

APP-003707

**OPERATIONS OF THE EXISTING WERNHIL PARK MALL IN  
WINDHOEK, KHOMAS REGION**

**ENVIRONMENTAL MANAGEMENT PLAN**



**Prepared by:**



**Prepared for:**



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<b>Project:</b>	<b>OPERATIONS OF THE EXISTING WERNHIL PARK MALL IN WINDHOEK, KHOMAS REGION: ENVIRONMENTAL MANAGEMENT PLAN</b>	
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## **LIST OF ABBREVIATIONS**

<b>AIDS</b>	Acquired Immune Deficiency Syndrome
<b>BE</b>	Biological/Ecological
<b>DWA</b>	Department of Water Affairs
<b>DEA</b>	Directorate of Environmental Affairs
<b>EA</b>	Environmental Assessment
<b>EIA</b>	Environmental Impact Assessment
<b>EMA</b>	Environmental Management Act No 7 of 2007
<b>EMP</b>	Environmental Management Plan
<b>EMS</b>	Environmental Management System
<b>EO</b>	Economic/Operational
<b>ES</b>	Environmental Classification
<b>GPT</b>	Geo Pollution Technologies
<b>GHG</b>	greenhouse gasses
<b>HIV</b>	Human Immunodeficiency Virus
<b>IAPs</b>	Interested and Affected Parties
<b>IUCN</b>	International Union for Conservation of Nature
<b>m/s</b>	Meter per second
<b>MEFT</b>	Ministry of Environment, Forestry and Tourism
<b>mm/a</b>	Millimetres per annum
<b>MSDS</b>	Material Safety Data Sheet
<b>kWp</b>	Kilowatts peak
<b>PC</b>	Physical/Chemical
<b>PPE</b>	Personal Protective Equipment
<b>PV</b>	Photovoltaic
<b>SANS</b>	South African National Standards
<b>SC</b>	Sociological/Cultural
<b>UNFCCC</b>	United Nations Framework Convention on Climate Change





## **GLOSSARY OF TERMS**

**Alternatives** - A possible course of action, in place of another, that would meet the same purpose and need but which would avoid or minimize negative impacts or enhance project benefits. These can include alternative locations/sites, routes, layouts, processes, designs, schedules and/or inputs. The “no-go” alternative constitutes the ‘without project’ option and provides a benchmark against which to evaluate changes; development should result in net benefit to society and should avoid undesirable negative impacts.

**Assessment** - The process of collecting, organising, analysing, interpreting and communicating information relevant to decision making.

**Competent Authority** - means a body or person empowered under the local authorities act or Environmental Management Act to enforce the rule of law.

**Construction** - means the building, erection or modification of a facility, structure or infrastructure that is necessary for the undertaking of an activity, including the modification, alteration, upgrading or decommissioning of such facility, structure or infrastructure.

**Cumulative Impacts** - in relation to an activity, 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 eventuating from similar or diverse activities or undertakings in the area.

**Environment** - As defined in the Environmental Assessment Policy and Environmental Management Act - “land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, palaeontological or social values”.

**Environmental Impact Assessment (EIA)** - process of assessment of the effects of a development on the environment.

**Environmental Management Plan (EMP)** - A working document on environmental and socio-economic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.

**Environmental Management System (EMS)** - An Environment Management System, or EMS, is a comprehensive approach to managing environmental issues, integrating environment-oriented thinking into every aspect of business management. An EMS ensures environmental considerations are a priority, along with other concerns such as costs, product quality, investments, PR productivity and strategic planning. An EMS generally makes a positive impact on a company’s bottom line. It increases efficiency and focuses on customer needs and marketplace conditions, improving both the company’s financial and environmental performance. By using an EMS to convert environmental problems into commercial opportunities, companies usually become more competitive.

**Evaluation** – means the process of ascertaining the relative importance or significance of information, the light of people’s values, preference and judgements in order to make a decision.

**Hazard** - Anything that has the potential to cause damage to life, property and/or the environment. The hazard of a particular material or installation is constant; that is, it would present the same hazard wherever it was present.

**Interested and Affected Party (IAP)** - any person, group of persons or organisation interested in, or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

**Mitigate** - The implementation of practical measures to reduce adverse impacts.

**Proponent (Applicant)** - Any person who has submitted or intends to submit an application for an authorisation, as legislated by the Environmental Management Act no. 7 of 2007, to undertake an

activity or activities identified as a listed activity or listed activities; or in any other notice published by the Minister or Ministry of Environment & Tourism.

**Public** - Citizens who have diverse cultural, educational, political and socio-economic characteristics. The public is not a homogeneous and unified group of people with a set of agreed common interests and aims. There is no single public. There are a number of publics, some of whom may emerge at any time during the process depending on their particular concerns and the issues involved.

**Scoping Process** - process of identifying: issues that will be relevant for consideration of the application; the potential environmental impacts of the proposed activity; and alternatives to the proposed activity that are feasible and reasonable.

**Significant Effect/Impact** - means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

**Stakeholder Engagement** - The process of engagement between stakeholders (the proponent, authorities and IAPs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can therefore be described by a spectrum or continuum of increasing levels of engagement in the decision-making process. The term is considered to be more appropriate than the term “public participation”.

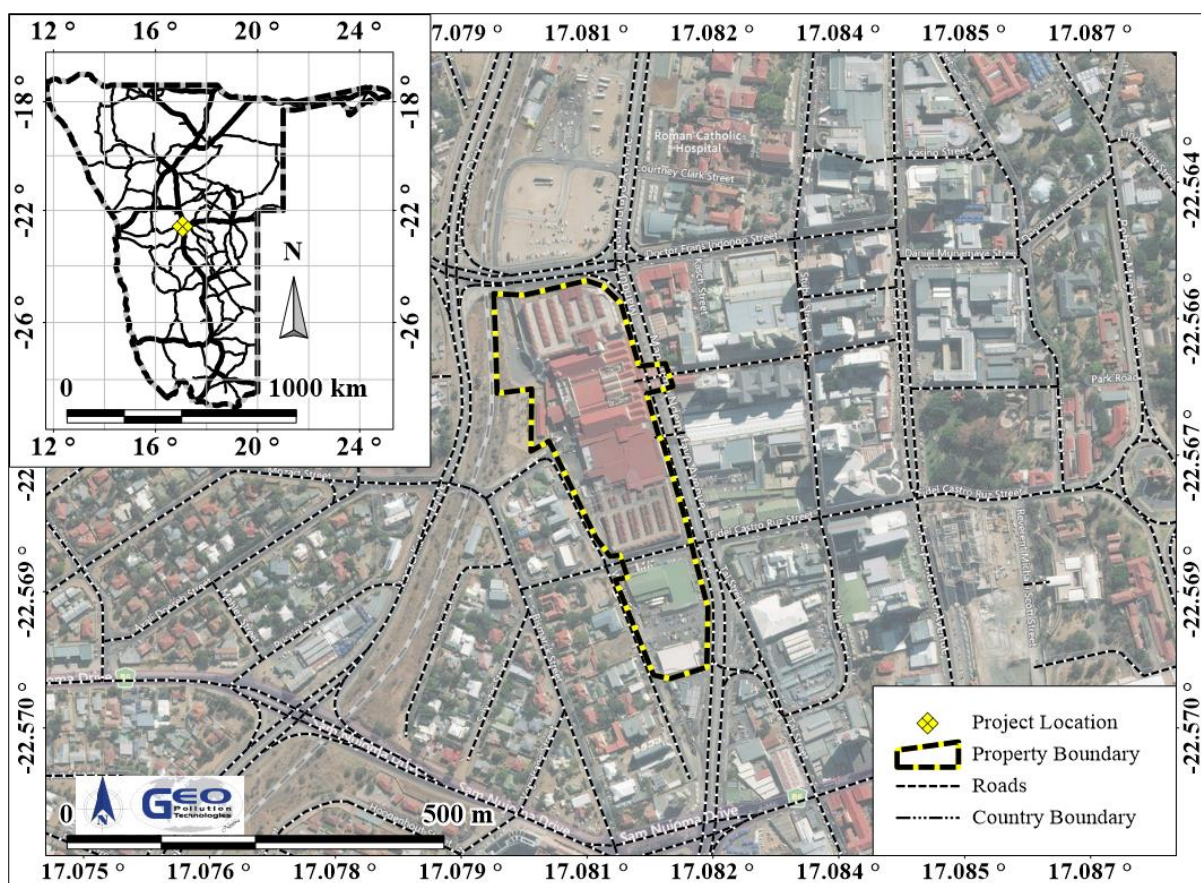
**Stakeholders** - A sub-group of the public whose interests may be positively or negatively affected by a proposal or activity and/or who are concerned with a proposal or activity and its consequences. The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (IAPs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

**Sustainable Development** - “Development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs and aspirations” – the definition of the World Commission on Environment and Development (1987). “Improving the quality of human life while living within the carrying capacity of supporting ecosystems” – the definition given in a publication called “Caring for the Earth: A Strategy for Sustainable Living” by the International Union for Conservation of Nature (IUCN), the United Nations Environment Programme and the World Wide Fund for Nature (1991).

# 1 INTRODUCTION

The Wernhil Park Mall was established in 1990 to serve as a convenient commercial hub in Windhoek. It was the first of such centres in Windhoek and continues its core activity of providing retail space to a variety of stores. In 2016, an environmental management plan (EMP) was prepared for the existing Wernhil Park Mall and its proposed Phase 4 upgrade (Shippiki et al., 2016). An environmental clearance certificate (ECC) for expansion, upgrade and continued operations of the mall was then awarded to the Proponent, Broll and List Property Management (Namibia) (Pty) Ltd, who manages the Wernhil Park Mall. The Wernhil Park Mall is located mainly between Mandume Ndemufayo Avenue, Wecke Street and Dr Frans Indongo Street in Windhoek (Figure 1-1 Project locationFigure 1-1).

Geo Pollution Technologies (Pty) Ltd was appointed by the Proponent, to apply for renewal of their existing ECC for the continued operations of the Wernhil Park Mall as well as to transfer the ECC to Wernhil Park (Pty) Ltd. To renew the ECC, an updated environmental management plan (EMP) will be prepared for the continued operations of the establishment. Renewal of the ECC is required as per the Environmental Management Act No. 7 of 2007 (EMA). The updated EMP will be submitted to the Environmental Commissioner, Ministry of Environment, Forestry and Tourism (MEFT), in support of the renewal of the ECC.



**Figure 1-1 Project location**

The EMP provides management options to ensure environmental impacts of the Wernhil Park Mall are continually minimised. The environment being defined in the Environmental Assessment Policy and Environmental Management Act as “land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values”.

The EMP is a tool used to take pro-active action by addressing potential problems before they occur. This limits potential future corrective measures that may need to be implemented and allows for

application of mitigation measures for unavoidable impacts. This document should continue to be used as an on-site reference document during all phases (planning, construction (care and maintenance), operations and decommissioning) of the Wernhil Park Mall. All monitoring and records kept should be included in a report to ensure compliance with the EMP. Parties responsible for transgression of the EMP should be held responsible for any rehabilitation that may need to be undertaken. A Health, Safety, Environment and Quality (HSEQ) policy as well as Environmental Policy could be used in conjunction with the EMP. Operators and responsible personnel must be taught the contents of these documents. Relevant regulations and guidelines must be adhered to and monitored regularly as outlined in the EMP.

The updated EMP will be used to apply for renewal of the existing ECC in compliance with Namibia's Environmental Management Act (Act No 7 of 2007).

## **2 SCOPE**

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The scope of the EMP is to:

- ◆ Provide a brief overview of all components and related operations of the Wernhil Park Mall.
- ◆ Summarise the legal and regulatory framework within which the Wernhil Park Mall operates.
- ◆ Provide a brief overview of the environment, i.e. the physical, biological, social and economic conditions, potentially impacted by the Wernhil Park Mall.
- ◆ Identify a range of management actions which could mitigate the potential adverse impacts to acceptable levels.
- ◆ Provide sufficient information to the relevant competent authorities and the MEFT to make informed decisions regarding the development

## **3 WERNHIL PARK MALL OPERATIONS AND RELATED ACTIVITIES**

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Operational activities related to the Proponent are diverse and include office and human resources administration; leasing retail space and management of tenants; management of various support infrastructure components such as escalators and lifts, air cooling systems and water and electricity supply; management of the parking areas (over 1,800 parking bays); waste management (including sewerage system), security operations; cleaning of the premises and infrastructure; and events hosting. Specialised infrastructure components operated and managed by the Wernhil Park Mall include the operations of the photovoltaic solar plant (on the roof of the Wernhil Park Mall); fuel receipt and storage (for the stand-by generators); and waste storage and disposal.

The activities associated with retail centres can be divided into two main groups, those pertaining to the mall management and those related to the various tenants' operations. The mall can accommodate more than 100 different tenants. Such activities may be grouped under either construction (care and maintenance) or operational activities. Minor construction activities are required from time to time to upgrade or maintain existing infrastructure. Maintenance is an ongoing process which mostly involve minor repairs, cleaning, painting, etc. of infrastructure, but may also require the periodic replacement or removal of obsolete infrastructure. Periodically new tenants will lease space within the mall who will require re-fitting of the space according to their needs. Likewise, existing tenants may wish to change the layouts and design of their leased spaces. The major infrastructure component are listed in Table 3-1.

The Wernhil Park Mall has various entrance points which allow public and private vehicles to access designated parking areas, while pedestrians may enter the mall from the parking areas as well as from cross-over bridges connected to Town Square.

**Table 3-1 Details of major operational component of the Wernhil Park Mall**

<b>Operational Component</b>	<b>Operation details</b>
<b>Electricity supply</b>	Combination of grid (City of Windhoek) supply and a Photovoltaic solar system on the roof which provides 1,130.4 kWp currently and will provide 2,120.4 kWp upon completion.
<b>Water supply</b>	Connected to City of Windhoek supply system.
<b>Wastewater (blackwater / sewerage)</b>	Connected to City of Windhoek wastewater lines.
<b>Wastewater (greywater)</b>	Connected to City of Windhoek wastewater lines.
<b>Hazardous waste (temporary storage)</b>	Medical waste is stored and managed by tenants. Some operators have their own hazardous waste management systems.
<b>General waste: temporary storage (including food waste)</b>	All general waste is collected in wheelie bins which are removed by private contractors.
<b>Recyclable waste</b>	Recyclable waste is collected in wheelie bins which are removed by private contractors.
<b>Storage of fuel (diesel) for standby generators</b>	Six generators have built in fuel storage tanks. On average 600 litres of diesel is stored in the built-in tanks (combined volume of all tanks).
<b>Chemical and lubricants storage (various)</b>	Chemicals and lubricants are stored in a designated areas which are access restricted.
<b>Parking</b>	Management of traffic flow within the parking area including payment system (the public transport area is not part of the mall operations).
<b>Water (other than supply)</b>	Heating-, water boosting-, wastewater- and firefighting systems installed and maintained.
<b>Traction-related systems</b>	Lifts and elevators are managed electronically.

#### **4 ADMINISTRATIVE, LEGAL AND POLICY REQUIREMENTS**

To protect the environment and achieve sustainable development, all projects, plans, programmes and policies deemed to have adverse impacts on the environment require an ECC, as per the Namibian legislation. The legislation and standards provided in Table 4-1 to Table 4-4 govern the environmental assessment process in Namibia and/or are relevant to the Wernhil Park Mall.

**Table 4-1 Namibian law applicable to the facility**

<b>Law</b>	<b>Key Aspects</b>
<b>The Namibian Constitution</b>	<ul style="list-style-type: none"> <li>◆ Promote the welfare of people</li> <li>◆ Incorporates a high level of environmental protection</li> <li>◆ Incorporates international agreements as part of Namibian law</li> </ul>
<b>Environmental Management Act</b> Act No. 7 of 2007, Government Notice No. 232 of 2007	<ul style="list-style-type: none"> <li>◆ Defines the environment</li> <li>◆ Promote sustainable management of the environment and the use of natural resources</li> <li>◆ Provide a process of assessment and control of activities with possible significant effects on the environment</li> </ul>
<b>Environmental Management Regulations</b> Government Notice No. 28-30 of 2012	<ul style="list-style-type: none"> <li>◆ Commencement of the Environmental Management Act</li> <li>◆ List activities that requires an environmental clearance certificate</li> <li>◆ Provide Environmental Impact Assessment Regulations</li> </ul>

<b>Law</b>	<b>Key Aspects</b>
<b>Petroleum Products and Energy Act</b> Act No. 13 of 1990, Government Notice No. 45 of 1990	<ul style="list-style-type: none"> <li>◆ Regulates petroleum industry</li> <li>◆ Makes provision for impact assessment</li> <li>◆ Petroleum Products Regulations (Government Notice No. 155 of 2000)               <ul style="list-style-type: none"> <li>○ Prescribes South African National Standards (SANS) or equivalents for construction, operation and decommissioning of petroleum facilities (refer to Government Notice No. 21 of 2002)</li> </ul> </li> </ul>
<b>The Water Act</b> Act No. 54 of 1956	<ul style="list-style-type: none"> <li>◆ Remains in force until the new Water Resources Management Act comes into force</li> <li>◆ Defines the interests of the state in protecting water resources</li> <li>◆ Controls the disposal of effluent</li> <li>◆ Numerous amendments</li> </ul>
<b>Water Resources Management Act</b> Act No. 11 of 2013	<ul style="list-style-type: none"> <li>◆ Provide for management, protection, development, use and conservation of water resources</li> <li>◆ Prevention of water pollution and assignment of liability</li> <li>◆ Not in force yet</li> </ul>
<b>Local Authorities Act</b> Act No. 23 of 1992, Government Notice No. 116 of 1992	<ul style="list-style-type: none"> <li>◆ Define the powers, duties and functions of local authority councils</li> <li>◆ Regulates discharges into sewers</li> </ul>
<b>Public Health Act</b> Act No. 36 of 1919	<ul style="list-style-type: none"> <li>◆ Provides for the protection of health of all people</li> </ul>
<b>Public and Environmental Health Act</b> Act No. 1 of 2015, Government Notice No. 86 of 2015	<ul style="list-style-type: none"> <li>◆ Provides a framework for a structured more uniform public and environmental health system, and for incidental matters</li> <li>◆ Deals with Integrated Waste Management including waste collection disposal and recycling; waste generation and storage; and sanitation.</li> </ul>
<b>Labour Act</b> Act No 11 of 2007, Government Notice No. 236 of 2007	<ul style="list-style-type: none"> <li>◆ Provides for Labour Law and the protection and safety of employees</li> <li>◆ Labour Act, 1992: Regulations relating to the health and safety of employees at work (Government Notice No. 156 of 1997)</li> </ul>
<b>Atmospheric Pollution Prevention Ordinance</b> Ordinance No. 11 of 1976	<ul style="list-style-type: none"> <li>◆ Governs the control of noxious or offensive gases</li> <li>◆ Prohibits scheduled process without a registration certificate in a controlled area</li> <li>◆ Requires best practical means for preventing or reducing the escape into the atmosphere of noxious or offensive gases produced by the scheduled process</li> </ul>
<b>Hazardous Substances Ordinance</b> Ordinance No. 14 of 1974	<ul style="list-style-type: none"> <li>◆ Applies to the manufacture, sale, use, disposal and dumping of hazardous substances as well as their import and export</li> <li>◆ Aims to prevent hazardous substances from causing injury, ill-health or the death of human beings</li> </ul>
<b>Pollution Control and Waste Management Bill (draft document)</b>	<ul style="list-style-type: none"> <li>◆ Not in force yet</li> <li>◆ Provides for prevention and control of pollution and waste</li> <li>◆ Provides for procedures to be followed for licence applications</li> </ul>

**Table 4-2 Municipal By-laws, Guidelines and Regulations**

<b>Municipal By-laws, Guidelines or Regulations</b>	<b>Key Aspects</b>
<b>Groundwater Protection Regulations</b>	<ul style="list-style-type: none"> <li>◆ Provides for the protection of groundwater, landscape and vegetation sensitivity</li> <li>◆ Requires an EIA and EMP for projects that may potentially impact on groundwater</li> <li>◆ Identifies three groundwater control zones: medium, high and very high</li> </ul>
<b>Windhoek Environmental Structure Plan and Environmental Policy</b>	<ul style="list-style-type: none"> <li>◆ Integrates spatial planning decision-making, environmental planning and environmental impact management</li> </ul>
<b>Town Planning Scheme</b>	<ul style="list-style-type: none"> <li>◆ Enables the comprehensive management of all property and related public sector functions across the city</li> <li>◆ Provides for the protection of groundwater and the environment</li> <li>◆ Limits the amount of fuel which may be store for standby generators</li> </ul>
<b>Sewerage and Drainage Regulations</b>	<ul style="list-style-type: none"> <li>◆ Regulates discharges into sewer systems.</li> <li>◆ Provides standards to which effluents entering a sewer system must adhere.</li> <li>◆ Regulates storm water run-off.</li> </ul>
<b>Noise Control Regulations</b>	<ul style="list-style-type: none"> <li>◆ Provides noise standards to which activities need to adhere to</li> <li>◆ Limits noise pollution as per Council Resolution 215/09/2006</li> </ul>

**Table 4-3 Relevant Multilateral Environmental Agreements for Namibia and the Facility**

<b>Agreement</b>	<b>Key Aspects</b>
<b>Stockholm Declaration on the Human Environment, Stockholm 1972.</b>	<ul style="list-style-type: none"> <li>◆ Recognizes the need for a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human environment</li> </ul>
<b>1985 Vienna Convention for the Protection of the Ozone Layer</b>	<ul style="list-style-type: none"> <li>◆ Aims to protect human health and the environment against adverse effects from modification of the Ozone Layer are considered.</li> <li>◆ Adopted to regulate levels of greenhouse gas concentration in the atmosphere</li> </ul>
<b>United Nations Framework Convention on Climate Change (UNFCCC)</b>	<ul style="list-style-type: none"> <li>◆ The Convention recognises that developing countries should be accorded appropriate assistance to enable them to fulfil the terms of the Convention</li> </ul>
<b>Convention on Biological Diversity, Rio de Janeiro, 1992</b>	<ul style="list-style-type: none"> <li>◆ Under article 14 of The Convention, EIAs must be conducted for projects that may negatively affect biological diversity</li> </ul>

**Table 4-4 Standards or Codes of Practise**

Standard or Code	Key Aspects
<b>South African National Standards (SANS)</b>	<ul style="list-style-type: none"> <li>◆ The Petroleum Products and Energy Act prescribes SANS standards for the construction, operations and demolition of petroleum facilities</li> <li>◆ SANS 10131: 2004 deals with above-ground storage tanks for petroleum products</li> <li>◆ SANS 10089-3:2010 is specifically aimed at storage and distribution of petroleum products at fuel retail facilities and consumer installations <ul style="list-style-type: none"> <li>○ Provide requirements for spill control infrastructure</li> </ul> </li> </ul>

The project is listed as an activity requiring an environmental clearance certificate as per the following points from Sections 1, 2 and 9 of Government Notice No. 29 of 2012:

***Section 1 of Government Notice No. 29 of 2012: Energy Generation, Transmission and Storage Activities***

- ◆ 1.1 (a) The construction of facilities for - the generation of electricity. The Proponent generates solar energy by means of solar panels fixed on the roof.

***Section 2 of Government Notice No. 29 of 2012: Waste Management, Treatment, Handling and Disposal Activities***

- ◆ 2.3 The import, processing, use and recycling, temporary storage, transit or export of waste. Various types of waste are temporarily stored and or treated on site.

***Section 9 of Government Notice No. 29 of 2012: Hazardous Substance Treatment, Handling and Storage***

- ◆ 9.1 “The manufacturing, storage, handling or processing of a hazardous substance defined in the Hazardous Substances Ordinance, 1974.” Fuel (diesel) is stored on site.
- ◆ 9.2 “Any process or activity which requires a permit, licence or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or authorisation or which requires a new permit, licence or authorisation in terms of a law governing the generation or release of emissions, pollution, effluent or waste.” Fuel is stored on site.
- ◆ 9.5 “Construction of filling stations or any other facility for the underground and aboveground storage of dangerous goods, including petrol, diesel, liquid petroleum gas or paraffin” Diesel is stored in aboveground tanks on site.

## **5 ENVIRONMENTAL CHARACTERISTICS**

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

### **5.1 LOCALITY AND SURROUNDING LAND USE**

The Wernhil Park Mall is located mainly between Mandume Ndemufayo Avenue, Wecke Street and Dr Frans Indongo Street on erven 8897, 5740, 5741, 8272 and Re/6871, in the central business district of Windhoek (-22.567476 °S, 17.081091 °E) (Figure 1-1). The erven which are zoned for commercial land use, are in an area with multiple commercial centres with similar zoning. The complex is located adjacent to the railway line, which is located west of the mall and adjacent to a fuel retail facility which is located south of the mall. A major public transport node is situated north of the mall, across Frans Indongo Street. East of the mall is Mandume Ndemufayo Avenue, followed by Town Square, a fuel retail facility, Cymot and various other smaller businesses and shops. Some sections of the mall are built above City of Windhoek property. The one section bridges a public street, Fidel Castro Street, and the second section, on the northern end bordering Dr Frans Indongo Street, is above a taxi rank. Both the street and taxi



rank are managed by the City of Windhoek. The Wernhill Park Mall is also connected to the Town Square commercial centre via two cross-over bridges extending over Mandume Ndemufayo Avenue.

**Implications and Impacts**

The site is situated in an area earmarked for commercial and business activities. Operations are thus similar in nature to surrounding properties. Traffic to and from the site is the most significant impact resulting from operations.

**5.2 CLIMATE**

The project location is part of a semi-arid highland savannah region. Heavy rainfall in this region is mostly common between January and March, peaking mostly in February, whilst May to September have little or no rainfall. The aridity of the region causes water resources to be a scarce commodity that has to be conserved and protected from pollution. A general summary of climatic conditions for the area is provided in Table 5-1. Table 5-2 presents the CHIRPS-2 (Climate Hazards Group Infra-Red Precipitation with Station data version 2) dataset on rainfall for the project area. It consist of long term rainfall data (1981 to near-present) obtained from satellite imagery and in-situ station data. The resultant dataset provides a reasonably well represented overview of the climatic conditions and historic weather conditions of a general area. True values for single, site specific meteorological events may however differ to some degree.

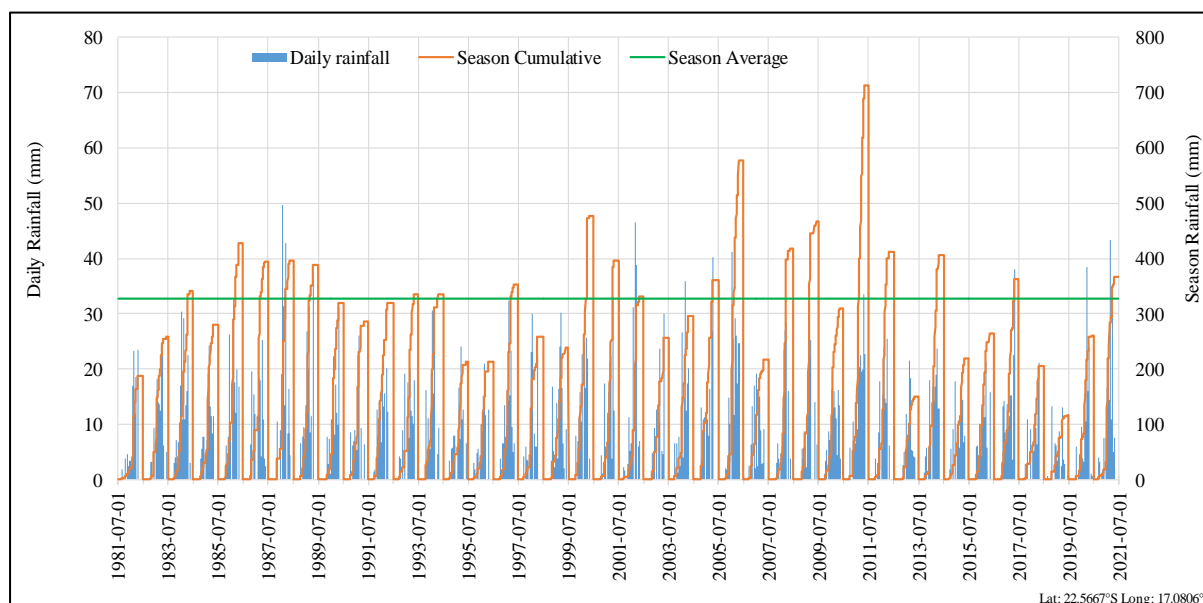
The average annual rainfall for the last 40 years was calculated as 327 mm/a, with a coefficient of variance of 35 % (Table 5-2). This coefficient of variance correlate with Atlas of Namibia Project data (Table 5-1). Daily and seasonal rainfall data (Funk et al., 2015) is presented in Figure 5-1. Seasonal (July to June) total rainfall, centred on the average line for the last 40 years, is presented, with the daily total rainfall and the seasonal cumulative rainfall. From the figure it is clear that Windhoek mostly experienced below average rainfall during the last decade.

**Table 5-1 Summary of Climate Data (Digital Atlas of Namibia)**

<b>Average annual rainfall (mm/a)</b>	300-350
<b>Variation in annual rainfall (%)</b>	30-40
<b>Average annual evaporation (mm/a)</b>	3,000-3,200
<b>Water deficit (mm/a)</b>	1,701-1,900
<b>Average annual temperatures (°C)</b>	19-20
<b>Windrose - Wind Direction and Speed: Period 1973 - 2022 (Mesonet, 2022)</b>	<p>[FYWE] Windhoek Windrose Plot Time Bounds: 20 Jun 1973 02:00 PM - 01 Jan 2022 11:00 AM Africa/Windhoek</p> <p>Summary obs count: 69580 Missing: 6495 Avg Speed: 3.1 mps</p> <p>Wind Speed [meter / second]          1.0 - 4.0    4.0 - 6.0    6.0 - 8.0    8.0 - 10.0    10.0 - 12.0    12.0+     </p>

**Table 5-2 Rainfall statistics for the project area (Funk et al., 2015)**

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Minimum (mm/m)	12.21	16.92	9.15	7.48	0.00	0.00	0.00	0.00	0.00	0.00	5.28	8.23
Maximum (mm/m)	268.45	266.38	149.28	143.53	9.02	4.99	0.15	1.92	7.15	41.81	70.81	106.47
Average (mm/m)	72.4	87.7	56.5	34.5	1.2	0.2	0.0	0.1	1.8	11.1	21.3	33.5
Variability (%)	74.0	62.0	63.0	87.0	204.0	410.0	436.0	463.0	134.0	82.0	69.0	70.0
Daily maximum (mm)	49.6	46.6	42.8	40.3	9.0	5.0	0.2	1.9	6.6	19.5	26.3	30.4
Average rain days	8	9	6	3	0	0	0	0	1	2	4	5
Season July - June average: 327 mm						Season coefficient of variation: 35 %						
Data range	1981-Jul-01 to					2021-Jun-30			Lat: 22.5667°S Long: 17.0806°E			

**Figure 5-1 Daily and seasonal rainfall (Funk et al., 2015)*****Implications and Impacts***

Rainfall events are typically thunderstorms with heavy rainfall that can occur in short periods of time (cloud bursts) which may result in floods. Heavy rainfall events may result in the leaching of pollutants or hazardous substances into groundwater as well as runoff into surface waters. Such events may also flood infrastructure such as the parking area, surrounding streets and stormwater drains. The extreme variability in seasonal rainfall makes water an extremely vulnerable resource.

**5.3 TOPOGRAPHY AND DRAINAGE**

The regional topography of the area can be described as a wide graben valley sloping north inside the surrounding hilly terrain. The valley floor is relatively flat compared to the surrounding terrain (Komas Hochland to the west and Eros Mountains to the east) where moderate to steep slopes are the norm. A very distinct mountain range (Auas Mountains) cuts across the valley south of the city and divides the valley into two parts, with the southern part draining to the south. The topography is strongly related to the historic geological structural activities that took place in the area. These can be summarised as a graben structure striking roughly from north to south and thrusting that is evident along the Auas Mountains.

Regional drainage tend to be in a northern direction. The site is located on the western edge of the catchment of the Klein Windhoek River, a tributary of the Swakop River. The on-site surface drainage is heavily impacted by anthropogenic activities, but is expected to be mainly in an eastern direction from the site. The site has a low relief with a slope of < 5°.

***Implications and Impacts***

Any pollutants that are not contained and are transported via surface water flow, will flow out of the site via storm water drainage lines and potentially pollute the natural environment. Cumulative effects may be considered for the Klein Windhoek River and the Swakoppoort Dam.

**5.4 GEOLOGY AND HYDROGEOLOGY**

Metasedimentary rocks of the Namibian Age constitute the regional geology of the study area, consisting of rocks from the Damara Sequence. The Damara Sequence is locally subdivided into the Swakop Group rocks. The Kuiseb Formation make up the Swakop Group and include amphibolite, schist, micaceous quartzite and quartzite. The project location is situated on an alluvium deposit (sand) and is underlain by the Kuiseb Formation rocks (schist).

The metamorphic formations of the study area strike in a west-south-westerly direction and dip 15-35° to the north-northwest. The structural geology of the Windhoek area is complex as a result of numerous episodes of folding, faulting, thrusting and rifting. A number of north- to north-westerly striking faults and joints found in Windhoek form the major underground water conduits and therefore determine the conditions of the aquifer. A shallow alluvium basin overlay these formations within the Windhoek Graben Valley. Host rock fracturing along fault planes results in better development of secondary porosity in quartzite compared to schistose terrain, which is prone to plastic deformation rather than brittle fracturing. The quartzite therefore exhibits significantly higher secondary porosity and permeability, compared to the micaceous schist.

The mall is located north of the Windhoek Wellfield Areas, in an area where less strict control on potential pollution sources are placed (Figure 5-2). Based on the Windhoek Environmental Structure Plan the project location falls within a zone of medium to high geological sensitivity due to the underlying alluvium, with high sensitivity around the major fault to the east of the project area (Figure 5-3Figure 5-2). The project location is situated in the Okahandja Groundwater Basin. Flow along preferred flow paths might be in different directions, but the larger scale flow is still expected to be in a northerly direction. This area falls in the Windhoek-Gobabis Subterranean Water Control Area (Extension). The groundwater is therefore a permit controlled area. Groundwater remains the property of the Government of Namibia.

The groundwater level in a 5 km radius around the mall can be as little as one meter below surface. Groundwater flow is expected to take place through primary porosity in the surface cover, while it is expected to flow along fractures, faults (secondary porosity) and other geological structures present within the underlying formations (hard rock formations). Groundwater flow from the site can be expected in a northerly direction. Local flow patterns may vary due to groundwater abstraction. Water is utilized in the area, with at least 26 boreholes known of within a 5 km radius (Table 5-3).



Figure 5-2 Inferred groundwater flow and groundwater basins

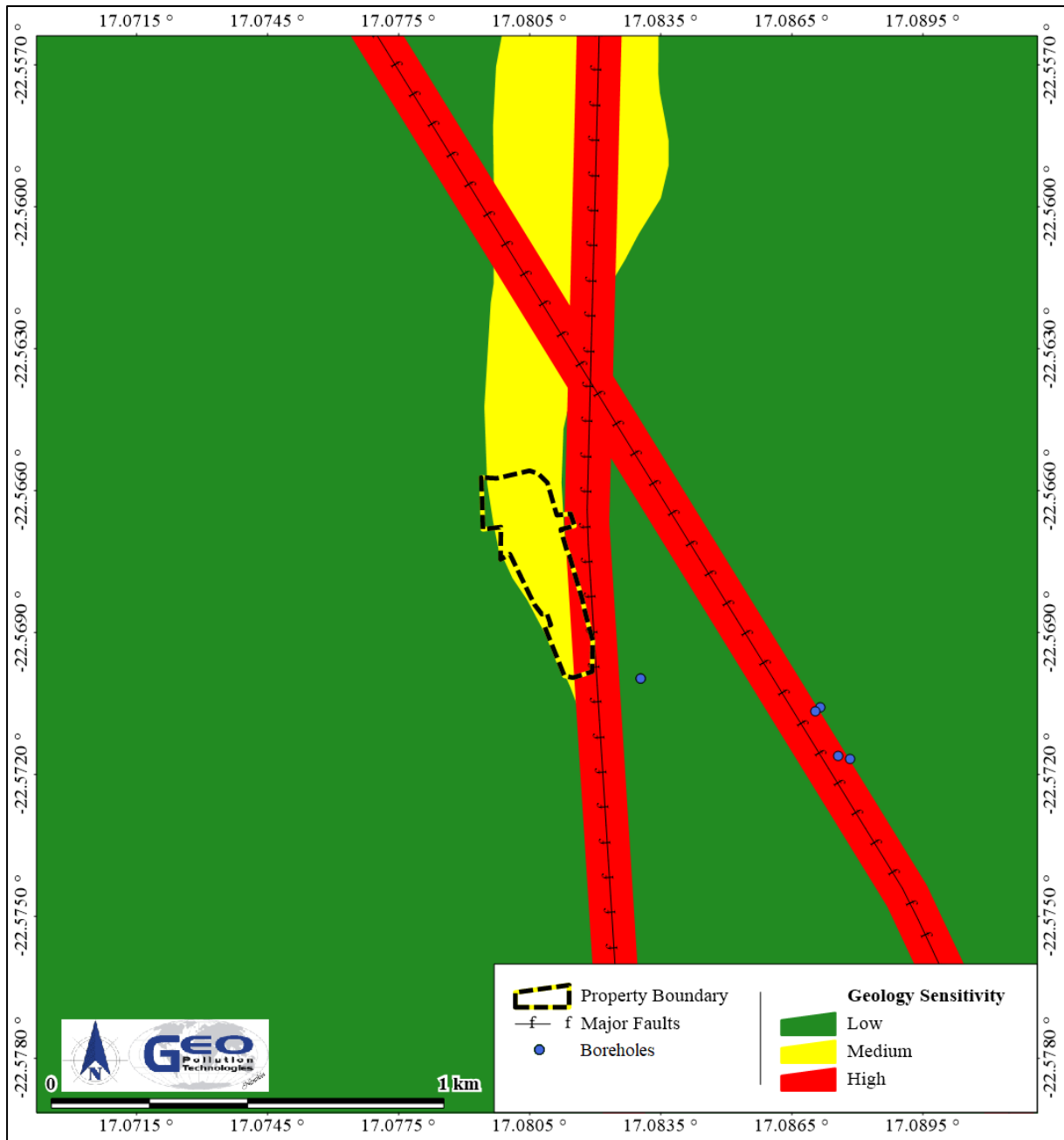



Figure 5-3 Geological sensitivity (Botha et al., 2020)

**Table 5-3 Borehole data**

Query Centre: Wernhil Park Mall; -22.5667°S; 17.0806°E		Query Box Radius: 5.0km										
		NUMBER OF KNOWN BOREHOLES	LATITUDE	LONGITUDE	DEPTH (mbs)	YIELD (m <sup>3</sup> /h)	WATER LEVEL (mbs)	WATER STRIKE (mbs)	TDS (ppm)	SULPHATE (ppm)	NITRATE (ppm)	FLUORIDE (ppm)
Data points		26			23	21	22	16	18	16	17	17
Minimum			-22.521704	17.031873	38	2	1	18	30	50	0	0
Average					189	41	41	63	542	139	3	1
Maximum			-22.611696	17.129327	524	91	104	128	1439	500	36	4
Group A					8.70%	90.48%	18.18%	0.00%	94.44%	81.25%	88.24%	88.24%
Limit					50	>10	10	1000	200	10	1.5	
Group B					8.70%	0.00%	54.55%	43.75%	5.56%	18.75%	5.88%	5.88%
Limit					100	>5	50	50	1500	600	20	2.0
Group C					39.13%	9.52%	22.73%	31.25%	0.00%	0.00%	5.88%	0.00%
Limit					200	>0.5	100	100	2000	1200	40	3.0
Group D					43.48%	0.00%	4.55%	25.00%	0.00%	0.00%	0.00%	5.88%
Limit					>200	<0.5	>100	>100	>2000	>1200	>40	>3

Statistical grouping of parameters is for ease of interpretation, except for the grouping used for sulphate, nitrate and fluoride, which follow the Namibian guidelines for the evaluation of drinking-water quality for human consumption, with regard to chemical, physical and bacteriological quality. In this case the groupings has the following meaning:

Group A: Water with an excellent quality

Group B: Water with acceptable quality

Group C: Water with low health risk

Group D: Water with a high health risk, or water unsuitable for human consumption.

#### **Implications and Impacts**

A medium risk to groundwater is expected due to the medium geological sensitivity of the area. This is mainly due to the subsurface geology of highly permeable alluvium with less permeable mica schist there under. Chemicals and waste stored on site have the potential to pollute the groundwater should a spill occur. Groundwater remains an important resource and would be a risk if fuel spills are not contained, cleaned and disposed of properly.

### **5.5 PUBLIC WATER SUPPLY**

Water consumption in Windhoek is well managed by means of water demand management. Nevertheless, available water is one of the city's most scarce resources and represents a constraint for sustainable development in future. Consumption will increase with the soaring influx of people to the city.

Listed in order of resource development, Windhoek receives its water from boreholes in and around town, reclaimed water (New Goreangab Water Reclamation Plant), and a NamWater Scheme that transfers water from the Von Bach Dam, the Swakoppoort Dam, the Omatako Dam and the Grootfontein Karst Area. The city also conducts artificial recharge of the Windhoek aquifer and is extending this scheme through the installation of new recharge boreholes as well as the development of deeper abstraction boreholes, 400 to 500 m deep. This clearly illustrates the value of the aquifer. The boreholes are the second most important water resource of the city and the sustained use of the aquifer needs to be assured.

The Wernhil Park Mall is located within the Swakoppoort Dam catchment which is important in terms of public water supply for the central areas of Namibia. The Swakoppoort Dam forms one of the three dams that supply water to the central areas of Namibia.

***Implications and Impacts***

Groundwater is a source of potable water and as such public water supply is at risk if significant pollution occurs on site. The likelihood that the Municipal water supply boreholes are impacted by pollution from this facility is low, but other groundwater users nearby might be at risk.

**5.6 FAUNA AND FLORA**

Windhoek lies in the centre of the Savanna vegetation zone. Trees such as *Acacia hereroensis*, *Combretum apiculatum*, *Acacia reficiens* and a variety of other acacia trees are characteristic of this zone. Table 5-4 and Table 5-5 present a summary of the general fauna and flora of the area. The property is completely built up and void of all vegetation apart from ornamental plants.

**Table 5-4 General Flora Data (Atlas of Namibia Project, 2002)**

<b>Biome</b>	Savanna
<b>Vegetation type</b>	Highland shrubland
<b>Vegetation structure type</b>	Dense shrubland
<b>Diversity of higher plants</b>	Highest (Diversity rank = 1 [1 to 7 representing highest to lowest diversity])
<b>Number of plant species</b>	More than 500
<b>Percentage tree cover</b>	11-25
<b>Tree height (m)</b>	2-5
<b>Percentage shrub cover</b>	11-25
<b>Shrub height (m)</b>	1-2
<b>Percentage dwarf shrub cover</b>	2-10
<b>Dwarf shrub height (m)</b>	< 0.5
<b>Percentage grass cover</b>	26-50
<b>Grass height (m)</b>	<0.5
<b>Dominant plant species 1</b>	<i>Acacia hereroensis</i>
<b>Dominant plant species 2</b>	<i>Combretum apiculatum</i>
<b>Dominant plant species 3</b>	<i>Acacia reficiens</i>
<b>Dominant plant species 4</b>	<i>Acacia hebeclada</i>
<b>Dominant plant species 5</b>	<i>Ziziphus mucronata</i>
<b>Dominant plant species 6</b>	<i>Searsia Species</i>

**Table 5-5 General Fauna Data (Atlas of Namibia Project, 2002)**

<b>Mammal Diversity</b>	61 - 75 Species
<b>Rodent Diversity</b>	20 - 23 Species
<b>Bird Diversity</b>	> 230 Species
<b>Reptile Diversity</b>	71 - 80 Species
<b>Snake Diversity</b>	35 - 39 Species
<b>Lizard Diversity</b>	> 35 Species
<b>Frog Diversity</b>	8 - 11 Species
<b>Termite Diversity</b>	7 - 9 Genera
<b>Scorpion Diversity</b>	18 - 21 Species

***Implications and Impacts***

Operations are existing and located on a developed property. No immediate threat to biodiversity in the area is expected, however, uncontrolled pollution may and can cause damage to any biodiversity of the area.

Contribution and continued efforts to environmental conservation has not only directly benefitted the environment, but also has a significant cumulative impact on the conservation of the Namibian environment and its related tourism potential, which is one of the main economic drivers in Namibia.

## 5.7 DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

The project area falls within capital city of Namibia, Windhoek, situated within the Khomas Region. Windhoek is the largest and most densely populated town in Namibia and is the main hub of commerce and industry. As a result, a continuous influx of job seekers into Windhoek occur, which in turn increases the size of informal settlements in the area. See Table 5-6 for a summary of the main demographic statistics of Windhoek, the region and nationally. The industrial area has established businesses and industries and plays an important part in the economic sector of Windhoek and Namibia as a whole.

**Table 5-6 Demographic characteristics of Windhoek the Khomas Region and Nationally (Namibia Statistics Agency, 2011)**

	Windhoek	Khomas Region	Namibia
Population (Males)	159,600*	164,600	1,021,912
Population (Females)	162,800*	167,700	1,091,165
Population (Total)	322,500	332,300	2,113,077
Unemployment (15+ years)	N/A	21.7%	33.8%
Literacy (15+ years)	N/A	95.7%	87.7%
Education at secondary level (15+ years)	N/A	60.4%	51.2%
Households considered poor	N/A	5.8%	19.5%

\*Data available from preliminary results only (National Planning Commission, 2012)

### ***Implications and Impacts***

Operations of the Proponent enables not only remuneration for employment, but also important resource contributions to the community. Significant impacts, especially in terms of employment within the commercial and service sector.

## 5.8 HERITAGE, CULTURAL AND ARCHAEOLOGICAL ASPECTS

Significant sites or objects of heritage, cultural and archaeological value nearby include, but is not limited to, the Gibeon Meteorites, the site of relics of a prehistoric elephant, Oudstryders Memorial and two churches. No known archaeological resources have been noted at the site of establishment of the Wernhil Park Mall.

### ***Implications and Impacts***

No impact on any heritage, cultural and archaeological sites are expected from operations of the Wernhil Park Mall.

## 6 ENVIRONMENTAL MANAGEMENT PLAN

The purpose of this section is to list the most pertinent environmental impacts that are expected from the operational, construction (upgrades, maintenance, etc.) and potential decommissioning activities of the Wernhil Park Mall.

### 6.1 OBJECTIVES OF THE EMP

The EMP provides management options to ensure impacts of the mall is minimised. An EMP is a tool used to take pro-active action by addressing potential problems before they occur. This should limit the corrective measures needed, although additional mitigation measures might be included if necessary. The environmental management measures are provided in the tables and descriptions below. These management measures should be adhered to during the various phases of the operation of the mall. This section of the report can act as a stand-alone document. All personnel taking part in the operations of the mall and all tenants or service providers should be made aware of the contents in this section, so as to plan the operations accordingly and in an environmentally sound manner.



The objectives of the EMP are:

- ◆ to include all components of construction activities (upgrades, maintenance, etc.) and operations of the lodge;
- ◆ to prescribe the best practicable control methods to lessen the environmental impacts associated with the lodge;
- ◆ to monitor and audit the performance of operational personnel in applying such controls; and
- ◆ to ensure that appropriate environmental training is provided to responsible operational personnel.

## **6.2 IMPLEMENTATION OF THE EMP**

Section 6.3 outline the management of the environmental elements that may be affected by the different activities. Impacts addressed and mitigation measures proposed are seen as minimum requirements which have to be elaborated on. Delegation of prevention and mitigation measures as well as reporting activities, should be determined by the Proponent and included in the EMP. The EMP is a living document that must be prepared in detail, and regularly updated, by the Proponent as the project progress and evolve.

The EMP and ECC must be communicated to the mall management and tenants. A copy of the ECC and EMP should be kept on site. All monitoring results must be reported on as indicated. Reporting is important for any future renewals of the ECC and must be submitted to the MEFT. Renewal of ECC will require six monthly reports based on the monitoring prescribed in this EMP.

Various potential and definite impacts will emanate from the operations and decommissioning phases. The majority of these impacts can be mitigated or prevented. The prevention and mitigation measures are listed below.

## **6.3 MANAGEMENT OF IMPACTS: OPERATIONS AND CONSTRUCTION**

### **6.3.1 Planning**

Planning is an ongoing process and includes planning for construction, operations, and decommissioning of the Wernhil Park Mall. As part of the planning phase, it is the responsibility of the Proponent to ensure they, and their tenants, remain, compliant with all legal requirements that govern the respective activities executed at the mall. All required management measures must be in place prior to and during all phases, to ensure potential environmental impacts and risks are minimised. Typical planning activities include:

- ◆ Incorporate relevant EMP parameters into tenants' contracts.
- ◆ Obtain permits and approvals from local and national authorities, inclusive of a municipal business registration certificate (Proponent and tenants).
- ◆ Ensure continued compliance to land use rights (Proponent and tenants).
- ◆ Appoint a health, safety and environmental coordinator to implement the EMP and prepare and update various emergency response plans, waste management plans, etc. (Proponent).
- ◆ Provide for a fund to cater for environmental incidents such as pollution clean-up and ecological restoration if ever required (Proponent and if applicable also tenants).
- ◆ Ensure all appointed contractors and employees enters into an agreement with the Proponent, which includes the EMP (Proponent).
- ◆ Establish and / or maintain a reporting system to report on aspects of construction and maintenance, operations and decommissioning as outlined in the EMP and as required by the DEA (Proponent).
- ◆ Make provisions to have a Health, Safety and Environmental Coordinator to implement the EMP and oversee occupational health and safety as well as general environmental related compliance at the site.
- ◆ Have the following emergency plans, equipment and personnel on site where reasonable to deal with all potential emergencies:

- Risk management / mitigation / EMP/ Emergency Response Plan and HSE Manuals
  - Adequate protection and indemnity insurance cover for incidents;
  - Comply with the provisions of all relevant safety standards;
  - Procedures, equipment and materials required for emergencies.
- ◆ Update the EMP and apply for an amendment application should any of the listed activities of the EMA be triggered.
  - ◆ Apply for renewal of the ECC prior to its expiry (once every three years)

### **6.3.2 Skills, Technology and Development**

Various infrastructure components at the Wernhil Park Mall are specialised, which require specialised skills for operations (such as the maintenance of escalators, lifts, photovoltaic solar system, etc.). Skills development and training continuously benefit employees and contractors involved in the maintenance and operation of such components. New technologies are continuously considered and invested in for smaller components and by certain tenants. Periodic maintenance, upgrades and repairs benefit local contractors whose employees are also periodically trained.

**Desired Outcome:** To see an increase in skills of local Namibians, as well as development and technology advancements in the manufacturing industry.

#### **Actions**

##### **Enhancement:**

- ◆ If the skills exist locally, employees and contractors must first be sourced from the town, then the region and then nationally. Deviations from this practice must be justified.
- ◆ Skills development and improvement programs to be made available as identified during performance assessments.
- ◆ Employees to be informed about parameters and requirements for references upon employment.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ Record should be kept of training provided.
- ◆ Ensure that all training is certified or managerial reference provided (proof provided to the employees) inclusive of training attendance, completion and implementation.
- ◆ Bi-annual summary report on all training provided.

### **6.3.3 Revenue Generation and Employment**

The change in land use has led to changes in the way revenue is generated and paid to the national treasury over the last 30 years. The establishment is considered to be a major employer. Not only does the mall employ people directly, but indirect employment through contractors such as cleaning services, security and tenants, sustains over a thousand jobs in the commercial sector. Continued employment in the private sector increases the economic resilience of employees and contributes to the overall revenue generation in Namibia. Employment is sourced locally while skilled labour/contractors may be sourced from other regions. The mall itself is a revenue generating facility through the provision of essential and luxury commodities and services.

**Desired Outcome:** Contribution to national treasury and provision of employment to local Namibians.

#### **Actions**

##### **Enhancement:**

- ◆ The Proponent must employ local Namibians where possible.
- ◆ If the skills exist locally, employees must first be sourced from the town, then the region and then nationally.
- ◆ Deviations from this practice must be justified.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ Bi-annual summary report based on employee records.

### **6.3.4 Demographic Profile and Community Health**

The project is reliant on labour with a significant workforce. Impacts related to the demographic profile and community health relate to the influx of people to Windhoek (job-seekers) and the transport industry, and the potential social ills and deviant behaviour that often accompany such events. This includes the spread of communicable diseases such as HIV/AIDS and increased criminal activities. Additional employment opportunities also mean more spending power which can lead to increased misuse of alcohol and drugs. The cumulative impact on the demographic profile, (immigration towards Windhoek) (urbanisation) of people in search of employment may lead to an increase of informal settlements within which social ills and communicable disease like HIV/AIDS and alcoholism/drug abuse disease may be more prevalent. However, the establishment, being such a large employer will contribute to various, indirect positive demographic drivers in the community. Increased economic resilience of employees increases their ability to provide necessities key to longevity such as access to healthcare and food for themselves and their families. Thereby, the fertility and mortality rate of the local demographic profile may be affected. It is however a highly cumulative impact which strives to improve the negative trending status quo.

**Desired Outcome:** To prevent the in-migration and growth in informal settlements, prevent the spread of communicable disease and prevent / discourage socially deviant behaviour.

#### **Actions:**

##### **Enhancement / Prevention:**

- ◆ Employ only local people from the area, deviations from this practice should be justified appropriately.
- ◆ Appointment of reputable contractors where applicable.
- ◆ Adhere to all local authority by-laws relating to environmental health which includes, but is not limited to, sanitation requirements for employees, tenants and patrons.
- ◆ Provide educational, awareness information for employees on various topics of social behaviour and HIV/AIDs.
- ◆ Disciplinary steps, within the legal parameters of Namibia, to be taken for socially deviant behaviour during working hours should be clearly stipulated in employment and tenant contracts.

##### **Mitigation:**

- ◆ Take disciplinary action against employees not adhering to contractual agreements with regard to socially deviant behaviour (e.g. alcohol or drug abuse during working hours).

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ Facility inspection sheet for all areas which may present environmental health risks, kept on file.
- ◆ Bi-annual summary report based on educational programmes and training conducted.

### 6.3.5 Traffic

The Wernhil Park Mall is a major attraction in the central business district of Windhoek. To accommodate patrons, the mall was upgraded to include 1,800 parking bays which are accessed by a variety of mall entrances. In addition the mall is partially built over a public transport node (taxi rank) with an additional tax rank located north of the mall. The high volume of vehicular and pedestrian traffic increases the collision and incidents risk in the surrounding streets. Dedicated delivery areas allows for heavy motor vehicle access away from the public entrances. Should traffic related problems exist, a combined initiative, from all businesses together with the City of Windhoek, should be considered to address possible issues such as traffic congestion and road degradation.

**Desired Outcome:** Minimum impact on traffic and no transport or traffic related incidents.

#### **Actions**

##### **Prevention:**

- ◆ Erect clear signage regarding access and exit points to parking areas as well as speed limits in parking areas.
- ◆ Trucks making deliveries or doing pick-ups may not be allowed to park in streets for extended periods or be allowed to obstruct neighbouring properties' entrances.
- ◆ Maintain optimal functioning of the parking payment system and booms to ensure traffic does not backup into surrounding streets.

##### **Mitigation:**

- ◆ If any traffic impacts are expected, possibly as a result of delivery of equipment or construction material, traffic management should be performed to prevent these.
- ◆ Speed calming infrastructure may be considered in parking areas.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ Any complaints received regarding traffic issues should be recorded together with action taken to prevent impacts from repeating itself.
- ◆ A bi-annual report should be compiled of all incidents reported, complaints received, and actions taken.

### 6.3.6 Health, Safety and Security

Activities associated with the operational phase is reliant on human labour and therefore exposes them to health and safety risks. Activities such as the operation or maintenance of machinery and handling of hazardous chemicals, poses the main risks to employees. Storage of incompatible chemicals in close proximity to each other may result in flammable, explosive or toxic conditions when cross-contamination occur. This include storage of cleaning materials or potentially hazardous stock in shops (e.g. swimming pool chlorine and acids). *Legionella* and other bacteria may proliferate under optimum conditions in water sources such as water coolers and blind ending water pipes.

Security risks are related to unauthorized entry into the mall and individual shops, theft and sabotage.

**Desired Outcome:** To prevent injury, health impacts and theft.

#### **Actions**

##### **Prevention:**

- ◆ Implement and maintain an integrated health and safety management system, to act as a monitoring and mitigating tool.
- ◆ Comply with all health and safety standards as specified in the Labour Act and related legislation.
- ◆ All chemicals must be stored and handled according MSDS instructions. This includes segregation of incompatible products (e.g. acids and reducing agents).
- ◆ Clearly label dangerous and restricted areas as well as dangerous equipment and products. This include wet floors, areas with a danger of falling objects and during maintenance of escalators and elevators, etc.
- ◆ Provide all employees with required and adequate personal protective equipment (PPE) where required.
- ◆ Ensure that all personnel receive adequate training on the operational procedures of equipment and machinery and the handling of chemicals and hazardous substances. Ensure that staff understand the importance of segregating incompatible materials even if it is only empty packaging material with residual traces of chemicals. Also ensure that more than one employee is trained on these aspects to ensure an adequately trained and qualified person is always present on site to ensure appropriate handling and storage of chemicals (e.g. in the event of personnel being on leave).
- ◆ Train selected personnel in first aid and ensure first aid kits and equipment are available on site and regularly serviced/replaced.
- ◆ The contact details of all emergency services must be readily available.
- ◆ Implement a maintenance register for all equipment whose malfunction can lead to injury or exposure to hazardous substances (e.g. elevators).
- ◆ A *Legionella* risk assessment and management plan should be compiled which includes bi-annual inspection and analysis of water sources potentially containing *Legionella* (sources such as water cooler systems etc.).
- ◆ Equipment and commodities that will be locked away on site must be placed in a way that does not encourage criminal activities (e.g. theft).
- ◆ Ensure ample security is present to protect property, tenants and patrons.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ Any incidents must be recorded with action taken to prevent future occurrences.
- ◆ A bi-annual report should be compiled of all incidents reported. The report should contain dates when training were conducted and when safety equipment and structures were inspected and maintained.

### 6.3.7 Fire

Various materials stored in the mall and kept in shops are flammable and pose fire risks. Fires can result from incorrect handling of such materials, e.g. incorrect storage or cross-reactivity, from faulty electrical equipment, mechanically produced sparks, human error or be a deliberate malicious action. The site is located next to fuel retail facilities and built-up areas while being directly connected to two adjoining buildings, all of which increases the difficulty of fighting fires.

**Desired Outcome:** To prevent property damage, possible injury and impacts caused by uncontrolled fires.

#### **Actions:**

##### **Prevention:**

- ◆ Ensure an adequately functioning and regularly serviced fire detection and suppressant system is operational throughout the mall.
- ◆ Prepare a holistic fire protection and prevention plan. This plan must include evacuation plans and signage, an emergency response plan and a firefighting plan.
- ◆ All fire escapes and exits must be free of obstructions.
- ◆ Personnel training (safe operational procedures, firefighting, fire prevention and responsible housekeeping practices). All tenants should possess all necessary firefighting equipment with adequately trained personnel.
- ◆ Ensure all fuel and chemicals, are stored and handled according to MSDS and SANS instructions. Regular inspections of tenants' shops to ensure compliance should be conducted.
- ◆ Regular site, mechanical and electrical inspections and maintenance.
- ◆ Regular maintenance of firefighting equipment. Regular inspections of tenants' shops' firefighting equipment to ensure compliance should be conducted.
- ◆ Clean all spills / leaks of all chemicals and flammable materials according to MSDS instructions.
- ◆ Do not allow waste to accumulate and become a fire hazard.

##### **Mitigation**

- ◆ In case of a fire, initiate the necessary fire response measures including triggering of the alarm, contacting emergency services, evacuation, firefighting, etc.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors
- ◆ Tenants

##### **Data Sources and Monitoring:**

- ◆ A register of all incidents must be maintained. This should include measures taken to ensure that such incidents do not repeat themselves.
- ◆ A bi-annual report should be compiled of all incidents reported. The report should contain dates when fire drills were conducted and when fire equipment was tested and training given.



### 6.3.8 Noise

Malls are inherently noise environments with poor acoustic comfort as store music, environmental noise, people's voices, and steps culminate in a raised ambient noise level, which usually has a higher decibel rating than outside environments. Sources of disruptive noise in the mall vary over time with mall music seemingly being the main sources of aggravating sound, followed by mall activities (such as people walking, chairs dragging, alarms and children yelling) (Alnuman, Nasim & Ziad, 2020). Noise may affect the ability to work while, in some instances may lead to aggravating mental health challenges. Noise may also affect patrons and clients influencing the length of stay in a particular store or the mall itself. Limited industrial noise may be present during maintenance or repairs. In such instances elevated noise levels will have a higher impact on mall employees, tenants and patrons.

**Desired Outcome:** To prevent any nuisance and hearing loss due to noise generated.

#### **Actions**

##### **Prevention:**

- ◆ Follow the City of Windhoek guidelines for limits on noise pollution (Council Resolution 215/09/2006). The facility is situated in the central business district, a commercial area. Noise should be limited to 65 decibels (limit for commercial properties).
- ◆ All machinery employed in or around the mall must be regularly serviced to ensure minimal noise production (e.g. air conditioner motors, elevator motors, etc.).
- ◆ Tenants should ensure noise levels within their stores does not become a nuisance or health risk to mall patrons or nearby stores.

##### **Mitigation:**

- ◆ Hearing protectors as standard PPE for construction and maintenance workers in situations with elevated noise levels.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors
- ◆ Tenants

##### **Data Sources and Monitoring:**

- ◆ City of Windhoek guidelines.
- ◆ Maintain a complaints register.
- ◆ Bi-annual report on complaints and actions taken to address complaints and prevent future occurrences.

### 6.3.9 Waste Production

Various waste streams result from the operational phase. Waste may include hazardous waste associated with the handling of hydrocarbon products, chemicals, medical waste, batteries, etc.; recyclable wastes such as glass, metal, paper and plastic as well as organic waste; and domestic waste. Waste presents a contamination risk and when not removed regularly may become a fire and health hazard. Construction waste may include building rubble and discarded equipment. Contaminated soil and water are considered as hazardous wastes.

**Desired Outcome:** To reduce the amount of waste produced, and prevent pollution and littering.

#### **Actions**

##### **Prevention:**

- ◆ Develop a waste management plan which should categorise different waste streams (for both the mall management and tenants) and handling of such waste.
- ◆ Waste reduction measures must be implemented and motivated among tenants and all waste that can be re-used / recycled must be kept separate.
- ◆ Ensure adequate temporary waste storage facilities are available and that waste cannot be blown away by wind.
- ◆ Prevent scavenging (human and non-human) of stored waste.
- ◆ All regulations and by-laws relating to environmental health should be adhered to.
- ◆ As per the City of Windhoek town planning scheme, no refuse, rubble or other hazardous substance that may pollute groundwater may be dumped except at a site designated by Council as a waste disposal site.
- ◆ Waste should be disposed of regularly and at appropriately classified disposal facilities, this includes hazardous material (empty chemical containers, contaminated rugs, paper water and soil),
- ◆ All tenants to be held responsible for their own hazardous waste with safe disposal certificates issued.
- ◆ See the MSDS available from suppliers for disposal of contaminated products and empty containers.
- ◆ Continue to liaise with the municipality regarding waste, handling of hazardous waste and waste water.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors
- ◆ Tenants

##### **Data Sources and Monitoring:**

- ◆ A register of hazardous waste disposal should be kept. This should include type of waste, volume as well as disposal method/facility.
- ◆ Any complaints received regarding waste should be recorded with notes on action taken.
- ◆ All information and reporting to be included in a bi-annual report.

### **6.3.10 Ecosystem and Biodiversity Impact**

The property is already developed. No significant impact on the biodiversity of the area is predicted as operations is ongoing on the site. Impacts are mostly related to pollution of the environment.

**Desired Outcome:** To avoid pollution of and impacts on the ecological environment.

**Actions.**

**Mitigation:**

- ◆ Report any extraordinary animal sightings to the Ministry of Environment, Forestry and Tourism.
- ◆ Mitigation measures related to waste handling and the prevention of groundwater, surface water and soil contamination should limit ecosystem and biodiversity impacts.
- ◆ Avoid scavenging of waste by fauna.
- ◆ The establishment of habitats and nesting sites at the facility should be prevented where possible.

**Responsible Body:**

- ◆ Proponent

**Data Sources and Monitoring:**

- ◆ All information and reporting to be included in a bi-annual report.

### **6.3.11 Groundwater, Surface Water and Soil Contamination**

Operations entail the storage and handling of limited amounts of hazardous fuel (diesel for backup generators) and chemicals which present a potential environmental contamination risk. Contamination may either result from failing storage facilities, spills and leaks associated with incorrect handling, human error or incorrect disposal methods. Such spills may contaminate surface water, soil and groundwater.

**Desired Outcome:** To prevent the contamination of water and soil.

#### **Actions**

##### **Prevention:**

- ◆ Adhere to fuel storage permit conditions from Ministry of Mines and Energy (for any fuel storage of more than 200 litres).
- ◆ Spill control structures and procedures must be in place according to SANS standards or better for all fuel (standby generators) and chemical storage and handling areas.
- ◆ No more than 1,000 litres of fuel, specifically for on-site standby generators, may be stored on site, without prior approval, as per Windhoek Town Planning Scheme.
- ◆ The procedures followed to prevent environmental damage during service and maintenance, and compliance with these procedures, must be audited and corrections made where necessary.
- ◆ Proper training of operators must be conducted on a regular basis (fuel and chemical handling, spill detection, spill control).
- ◆ All drains leading directly into sewers must be closed off, and locked where possible, to prevent any unwanted products from entering sewers should an accidental spill, pipe burst, valve malfunction, etc. occur. Where drains are present to drain wash water, these should only be opened during times of washing and closed immediately thereafter.
- ◆ Any tenant producing industrial effluent must obtain a City of Windhoek's effluent disposal permit.
- ◆ The maintenance of any storm water pipe, channel or work shall be the responsibility of the Proponent (excluding the public transport facilities).

##### **Mitigation:**

- ◆ Any fuel spillage of more than 200 litre must be reported to the Ministry of Mines and Energy as per permit conditions.
- ◆ Any spill must be cleaned up immediately and spill clean-up means must be readily available on site as per the relevant MSDS.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors

##### **Data Sources and Monitoring:**

- ◆ A report should be compiled bi-annually of all spills or leakages of fuel or chemicals as well as all effluent monitoring results.
- ◆ The report should contain the following information: date and duration of spill, product spilled, volume of spill, remedial action taken, where applicable comparison of pre-exposure baseline data (previous pollution conditions survey results) with post remediation data (e.g. soil/groundwater hydrocarbon concentrations) and for fuel spills a copy of documentation in which spill was reported to Ministry of Mines and Energy.

### **6.3.12 Visual Impact**

This impact is not only associated with the aesthetics of the site, but also the structural integrity. The mall was designed to form part of the urban character and uniquely located in the central business district serving as a point of interest to tourists and patrons to the area, it should be kept clean, tidy and maintained to ensure it remains aesthetically pleasing.

**Desired Outcome:** To minimise aesthetic impacts associated with the mall.

#### **Actions**

##### **Mitigation:**

- ◆ Regular waste disposal, good housekeeping and routine maintenance on infrastructure will ensure that the longevity of structures are maximised and a low visual impact is maintained.
- ◆ All components of the Wernhil Park Mall to be kept clean and neat.

##### **Responsible Body:**

- ◆ Proponent
- ◆ Contractors
- ◆ Tenants

##### **Data Sources and Monitoring:**

- ◆ A maintenance record should be kept.
- ◆ A bi-annual report should be compiled of all complaints received and actions taken.

### **6.3.13 Cumulative Impact**

Possible cumulative impacts associated with the operational phase include increased traffic in the area, noise, over abstraction of groundwater and potential water contamination.

**Desired Outcome:** To minimise cumulative all impacts associated with the facility.

#### **Actions**

##### **Mitigation:**

- ◆ Addressing each of the individual impacts as discussed and recommended in the EMP would reduce the cumulative impact.
- ◆ Reviewing biannual reports for any new or re-occurring impacts or problems would aid in identifying cumulative impacts and help in planning if the existing mitigations are insufficient.

##### **Responsible Body:**

- ◆ Proponent

##### **Data Sources and Monitoring:**

- ◆ Bi-annual report on all other impacts must be created to give an overall assessment of the impact of the operational phase.

#### **6.4 DECOMMISSIONING AND REHABILITATION**

Decommissioning is not foreseen during the validity of the environmental clearance certificate. Decommissioning was however assessed as construction activities include modification and decommissioning. Should decommissioning occur at any stage, rehabilitation of the area may be required. Decommissioning will entail the complete removal of all infrastructure including buildings and underground infrastructure. Any pollution present on the site must be remediated. The impacts associated with this phase include noise and waste production as structures are dismantled. Noise must be kept within City of Windhoek standards and waste should be contained and disposed of at an appropriately classified and approved waste facility and not dumped in the surrounding areas. Should the facility be decommissioned, the positive impacts of employment, revenue generation and development will no longer be present. Future land use after decommissioning should be assessed prior to decommissioning and rehabilitation initiated if the land would not be used for future purposes. The environmental management plan for the facility will have to be reviewed at the time of decommissioning to cater for changes made to the site and implement guidelines and mitigation measures.

#### **6.5 ENVIRONMENTAL MANAGEMENT SYSTEM**

The Proponent could implement an Environmental Management System (EMS) for their operations. An EMS is an internationally recognized and certified management system that will ensure ongoing incorporation of environmental constraints. At the heart of an EMS is the concept of continual improvement of environmental performance with resulting increases in operational efficiency, financial savings and reduction in environmental, health and safety risks. An effective EMS would need to include the following elements:

- ◆ A stated environmental policy which sets the desired level of environmental performance;
- ◆ An environmental legal register;
- ◆ An institutional structure which sets out the responsibility, authority, lines of communication and resources needed to implement the EMS;
- ◆ Identification of environmental, safety and health training needs;
- ◆ An environmental program(s) stipulating environmental objectives and targets to be met, and work instructions and controls to be applied in order to achieve compliance with the environmental policy; and
- ◆ Periodic (internal and external) audits and reviews of environmental performance and the effectiveness of the EMS.
- ◆ The EMP.

## **7 CONCLUSION**

The operations of the Wernhil Park Mall contributes positively to the commercial sector operational in Namibia. In addition to various commodities supplied, the facility contributes locally to employment, skills transfer and training which in turn develops the local workforce. Potential and definite positive and negative impacts can be expected from the mall's operations. Positive impacts can be promoted/enhanced while negative impacts can be prevented or mitigated. The Proponent must appoint local contractors and employees as far as is practically possible and adhere to Namibian labour and health and safety legislation and regulations. All chemicals and fuel must be stored and handled according to the applicable MSDS and/or SANS standards or better. All personnel should be trained in the handling and storage of chemicals and dangerous goods. Noise levels should at all times meet the prescribed City of Windhoek guidelines for limits on noise pollution (Council Resolution 215/09/2006). Fire prevention and response should be adequate and meet the requirements of the local fire brigade. A waste management plan should be developed and any waste produced must regularly be removed from site and disposed of at an appropriate facility or re-used or recycled where possible. Hazardous waste must be disposed of at an approved hazardous waste disposal site.

The updated EMP should continue to be used as an on-site reference document for the operations of the mall. Relevant aspects should be communicated to tenants and become part of their contracts. Parties responsible for transgressing of the EMP should be held responsible for any rehabilitation that may

need to be undertaken. The Proponent could use an in-house environment management system in conjunction with the environmental management plan. All operational personnel, including tenants and contractors, must be taught the contents of these documents.



## 8 REFERENCES

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## **Appendix A: Environmental Clearance Certificate**





REPUBLIC OF NAMIBIA

MINISTRY OF ENVIRONMENT AND TOURISM

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25 July 2016

OFFICE OF THE ENVIRONMENTAL COMMISSIONER

The Managing member  
Broll Namibia  
Zanlunor Building  
P O Box 25824  
Windhoek

Dear Sir or Madam

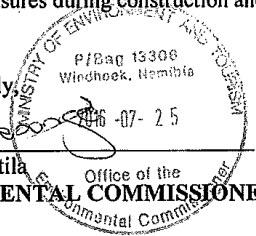
**SUBJECT: ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE PROPOSED UPGRADE OF THE EXISTING WERNHIL PARK SHOPPING MALL, WINDHOEK, KHOMAS REGION**

I acknowledge receipt of your Environmental Management Plan (EMP) for the upgrade of the Wernhil Park Shopping Mall and associated infrastructure.

The report contains a comprehensive analysis of environmental issues pertaining to adequate provisions for prevention, monitoring and mitigation of adverse effect on the environment. Therefore, the specified mitigation measures during construction and operation are sufficient.

Yours sincerely,

  
Teofilus Nghitila  
Office of the  
ENVIRONMENTAL COMMISSIONER



**"Stop the poaching of our rhinos"**



## **Appendix B: Consultant's Curriculum Vitae**





**ENVIRONMENTAL SCIENTIST****André Faul**

André entered the environmental assessment profession at the beginning of 2013 and since then has worked on more than 160 Environmental Impact Assessments including assessments of the petroleum industry, harbour expansions, irrigation schemes, township establishment and power generation and transmission. André's post graduate studies focussed on zoological and ecological sciences and he holds a M.Sc. in Conservation Ecology and a Ph.D. in Medical Bioscience. His expertise is in ecotoxicological related studies focussing specifically on endocrine disrupting chemicals. His Ph.D. thesis title was The Assessment of Namibian Water Resources for Endocrine Disruptors. Before joining the environmental assessment profession he worked for 12 years in the Environmental Section of the Department of Biological Sciences at the University of Namibia, first as laboratory technician and then as lecturer in biological and ecological sciences.

**CURRICULUM VITAE ANDRÉ FAUL**

Name of Firm	:	Geo Pollution Technologies (Pty) Ltd.
Name of Staff	:	ANDRÉ FAUL
Profession	:	Environmental Scientist
Years' Experience	:	21
Nationality	:	Namibian
Position	:	Environmental Scientist
Specialisation	:	Environmental Toxicology
Languages	:	Afrikaans – speaking, reading, writing – excellent English – speaking, reading, writing – excellent

**EDUCATION AND PROFESSIONAL STATUS:**

B.Sc. Zoology	:	University of Stellenbosch, 1999
B.Sc. (Hons.) Zoology	:	University of Stellenbosch, 2000
M.Sc. (Conservation Ecology)	:	University of Stellenbosch, 2005
Ph.D. (Medical Bioscience)	:	University of the Western Cape, 2018

First Aid Class A	EMTSS, 2017
Basic Fire Fighting	EMTSS, 2017

**PROFESSIONAL SOCIETY AFFILIATION:**

Environmental Assessment Professionals of Namibia (Practitioner)

**AREAS OF EXPERTISE:**

Knowledge and expertise in:

- ◆ Water Sampling, Extractions and Analysis
- ◆ Biomonitoring and Bioassays
- ◆ Biodiversity Assessment
- ◆ Toxicology
- ◆ Restoration Ecology

**EMPLOYMENT:**

2013-Date	:	Geo Pollution Technologies – Environmental Scientist
2005-2012	:	Lecturer, University of Namibia
2001-2004	:	Laboratory Technician, University of Namibia

**PUBLICATIONS:**

Publications:	5
Contract Reports	+160
Research Reports & Manuals:	5
Conference Presentations:	1