



**City of Ekurhuleni**  
**Delmore Park Extension 8 Bulk Services**  
**Draft Environmental Management Programme**

**GDARD Reference Number: GAUT 002/20-21/E2798**

March 2021

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# City of Ekurhuleni

## Delmore Park Extension 8 Bulk Services

### Draft Environmental Management Programme

March 2021

Project Ref - 142

Prepared by: Suzanne van Rooy



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Signed:

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Date: March 2021

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## ***Abbreviations***

|       |   |
|-------|---|
| BAR   | Basic Assessment Report                                 |
| EAP   | Environmental Assessment Practitioner                   |
| ECO   | Environmental Control Officer                           |
| EIA   | Environmental Impact Assessment                         |
| EMPr  | Environmental Management Programme                      |
| GDARD | Gauteng Department of Agriculture and Rural Development |
| HGM   | Hydrogeomorphic   |
| NEMA  | National Environmental Management                       |
| NWA   | National Water Act                                      |
| SAHRA | South African Heritage Resources Agency                 |

# 1 INTRODUCTION AND BACKGROUND

An Environmental Management Programme (EMPr) is a site-specific plan developed to ensure that all necessary measures are identified and implemented in order to protect the environment and comply with environmental legislation.

A site-specific EMPr has been prepared for the management of all activities associated with the development of the Delmore Extension 8 Bulk Services project in order to confirm the likely environmental issues that may arise from the activities, the likely harm that these activities may pose on the surrounding environment and how these activities will be managed as to minimise any harm to the environment.

## 1.1 Introduction

An EMPr is a plan or programme that sets out guidelines that describe how activities that have or could have an adverse impact on the environment, will be mitigated, controlled, and monitored and subsequently achieve a required operational and/or end state.

The purpose of the EMPr is to provide for preventative, corrective and best practice measures to ensure that activities are undertaken in an environmentally responsible manner and that such activities are sustainable in the long term. The primary objectives of the EMPr, include, but are not limited to the following:

- Describe actions that when implemented will achieve mitigation of environmental impacts, or result in approved management of activities thereby reducing the probability of impacts occurring;
- Define organisational and administrative arrangements for environmental management and monitoring, including defining the responsibilities of staff and co-ordination, liaison and reporting procedures;
- Ensuring that discussions are held with the site supervision staff, regarding pro-active environmental management, such that potential problems can be identified and mitigation measures adopted prior to any work being carried out;
- Define the procedures to be followed as to ensure environmental control, in the event of pollution occurring that may require actions.

## 1.2 Content of the Environmental Management Programme

The EMPr has been structured in accordance with the requirements as specified in the NEMA EIA Regulations.

**Table 1: Requirements of an EMPr**

| No | Description   | Reference               |
|----|---|-------------------------|
| 1  | An EMPr must comply with Section 24N of the Act and include-  |                         |
| a) | details of:<br>(i) the EAP who compiled the EMPr; and<br>(ii) the expertise of the EAP to prepare an EMPr, including a curriculum vitae;  | Chapter 2<br>Annexure A |
| b) | a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;  | Chapter 3               |
| c) | a map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers; | Figure 1<br>Figure 2    |

| No | Description   | Reference                       |
|----|---|---------------------------------|
| d) | a description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including— <ul style="list-style-type: none"> <li>(i) planning and design;</li> <li>(ii) pre-construction activities;</li> <li>(iii) construction activities;</li> <li>(iv) rehabilitation of the environment after construction and where applicable post closure; and</li> <li>(v) where relevant, operation activities;</li> </ul>  | Chapter 5<br>Table 7<br>Table 8 |
| f) | a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraph (d) will be achieved, and must, where applicable, include actions to — <ul style="list-style-type: none"> <li>(i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</li> <li>(ii) comply with any prescribed environmental management standards or practices;</li> <li>(iii) comply with any applicable provisions of the Act regarding closure, where applicable; and</li> <li>(iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable;</li> </ul> | Chapter 5<br>Table 7<br>Table 8 |
| g) | the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);   | Chapter 9                       |
| h) | the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);  | Chapter 9                       |
| i) | an indication of the persons who will be responsible for the implementation of the impact management actions;   | Chapter 4                       |
| j) | the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;  | Table 7<br>Table 8              |
| k) | the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);   | Chapter 9                       |
| l) | a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;   | Chapter 9                       |
| m) | an environmental awareness plan describing the manner in which— <ul style="list-style-type: none"> <li>(i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and</li> <li>(ii) risks must be dealt with in order to avoid pollution or the degradation of the environment; and</li> </ul>  | Chapter 8                       |
| n) | any specific information that may be required by the competent authority.   | Not applicable                  |

## 2 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Table 2 provides the details of the Environmental Assessment Practitioner (EAP) for the Delmore Park Extension 8 Bulk Services project.

**Table 2: Details of the Environmental Assessment Practitioner**

|  |  |
|--|--|
| <b>Environmental Assessment Practitioner</b> | Suzanne van Rooy   |
| <b>Company</b>                               | Alta van Dyk Environmental Consultants cc                      |
| <b>Qualifications</b>                        | MPhil Environmental Management (University of Stellenbosch)    |
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### 2.1 Expertise of the Environmental Assessment Practitioner

Suzanne is a senior environmental scientist and has 13 years' experience as an environmental assessment practitioner, having worked largely in South Africa's mining sector. She is a professionally registered environmental scientist with the South African Council of Natural Scientific Professionals (registration number 400378/11). Her field of expertise includes the compilation of environmental impact assessments and environmental management programmes, environmental auditing and stakeholder engagement.

Refer to Annexure A for the curriculum vitae of the EAP.



### 3 PROJECT DESCRIPTION

#### 3.1 Project background

The City of Ekurhuleni has been granted environmental authorisation by the Gauteng Department of Agriculture and Rural Development (GDARD) to develop the proposed Delmore Park Extension 8 housing development (reference number GAUT 002/18-19/E2183). The proposed project is located on various portions of the farm Driefontein 85 IR in Boksburg. The proposed development requires bulk services, including water and sewer lines.

#### 3.2 Project description

The proposed bulk services project entails the construction of a bulk sewer pipeline and bulk water pipeline to provide services to the approved Delmore Park Extension 8 Development. The proposed Delmore Park Extension 8 Development is situated on the farm Driefontein 85 IR, portion 394, 397 and 521, in Boksburg, Gauteng Province. The development will consist of 2930 low-cost residential units in multiple-storey buildings and other uses such as educational, business, health, public transport and community facilities. The proposed bulk services pipelines will, where possible, run on the road reserve, or on open spaces. Refer to Figure 1 for a map of the project location.

The proposed bulk water supply line will be 1 600 m in length and will run from Main Reef Road (R29) in a southern direction along Station Road, underneath the railway line where it will connect with the Delmore Park Extension 8 pipe network.

The sewer line will include a new bulk sewer line (Delmore Park Main Branch) and replacement of a section of the existing Lilianton Main Outfall Sewer.

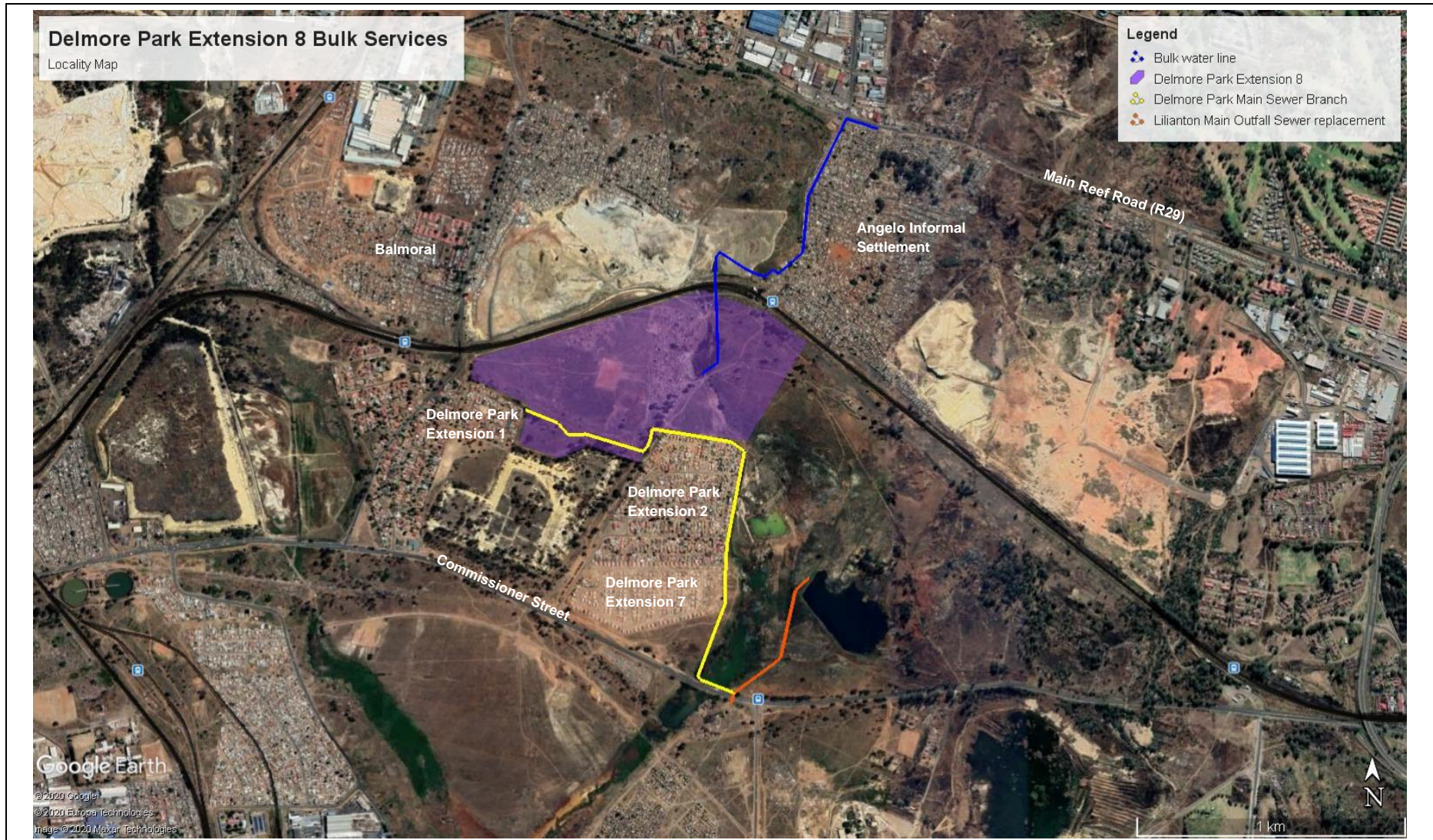
The new sewer line will be 2 000 m in length and will run from the existing Manhole 13 on the Lilianton Main Outfall Sewer, where it will cross a wetland and run along the eastern edge of Delmore Park Extension 7 and 2 in a northerly direction, make a west turn along the northern edge of Delmore Park Extension 2 and continue in a westerly direction to the north east point of Delmore Park Extension 1. This new Delmore Park Main Branch will collect sewerage from Delmore Park Extensions 1, 8, 2 and 7.

The section to be replaced on the Lilianton Main Outfall Sewer is 600 m in length and runs from Manhole 6 on the Lilianton Main Outfall Sewer in a southerly direction to Manhole 14.

Refer to Table 3 for general project details and Table 4 and Table 5 for specific details of the bulk sewer pipeline and bulk water pipeline specifically.

**Table 3: General project details**

| Details                   | Description                           |
|---------------------------|---------------------------------------|
| Location of the pipelines | Various portions of Driefontein 85 IR |
| Municipal Jurisdiction    | City of Ekurhuleni                    |
| Ward Number               | Ward 33<br>Ward 21                    |
| Nearest town              | Boksburg                              |



**DELMORE PARK EXTENSION 8 BULK SERVICES  
LOCALITY MAP**

**Figure 1**

**Figure 1: Locality map for the Delmore Park Extension 8 bulk services project**

**Table 4: Project details: Bulk sewer line**

| Details                          | Description  |
|----------------------------------|--|
| Length of pipeline               | 2 000m   |
| Diameter of pipeline             | 160mm to 400mm in diameter;  |
| Piping material                  | <ul style="list-style-type: none"> <li>• Pipes with diameters up to 450mm diameter: uPVC class 34 solid wall with slip-on couplings.</li> <li>• Pipes with diameters larger than 450mm diameter: HPDE Class PN 10 but welded.</li> </ul> |
| Excavated depth for the pipeline | 1.3 m to 4.5m  |
| Excavated width for the pipeline | 0.76m to 1.2m  |

**Table 5: Project details: Bulk water line**

| Details                          | Description   |
|----------------------------------|---------------|
| Length of pipeline               | 1 600m        |
| Diameter of pipeline             | 500mm         |
| Piping material                  | mPVC          |
| Excavated depth for the pipeline | 1.8m to 2m    |
| Excavated width for the pipeline | 0.76m to 1.2m |

### 3.3 Environmental related permits required

Triggered listed activities in terms of the National Environmental Management Act (Act No. 107 of 1998) (NEMA) 2014 Environmental Impact Assessment (EIA) Regulations (as amended in 2017) are shown in Table 6 below. Activities in Listing 1 and 3 are triggered by the proposed development, and therefore a Basic Assessment environmental authorisation process is followed.

**Table 6: Listed activities triggered by the Delmore Park Extension 8 bulk services project**

| Listed activity   | Description of project activity that triggers listed activity |
|---|---|
| <b>Activity 9 of Listing Notice 1</b><br>The development of infrastructure exceeding 1000 metres in length for the bulk transportation of water or storm water-<br>(i) With and internal diameter of 0.36 meters or more;<br>or<br>(ii) With a peak throughput of 120 litres per second or more | Development of a bulk water pipeline 1 600m in length.        |
| <b>Activity 10 of Listing Notice 1</b><br>The development and related operation of infrastructure exceeding 1000 metres in length for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes-                                    | Development of a bulk sewer pipeline 2 000m in length.        |

| Listed activity  | Description of project activity that triggers listed activity  |
|--|--|
| (i) With and internal diameter of 0.36 metres or more; or<br>(ii) With a peak throughput of 120 litres per second or more  |  |
| <b>Activity 12 of Listing Notice 1</b><br>The development of:<br>(ii) infrastructure or structures with a physical footprint of 100 square metres or more;<br>(a) within a watercourse;<br>(c) within 32 metres of a watercourse, measured from the edge of watercourse  | The proposed bulk sewer pipeline crosses a delineated wetland.   |
| <b>Activity 19 of Listing Notice 1</b><br>The infilling or depositing of any material of more than 10m <sup>3</sup> into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m <sup>3</sup> from a watercourse;  | Construction of the proposed sewer pipeline will involve excavation within a watercourse.  |
| <b>Activity 12 of Listing Notice 3</b><br>The clearance of an area of more than 300m <sup>2</sup> or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance development plan.<br>Gauteng:<br>(i) Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;<br>(ii) Within Critical Biodiversity Areas or Ecological Support Areas identified in the Gauteng Conservation Plan or bioregional plans; or<br>(iii) On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning. | Vegetation clearance will take place for the construction of both pipelines. The pipeline routes fall within an Ecological Support Area and Critical Biodiversity Area as per the Gauteng Conservation Plan. |

In addition, a Water Use Licence Application will be submitted in terms of the National Water Act (Act No. 36 of 1998) (NWA) as the following Section 21 water uses are triggered:

(c) and (i) impeding or diverting the flow of water in a watercourse, altering the bed, banks, course or characteristics of a watercourse (construction and operation of pipelines within a delineated wetland, or within 500m from a delineated wetland).

### 3.4 Sensitive areas

A sensitivity map was produced to visually represent the sensitivity of each wetland unit to the proposed development based on the findings of the wetland assessment. Refer to Figure 2. All identified wetland hydrogeomorphic (HGM) units were classified as having a High sensitivity while their associated buffers were assigned a Moderate-High sensitivity. Additionally, all artificial systems were classified as Moderate-Low and all other non-wetland areas within the 500 m regulated area were assigned a Low sensitivity from a wetland perspective.

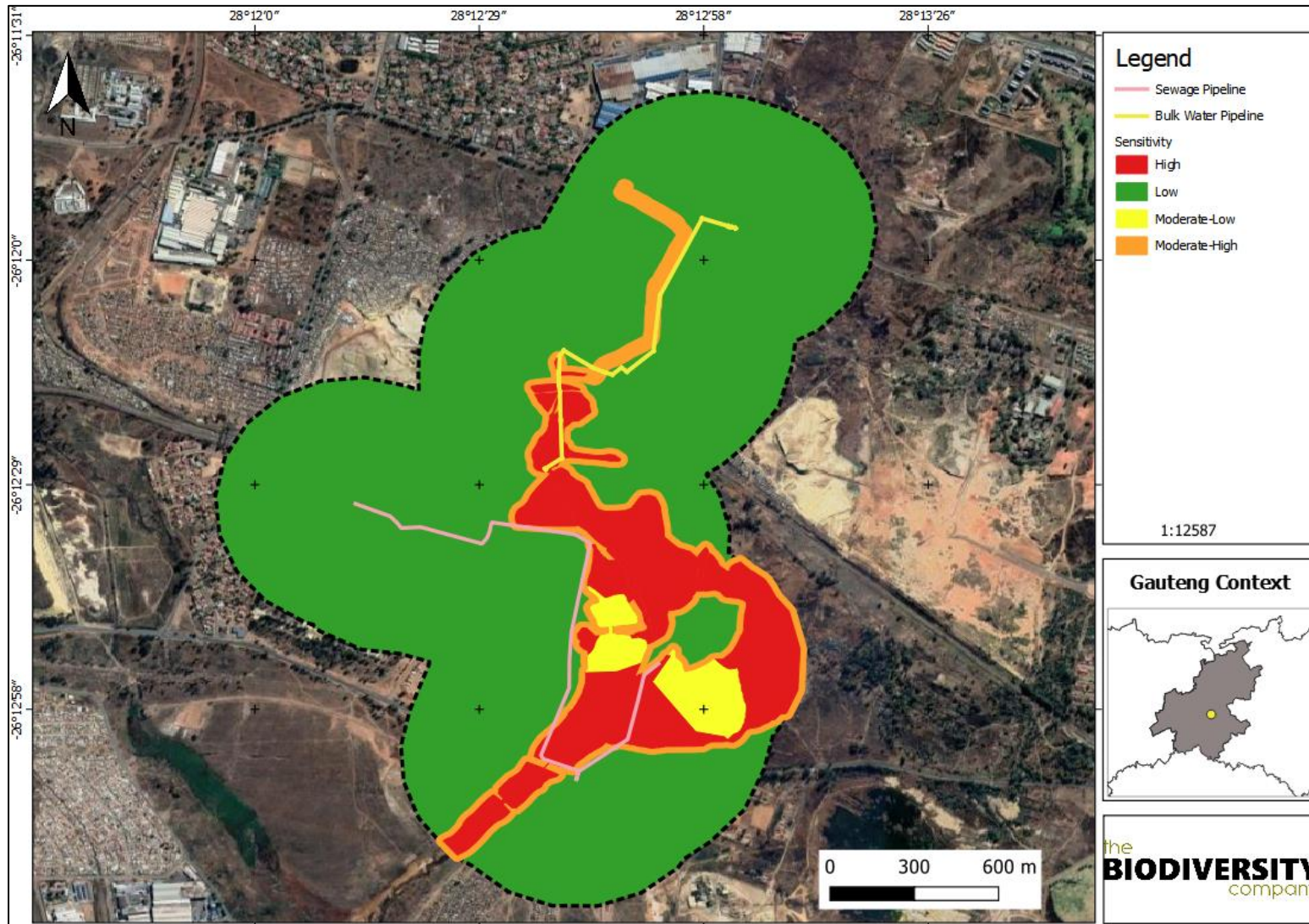


Figure 2: Wetland sensitivity map (TBC, 2020)

## **4 ROLES AND RESPONSIBILITIES**

The roles and responsibilities indicate which team member(s) are responsible for implementation of the identified mitigation measures, management plan and monitoring. The following parties will have roles and responsibilities in the implementation of this EMPr.

- Applicant (City of Ekurhuleni);
- Contractor;
- Operator;
- Environmental Manager; and
- Environmental Control Officer (ECO).

The roles and responsibilities of each party is described in the sections below.

### **4.1 Applicant**

City of Ekurhuleni is the applicant and will therefore be the entity monitoring the implementation of the EMPr and compliance with the authorisation. The following roles and responsibilities are assigned to the applicant:

- Ensure compliance with the conditions in the EMPr and environmental authorisation during all phases of the project;
- Ensure that contractors and operators undertake to adhere to all the provisions of the EMPr;
- Ensure that environmental monitoring takes place;
- Ensure that independent environmental audits are undertaken;
- Ensure that all monitoring and audit reports are submitted to the competent authority.

### **4.2 Contractor**

During the construction phase, the construction contractor will:

- Be responsible to have the EMPr available on site at all times;
- Appoint an ECO for the construction phase;
- Ensure that all mitigation measures for which they are responsible, are implemented as described in this EMPr; and
- Ensure that all problems identified during environmental inspections, are addressed and rectified as soon as reasonably possible.

### **4.3 Operator**

During the operational phase, the operator will:

- Be responsible to have the EMPr available on site at all times;
- Ensure that all mitigation measures for which they are responsible, are implemented as described in this EMPr; and
- Ensure that all problems identified during environmental inspections, are addressed and rectified as soon as reasonably possible.

#### **4.4 Environmental Manager**

The responsibilities of the environmental manager are as follows (during all phases of the project

- Implement environmental policies, procedures, and management plans
- Review and analysis of monitoring results and preparation of reports to management and stakeholders
- Planning of and carrying out environmental training programs for employees and contractors
- Obtaining and maintaining all necessary environmental permits in liaison with the legal manager
- Management of the environmental related components of the grievance mechanism
- Support the ECO in his/her roles and responsibilities.

#### **4.5 Environmental Control Officer**

The responsibilities of the ECO during all phases of the project are as follows:

- Inspections/audits of environmental protection requirements by employees and sub-contractors;
- Sampling and data capture in accordance with the environmental monitoring program and analysis of results; and
- Assistance with the preparation of environmental monitoring reporting and permit applications.

## **5 MITIGATION AND/OR MANAGEMENT MEASURES**

### **5.1 Pre-construction management measures**

A variety of potential impacts are associated with the construction activities for this project. These impacts can be categorised as general construction related impacts as well as construction impacts specifically related to this site. General best practice rules to construction should be followed at all times. In addition to this the specific mitigation measures and recommendations as highlighted by the Basic Assessment Report (BAR) and various specialists for this specific site is highlighted below.

Mitigation measures to be implemented during the construction and operational phases are presented in Table 7 and Table 8 respectively. As the project will a permanent facility, no mitigation for the closure phase have been included.



**Table 7: Mitigation measures to be implemented during the construction phase of the Delmore Park Extension 8 bulk services project**

| Construction               |   |  |  |  |
|----------------------------|---|--|--|--|
| Component                  | Management Outcomes   | Possible activity that may cause an impact           | Potential Environmental Impact                               | Management Measure   |
| Soils                      | Conservation of soils a resource  | Trench excavation and installation of infrastructure | Loss of soils to compaction and erosion                      | <ul style="list-style-type: none"> <li>All construction/operational and access must make use of the existing roads that can be found in and around the project area.</li> <li>A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use.</li> <li>No servicing of equipment on site during construction unless necessary.</li> <li>All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers.</li> <li>Compacted areas are to be ripped to loosen the soil structure where necessary.</li> <li>Erosion mitigation strategies and proper stormwater management must be considered to limit erosion within the development footprint area.</li> <li>Implement appropriate stormwater management measures, including the temporary diversion of upstream run-off from the construction and laydown areas.</li> <li>A rehabilitation strategy focussed on revegetation must be initiated after the construction phase.</li> </ul> |
| Vegetation                 | Limit the disturbance and destruction of vegetation, fauna and habitat<br>Protection of SCC                   | Site clearing and preparation                        | Spread and/or establishment of alien and/or invasive species | <ul style="list-style-type: none"> <li>Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.</li> <li>Compilation of and implementation of an alien vegetation management plan.</li> <li>A pest control plan must be put in place and implemented; it is imperative that poisons not be used.</li> </ul>   |
|                            |   |  | Loss of flora  | <ul style="list-style-type: none"> <li>Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.</li> <li>Pipeline areas to be rehabilitated immediately after construction and ensure that vegetation regrowth take place.</li> <li>Leaking equipment and vehicles must be repaired immediately or be removed from project area to facilitate repair.</li> </ul>  |
| Fauna                      | Protection of faunal species  | Site clearing and preparation                        | Impact on faunal species                                     | <ul style="list-style-type: none"> <li>A qualified environmental control officer must be on site when construction begins. The area must be walked through by a biologist prior to construction to ensure no faunal species remain in the habitat and get killed. Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated.</li> <li>Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site.</li> </ul>  |
| Surface water and wetlands | Minimise the potential for surface water and wetland<br>Conserve delineated wetlands<br>Conservation of water | Site clearing and preparation                        | Direct loss, disturbance and degradation of wetlands         | <ul style="list-style-type: none"> <li>Restrict all construction related activities to within the proposed pipeline servitude.</li> <li>Adhere to the prescribed wetland buffers for secondary activities. Restrict all secondary activities (e.g. laydown yards, storage areas, cement mixing and equipment to outside of wetlands and their prescribed buffers.</li> <li>Consider above ground crossings over wetland areas. Alternatively, open trench crossings are permissible but backfilling and rehabilitation must be undertaken. Open trench crossings must be achieved during the dry season period.</li> <li>Indicate delineated wetlands on site layout plans. Load wetland spatial data onto a GPS and use it to mark out the positions where the pipeline will enter and exits the prescribed buffer on the boundary of a wetland. Try to reduce the disturbance footprint and the unnecessary clearing</li> </ul>  |

| Construction |                     |  |   |   |
|--------------|---------------------|--|---|---|
| Component    | Management Outcomes | Possible activity that may cause an impact           | Potential Environmental Impact  | Management Measure  |
|              |                     |  |   | <p>of vegetation on either side of the trench as far as possible when traversing wetlands.</p> <ul style="list-style-type: none"> <li>At crossing points restrict all construction activities to a 10 m corridor of the pipeline route.</li> <li>Demarcate the 10 m construction corridor as well as the prescribed m buffer on the ground (e.g. painted wooden poles).</li> <li>Construct as far as possible during winter when flow volumes are lowest, prioritise this for crossing sites. This will reduce impacts to wetlands due to soil poaching and vegetation trampling under peak saturation levels.</li> <li>Additionally, the risk of vehicles getting stuck and further degrading the vegetation integrity is lowest during this time.</li> </ul>  |
|              |                     |  | Increased bare surfaces, runoff and potential for erosion and resulting sedimentation of the wetlands   | <ul style="list-style-type: none"> <li>Keep the trench excavation neat and tidy. Only stockpile on one side of the trench (the same side as the excavator tracks). Separate topsoil and sub-soil, and backfill in same order.</li> <li>Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash.</li> <li>Mixing of concrete must under no circumstances take place in any wetland or the prescribed buffers. Scrape the area where mixing and storage of sand and concrete occurred to clean once finished.</li> <li>Do not situate any of the construction material laydown areas within any wetland or prescribed buffer.</li> <li>No machinery should be allowed to be parked in any wetlands.</li> <li>Ensure topsoil is spread back over trench area. Flatten and lightly till (no deeper than 30 cm) excavated / cleared areas to encourage vegetation establishment as soon as possible.</li> </ul> |
|              |                     |  | Degradation of wetland vegetation and the introduction and spread of alien and invasive vegetation  | <ul style="list-style-type: none"> <li>Promptly remove all alien and invasive plant species that may emerge during construction (i.e. weedy annuals and other alien forbs) must be removed.</li> <li>The use of herbicides is not recommended in or near wetlands (opt for mechanical removal).</li> <li>Appropriately stockpile topsoil cleared from the project area. This can be used for rehabilitation of the servitude.</li> <li>Clearly demarcate construction footprint, and limit all activities to within this area.</li> <li>Minimize unnecessary clearing of vegetation. Landscape and re-vegetate all denuded areas as soon as possible.</li> </ul>  |
|              |                     | Trench excavation and installation of infrastructure | Increased sediment loads to downstream reaches  | <ul style="list-style-type: none"> <li>See mitigation for increased bare surfaces, runoff and potential for erosion.</li> <li>Re-instate topsoil and lightly till disturbance footprint.</li> <li>At all crossings install sandbags on downstream side of the footprint to trap sediment until the site has been constructed and vegetation has re-established.</li> </ul>  |
|              |                     |  | Contamination of wetlands with hydrocarbons due to machinery leaks and eutrophication of wetland systems with human sewerage and other waste. | <ul style="list-style-type: none"> <li>Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility.</li> <li>Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent them leaking and entering the wetland areas.</li> <li>Regularly maintain stormwater infrastructure, pipes, pumps and machinery to minimise the potential for leaks. Check for oil leaks, keep a tidy operation, install bins and promptly clean up any spills or litter.</li> <li>Provide appropriate sanitation facilities during construction and service them regularly.</li> <li>Sanitation facilities to be placed outside of delineated wetlands.</li> </ul>  |
|              |                     |  | Backfilling of trench   | <p>Disruption of wetland soil profile and alteration of hydrological regime</p> <ul style="list-style-type: none"> <li>Ensure that topsoil is appropriately stored and re-applied during trench backfilling.</li> <li>Make sure that the soil is backfilled and compacted to accepted geotechnical standards to avoid conduit formation along the trench.</li> </ul>  |

| Construction |   |   |  |  |
|--------------|---|---|--|--|
| Component    | Management Outcomes                                   | Possible activity that may cause an impact  | Potential Environmental Impact   | Management Measure   |
| Heritage     | Protect and preserve heritage findings                | Site clearing and preparation<br>Trench excavation and installation of infrastructure | Disturbance or destruction of identified structure and stone cairn.                                      | <ul style="list-style-type: none"> <li>The recorded features should be indicated on design plans and should be avoided.</li> <li>Implementation of a chance find procedure should an artefact or grave be uncovered during construction.</li> </ul>  |
| Noise        | Minimise the generation of noise                      | Site clearing and preparation<br>Trench excavation and installation of infrastructure | General rise in ambient noise levels   | <ul style="list-style-type: none"> <li>Ensure high level of equipment maintenance, especially intake and exhaust mufflers.</li> <li>Replace pure tone (beeping) with broadband (hissing) reversing alarms.</li> <li>Construction activities to take place only during daylight hours.</li> </ul>   |
| Air Quality  | Minimise atmospheric emissions and dust generation    | Site clearing and preparation<br>Trench excavation and installation of infrastructure | Increased dust fallout   | <ul style="list-style-type: none"> <li>Apply dust suppressants to gravel roads used.</li> <li>Set speed limits to 40 km/h to minimise the creation of fugitive dust within the project boundary.</li> <li>Dust-reducing mitigation measures must be put in place and must be strictly adhered to, during the construction phase. This includes wetting of exposed soft soil surfaces and not conducting activities on windy days which will increase the likelihood of dust being generated.</li> </ul>  |
| Traffic      | Minimise impact on existing traffic flow in area      | Construction activities   | Vehicle traffic congestion   | <ul style="list-style-type: none"> <li>Ensure that proper road signage is used.</li> <li>Limit access to the construction site to construction vehicles only.</li> </ul>   |
| Social       | Maximise employment opportunities and social benefits | Site clearing and preparation<br>Trench excavation and installation of infrastructure | Benefits resulting from employment and income opportunities created by the construction of the pipelines | <ul style="list-style-type: none"> <li>Develop a clear and concise employment policy prioritising local employment.</li> <li>Employ local works if qualified applicants with the appropriate skills are available.</li> <li>Purchase goods and services at a local level if available.</li> </ul>  |
|              |   |   | Potential relocation of certain houses in the informal settlements                                       | <p>If resettlement is required, the following mitigation measures should be implemented:</p> <ul style="list-style-type: none"> <li>Develop a robust, transparent, consistent and inclusive resettlement and compensation framework that is aligned with national legislation and Good International Industry Practice (GIIP).</li> <li>Carefully investigate and benchmark current compensation practices, considering potential disadvantages to vulnerable people and groups.</li> <li>Institute all elements of GIIP in resettlement planning, including ongoing engagement, identification of alternative land, grievance mechanisms and compensation.</li> <li>Establish an ongoing link between project planning and community relations to ensure ongoing responsiveness to impact reducing activities.</li> <li>Proactively include information on resettlement and resettlement planning in wider stakeholder engagement.</li> </ul> |

**Table 8: Mitigation measures to be implemented during the operational phase of the Delmore Park Extension 8 bulk services project**

| Operation                  |   |  |  |  |
|----------------------------|---|--|--|--|
| Component                  | Management Outcomes   | Possible activity that may cause an impact | Potential Environmental Impact                                   | Management Measure   |
| Soils                      | Conservation of soils a resource  | Operation of sewer line                    | Soil contamination due to leaks                                  | <ul style="list-style-type: none"> <li>• Conduct regular inspections of manholes along both the pipeline routes and fix leaks timeously. Engineers should advise on the frequency of pressure tests to detect leaks.</li> <li>• Monitor water quality.</li> <li>• Install leak detection devices.</li> </ul>             |
| Surface water and wetlands | Minimise the potential for surface water and wetland<br>Conserve delineated wetlands<br>Conservation of water | Operation of sewer and water lines         | Increased water and sewerage inputs to downstream wetlands       | <ul style="list-style-type: none"> <li>• Conduct regular inspections of manholes along both the pipeline routes and fix leaks timeously. Engineers should advise on the frequency of pressure tests to detect leaks.</li> <li>• Monitor water quality in wetlands.</li> <li>• Install leak detection devices.</li> </ul> |
| Social                     | Maximise employment opportunities and social benefits   | Operation of sewer and water lines         | Benefits resulting from obtaining bulk services in the community | <ul style="list-style-type: none"> <li>• Ensure that the bulk services pipelines are in good working order.</li> </ul>   |

## **6 CHANCE FIND PROCEDURES**

### **6.1 Heritage chance find procedure**

The possibility of the occurrence of subsurface archaeological finds cannot be excluded. Therefore, if during construction any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped and a qualified archaeologist must be contacted for an assessment of the find and therefore chance find procedures should be put in place as part of the EMP. A short summary of chance find procedures is discussed below.

This procedure applies to the developer's permanent employees, its subsidiaries, contractors and subcontractors, and service providers. The aim of this procedure is to establish monitoring and reporting procedures to ensure compliance with this policy and its associated procedures. Construction crews must be properly inducted to ensure they are fully aware of the procedures regarding chance finds as discussed below.

- If during the pre-construction phase, construction, operations or closure phases of this project, any person employed by the developer, one of its subsidiaries, contractors and subcontractors, or service provider, finds any artefact of cultural significance or heritage site, this person must cease work at the site of the find and report this find to their immediate supervisor, and through their supervisor to the senior on-site manager.
- It is the responsibility of the senior on-site Manager to make an initial assessment of the extent of the find and confirm the extent of the work stoppage in that area.
- The senior on-site Manager will inform the ECO of the chance find and its immediate impact on operations. The ECO will then contact a professional archaeologist for an assessment of the finds who will notify the South African Heritage Resources Agency (SAHRA).

### **6.2 Paleontological chance find procedure**

The following procedure is only required if fossils are seen on the surface and when excavations/drilling commence.

- When excavations begin the rocks and must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone, coal) should be put aside in a suitably protected place. This way the mining activities will not be interrupted.
- Photographs of similar fossil plants must be provided to the developer to assist in recognizing the fossil plants in the shales and mudstones. Refer to the Palaeontology study for photos of examples. This information will be built into the EMP's training and awareness plan and procedures.
- Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
- If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
- Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits.
- If no good fossil material is recovered, then no site inspections by the palaeontologist will not be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
- If no fossils are found and the excavations have finished, then no further monitoring is required.

## **7 ENVIRONMENTAL MONITORING**

A monitoring programme will be implemented for the duration of the construction of the Delmore Park Extension 8 bulk services. This programme will include (but is not limited to):

- Establishing a baseline through the taking of photographs of identified environmental aspects and potential impact on the lodge area;
- Monitoring of the spread of alien invasive species around the site;
- Monitoring of stormwater management structures and the effectiveness thereof; and
- Ensuring that re-vegetation is taking place at rehabilitated construction areas.

## **8 ENVIRONMENTAL AWARENESS**

Environmental awareness is an essential part of the implementation of the EMPr during the construction and operational phases of the project. The purpose of environmental awareness is to make contractors and employees mindful of the environmental sensitivities around the site, the potential environmental impacts as well as the mitigation measures that need to be implemented.

### **8.1 Environmental awareness training**

Environmental awareness training must be implemented during the construction and operational phases of the lodge development. The ECO will be responsible for compiling the material required for the training, and should include, as a minimum, the following:

- Environmental legal requirements and obligations;
- Environmental sensitive areas;
- Details regarding plant Species of Conservation Concern, and the procedures to be followed should these be encountered;
- Heritage features and the associated chance find procedure should any archaeological finds be made;
- Details of the waste management procedures
- Emergency procedures;
- Relevant mitigation measures to be carried out as listed in the EMPr

All personnel, contractors to undergo environmental awareness training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of protected species, their identification, conservation status and importance, biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr.

In addition, environmental awareness should also be provided to guests visiting the lodge.

### **8.2 Basic Rules of Conduct**

The following list represents the basic Do's and Don'ts towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks. These are not exhaustive and serve as a quick reference aid. NOTE: ALL new site personnel must attend an environmental awareness/induction presentation. Please inform your foreman or manager if you have not attended such a presentation or contact the ECO.

#### **DO:**

- Clear your work areas of litter and building rubble at the end of each day – use the waste bins provided and prevent litter from being blown away by wind.
- Report all fuel or oil spills immediately and stop the spill from continuing.
- Dispose of cigarettes and matches carefully, so to prevent veld fires (arson and littering is an offence).
- Confine work and storage of equipment to within the immediate work area.
- Use all safety equipment and comply with all safety procedures.
- Ensure a working fire extinguisher is immediately at hand if any “HOT WORK” is undertaken e.g. welding, grinding, gas cutting etc.
- Prevent excessive dust and noise.

***DO NOT:***

- Do not litter - report dirty or full facilities, i.e. full dustbins and dirty or blocked chemical toilets.
- Do not make any fires.
- Do not enter any fenced off or demarcated areas.
- Do not allow waste, litter, oils or foreign materials into any storm water channels or drains or watercourses.
- Do not litter or leave food lying around.



## **9 COMPLIANCE WITH THE EMPR**

### **9.1 Site inspections**

During the construction phase, the construction contractor must appoint a suitable qualified ECO to undertake weekly visual site inspections supported by photographic evidence. The weekly visual inspection findings must be collated into a monthly compliance report to report on the compliance of the construction phase mitigation measures. The monthly site inspection reports should cover the following:

- routine observations of behaviours and practices;
- noting of unusual events, incidents and accidents (natural and human triggered);
- brief statement whether or not conditions of the EMPr are being met; and where it is reportable to authorities;
- possible reasons why conditions are not being met; and
- corrective action plans.

The report should be submitted to the environmental manager and construction contractor. Copies of the inspection reports should be kept on site.

It is recommended that photographs are taken of the site prior to, during and immediately after construction as a visual reference. These photographs should be stored with other records related to this EMP. If captured in digital format, hard copies, in colour, must be kept with all other records relevant to the implementation of this EMP. Photographic reference of wetlands and relocation related aspects should be included.

### **9.2 Internal EMP Performance Assessment**

During the construction phase, a formal EMPr Performance Assessment as per the NEMA EIA Regulations must be undertaken by the ECO once during the construction period and once when construction has been completed prior to the site being handed over to the Operator. This report will be approved/signed-off by both the applicant and Construction Contractor in support of close-out of the construction phase.

### **9.3 External EMP Performance Assessment**

After the construction phase, an external EMP Performance Assessment must be undertaken by an independent Environmental Assessment Practitioner to assess the effectiveness of mitigation measures identified in the EMP and to formally document the close-out of the construction phase. The report must be submitted to the VLNR Manager for review, and the final report must be submitted to the competent authority.

### **9.4 Incident Reporting**

An environmental incident is an unwanted event that has an actual or potential (near-hit) negative impact on the environment, affecting the quality of air, land or water, fauna or flora, and / or causing stakeholder concern. A causal link must be able to be made between an operational activity and the event. Environmental Incidents is monitored to establish the following:

- Which repeat incidents occur;
- Has the incident been investigated and the root cause been identified;
- Effectiveness of implementation of preventative and corrective actions; and

- To monitor trends to check the effectiveness of the mitigation measures.

**Table 9: Incident register**

| Name of person reporting the incident | Information on the incident | Date of incident identified | Actions taken as to address the incident | Date of rectification | Signature |
|---------------------------------------|-----------------------------|-----------------------------|--|-----------------------|-----------|
|                                       |                             |                             |  |                       |           |

## 9.5 Emergency Procedures

The purpose of this procedure is to:

- document the mechanism by which potential emergency situations and accidents will be identified during the construction phase that can have an impact on the environment; and
- Provide guidelines on the response to actual emergency situations and accidents to prevent or mitigate associated environmental impacts that may occur.

An environmental emergency situation or accident is an unexpected, sudden occurrence with the potential to endanger people or seriously damage the environment, either immediately or with a delayed effect.


Potential emergencies shall be identified and response plans shall be developed for all identified emergencies. These include the following:

- how potential emergency situations and accidents will be identified;
- a guideline for developing emergency preparedness and response procedures, for use by sections on the mine to address section-specific emergencies, stating how to respond to potential emergencies that might have an impact on the environment;
- the process to be followed in the case where an emergency situation or accident occurs;
- when potential emergency situations or accidents and their associated procedures will be reviewed; and
- The frequency at which the procedures shall be tested.

## ***10 ANNEXURES***

|       |         |         |          |
|-------|---------|---------|----------|
| Name: | Suzanne | Surname | Van Rooy |
|-------|---------|---------|----------|

## CURRICULUM VITAE

|                              |                              |  |
|------------------------------|------------------------------|--|
| <b>Personal Information:</b> | Surname                      | <b>Van Rooy</b>  |
|                              | First names                  | <b>Suzanne</b>   |
|                              | Date of birth                | 1982-05-06   |
|                              | Gender                       | Female   |
|                              | Nationality                  | RSA  |
| <b>Contact Details:</b>      | Telephone number (land line) | 012 940 9457   |
|                              | Email Address                | suzanne@avde.co.za   |
| <b>Signature:</b>            |                              |  |

### Expertise:

|   |   |  |
|---|---|--|
| <b>Date</b><br><i>August 2020<br/>to present</i>              | Area of expertise                       | Project management, environmental authorisations, stakeholder engagement, environmental compliance and performance assessments, environmental feasibility, water use licensing |
|   | Employers Name                          | Alta van Dyk Environmental Consultants cc  |
|   | Employer's locality and contact details | 4 Garcia Peak<br>Midlands Estate<br>Centurion<br>1692<br>012 940 9457  |
|   | Main Activities and Responsibilities    | Environmental Assessment Practitioner (EAP)<br>Project Manager<br>Project Planning<br>Project Financing  |
| <b>Date</b><br><i>1 September<br/>2009 – 31<br/>July 2020</i> | Area of expertise                       | Environmental authorisations, stakeholder engagement, environmental compliance and performance assessments, environmental feasibility, water use licensing                     |
|   | Employers Name                          | SRK Consulting (South Africa) (Pty) Ltd  |
|   | Employer's locality and contact details | 265 Oxford Road<br>Illovo<br>2196<br>011 441 1111  |
|   | Main Activities and Responsibilities    | Environmental Assessment Practitioner (EAP)<br>Project Manager<br>Project Planning<br>Project Financing  |
| <b>Date</b><br><i>7 May 2007<br/>31 August<br/>2009</i>       | Area of expertise                       | Environmental authorisations, stakeholder engagement, environmental compliance and performance assessments, closure costing, bio-monitoring                                    |
|   | Employers Name                          | GCS (Pty) Ltd  |
|   | Employer's locality and contact details | 63 Wessel Road<br>Rivonia<br>2191<br>011 803 5726  |

|       |         |         |          |
|-------|---------|---------|----------|
| Name: | Suzanne | Surname | Van Rooy |
|-------|---------|---------|----------|

|                                      |   |
|--------------------------------------|---|
| Main Activities and Responsibilities | Environmental Assessment Practitioner (EAP)<br>Project Manager<br>Project Planning<br>Project Financing |
|--------------------------------------|---|

### Years of professional experience

Years of experience as substantiated in the individual CV.

|          |                                |
|----------|--------------------------------|
| 13 Years | Water and Environmental Fields |
|----------|--------------------------------|

### Qualifications:

|                              |  |
|------------------------------|--|
| <b>Qualification Awarded</b> | <b>MPhil Environmental Management</b>                                  |
| Name of Institution          | Stellenbosch University  |
| Date awarded                 | 2013   |
| <b>Qualification Awarded</b> | <b>Post Graduate Certificate in Education</b>                          |
| Name of Institution          | University of Johannesburg   |
| Date awarded                 | 2007   |
| <b>Qualification Awarded</b> | <b>B.Sc Honours Aquatic Health</b>                                     |
| Name of Institution          | University of Johannesburg   |
| Date awarded                 | 2005   |
| <b>Qualification Awarded</b> | <b>B.Sc Natural and Environmental Sciences (Geography and Zoology)</b> |
| Name of Institution          | University of Johannesburg   |
| Date awarded                 | 2004   |

### Membership of Professional Bodies:

|                          |   |
|--------------------------|---|
| <b>Professional body</b> | <b>South African Council for Natural Scientific Professions (SACNASP)</b> |
| Details of membership    | 400378/11<br>Registered as a Professional Natural Scientist               |
| Dates                    | 31 August 2011 to present   |
| <b>Professional body</b> | <b>International Association for Impact Assessment South Africa</b>       |
| Details of membership    | Membership - 5894   |
| Dates                    | Since 2018  |

**Language skills:** one (1) for low to five (5) for high).

| Language                  | Reading | Speaking | Writing |
|---------------------------|---------|----------|---------|
| English                   | 5       | 5        | 5       |
| Afrikaans (Mother Tongue) | 5       | 5        | 5       |

**Computing skills -** (1) for low to five (5) for high).

| Word | Excel | Power Point | Microsoft Projects |
|------|-------|-------------|--------------------|
| 5    | 5     | 4           | 3                  |