

## ENVIRONMENTAL IMPACT ASSESSMENT



### PROPOSED KHOMASDAL EXT 17-18 & ERF 2131 TOWNSHIP TOWNSHIP DEVELOPMENT PROJECT WINDHOEK

JANUARY 2022

#### CONSULTANT:

**MATRIX CONSULTING SERVICES**  
P.O. Box 25824 Windhoek  
Tel: +264-61-224197  
Fax: +264-61-212165



#### PROPONENT:

**City of Windhoek**  
P.O. Box 59, Windhoek  
Tel: +264 61 290 2690



## **EXECUTIVE SUMMARY**

City of Windhoek is proposing to develop Khomasdal Ext 17-18 & ERF2131 Township in Windhoek, Khomas region. The area under planning is located on Portion RE/FARM 466 of Windhoek Townlands and it is thus zoned "Undetermined". The Khomasdal Ext 17-18 & ERF 2131 Township Area measures approximately 44 ha and is thus large enough to be divided into several ervens (residential, municipal, business, institutional, streets and public open spaces).

The Environmental Management Act No.7 of 2007 stipulates that township developments be subjected to Environmental Impact Assessments (EIA). Matrix Consulting Services, an independent consultant, has been appointed by City of Windhoek to undertake an Environmental Impact Assessment on the development/servicing of Khomasdal Ext 17-18 & ERF 2131 Township, in Windhoek.

According to City of Windhoek Environmental Structure Plan of 2004:

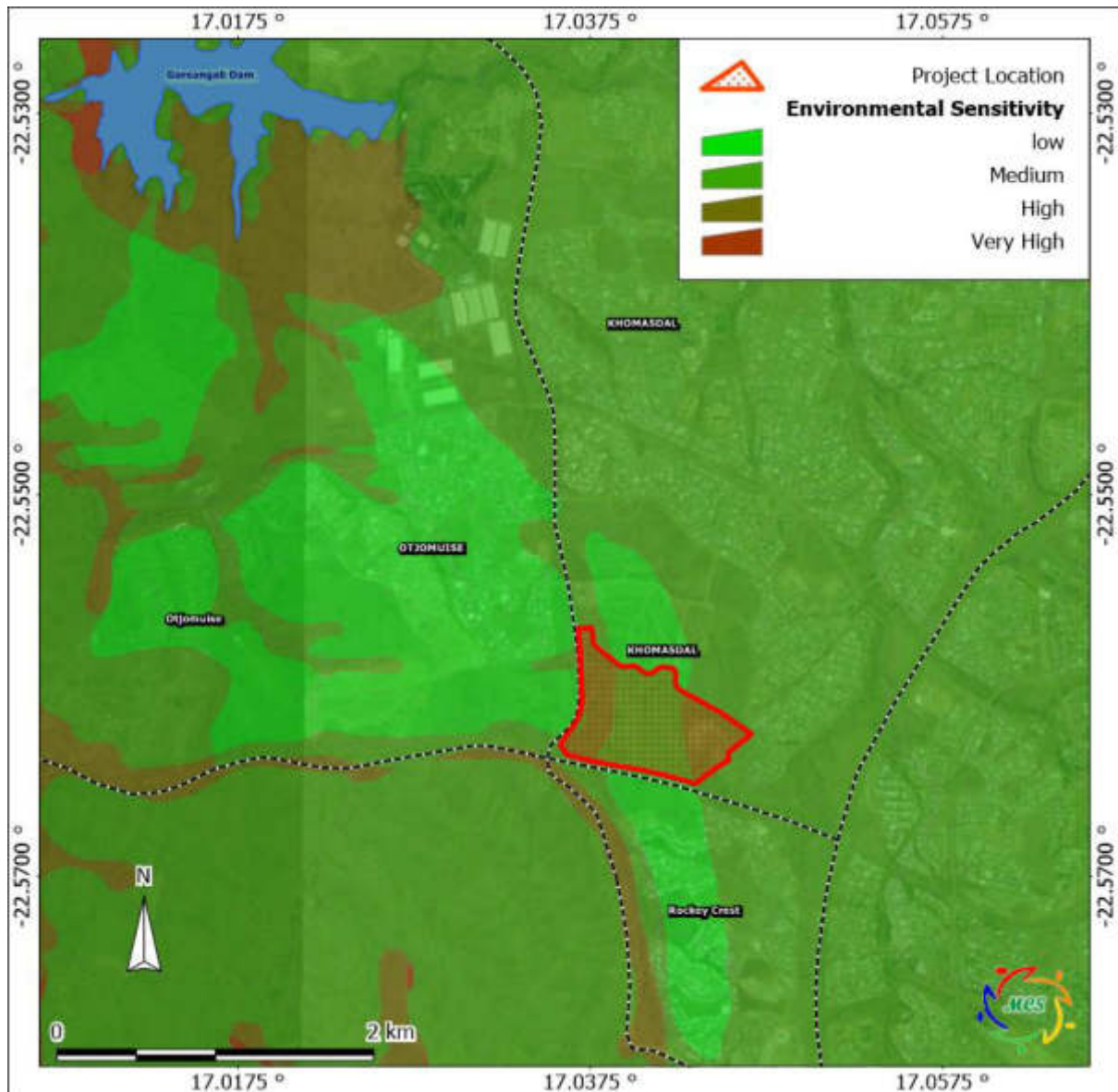
The control zones are based upon the following;

- The critical sensitivity of the southern Windhoek aquifer.
- The sensitivity of the catchment of the Goreangab Dam, and surface water resources, including rivers and streams throughout Windhoek.
- The sensitivity of the environment or a specific critical environmental component.
- The relative importance of the 'sense of place' or the specific character of Windhoek determined through resident participation, which includes topography and landscape quality as well as cultural / historical resources.
- The need to protect open space in Windhoek, which includes the river and aquatic systems, as well as the ridgelines, hills and mountains, and natural areas surrounding the city.
- The need to protect, manage and conserve sensitive natural vegetation cover

The study area falls within low environmental sensitivity zone, and some parts fall within the medium sensitive zones. This means that the environmental consequences of the proposed development in that area can be significant in



some parts of the area, and needs careful environmental management to prevent pollution to the Goreangab dam and its catchment. Part of the study area falls under the Medium Environmental Control Zone and as such no wet industries development is intended for that area.



**Figure 1. Environmental control zones**

All known environmental and social risks can be minimised and managed through implementing preventative measures and sound management systems. It is recommended that environmental performance be monitored regularly to ensure compliance and that corrective measures be taken if necessary. It is also recommended that this information be made available to the surrounding communities on a regular basis.

In general, the Khomasdal Ext 17-18 & ERF 2131 township project would pose limited environmental risks, provided the EMP for the activity is used properly

during planning, construction and operational phase. Due to the occurrence of faults within the study area and proximity to Goreangab Dam catchment area, the consultant recommends that no wet industries should be approved for this area. No potentially polluted liquid waste generating industries shall be placed within Khomasdal Ext 17-18 & ERF 2131 Township. This area is only suitable for light/dry industries that do not produce polluted liquids in any form. The Environmental Management Plan should be used as an on-site tool during all phases of the Khomasdal Ext 17-18 & ERF 2131 Township project. Parties responsible for non-conformances of the EMP will be held responsible for any rehabilitation that may need to be undertaken.

Should the Khomasdal Ext 17-18 & ERF 2131 Township project be modified or extended to a different area, it is recommended that a different EIA be done for the probable new location or extension.



## TABLE OF CONTENTS

<b>1. BACKGROUND AND INTRODUCTION</b> .....	<b>7</b>
<b>2. TERMS OF REFERENCE</b> .....	<b>8</b>
<b>3. PROJECT INFORMATION</b> .....	<b>9</b>
3.1 Project Rationale.....	9
<b>4. KHOMASDAL EXT 17-18 &amp; ERF 2131 TOWNSHIP DEVELOPMENT ACTIVITIES</b> .....	<b>10</b>
<b>5. ENVIRONMENTAL STUDY REQUIREMENTS</b> .....	<b>13</b>
<b>6. DESCRIPTION OF ALTERNATIVES</b> .....	<b>13</b>
6.1 No-Go Alternative.....	13
6.2 Site Alternative.....	14
<b>7. SCOPE OF THE EIA</b> .....	<b>14</b>
<b>8. METHODOLOGY</b> .....	<b>15</b>
<b>9. STATUTORY REQUIREMENTS</b> .....	<b>15</b>
9.1 National Legislative Requirements.....	15
9.2 International Conventions and Regulations.....	21
9.3 Municipal By-laws (City of Windhoek).....	21
<b>10. GENERAL ENVIRONMENT OF THE STUDY AREA</b> .....	<b>23</b>
10.1 Location and Land Use.....	23
10.2 Topography and Surface Water.....	24
10.3 Climate (Mandelsohn et al, 2003).....	25
10.4 Geology of the Area.....	25
10.5 Hydrogeological Characteristics.....	27
10.6 General Ecology.....	29
<b>11. SOCIO-ECONOMIC ASPECTS</b> .....	<b>35</b>
11.1 Regional Information.....	35
11.2 Windhoek.....	36
11.2.1 Economic Activities .....	36
11.2.2 Employment (Job Opportunities).....	36
11.2.3 Livelihoods.....	37
11.2.4 Tourism .....	37
11.2.5 In - Migration.....	37
11.2.6 HIV & Prostitution .....	37
11.2.7 Infrastructure & Increased Traffic.....	38
<b>12. STAKEHOLDER PARTICIPATION</b> .....	<b>38</b>
<b>13. ENVIRONMENTAL IMPACT EVALUATION</b> .....	<b>40</b>
13.1 Construction Activities of the Township Development.....	40
13.2 Operational Activities of Township Development.....	45
<b>14. CUMULATIVE IMPACTS</b> .....	<b>48</b>
<b>15. ENVIRONMENTAL MANAGEMENT PLAN</b> .....	<b>48</b>
<b>16. CONCLUSIONS</b> .....	<b>49</b>
<b>17. REFERENCES</b> .....	<b>50</b>

### List of Tables

<b>Table 1. Climate Data</b> .....	<b>25</b>
<b>Table 2. Stakeholders/I&amp;APS</b> .....	<b>39</b>
<b>Table 3. Impact Evaluation Criterion (DEAT 2006)</b> .....	<b>40</b>

### List of Figures

<b>Figure 1. Environmental control zones</b> .....	<b>2</b>
<b>Figure 2. Location Map</b> .....	<b>7</b>
<b>Figure 3: Proposed land-use for Khomasdal Ext 17-18 &amp; ERF 2131 Township</b> .....	<b>Error!</b>
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<b>Figure 4. Environmental Assessment Procedure of Namibia</b> .....	<b>19</b>
<b>Figure 5. Hydrogeological map</b> .....	<b>Error! Bookmark not defined.</b>
<b>Figure 6. Groundwater vulnerability map</b> .....	<b>28</b>
<b>Figure 7: Vegetation sensitivity zones</b> .....	<b>29</b>
<b>Figure 8: Environmental sensitivity zones</b> .....	<b>Error! Bookmark not defined.</b>



# Appendices

<b>Appendix A</b>	<b>Environmental management plan</b>
<b>Appendix B</b>	<b>Background Information Document</b>
<b>Appendix C</b>	<b>Newspaper adverts</b>
<b>Appendix D</b>	<b>Support from Relavent Authority</b>
<b>Appendix E</b>	<b>Lead Consultant Resume</b>

## List of Abbreviations

<b>EIA</b>	Environmental Impact Assessment
<b>EMP</b>	Environmental Management Plan
<b>EMA</b>	Environmental Management Act
<b>EMS</b>	Environmental Management System
<b>ESA</b>	Environmental Scoping Assessment
<b>I&amp;Aps</b>	Interested and Affected Parties
<b>PPPPs</b>	Projects, Plans, Programmes and Policies



## **PROJECT DETAILS**

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### **TEAM MEMBERS**

<b>NAME</b>	<b>POSITION</b>	<b>COMPANY</b>
<b>C. Ailonga</b>	Environmental Specialist	Matrix Consulting Services
<b>M. Shippiki</b>	Hydrogeologist	Matrix Consulting Services
<b>F. Kangombe</b>	Ecologist	Matrix Consulting Services - A
<b>E. Ndjembo</b>	Transport Engineer	Matrix Consulting Services - A

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**CLIENT:****City of Windhoek****P.O. Box 59 Windhoek****ENVIRONMENTAL  
CONSULTANT**

Matrix Consulting Services

Chris Ailonga (MSc Env Sci, Wits)

EIA Specialist

P.O. Box 25824 Windhoek

Tel: +264-61 224197

Fax: +264-61 212165

**REPORT STATUS:****FINAL**

# 1. BACKGROUND AND INTRODUCTION

City of Windhoek is proposing to develop Khomasdal Ext 17-18 & ERF 2131 Township in Windhoek, Khomas region. The proposed development is aimed at addressing the industrial erven shortage in the Windhoek. The proposed development will offer residential, business, institutional and municipal erven in the City. Bulk services and infrastructure that will be installed include provision of sewage, water, electricity, stormwater management and roads.

Matrix Consulting Services, an independent consultant, has been appointed by City of Windhoek to undertake an Environmental Impact Assessment (EIA) on the development/servicing of Khomasdal Ext 17-18 & ERF 2131 Township, in Windhoek.

An assessment will be undertaken to determine the potential impact of the development on the environment and to determine all safety, health and social impacts associated with the proposed development activities. The project location is indicated on the map.

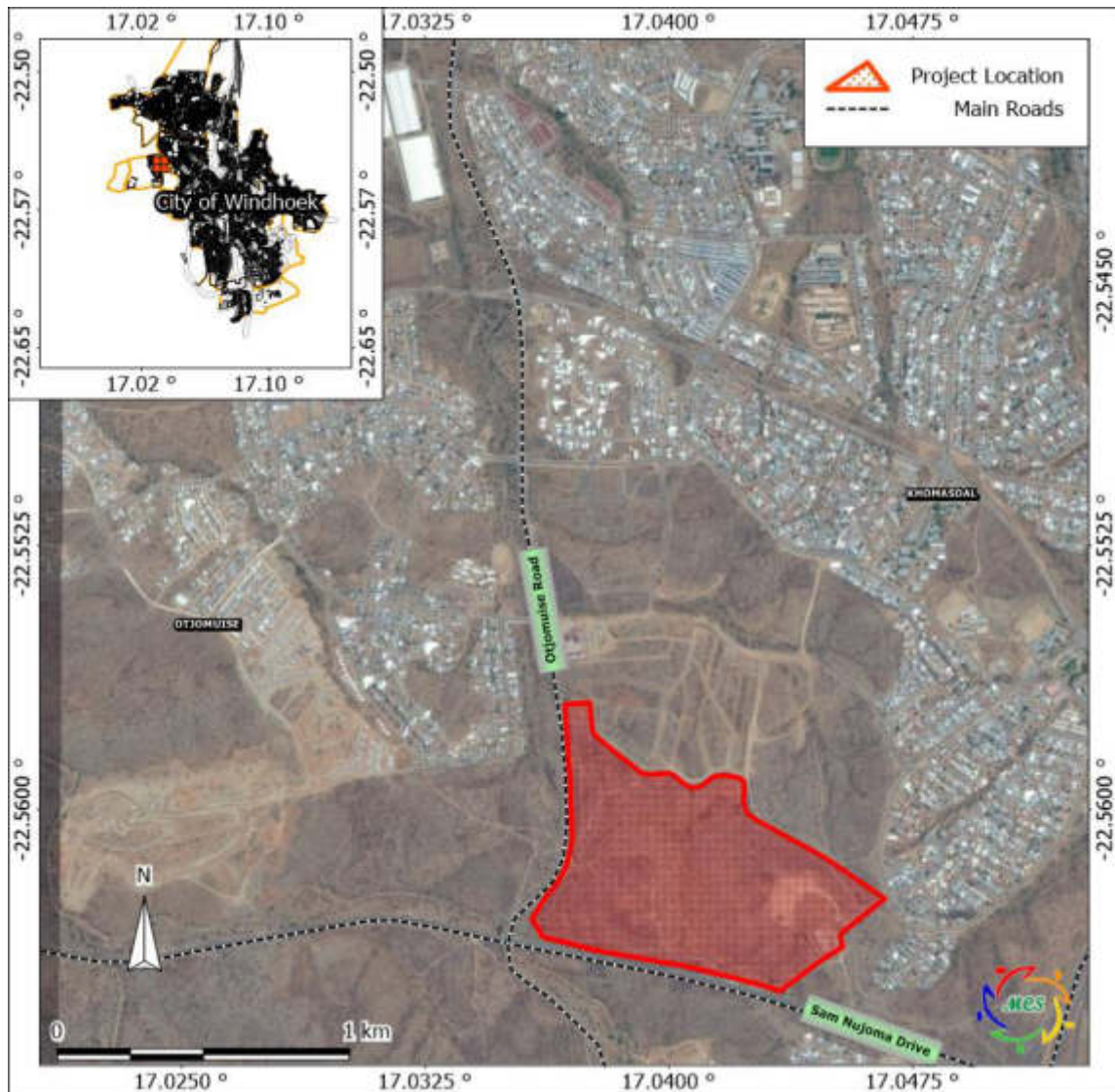


Figure 2. Location Map





The environmental assessment will be conducted as per Namibia's Environmental Assessment Policy and the Environmental Management Act No.7 of 2007 and its regulations of 2012.

The proposed Khomasdal Ext 17-18 & ERF 2131 Township is currently zoned "undetermined" in the Windhoek structure plan and City of Windhoek wishes to apply for the rezoning of this portion and formalise it into Khomasdal Ext 17-18 Township & ERF 2131, at the same time maintaining the sensitive environmental setting of the area e.g. vegetation, groundwater etc.

This project was registered with the Ministry of Environment and Tourism (MET), as per Environmental Management Act No 7 of 2007 requirements (see appendix I).

## **2. TERMS OF REFERENCE**

The City of Windhoek has commissioned an Environmental Impact Assessment (EIA) for the proposed Khomasdal Ext 17-18 & ERF 2131 Township project, in Windhoek. The proposed township is one of the development mechanism projects that the City of Windhoek has engaged to address serviced land scarcity in Windhoek. The Khomasdal Ext 17-18 & ERF 2131 Township is located at 22.56180°S; 17.03973°E.

Matrix Consulting Services was appointed to undertake the Environmental Impact Assessment of the proposed Khomasdal Ext 17-18 & ERF 2131 Township Development. This study will enable decision makers to make an informed decision regarding the development and make sure it does not have significant impacts and that they are mitigated. The environmental impact assessment was conducted to comply with the Environmental Assessment Policy (1995) and the Environmental Management Act (2007).



### 3. PROJECT INFORMATION

#### 3.1 Project Rationale

The City of Windhoek is currently experiencing a scarcity of developable land for industrial activities and therefore initiated this project to develop (service) Khomasdal Ext 17-18 & ERF 2131 Township.

The need for the project relate to the strategic plans of the City of Windhoek to avail serviced residential ervens.

The proposed project will provide residential to general residential, business, municipal, institutional, undetermined ervens, streets and public open spaces. Other associated land uses of Khomasdal Ext 17-18 & ERF 2131 are related to provision of bulk services. The development will therefore not only benefit the future occupants but also the surrounding areas by providing necessary facilities, potential jobs and social services that are not currently in place

The proposed development of the site is desirable from the perspective of availability and proximity of engineering bulk services, compatibility with adjacent projects, accessibility, size and locality. The proposed development will also create employment, both during the construction and operational phase.

The Khomasdal Ext 17-18 & ERF 2131 Township will consist of:

Type	Number of ervens
Business	2
Institutional	3
Public open spaces	3
General residential	10
Municipal	2
Residential	291

The Khomasdal Ext 17-18 & ERF 2131 Township will be serviced to ensure the provision of all municipal services, such as water, sewerage, roads and electricity.



### **Other Potential spin-offs from the development of Khomasdal Ext 17-18 & ERF 2131 Township:**

- ❖ Potential revenue generation from the sale of ervens by the City of Windhoek.
- ❖ Reduced serviced land scarcity in Windhoek. Creation of job opportunities, training and skills development during construction and operational phase. It is estimated that the new jobs will improve the livelihoods of the workers and their families. Given that the unemployment rate of 35 to 40% in the region, this in itself is regarded as a significant benefit to the socio-economic situation in the region (2001, Population and Housing Census, Khomas Region).
- ❖ Provision of housing and community facilities.
- ❖ Impact on health and safety of residents by developing Khomasdal Ext 17-18 & ERF 2131 Township.
- ❖ Change the sense of the place of the area from undeveloped townland to a formal township.
- ❖ Increase in economic opportunities in the area.
- ❖ General enhancement of the quality of life in the Khomas Region and the surrounding area, should the project be economically viable.

## **4. KHOMASDAL EXT 17-18 & ERF 2131 TOWNSHIP DEVELOPMENT ACTIVITIES**

### **4.1 Current land-use of Khomasdal Ext 17-18 & ERF 2131 Township**

The proposed site is not developed in any form; however the land has been earmarked for development over the years. The site is previously disturbed with the presence of powerline servitudes observed in the area. Evidence of sparsely pedestrian tracks and illegal waste dumping is also observed within the project area. Atleast 70% of the project site can be regarded natural with little obvious disturbance. Invader plants are visible on some parts of the project site, especially in areas of disturbance.



#### 4.2 Proposed land-use of Khomasdal Ext 17-18 & ERF 2131 Township

The proposed Khomasdal Ext 17-18 & ERF 2131 Township is planned to be within the existing Windhoek townlands. The proposed development is aimed at addressing industrial land scarcity in Windhoek. The proposed development will mainly offer residential ervens as well as other land-use type erven.

The proposed layout of the Khomasdal Ext 17-18 & ERF 2131 Township is illustrated in the map below.

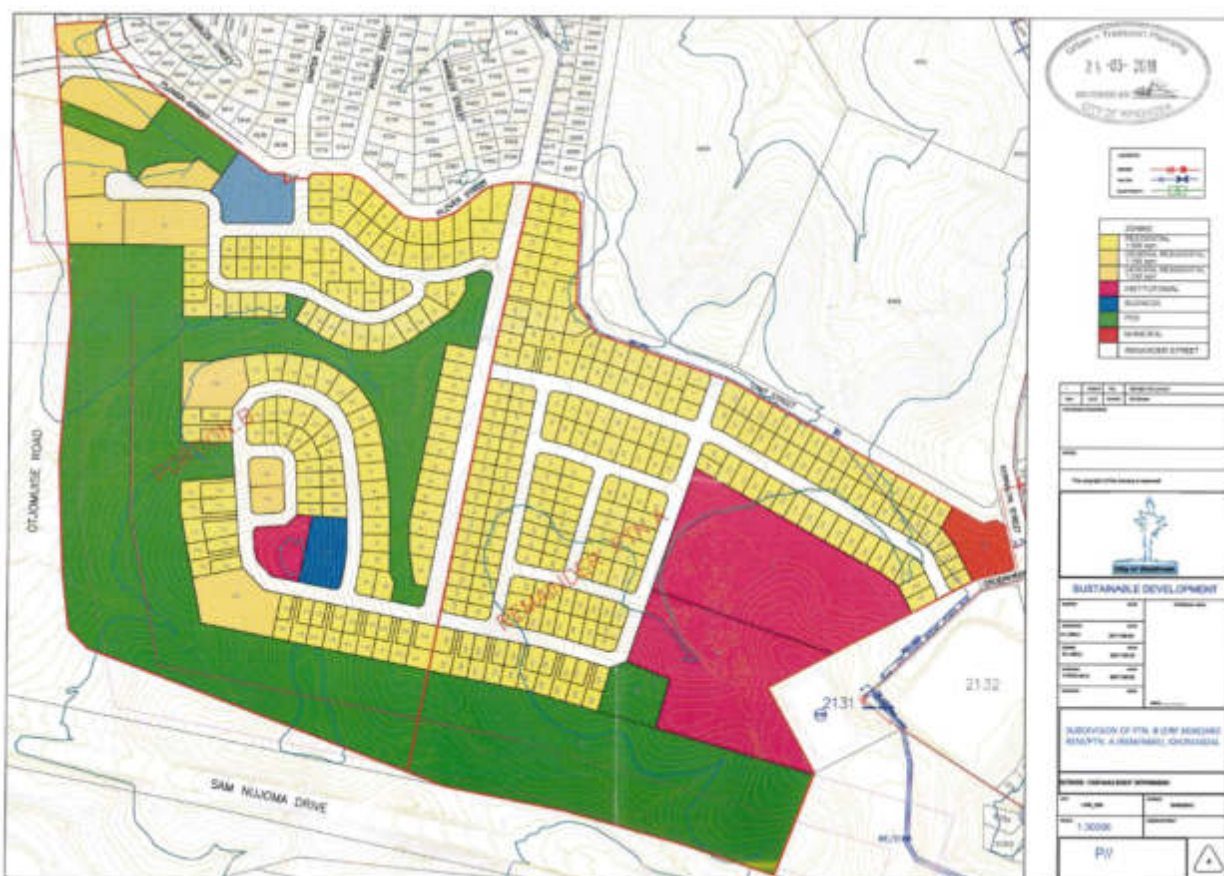


Figure 3. Proposed land-use for Khomasdal Ext 17-18 & ERF 2131 Township

The establishment of the proposed development requires the installation of supporting bulk services infrastructure, and will be serviced in accordance to City of Windhoek regulations. The bulk services required for the construction of the development will include the following:

**Sewage:** A full waterborne sewage system is proposed for all erven. Excavations for sewer pipelines will have the maximum depth of 2.8m. Sewage generated from the proposed development will be pumped to the Gammams Waster Water Treatment Works. The bulk sewer network has sufficient capacity to cope with the demand.



**Water:** City of Windhoek will provide the water for the proposed development from the existing Namwater/City of Windhoek reservoirs. Water will be provided by connecting to the existing bulk water main system that passes near the site, adjacent to the existing Otjomuise Township. Excavation for water pipelines will be  $\pm 1.2\text{m}$ , with soil cover of a minimum 600mm.

**Electricity (11kV):** The development will be supplied from the existing Nampower/City of Windhoek grid. Power will be connected to the ring network via underground cables from the Substations. Excavations for electrical cables will be  $\pm 1.0\text{m}$ , with soil cover of a minimum 600mm.

**Storm water Management System:** Provision will be made for stormwater attenuation to reduce the increase in stormwater run-off resulting from the development compared to pre-development phase, through the incorporation of storm water management system.

**Roads:** The existing road network will be utilised to service the proposed development. Street roads and access roads to Khomasdal Ext 17-18 & ERF 2131 Township will be upgraded. Khomasdal Ext 17-18 & ERF 2131 Township will be accessed via the existing Winnie Madikizela Mandela Road; and existing roads like Plover Street, Kransswael Street, Kronlien Street and Woodpecker Street.

**Waste:** City of Windhoek waste removal contractors (e.g. Rent a Drum, Kleen Tek, Salute Trading etc) will remove domestic waste.

#### **4.2.1 Construction Activities**

- Transporting relevant building material and equipment.
- Installation of associated electrical supply cables.
- Installation of associated water pipelines.
- Installation of associated sewer lines.
- Installation of storm water management system
- Roads construction
- Land clearance

#### **4.2.2 Operational Activities**

Operation and maintenance of the sewer, water, electrical services and roads.

#### **4.2.3 Housing**

Should a construction camp be necessary, it should be located in such a way that it does not pose a risk to the public.

#### **4.2.4 Access Road**



The site will be accessed using existing Winnie Madikizela Mandela Road; and existing roads like Plover Street, Kransswael Street, Kronlien Street and Woodpecker Street.

#### **4.2.5 Waste Management**

All waste generated at the site will be collected in plastic or steel drums and removed from site and disposed at Kupferberg Landfill. Hazardous waste will be collected and stored separately, and disposed off at an appropriate hazardous waste cell at Kupferberg landfill.

Mobile toilets will be used by the contractors during the construction phase respectively. The waste must be disposed off at Gammams Waste Water Treatment Works.

#### **4.2.6 Site Rehabilitation**

After the construction is complete, the site will be cleared of all chemical and hydrocarbon spills, pipe cuttings, electrical cuttings etc. Excavations for bulk services will need to be covered and levelled properly.

### **5. ENVIRONMENTAL STUDY REQUIREMENTS**

According to the Environmental Management Act no. 7 of 2007 the proponent requires an environmental clearance certificate from the Ministry of Environment and Tourism (Department of Environmental Affairs) to undertake the development of Khomasdal Ext 17-18 & ERF 2131 Township from an undeveloped townland to a township, in Khomas Region. The rezoning of land from open space to any other land use is a '*listed activity*' as per the *List of Activities requiring Environmental Clearance* (Government Notice 29 of 6 February 2012) and accordingly requires an Environmental Impact Assessment (EIA) to be conducted.

The environmental clearance certificate means that the Ministry of Environment and Tourism is satisfied that the activity in question will not have an unduly negative impact on the environment. It may set conditions for the activity to prevent or to minimise harmful impacts on the environment.

### **6. DESCRIPTION OF ALTERNATIVES**

#### **6.1 No-Go Alternative**

The no-development alternative is the option of not going ahead with the development of Khomasdal Ext 17-18 & ERF 2131 Township. The no-go alternative will keep the site in its current state. This alternative is undesirable in terms of the current serviced erven scarcity in Windhoek. The site is vacant, and earmarked for a township development. The nearby Otjomuise informal settlement in the area is growing rapidly. Should the site remain in this state, the



possibility and threat of illegal land invasions and squatters settling on the site will persist.

Should the proposed activity not take place, the region could be deprived of developing a township, and ultimately reducing the residential ervens demand in Windhoek. The proposed activity could yield positive results that could provide an alternative serviced land to Windhoek. The No-go option will not be a viable alternative at this stage.

## **6.2 Site Alternative**

The project site is ideal for township development as all existing surrounding land use is residential. The land to be developed is owned by the City of Windhoek, and local authority wants to provide serviced land to address the scarcity of serviced land in Windhoek. The local authority wants to provide serviced land to address the scarcity of serviced residential land in Windhoek. The area is in close proximity to existing engineering services which has capacity to support the proposed township development.

The area holds less ecological and conservation values, and the best option chosen is to develop Khomasdal Ext 17-18 & ERF 2131 Township with strict consideration of environmental aspects. Mitigation measures on impacts likely to be caused by the activity are incorporated in the planning and execution of the activity. The proposed township development is expected to have minimal impact on the environment; hence the environmental footprint of this activity is expected to be minimal.

## **7. SCOPE OF THE EIA**

The scope of the EIA aims at identifying and evaluating potential environmental impacts emanating from the proposed development of Khomasdal Ext 17-18 & ERF 2131 Township. Relevant data have been compiled by making use of secondary sources and from project site visits. Potential environmental impacts and associated social impacts are identified and addressed in this report.

The environmental impact assessment report aims to address the following:

- a) Identification of potential positive and negative environmental impacts.
- b) Provide sufficient information to determine if the proposed project will result in significant adverse impacts.
- c) Identification of “hotspots” which should be avoided where possible due to the significance of impacts.
- d) Evaluation of the nature and extent of potential environmental impacts.



- e) Identify a range of management actions which could mitigate the potential adverse impacts to required levels.
- f) Provide sufficient information to the Ministry of Environment to make an informed decision regarding the proposed project.
- g) Present and incorporate comments made by stakeholders.

## 8. METHODOLOGY

The following methods were used to investigate the potential impacts on the social and natural environment that could arise from the development of the Khomasdal Ext 17-18 & ERF 2131 Township in Windhoek:

- a) Information about the site and its surroundings was obtained from existing secondary information and site visits.
- b) Neighbours, interested and affected Parties (I&APs) were consulted and their views, comments and opinions are presented in this report.

## 9. STATUTORY REQUIREMENTS

### 9.1 National Legislative Requirements

The EIA process is undertaken in terms of Namibia's Environmental Management Act no. 7 of 2007 and the Environmental Assessment Policy of 1995, which stipulates activities that may have significant impacts on the environment. Listed activities require the authorisation from the Ministry of Environment and Tourism (DEA). Section 32 of the Environmental Management Act requires that an application for an environmental clearance certificate be made for the listed activities. The following environmental legislations are relevant to this project:

#### ➤ *The Namibian Constitution*

The Namibian Constitution has a section on principles of state policy. These principles cannot be enforced by the courts in the same way as other sections of the Constitution. But they are intended to guide the Government in making laws which can be enforced.

The Constitution clearly indicates that the state shall actively promote and maintain the welfare of the people by adopting policies aimed at management of ecosystems, essential ecological processes and biological diversity of Namibia for the benefit of all Namibians, both present and future.

#### ➤ *Environmental Management Act No.7 of 2007*

This Act provides a list of projects requiring an Environmental Assessment. It aims to promote the sustainable management of the environment and the use of natural resources and to provide for a process of assessment and





control of activities which may have significant effects on the environment; and to provide for incidental matters.

The Act defines the term “*environment*” as an interconnected system of natural and human-made elements such as land, water and air; all living organisms and matter arising from nature, cultural, historical, artistic, economic and social heritage and values.

The Environmental Management Act has three main purposes:

- (a) to make sure that people consider the impact of activities on the environment carefully and in good time.
- (b) to make sure that all interested or affected people have a chance to participate in environmental assessments
- (c) to make sure that the findings of environmental assessments are considered before any decisions are made about activities which might affect the environment

The rezoning of land from open space to any other land use is a ‘*listed activity*’ as per the *List of Activities requiring Environmental Clearance* (Government Notice 29 of 6 February 2012) and accordingly requires an Environmental Impact Assessment (EIA) to be conducted.

*Line Ministry: Ministry of Environment, Forestry and Tourism*  
(Contact: Timo Mufeti, Tel: 061-284 2715)

#### ➤ ***Atmosphere Pollution Prevention Ordinance (1976)***

This Ordinance generally provides for the prevention of the pollution of the atmosphere. Part IV of this ordinance deals with dust control. The Ordinance is clear in requiring that any person carrying out an industrial process which is liable to cause a nuisance to persons residing in the vicinity or to cause dust pollution to the atmosphere, shall take the prescribed steps or, where no steps have been prescribed, to adopt the best practicable means for preventing such dust from becoming dispersed and causing a nuisance.

*Line Ministry: Ministry of Environment, Forestry and Tourism*  
(Contact: Timo Mufeti, Tel: 061-284 2715)

#### ➤ ***Water Resources Management Act of Namibia (2004)***

This act repealed the existing South African Water Act No.54 of 1956 which was used by Namibia. This Act ensures that Namibia’s water resources are managed, developed, protected, conserved and used in ways which are consistent with fundamental principles depicted in section 3 of this Act. Part IX regulates the control and protection of groundwater resources. Part XI, titled Water Pollution Control, regulates discharge of effluent by permit. Thus developers are required to efficiently plan for sewage disposal.

*Line Ministry: Ministry of Agriculture, Water Affairs and Forestry*



(Contact: Ms Elizabeth Amagola, Tel: 061-208 7719)

➤ **Water Act No.54 of 1956**

This Act provides for Constitutional demands including pollution prevention, ecological and resource conservation and sustainable utilisation. In terms of this Act, all water resources are the property of the State and the EIA process is used as a fundamental management tool.

A water resource includes a watercourse, surface water, estuary or aquifer, and, where relevant, its bed and banks. A watercourse means a river or spring; a natural channel in which water flows regularly or intermittently; a wetland lake or dam, into which or from which water flows; and any collection of water that the Minister may declare to be a watercourse. Permits are required in terms of the Act for the undertaking of the following activities relevant to the proposed project:

- ✓ Discharge of waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit in terms of Section 21 (f); and
- ✓ Disposal of waste in a manner that may detrimentally impact on a water resource in terms of Section 21 (g).

*Line Ministry: Ministry of Agriculture, Water Affairs and Forestry*

(Contact: Ms Elizabeth Amagola, Tel: 061-208 7719)

➤ **The Draft Wetland Policy (1993)**

Requires that any wetlands and its associated hydrological functions form a part, to be managed in such a way that their biodiversity, vital ecological functions and life support systems are protected for the benefit of present and future generations.

*Line Ministry: Ministry of Environment, Forestry and Tourism*

(Contact: Timo Mufeti, Tel: 061-284 2715)

➤ **Environmental Assessment Policy of Namibia (1995)**

Environmental Assessments (EA's) seek to ensure that the environmental consequences of development projects and policies are considered, understood and incorporated into the planning process, and that the term ENVIRONMENT (in the context of IEM and EA's) is broadly interpreted to include biophysical, social, economic, cultural, historical and political components.

All listed policies, programmes and projects, whether initiated by the government or the private sector, should be subjected to the established EA procedure as set out in Figure 2.

*Line Ministry: Ministry of Environment, Forestry and Tourism*

(Contact: Timo Mufeti, Tel: 061-284 2715)



➤ **Forestry Act (No.12 of 2001)**

This Act makes provision for the protection various plant species. Harvesting permits are required from the Directorate of Forestry to clear certain protected vegetation species from the site.

*Line Ministry: Ministry of Agriculture, Water Affairs and Forestry*

*(Contact: Andries Uugwanga, Tel: 062-501925)*

➤ **Townships and Division of Land Amendment Act (No.28 of 1992)**

Article (l) of this Act stipulates that “Whenever any area of land constitutes, by reason of its situation, a portion of an approved township, or adjoins an approved township, the Executive Committee may, by proclamation notice in the Gazette and after consultation with the Board, extend the boundaries of the township to include such an area”. Thus the new township needs to be approved by the Namibian Planning Advisory Board and the Townships Board.

*Line Ministry: Ministry of Regional and Local Government, Housing and Rural Development*

*(Contact: Mr. Erastus Negonga, Tel: 061-297 2911)*

➤ **Sewerage and Drainage Regulations (amendments) Local authorities act, section 23 (1992).**

The regulations make provision for proper construction of pipelines in drainage lines. The regulations also stipulate the prevention of pollution and environmental damage caused by improper construction of sewerage and water pipelines in drainage lines.

*Line Ministry: Ministry of Regional and Local Government, Housing and Rural Development*

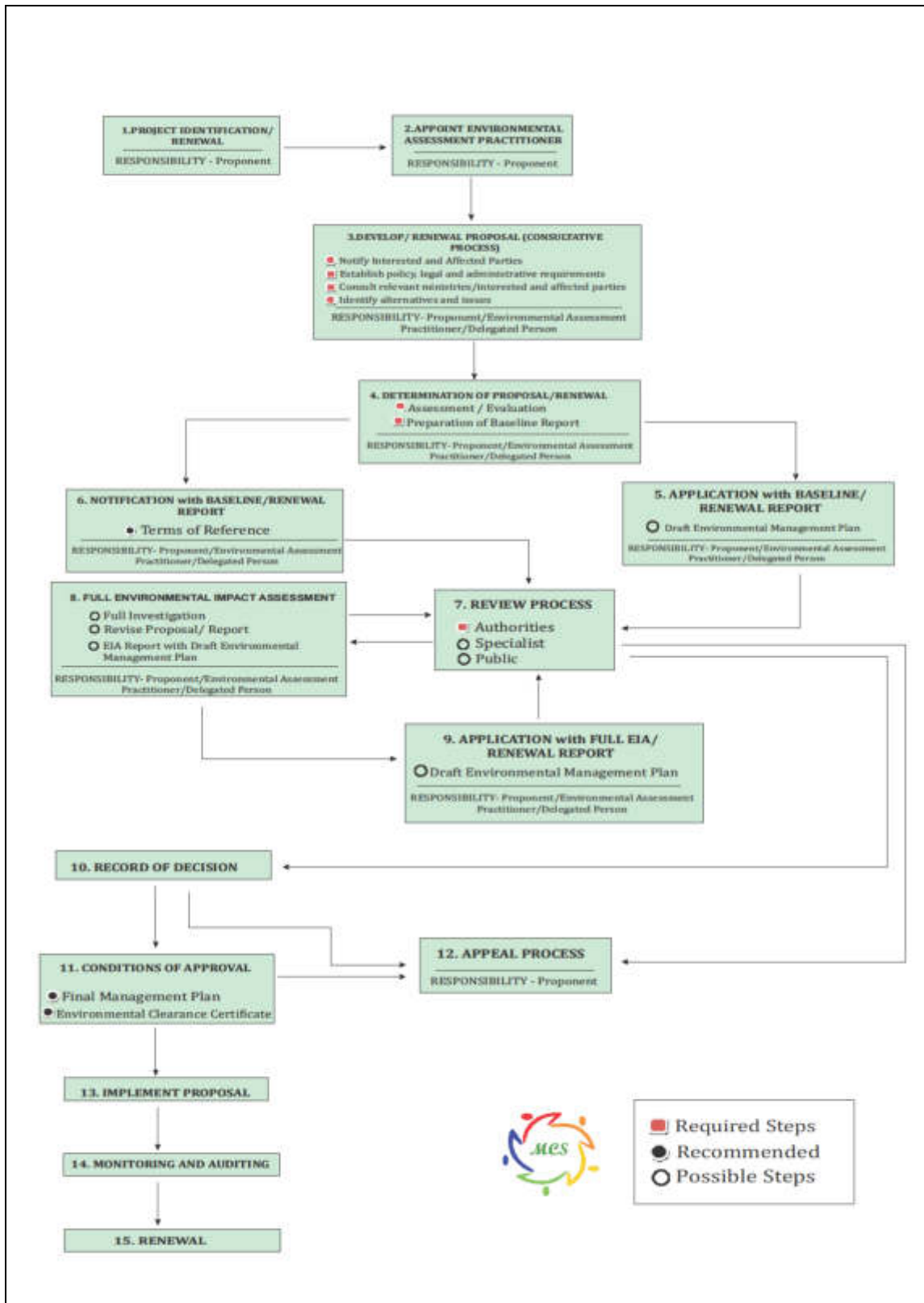
*(Contact: Mr. Erastus Negonga, Tel: 061-297 2911)*

➤ **Soil Conservation Act (No.76 of 1969).**

The Act advocates for the Prevention and combating of soil erosion, conservation, improvement and manner of use of soil and vegetation, and protection of water resources.

*(Contact: Timo Mufeti, Tel: 061-284 2715)*





**Figure 4. Environmental Assessment Procedure of Namibia** (Adapted from the Environmental Assessment Policy of 1995)

➤ ***Draft Pollution Control and Waste Management Bill***

The proposed project of the Khomasdal Ext 17-18 & ERF 2131 Township Development, only applies to Parts 2 and 7 of the Bill.

Part 2 stipulates that no person shall discharge or cause to be discharged any pollutant to the air from a process except under and in accordance with the provisions of an air pollution licence issued under section 23. It further provides for procedures to be followed in licence application, fees to be paid and required terms of conditions for air pollution licences.

Part 7 states that any person who sells, stores, transports or uses any hazardous substances or products containing hazardous substances shall notify the competent authority, in accordance with sub-section (2), of the presence and quantity of those substances.

➤ ***Hazardous Substances Ordinance No. 14 of 1974***

The Ordinance applies to the manufacture, sale, use, disposal and dumping of hazardous substances, as well as their import and export and is administered by the Minister of Health and Social Welfare. Its primary purpose is to prevent hazardous substances from causing injury, ill-health or the death of human beings.

*Line Ministry: Ministry of Health and Social Services*

➤ ***Public Health Act 36 of 1919 and Subsequent Amendments***

The Act, with emphasis to Section 119 prohibits the presence of nuisance on any land occupied. The term nuisance for the purpose of this EIA is specifically relevant specified, where relevant in Section 122 as follows:

- ✓ any dwelling or premises which is or are of such construction as to be injurious or dangerous to health or which is or are liable to favour the spread of any infectious disease;
- ✓ any area of land kept or permitted to remain in such a state as to be offensive, or liable to cause any infectious, communicable or preventable disease or injury or danger to health; or
- ✓ any other condition whatever which is offensive, injurious or dangerous to health.

Potential impacts associated with the development of Khomasdal Ext 17-18 & ERF 2131 Township project are expected to include dust, air quality impacts, noise nuisance and smoke emissions.

*Line Ministry: Ministry of Health and Social Services*

➤ ***National Heritage Act (No.76 of 1969).***

The Act calls for the protection and conservation of heritage resources and artefacts. Should any archaeological material, e.g. old weapons, coins, bones found during the construction, work should stop immediately and the National Heritage Council of Namibia must be informed as soon as possible. The Heritage Council will then decide to clear the area or decide to conserve the site or material.

*(Contact: Rev. Salomon April, Tel: 061-244375, National Heritage Council of Namibia)*



## **9.2 International Conventions and Regulations**

Article 144 of the Namibian Constitution states that “the general rules of public international law and international agreements binding upon Namibia form part of the law of Namibia.” This means that all the international agreements that Namibia signed become part of the law of our country. These laws and/or agreements are:

- ✓ Convention on Biological Diversity, 1992;
- ✓ United Nations Framework Convention on Climate Change, 1992;
- ✓ Kyoto Protocol on the Framework Convention on Climate Change, 1998;
- ✓ Stockholm Convention of Persistent Organic Pollutants, 2001.

## **9.3 Municipal By-laws (City of Windhoek)**

### **➤ Groundwater Protection Regulations**

The protection of the groundwater resource in a development scenario should be provided for, in a formally documented and legislated EIA process. The EIA process or procedure provides for the institutionalization of decision making regarding the potential impact development activities will have on the receiving natural, social and cultural environment. Further, the process makes provision for the identification and listing of types of activities that would be required to follow the process before any authorisation will be given.

*(Contact: Mr. Olavi Makuti, Tel: 061-290 3518, e-mail: olm@windhoekcc.org.na)*

### **➤ Environmental Structure Plan and Policy**

The Environmental Structural Plan & Policy provides sufficient information for those making decisions regarding a particular development so that proper environmental evaluation can be conducted, which is appropriate to the scale of the proposed project and the risks to the environment which it may pose.

It establishes where there are potential and real problem environmental areas, such as land degradation, pollution, indiscriminate resource use etc. The Environmental Structural Plan is the baseline upon which the policy is established.

*(Contact: Mr. Olavi Makuti, Tel: 061-290 3518, e-mail: olm@windhoekcc.org.na)*

### **➤ Windhoek Town Planning Scheme (2005)**

The Town Planning Scheme enables the comprehensive management of all property and related public sector functions across the city. The guidelines on the Conservation of Natural Resources should be addressed in this project.



➤ ***Policy for the Distribution and Future Usage of Public Open Spaces in Windhoek (2000)***

The policy provides guidelines for the establishment of open spaces and green corridors along drainage lines and sensitive environmental areas. The policy advocates for the provision of land for the explicit development of open spaces.

*(Contact: Mr. Olavi Makuti, Tel: 061-290 3518, e-mail: olm@windhoekcc.org.na)*



## 10. GENERAL ENVIRONMENT OF THE STUDY AREA

This section lists the most important environmental characteristics of the study area and provides a statement on the potential environmental impacts on each.

### 10.1 Location and Land Use

The proposed Khomasdal Ext 17-18 & ERF 2131 Township (22.56180°S; 17.03973°E) is located at the corner of Sam Nujoma Drive and Winnie Madikizela Mandela Road (Otjomuise Road), on the western outskirts of Windhoek. See Figure 1.

The site is located within a partially developed townlands zoned area, as per local municipal regulations, which is surrounded by Otjomuise extension 1 on the western side, the northern part of Khomasdal Ext 17-18 & ERF 2131 Township borders Khomasdal Ext 16 while Acacia Suburb lies on the eastern side. South of Khomasdal Ext 17-18 & ERF 2131 Township is Rocky Crest Extension 1.







*North*



*South*

## **10.2 Topography and Surface Water**

The landscape of the Khomasdal Ext 17-18 & ERF 2131 Township is classified as being in the Khomas Hochland Plateau region, which is characterized by rolling hills in the west with many summit heights equivalent reflecting older land surfaces.

The township development lies in the Goreangab Dam catchment situated approximately 4km north-west of the project location. Drainage is well developed and runoff takes place through small streams (rivers) running through the site. These streams eventually join and flow towards the north into the Goreangab Dam.

Care should be taken to avoid contamination of these surface water bodies in the area, especially during rainy seasons, as water in these bodies is used for aquifer recharge and water in the dam is reclaimed.

### 10.3 *Climate* (Mandelsohn et al, 2003)

**Table 1. Climate Data**

Classification of climate:	Sub-tropical area
Average rainfall:	Rainfall in the area is averaged to be between 300-350 mm per year.
Variation in rainfall:	Variation in rainfall is averaged to be 30-40 % per year.
Average evaporation:	Evaporation in the area is averaged to be between 2100-2240 mm per year.
Precipitation:	The highest summer rains are experienced in February.
Water Deficit:	Water deficit in the area is averaged to be between 1700- 1900mm per year.
Temperatures:	Temperatures in the area are averaged to be between 18- 20 °C per year.
Wind direction:	Wind directions in the area are predominantly easterly winds.

### 10.4 *Geology of the Area*

The project location has a very thin soil cover (less than 30cm). The general geology or rock formations underlying the township development consists mainly of mica rich schist and quartz rich schist (quartzite), containing quartz veins. All of the intersected rock formations belong to the Kuiseb formation of the Damara Sequence. In this area the formation is known to have a dip of  $\pm 30^\circ$  in a northerly direction. The schist has an abundance of layers (schistosity) consisting of quartz rich and mica rich layers. Some major Amphibolite intrusions are also present in the area.



*Surface geology*



North-southerly faults are common in the area, with a large north-south striking fault observed on the western part of the project location. The Aretaragas River situated about 3.6km west of the project location also follows a major north-south striking fault. The Amphibolite intrusions in the area are clearly affected by the faults and large displacements are visible.

The overall complex geology of the Windhoek area is a result of numerous folding and faulting episodes, including thrusting and rifting, to which the area has been subjected. Metasedimentary rocks of the Swakop Group, which is part of the Damara Sequence, constitute the Windhoek Aquifer.

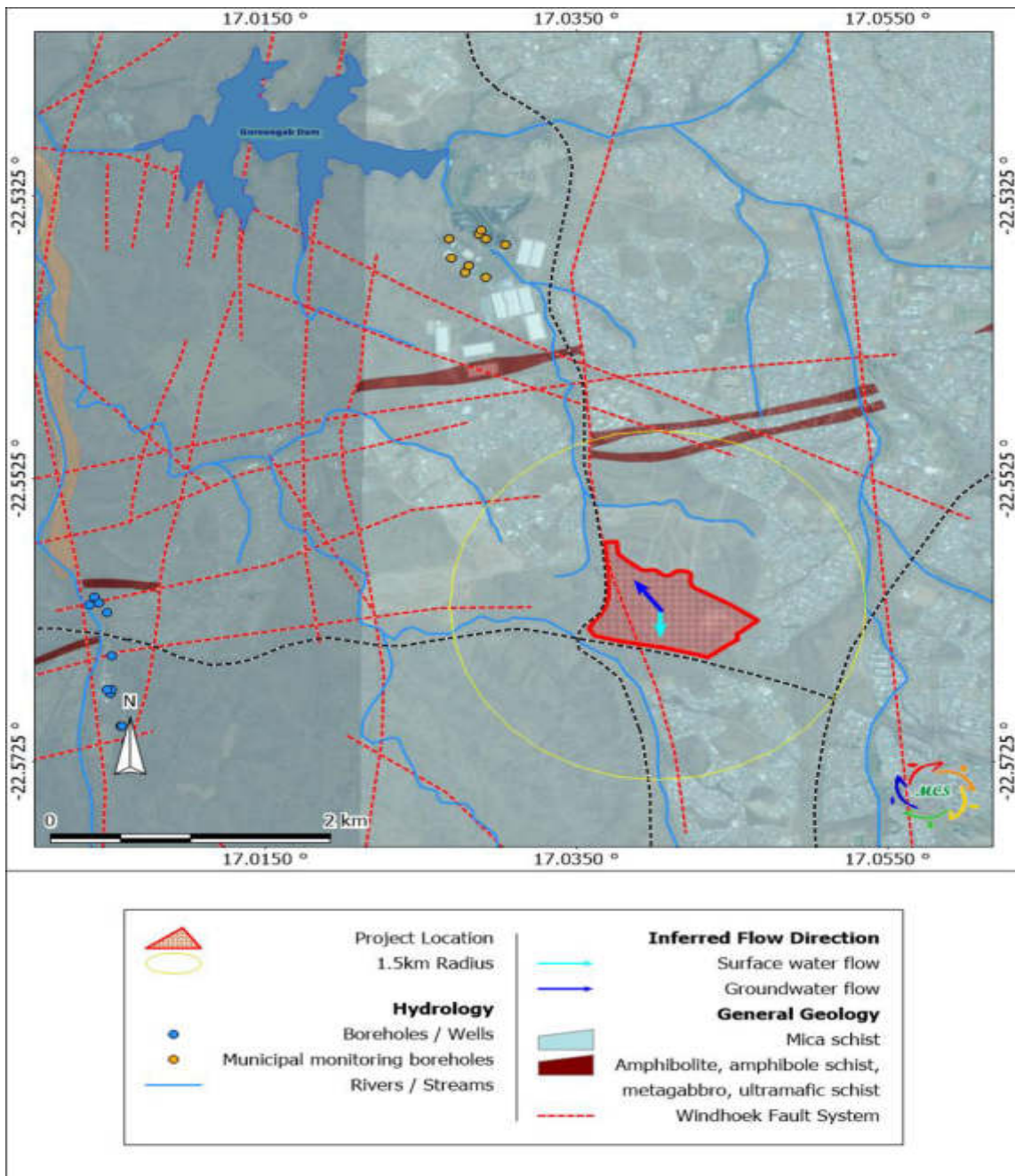


Figure 5. Geohydrological map



### **10.5 Hydrogeological Characteristics**

A number of north-southerly striking faults and joints found in Windhoek form the major underground water conduits of the Windhoek Aquifer and hence determine the conditions of the aquifer. Secondary porosity giving rise to high aquifer transmissivity is best developed in faults with post-hydrothermal alteration brecciation in quartzitic environments. Moreover host rock fracturing along fault planes results in better development of secondary porosity in quartzite compared to schistose terrain such that the aquifer reaches its maximum potential in this type of setting. The sedimentary formations of the study area strike in an east-north-easterly direction and dip 25-30° to the north-northwest.

The micaceous schist found in the area, is prone to plastic deformation rather than brittle, fracturing, exhibiting significantly lower secondary porosity and permeability. Groundwater flow would be mostly through secondary porosity along fractures, faults and other geological structures present within the underlying formations in the area.

On the other hand, the more competent quartzite is subject to brittle deformation and thus exhibits relatively high secondary porosity and permeability due to jointing. The joints of the quartzite show evidence of fluid flow by carbonate and quartz infill and iron staining.

Groundwater flow from the site is expected from south to north, towards the Goreangab Dam. According to the City of Windhoek, Namwater, Department of Water Affairs (DWA) and MCS database approximately no boreholes are present within a 1.5km radius of the project location respectively. Groundwater table in the area is expected to be less than 25m below ground level (mbgl).

Groundwater belongs to the government of the Republic of Namibia; hence the area does fall within the Windhoek-Gobabis Subterranean Water Control Area, of Government Notice 189 of 6 February 1970. This means that Government controls groundwater usage in this area.

The study area was mapped during the Groundwater Vulnerability Study of the Windhoek Aquifer (City of Windhoek, 2000) as having as having low to moderate aquifer pollution vulnerability. Geological features may form preferential pathways to the underlying aquifer. These geological features might form preferential pathways to the underlying aquifer..



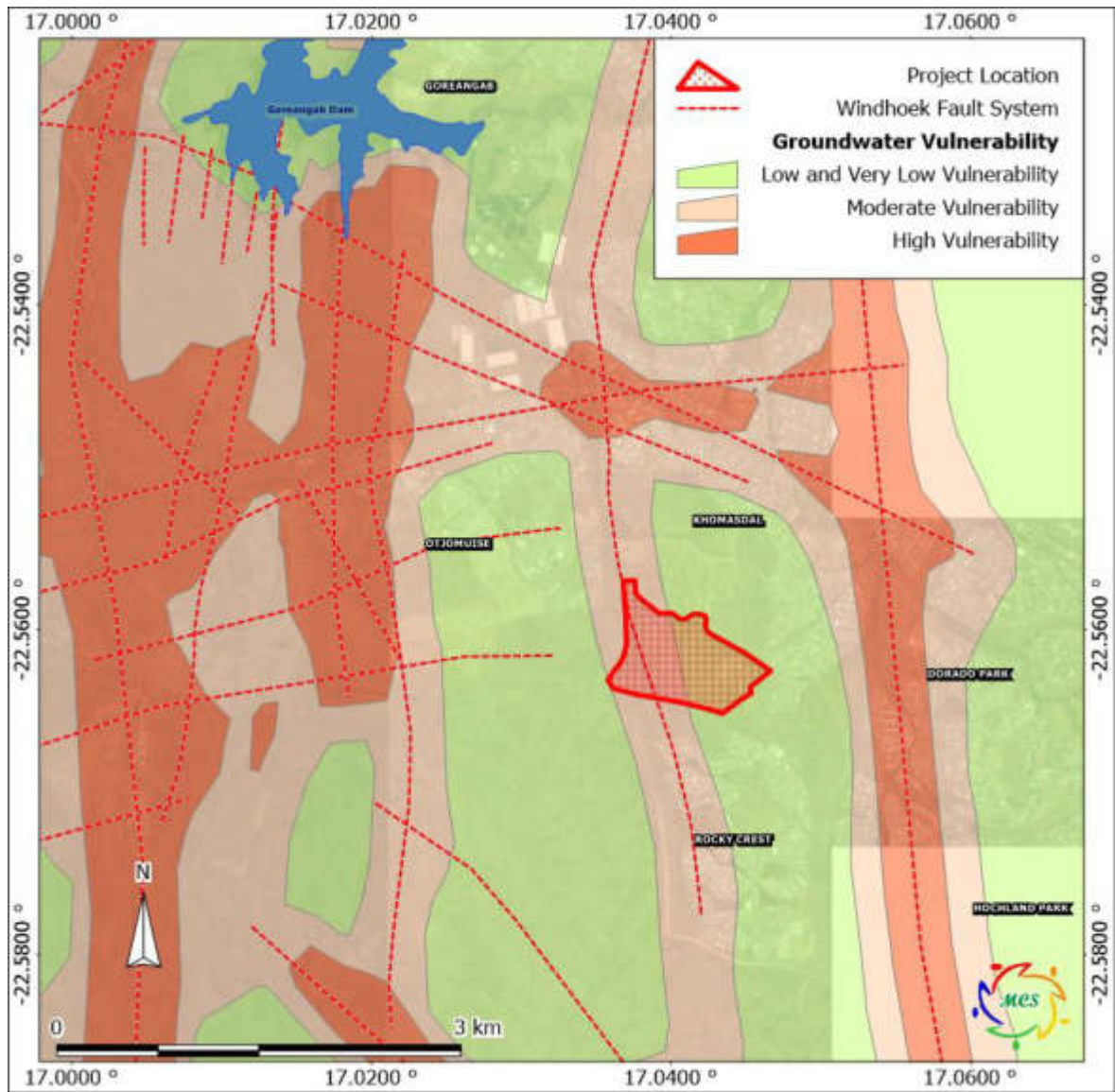


Figure 6. Hydrogeological map

## 10.6 General Ecology

The site falls within the Tree and Shrub savanna biome, which is characterised by high shrubland and thorn bush type vegetation. The vegetation structure type is classified as Dense Shrubland. According to the Windhoek's environmental structure plan, the proposed township lies within medium vegetation sensitive zone, with some part of the area in the north-east being a low sensitive zone.

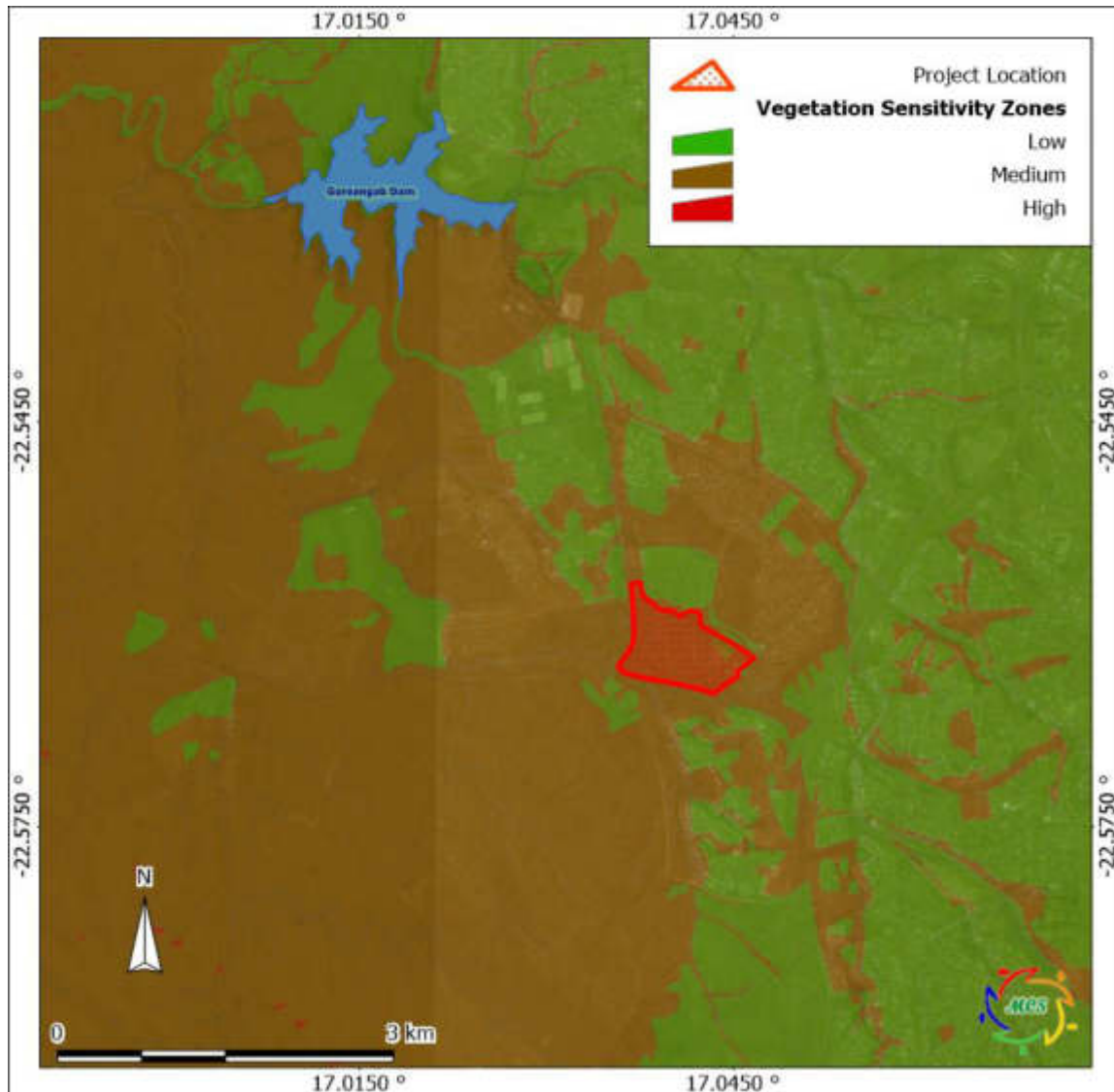


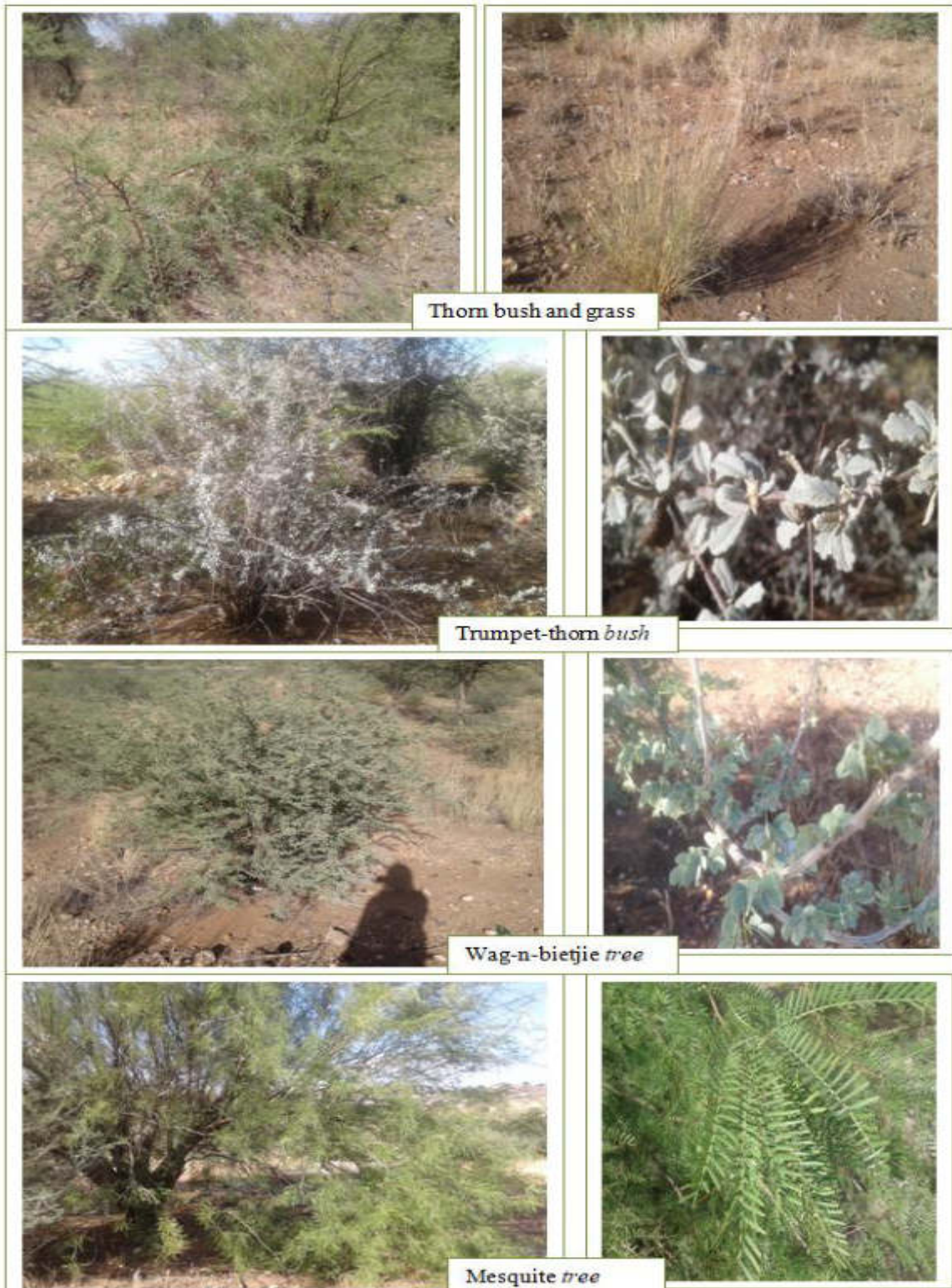
Figure 7. Vegetation sensitivity zones

The site falls within the Tree and shrub savanna biome, which is characterised by high shrubland and thorn bush type vegetation. The vegetation structure type is classified as Dense Shrubland.

The site itself is disturbed and earmarked for development. The dominant vegetation on site consists mainly of thorn bush and trees (*Acacia mellifera*), Trump-thorn (*Catophractes Alexandri*), Wag-n-bietjie (*Ziziphus mucronata*),

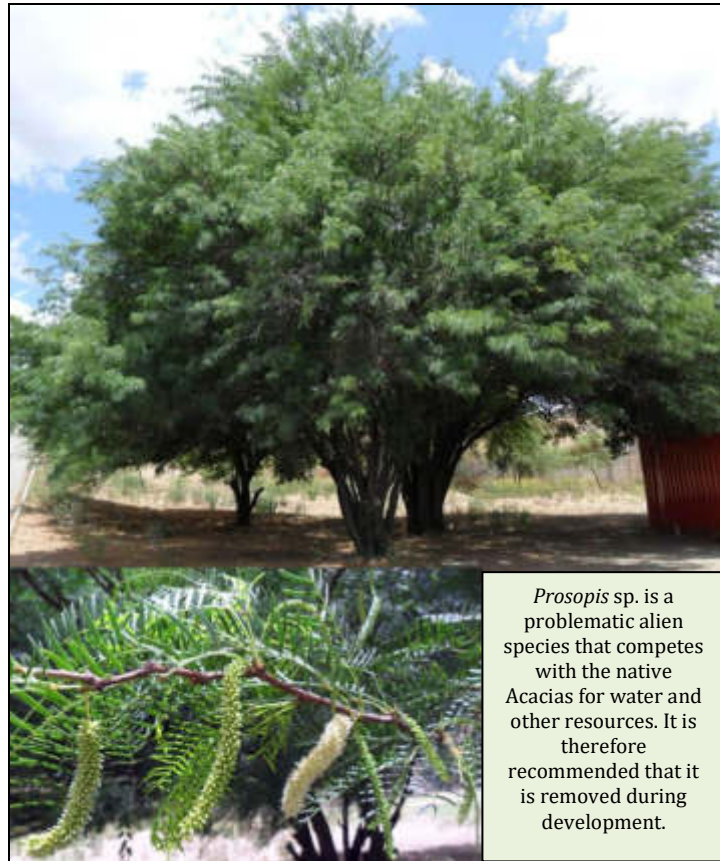
Mesquite (*Prosopis glandulosa*) and Camel thorn (*Acacia Erioloba*). Scattered short grass and shrubs are also present in the area.

The Camel thorn trees are protected in Namibia by the Forestry Act (No.12 of 2001). It is recommended that the protected Camel thorn trees be conserved and incorporated into the development. The following photos below illustrate the prominent vegetation at the site.



Vegetation encountered in the area also include kudu bush, a few scattered *Catophractes alexandrii* species. Invasive species (e.g. *Nicotiana glauca*) is also encountered at the site, which is a sign of disturbance. The following photos illustrate the vegetation on site.

Vegetation recommended to be removed during development:







Vegetation (>150mm girth) recommended to be conserved by the specialist ecologist:





***Boscia albitrunca***  
 Namibian common names:  
 Hunihaib, Omutendereti,  
 Omungwindi, Munkudi,  
 Omunkuzi,  
 Kabumbumutemwa,  
 Witgatboom, Shepherd's  
 tree



***Ziziphus mucronata***  
 Namibian common names:  
 Omukekete, Omusheshete,  
 Omukaru,  
 Muketete, Mukalu, =aros,  
 blinkblaar-wag-'n- bietjie'  
 buffalo-thorn

Deducing from the Atlas of Namibia, the proposed site is within the area that is known to have >500 plant species (Mandelsohn et al, 2003).

With regards to fauna, it is estimated that at least 71 to 80 reptile, 8 to 11 amphibian, 61 to 75 mammal and 201 to 230 bird species (breeding residents) are known to or are expected to occur in the project area of which only a very few proportion are endemics. However, there were very few birds observed at the study area, because of the few plants species on site and current movements in the highly populated neighbouring townships.

The study area falls within low environmental sensitivity zone in term of water, and some parts fall within the high sensitive zones. This means that the environmental consequences of the proposed development in that area are insignificant in some parts of the area, while very high sensitive zones need careful environmental management to prevent pollution the Goreangab dam and its catchment. Part of the study area falls under the High Environmental Control Zone and as such no wet industries development is intended for that area.

According to City of Windhoek Environmental Structure Plan of 2004:

The control zones are based upon the following;

- The critical sensitivity of the southern Windhoek aquifer.
- The sensitivity of the catchment of the Goreangab Dam, and surface water resources, including rivers and streams throughout Windhoek.
- The sensitivity of the environment or a specific critical environmental component.
- The relative importance of the 'sense of place' or the specific character of Windhoek determined through resident participation, which includes topography and landscape quality as well as cultural / historical resources.
- The need to protect open space in Windhoek, which includes the river and aquatic systems, as well as the ridgelines, hills and mountains, and natural areas surrounding the city.
- The need to protect, manage and conserve sensitive natural vegetation cover



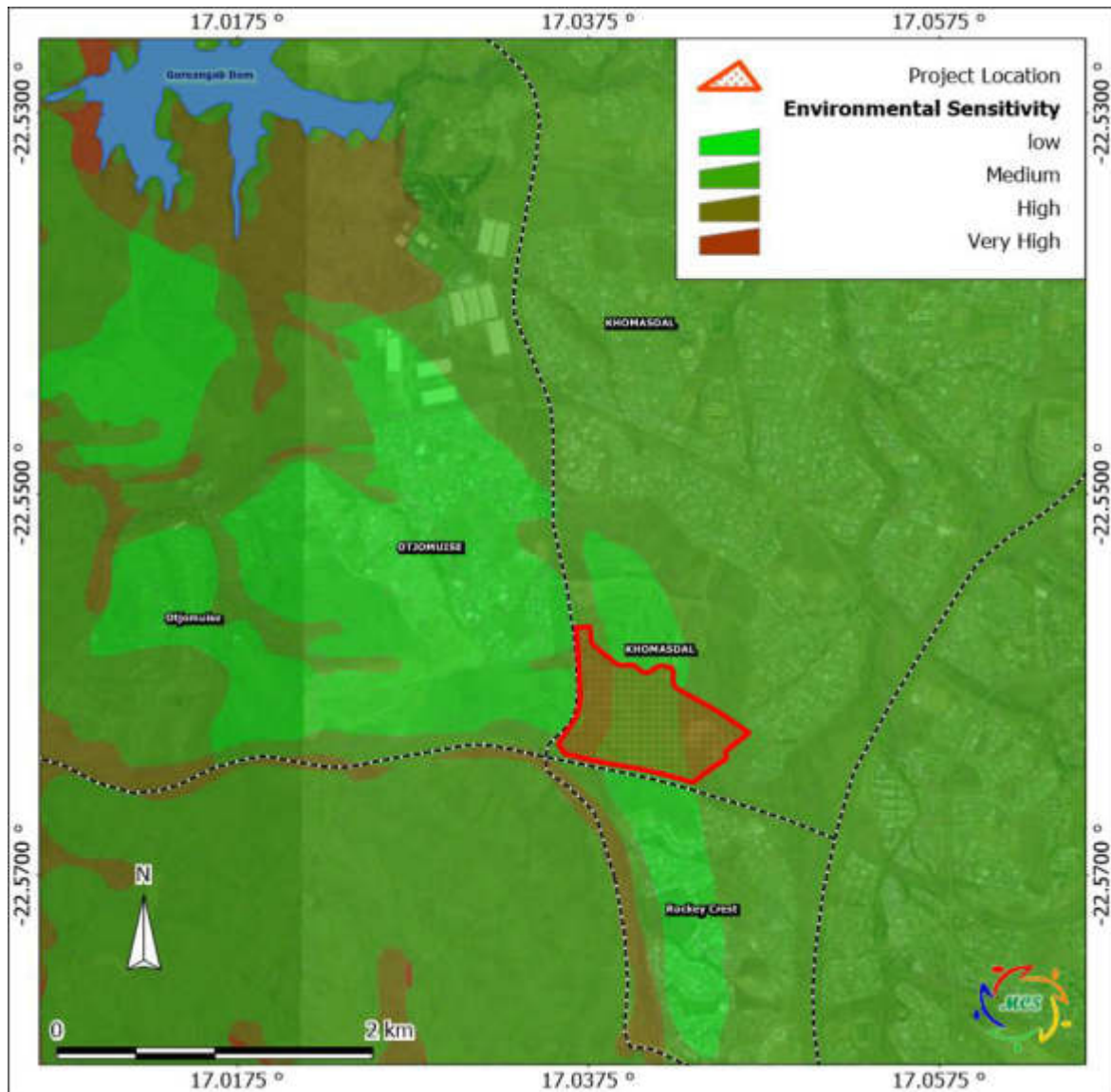


Figure 8. Environmental sensitivity zones

## 11. SOCIO-ECONOMIC ASPECTS

This section provides an overview of socio-economic characteristics of the study area. It provides regional and local information on the, economic activities, population dynamics, vulnerability, and social services currently available in the area.

### 11.1 Regional Information

The proposed Khomasdal Ext 17-18 & ERF 2131 Township project will be situated in the Khomas Region of Namibia. The total current population is estimated to be 250,262 (126,648 males and 123,613 females) (NPC, 2001). Ninety-four percent of the population of the Khomas Region over 15 years of age are literate. The estimated unemployment rate in Khomas region is 29%, whilst it is 35 to 40% in Windhoek. The population density in Khomas region is



relatively high at 6.8 persons per km<sup>2</sup>, compared to the national average of 2 persons per km<sup>2</sup>.

The life expectancy in Khomas region is 56 years in females and 54 years in males. The Human Poverty Index in Khomas region is 17.09, meaning almost a quarter of all people living in Khomas are poverty stricken.

## **11.2 Windhoek**

### **11.2.1 Economic Activities**

The City of Windhoek is the capital city of Namibia and is often referred to as the cleanest city in Africa. The city is the hub for all economic activities in the Khomas Region and is linked to Namibia's air, rail and road network, making it well situated to service Zambia, Zimbabwe, Botswana, Southern Angola and South Africa.

Khomasdal Ext 17-18 & ERF 2131 Township project is a win-win opportunity for all parties involved, whether they are the land owner (City of Windhoek) and/or potential residents and the local government, or the surrounding community. The Khomasdal Ext 17-18 & ERF 2131 Township project will address the land scarcity is currently rife in Windhoek. The Khomasdal Ext 17-18 & ERF 2131 Township project has a potential revenue generation from the sale of ervens.

### **11.2.2. Employment (Job Opportunities)**

Unemployment still hampers most of the developing world and Windhoek is not an exception. The proposed township project is likely to increase the job opportunities in Windhoek. The construction phase of the project will provide job opportunities, of which 80% are expected to be unskilled and semi-skilled people and can be sourced from the unemployed labour force of Windhoek (unemployment rate is 35 to 40% in Windhoek).

Even before projects produce profits from the sale of erven or use of bulk services, they produce a related benefit for the surrounding communities and the city at large, which is job creation. Bulk services construction involves engineers, construction firms, equipment vendors, and utilities. All of this cost is spent locally for piping, construction, and operational personnel, contractors, providing additional economic benefits to the community through increased employment and local sales.

Some of the services in the operational phase will be outsourced e.g. maintenance of bulk services, waste removal etc. The outsourcing of these services will strengthen existing business operating in the area and provide employment to people.



### **11.2.3 Livelihoods**

Economic activities in Windhoek and the surrounding areas are limited and livelihoods are heavily dependent on the business sector and salaries of civil servants. The livelihoods of the locals are likely to be positively impacted therefore predicted to be better than before the development of the gas extraction project in the area.

### **11.2.4 Tourism**

Windhoek is the major tourism gateway to the rest of Namibia. The city itself also attracts a lot of tourists from all over the world, due to its range of attractions in and around the city; and the rich cultural diversity found in the capital.

This tourist city renowned for being one of the cleanest in the world, therefore the Khomasdal Ext 17-18 & ERF 2131 Township Project helps combat the lack of serviced land available for low-middle income groups.

Excessive waste, dust, noise, vibrations and appalling air quality can have negative impacts on the tourism industry in the area, as it can become a nuisance to residents and tourists.

### **11.2.5 In - Migration**

Due to enhanced employment opportunities that could be created by the envisaged project, some in-migration of job seekers to Windhoek can be expected. Depending on the amount of in-migration, local areas may start experiencing overcrowdings, over use of infrastructure, local conflicts, increase of goods prices due to increased demand etc.

### **11.2.6 HIV & Prostitution**

Namibia has a high incidence rate of HIV/AIDS, which has a strong and adverse socio-economic impact on livelihoods of people in the region. The HIV prevalence rate for the age group 15 to 49 is estimated at 21.3% for Namibia (UNDP, 2005).

The spending power of locals working on this project is likely to increase, and this might be a perfect opportunity for sex workers to explore. Migrant labourers from other regions and expatriates are normally vulnerable and may use the services rendered by the sex workers.

Should the HIV prevalence increase, the following consequential issues could arise:

- ✓ Reduced workforce in the Khomas Region.
- ✓ Diversion of income expenditure to medical care.
- ✓ Increase in orphans and household headed by children.



- ✓ Increase in pregnancy related mortality.
- ✓ The current rate of 3,129 people per doctor could increase.

### **11. 2.7 Infrastructure & Increased Traffic**

The traffic in the area would be expected to increase slightly and it might contribute to heavy traffic during peak hours and a higher number of car accidents. Infrastructure like roads will be affected due to increased traffic and heavy-duty cargo trucks accessing the site from Winnie Madikizela Mandela Road.

## **12. STAKEHOLDER PARTICIPATION**

Consultation with the public forms an integral component of an EIA investigation and enables I&APs e.g. neighbouring landowners, local authorities, environmental groups, civic associations and communities, to comment on the potential environmental impacts associated with the proposed development and to identify additional issues which they feel should be addressed in the EIA. The primary aims of public participation were:

- ❖ To initiate participation of Interested and affected parties (I&APs), e.g. local authorities and communities.
- ❖ To inform I&APs and key stakeholders about the proposed development.
- ❖ To identify issues and concerns of key stakeholders and I&APs with regards to the proposed development.
- ❖ To provide information to enable informed decision making
- ❖ To develop a communication structure with stakeholder and I&APs
- ❖ To promote transparency of the project
- ❖ To ensure the public and stakeholders comments are considered for the development.
- ❖ To provide answers to I&APs queries
- ❖ To encourage shared responsibility and sense of ownership.

Decision-making authorities were consulted throughout from the outset of the study, and have been engaged throughout the project process. Consultation with the department of Environmental Affairs (MET) included the environmental assessment procedure and application procedure.

Public participation notices were advertised in local newspapers on two different occasions, namely; (See Appendix C)

- ✓ The Namibian Newspaper, 16 and 23 August 2021



✓ The NewEra Newspaper, 16 and 23 August 2021

In the adverts an e-mail address was provided to the general public to register as interested and affected parties; and to request a background information document for the project. Posters were placed at strategic locations to invite interested and affected parties to the meeting, e.g. COW offices, Otjomuise Clinic, Otjomuise Shopping Complex, and Otjomuise Police Station. A public meeting was held at the NUST Hotel School, at 10H00, on the 30<sup>th</sup> of August 2021.

An environmental assessment and process presentation was presented at the public participation meeting. Invited stakeholders did not make it to the meeting in spite of receiving invitations and mass media advertising. The public participation meeting did not attract people, besides the client and consultant. The meeting went ahead, and no objections to the project were recorded.

The general concerns received via e-mail were not environmental related at all, most of them were about socio-economic issues, preferential options to buy ervens, procedure on how the land will be sold, and making sure the City of Windhoek first take care of first-time buyers when selling the industrial and business ervens. A background information document was available to all interested and affected parties 14 days before and after the meeting.

The City of Windhoek was also consulted and Mr. Shanyengange, the Environmental Coordinator, indicated no obvious environmental concerns regarding the proposed project, and advised to look carefully on the environmental sensitivity of the area, e.g. pollution, water features and noise.

**Table 2. Stakeholders/I&APS**

<b>NAME</b>	<b>ORGANISATION/ERF</b>	<b>OWNER/POSITION</b>
Mr. H. Mukendwa	NamWater	Interested/ Affected Parties
Mr. J. Tjilondelo	Capital Technical Services	Interested/ Affected Parties
Mr. N. Keuavali	KAMAU TPDS	Interested/ Affected Parties
Mr. W. Shuuluka	Resident	Interested/ Affected Parties
Ms. Grazy Tshipo	Environmental Coordinator	City of Windhoek
Mr. M. Shenyengange	Environmental Coordinator	City of Windhoek





### 13. ENVIRONMENTAL IMPACT EVALUATION

The Environmental Impact Assessment sets out potential positive and negative environmental impacts associated with the proposed Khomasdal Ext 17-18 & ERF 2131 Township Development. The following assessment methodology will be used to examine each impact identified, see Table 3:

**Table 3. Impact Evaluation Criterion (DEAT 2006)**

Criteria	Rating (Severity)	
Impact Type	+VE	Positive
	0	No Impact
	-VE	Negative
Significance of impact being either	L	Low (Little or no impact)
	M	Medium (Manageable impacts).
	H	High (Adverse impact).

Probability:	Duration:
5 - Definite/don't know	5 - Permanent
4 - Highly probable	4 - Long-term (impact ceases)
3 - Medium probability	3 - Medium-term (5-15 years)
2 - Low probability	2 - Short-term (0-5 years)
1 - Improbable	1 - Immediate
0 - None	
Scale:	Magnitude:
5 - International	10 - Very high/don't know
4 - National	8 - High
3 - Regional	6 - Moderate
2 - Local	4 - Low
1 - Site only	2 - Minor
	0 - None

#### 13.1 Construction Activities of the Township Development.

##### 13.1.1 Dust Pollution and Air Quality

Dust will be generated during the construction and installation of bulk services, and problems thereof are expected to be site specific. Dust is expected to be worse during the winter months when strong winds occur. Release of various particulates from the site during the construction phase and exhaust fumes from vehicles and machinery related to the construction of bulk services are also expected to take place. Dust is regarded as a nuisance as it reduces visibility, affects the human health and retards plant growth.

It is recommended that regular dust suppression be included in the construction activities, when dust becomes an issue. No unnecessary revving of engines or operation of vehicles is allowed. In general, the servicing of Khomasdal Ext 17-18 & ERF 2131 Township is envisaged to have minimal impacts on the surrounding air quality.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Dust & Air Quality	-VE	2	1	2	1	M	L



### 13.1.2 Noise Impact

An increase of ambient noise levels at Khomasdal Ext 17-18 & ERF 2131 Township site is expected due to the construction activities. Noise pollution due to heavy-duty equipment and machinery will be generated.

It is not expected that the noise generated during construction will impact any third parties. Ensure all mufflers on vehicles are in full operational order; and any audio equipment should not be played at levels considered intrusive by others. The construction staff should be equipped with ear protection equipment.

Impact  
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Noise	-VE	1	1	4	4	M	L

### 13.1.3 Safety and Security

Safety issues could arise from the earthmoving equipment and tools that will be used on site during the construction phase. This increases the possibility of injuries and the contractor must ensure that all staff members are made aware of the potential risks of injuries on site. The presence of equipment lying around on site may also encourage criminal activities (theft).

Sensitize operators of earthmoving equipment and tools to switch off engines of vehicles or machinery not being used. The contractor is advised to ensure that the team is equipped with first aid kits and that they are available on site, at all times. Workers should be equipped with adequate personal protective gear and properly trained in first aid and safety awareness.

No open flames, smoking or any potential sources of ignition should be allowed at the project location. Signs such as 'NO SMOKING' must be prominently displayed in parts where inflammable materials are stored on the premises. Proper barricading and/or fencing around the work sites should be erected to avoid entrance of animals and/or unauthorized persons. Safety regulatory signs should be placed at strategic locations to ensure awareness. Adequate lighting within and around the construction locations should be erected, when visibility becomes an issue.

Impact  
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Safety & Security	-VE	1	1	4	2	M	L

### 13.1.4 Contamination of Groundwater

Groundwater quality could be impacted through oil leakages, lubricants and grease from the equipment and machinery utilised during the bulk servicing of Khomasdal Ext 17-18 & ERF 2131 Township. Possibility of contamination from



surface sources exists in the proximity of fault zones and Goreangab Dam catchment area.

Care must be taken to avoid contamination of soil and groundwater. Use drip trays when doing maintenance on machinery. Maintenance should be done on dedicated areas with linings or concrete floor. The risk can be lowered further through proper training of staff.

All spills must be cleaned up immediately. Excavations should be backfilled and sealed with appropriate material, if it is not to be used further.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Groundwater	-VE	2	2	2	2	M	L

### 13.1.5 Contamination of Surface Water

Contamination of surface water might occur through oil leakages, lubricants and grease from the equipment and machinery during the installation and maintenance of bulk services at Khomasdal Ext 17-18 & ERF 2131 Township. Oil spills may form a film on water surfaces in the nearby streams causing physical damage to water-borne organisms.

Machinery should not be serviced at the construction site to avoid spills. All spills should be cleaned up as soon as possible. Hydrocarbon contaminated clothing or equipments should not be washed within 25m of any surface water body.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Surface water	-VE	2	2	2	3	M	L

### 13.1.6 Generation of Waste

This can be in a form of rubble, cement bags, pipe and electrical wire cuttings. Contaminated soil due to oil leakages, lubricants and grease from the construction equipment and machinery may also be generated during the construction phase.

The oil leakages, lubricants and grease must be addressed. Contaminated soil must be removed and disposed off at the hazardous waste cell at Kupferberg Landfill. The contractor must provide containers on-site, to store any hazardous waste produced. Regular inspection and housekeeping procedure monitoring should be maintained by the contractor.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Waste	-VE	1	1	4	4	M	L



### 13.1.7 Traffic

The servicing of Khomasdal Ext 17-18 & ERF 2131 Township activities are expected to have a minor impact on the movement of traffic along Kornalyn Street, and could have an impact on traffic along Winnie Madikizela Mandela road. No diversion of traffic or closure of roads is expected.

Speed limit warning signs must be erected to minimise accidents. Heavy-duty vehicles and machinery must be tagged with reflective signs or tapes to maximise visibility and avoid accidents.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Traffic	-VE	2	1	4	3	M	L

### 13.1.8 Fires and Explosions

There should be sufficient water available for fire fighting purposes. Ensure that all fire-fighting devices are in good working order and they are serviced. All personnel have to be trained about responsible fire protection measures and good housekeeping such as the removal of flammable materials on site. Regular inspections should be carried out to inspect and test fire fighting equipment by the contractor.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Fires and Explosions	-VE	1	1	4	2	M	L

### 13.1.9 Nuisance Pollution

Aesthetics and inconvenience caused to persons using Sam Nujoma Drive and surrounding areas. The construction activities would be visible Sam Nujoma Drive and Winnie Madikizela Mandela Road, thus the supervisor should maintain tidiness on site at all times. Take cognition when parking vehicles and placing equipment.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Nuisance Pollution	-VE	1	1	2	2	L	L

### 13.1.10 Erosion and Sedimentation

Vegetation clearance and creation of impermeable surfaces could result in erosion in areas across Khomasdal Ext 17-18 & ERF 2131 Township. The clearance of vegetation will further reduce the capacity of the land surface to slow down the flow of surface water, thus decreasing infiltration, and increasing both the quantity and velocity of surface water runoff. The particles in suspension will be transported towards the north and could increase the



sedimentation in the Goreangab dam and Aretaragas River tributary flowing in the northern direction.

The proposed development will increase the amount of impermeable surfaces and therefore decrease the amount of groundwater infiltration. As a result, the amount of stormwater during rainfall events could increase. If proper stormwater management measures are not implemented this will impact negatively on the water courses close to the site.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Erosion and Sedimentation	-VE	1	1	4	2	M	L

### 13.1.10 Ecological Impacts

The proposed Khomasdal Ext 17-18 & ERF 2131 Township is an already disturbed area, with less conservation worthy vegetation and fauna. This area was previously disturbed, and has some alien invasive plants. Land will be cleared, leaving the big trees (>150mm girth) to maintain the vegetation within Khomasdal Ext 17-18 & ERF 2131 Township. However, impacts on fauna and flora are expected to be minimal. Disturbance of areas outside the designated working zone is not allowed.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Ecology	-VE	1	1	4	2	L	L

*Summary of all potential impacts expected during the construction of the bulk services of Khomasdal Ext 17-18 & ERF 2131 Township:*

In general, impacts are expected to be low to medium, mostly short lived and site specific. Mitigation options recommended in the Environmental Management Plan (EMP) will guide and ensure that the impacts during the construction activities are minimised.

The contractor on site should be made aware of the content and environmental requirements of this report through proper induction training.



## 13.2 Operational Activities of Township Development

### 13.2.1 Dust Pollution and Air Quality

Vehicles that will be accessing Khomasdal Ext 17-18 & ERF 2131 Township will contribute to the release of hydrocarbon vapours, carbon monoxide and sulphur oxides into the air. Possible release of sewer odour, due to sewer system failure or maintenance might also occur. All maintenance of bulk services of Khomasdal Ext 17-18 & ERF 2131 Township procedures have to be designed to enable environmental protection.

Impact  
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Dust & Air Quality	-VE	2	1	2	1	M	L

### 13.2.2 Noise Impact

Noise pollution already exists around the site in the form of noise generated from vehicles frequenting the existing Sam Nujoma Drive and Winnie Madikizela Mandela Road. Noise pollution due to this project in the operational phase is expected to be mainly from generators or pumps, road maintenance machinery during maintenance.

Ensure that generator engines are fitted with mufflers. Operators working in close proximity to the generators should be equipped with ear protection equipment, when noise becomes an issue. Observation of on-site noise levels by the Manager or Supervisor of Bulk Services Maintenance Department. The city of Windhoek should instil strict operational hours that are not beyond 19h00.

Impact  
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Noise	-VE	1	3	4	4	M	L

### 13.2.3 Contamination of Groundwater

Spillages might also occur during maintenance of the sewer system. This could have impacts on groundwater especially in cases of large sewer spills.

Potential health impact on groundwater users do exist. Potential impact on the natural environment from possible polluted groundwater also exists. The area is subjected to north-northwest structures, which might act as preferential pathways for any contaminants entering the saturated zone. Proper containment should be used in cases of sewerage system maintenance. to avoid any possible leakages.

Impact  
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Groundwater contamination	-VE	2	2	3	2	M	L



### 13.2.5 Generation of Waste

Waste in the form of solid waste from households, businesses and institutions will be generated. Waste will be removed and disposed off at Kupferberg Landfill by City of Windhoek Waste Removal Contractors e.g. Rent-a-Drum, Kleen Tek etc.

The City of Windhoek will have waste skips around Khomasdal Ext 17-18 & ERF 2131 Township like the rest of the suburbs in Windhoek.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Waste Generation	-VE	1	1	2	4	M	L

### 13.2.6 Failure of Reticulation Pipelines

Potential release of sewage, storm-water, water, into the environment due to pipeline/system failure. As a result, the spillage could be released into the environment and could potentially be a health hazard to surface and groundwater.

Proper reticulation pipelines and drainage systems should be installed. Regular bulk services infrastructure and system inspection should be conducted.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Failure of Reticulation Pipelines	-VE	1	1	4	2	L	L

### 13.2.7 Ecological Impacts

No impacts are expected as the proposed Khomasdal Ext 17-18 & ERF 2131 Township project in the operational phase. Vegetation in open spaces should not be disturbed or removed during the operational phase. Minimise the area of disturbance by restricting movement to the designated working areas during Maintenance.

Impact Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Ecology Impacts	-VE	1	1	4	2	L	L

### 13.2.8 Traffic

Traffic around the Khomasdal Ext 17-18 & ERF 2131 Township should be monitored, to avoid traffic congestion in the area. Speed limits and road signs as set out by City of Windhoek Traffic Department should be adhered to in order to minimise accidents. It is advisable that traffic lights be erected at the junction of Plover Street and Winnie Madikizela Mandela Road to ease traffic flow around the new township.



Impact  
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Traffic	-VE	1	3	4	4	M	L

### 13.2.9 Safety and Security

A number of health and safety threats exist during operational activities of Khomasdal Ext 17-18 & ERF 2131 Township. Individuals in the community can suffer from noise from maintenance activities around Khomasdal Ext 17-18 & ERF 2131 Township. Accidents on roads could increase as a result of increased traffic and deteriorated roads.

The contractor is advised to ensure that proper personal protective gear and first aid kits are available, at all times. Workers should also be properly trained in first aid and safety awareness.

Impact  
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Safety and Security	-VE	1	3	6	3	M	L

*Summary of all potential impacts expected during the operations of the Khomasdal Ext 17-18 & ERF 2131 Township:*

In general, impacts are expected to be low, short lived and site to local specific. An Environmental Management Plan (EMP) will ensure that the impacts during the operational activities are minimised and includes measures to reduce all impacts identified.

The contractor should be made aware of the content and environmental requirements of this report through proper induction training.





## 14. CUMULATIVE IMPACTS

These are impacts on the environment, which results from the incremental impacts of the Khomasdal Ext 17-18 & ERF 2131 Township project when added to other past, present, and reasonably foreseeable future actions regardless of what person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. In relation to an activity, it means the impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts resulting from similar or diverse activities or undertakings in the area.

Possible cumulative impacts associated with the development of Khomasdal Ext 17-18 & ERF 2131 Township includes groundwater contamination, noise emissions, land disturbance, traffic and possible accidents involving vehicles frequenting the area. These impacts could become significant and this could collectively impact on the environmental conditions in the area. Cumulative impacts could occur in both the operational and the construction phase.

Impact  
Evaluation:

Aspect	Impact Type	Scale	Duration	Magnitude	Probability	Significance	
						Unmitigated	Mitigated
Cumulative impacts	-VE	1	3	4	3	L	L

## 15. ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EMP) provides management options to ensure impacts of the proposed servicing of Khomasdal Ext 17-18 & ERF 2131 Township are minimised. An EMP is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the Khomasdal Ext 17-18 & ERF 2131 Township project are prevented, and the positive benefits of the projects are enhanced.

The objectives of the EMP are:

- ✓ to include all components of the Khomasdal Ext 17-18 & ERF 2131 Township project;
- ✓ to prescribe the best practicable control methods to lessen the environmental impacts associated with the Khomasdal Ext 17-18 & ERF 2131 Township project;
- ✓ to monitor and audit the performance of the project personnel in applying such controls; and
- ✓ to ensure that appropriate environmental training is provided to responsible project personnel.

The EMP acts as a stand-alone document, which can be used during the various phases of the proposed project. All contractors taking part in the bulk services construction activities should be made aware of the contents of the EMP. An EMP



for the construction and operational phases of Khomasdal Ext 17-18 & ERF 2131 Township project is attached as Appendix A.

## **16. CONCLUSIONS**

All known environmental and social risks can be minimised and managed through implementing preventative measures and sound management systems. It is recommended that environmental performance be monitored regularly to ensure compliance and that corrective measures be taken if necessary. It is also recommended that this information be made available to the surrounding communities on a regular basis. The business ervens in Khomasdal Ext 17-18 & ERF 2131 Township must only be reserved for light/dry industries that do not generate liquid pollutants, to protect the Goreangab Dam catchment, sensitive geological structures, Aretaragas River/fault and its tributaries.

In general, the proposed Khomasdal Ext 17-18 & ERF 2131 Township project would pose limited environmental risks, provided the EMP for the activity is used properly during planning, construction and operational phase. The Environmental Management Plan should be used as an on-site tool during all phases of the Khomasdal Ext 17-18 & ERF 2131 Township project. Parties responsible for non-conformances of the EMP will be held responsible for any rehabilitation that may need to be undertaken.

Should the Khomasdal Ext 17-18 & ERF 2131 Township project be modified or extended to a different area, it is recommended that a different EIA be done for the probable new location.

### **Matrix Consulting Services**

Chris Ailonga  
Principal Environmental Scientist  
January 2022



## 17. REFERENCES

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