



THE VEGETATION COMPLIANCE STATEMENT FOR THE PROPOSED DELMORE X8 BULK WATER AND SEWER PIPELINES

Delmore, Gauteng

November 2020

CLIENT



Prepared by:

The Biodiversity Company

Cell: +27 81 319 1225

Fax: +27 86 527 1965

info@thebiodiversitycompany.com

www.thebiodiversitycompany.com



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1 Introduction

The Biodiversity Company was appointed to conduct a vegetation assessment for the proposed Delmore X8 bulk water and sewer pipelines, Delmore, Gauteng Province. The proposed development (Figure 1-1) between the R29 and the M35 Commissioner Street, adjacent to housing developments and mining activity.

A wet season survey was conducted in November 2020, across the whole development footprint hereafter referred to as the “project area”. The survey focused on the project footprint and the areas directly adjacent to the project area. Furthermore, identification and description of any sensitive receptors were recorded across the project area, and the manner in which these sensitive receptors may be affected by the proposed development were also investigated

The approach has taken cognisance of the recently published Government Notice 320 in terms of NEMA dated 30 October 2020: “Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(a) and (h) and 44 of the National Environmental Management Act, 1998, when applying for Environmental Authorisation”. The National Web based Environmental Screening Tool has characterised the plant species theme for the sewage pipeline and bulk water pipeline project area as “medium sensitivity”.

This report, after taking into consideration the findings and recommendations provided by the specialist herein, should inform and guide the Environmental Assessment Practitioner (EAP) and regulatory authorities, enabling informed decision making with regards to the proposed project.

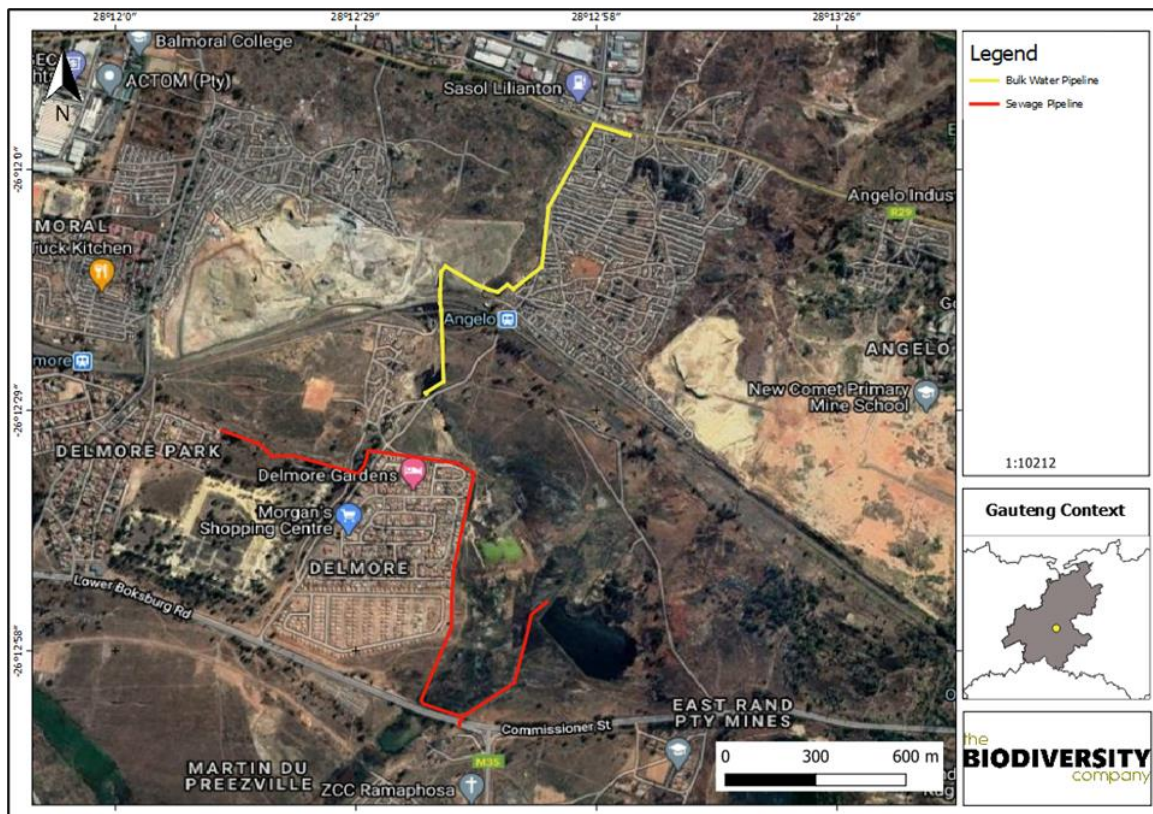


Figure 1-1 The project area

2 Specialist Details

Report Name	THE VEGETATION COMPLIANCE STATEMENT FOR THE PROPOSED DELMORE X8 BULK WATER AND SEWER PIPELINES
Submitted to	
Report writer	<p>Martinus Erasmus </p> <p>Martinus Erasmus obtained his B-Tech degree in Nature Conservation in 2016 at the Tshwane University of Technology. Martinus has been conducting EIAs, basic assessments and assisting specialists in field during his studies since 2015.</p>
Report reviewer	<p>Andrew Husted </p> <p>Andrew Husted is Pr Sci Nat registered (400213/11) in the following fields of practice: Ecological Science, Environmental Science and Aquatic Science. Andrew is an Aquatic, Wetland and Biodiversity Specialist with more than 12 years' experience in the environmental consulting field. Andrew has completed numerous wetland training courses, and is an accredited wetland practitioner, recognised by the DWS, and also the Mondi Wetlands programme as a competent wetland consultant.</p>
Declaration	<p>The Biodiversity Company and its associates operate as independent consultants under the auspice of the South African Council for Natural Scientific Professions. We declare that we have no affiliation with or vested financial interests in the proponent, other than for work performed under the Environmental Impact Assessment Regulations, 2017. We have no conflicting interests in the undertaking of this activity and have no interests in secondary developments resulting from the authorisation of this project. We have no vested interest in the project, other than to provide a professional service within the constraints of the project (timing, time and budget) based on the principals of science.</p>

3 Terms of Reference

The Terms of Reference (ToR) included the following:

- Description of the baseline receiving environment specific to the field of expertise (general surrounding area as well as site specific environment);
- Identification and description of any sensitive receptors in terms of relevant specialist discipline (flora) that occur in the project area, and the manner in which these sensitive receptors may be affected by the activity;
- Identify 'significant' ecological, botanical features within the proposed project areas;
- Identification of conservation significant habitats around the project area which might be impacted;
- Screening to identify any critical issues (potential fatal flaws) that may result in project delays or rejection of the application;
- Provide a map to identify sensitive receptors in the project area, based on available maps and database information; and
- Provide outcomes to be included in the Management plan.

4 Key Legislative Requirements

The legislation, policies and guidelines listed below are applicable to the current project in terms of biodiversity and ecological support systems. The list below, although extensive, is not exhaustive and other legislation, policies and guidelines may apply in addition to those listed below (Table 4-1).

Table 4-1 A list of key legislative requirements relevant to these studies in Gauteng

Region	Legislation
International	Convention on Biological Diversity (CBD, 1993)
	The Convention on Wetlands (RAMSAR Convention, 1971)
	The United Nations Framework Convention on Climate Change (UNFCCC, 1994)
	The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 1973)
	The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention, 1979)
National	Constitution of the Republic of South Africa (Act No. 108 of 2006)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998) Section 24 , No 42946 (January 2020)
	The National Environmental Management Act (NEMA) (Act No. 107 of 1998) Section 24 , No 43110 (March 2020)
	The National Environmental Management Protected Areas Act (Act No. 57 of 2003)
	The National Environmental Management Biodiversity Act (Act No. 10 of 2004)
	The National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
	The Environment Conservation Act (Act No. 73 of 1989) and associated EIA Regulations
	National Environmental Management Air Quality Act (No. 39 of 2004)

	National Protected Areas Expansion Strategy (NPAES)
	Environmental Conservation Act (Act No. 73 of 1983)
	Natural Scientific Professions Act (Act No. 27 of 2003)
	National Biodiversity Framework (NBF, 2009)
	National Forest Act (Act No. 84 of 1998)
	National Veld and Forest Fire Act (101 of 1998)
	National Spatial Biodiversity Assessment (NSBA)
	World Heritage Convention Act (Act No. 49 of 1999)
	National Heritage Resources Act, 1999 (Act 25 of 1999)
	Municipal Systems Act (Act No. 32 of 2000)
	Alien and Invasive Species Regulations, 2014
	South Africa's National Biodiversity Strategy and Action Plan (NBSAP)
	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
	Sustainable Utilisation of Agricultural Resources (Draft Legislation).
	White Paper on Biodiversity
	National Water Act (NWA, 1998)
Provincial	GDARD Requirements for Biodiversity Assessments (Version 3, 2014a)
	Gauteng Department of Agriculture and Rural Development (GDARD): Checklist for Biodiversity Assessments
	GDARD Mining and Environmental Impact Guide

5 Methodologies

5.1 Botanical Assessment

The botanical assessment encompassed an assessment of all the vegetation units and habitat types within the project area. The focus was on an ecological assessment of habitat types as well as identification of any Red Data species within the known distribution of the project area. The South African National Biodiversity Institute (SANBI) provides an electronic database system, namely the Botanical Database of Southern Africa (BODATSA), to access distribution records on southern African plants. This is a new database which replaces the old Plants of Southern Africa (POSA) database. The POSA database provided distribution data of flora at the quarter degree square (QDS) resolution. The Red List of South African Plants website (SANBI, 2017) was utilized to provide the most current account of the national status of flora. Relevant field guides and texts consulted for identification purposes in the field during the surveys included the following:

- Field Guide to the Wild Flowers of the Highveld (Van Wyk & Malan, 1997);
- A field guide to Wild flowers (Pooley, 1998);
- Guide to Grasses of Southern Africa (Van Oudtshoorn, 1999);
- Orchids of South Africa (Johnson & Bytebier, 2015);
- Guide to the Aloes of South Africa (Van Wyk & Smith, 2014);
- Mesembs of the World (Smith *et al.*, 1998);

- Medicinal Plants of South Africa (Van Wyk *et al.*, 2013);
- Freshwater Life: A field guide to the plants and animals of southern Africa (Griffiths & Day, 2016); and
- Identification guide to southern African grasses. An identification manual with keys, descriptions and distributions (Fish *et al.*, 2015).

Additional information regarding ecosystems, vegetation types, and Species of Conservation Concern (SCC) included the following sources:

- The Vegetation of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2012); and
- Red List of South African Plants (Raimondo *et al.*, 2009; SANBI, 2016).

The field work methodology included the following survey techniques:

- Timed meanders;
- Sensitivity analysis based on structural and species diversity; and
- Identification of floral red-data species.

5.2 Floristic Analysis

The wet season fieldwork and sample sites were placed within targeted areas (i.e. target sites) perceived as ecologically sensitive based on the preliminary interpretation of satellite imagery (Google Corporation) and GIS analysis (which included the latest applicable biodiversity datasets) available prior to the fieldwork. The focus of the fieldwork was therefore to maximise coverage and navigate to each target site in the field in order to perform a rapid vegetation and ecological assessment at each sample site. Emphasis was placed on sensitive habitats, especially those overlapping with the proposed project area.

Homogenous vegetation units were subjectively identified using satellite imagery and existing land cover maps. The floristic diversity and search for flora SCC were conducted through timed meanders within representative habitat units delineated during the scoping fieldwork. Emphasis was placed mostly on sensitive habitats overlapping with the proposed project areas.

The timed random meander method is a highly efficient method for conducting floristic analysis, specifically in detecting flora SCC and maximising floristic coverage. In addition, the method is time and cost effective and highly suited for compiling flora species lists and therefore gives a rapid indication of flora diversity. The timed meander search was performed based on the original technique described by Goff *et al.* (1982). Suitable habitat for SCC were identified according to Raimondo *et al.* (2009) and targeted as part of the timed meanders.

At each sample site notes were made regarding current impacts (e.g. mining, erosion etc.), subjective recording of dominant vegetation species and any sensitive features (e.g. wetlands, outcrops etc.). In addition, opportunistic observations were made while navigating through the project area.

6 Limitations

The following limitations should be noted for the assessment:

- Only a single season survey was conducted for the respective studies, this would constitute a wet season survey; and
- This assessment has not assessed any temporal trends for the project.

7 Results

7.1 Desktop Spatial Assessment

The following features describes the general area and habitat, this assessment is based on spatial data that are provided by various sources such as the provincial environmental authority and the SANBI. The desktop analysis and their relevance to this project are listed in Table 7-1.

Table 7-1 Desktop spatial features examined.

Desktop Information Considered	Relevant/Not relevant
Conservation Plan	The project area overlaps with Critical Biodiversity Area (CBA): Important and an Ecological Support Area (ESA) area
Terrestrial Ecosystem Threat Status	The project area falls within an ecosystem which is listed as Vulnerable (VU) ecosystem.
Terrestrial Ecosystem Protection Level	The project area falls in a "Not Protected" area.
Wetland Ecosystem Threat Status	A Critically Endangered (CR) wetland was found within the 500m regulated area of the project area
Wetland Ecosystem Protection Level	The wetland protection level as per the National Biodiversity Assessment (NBA) shows that the wetland within the 500 m regulated area is classed as "Not Protected"
Endemic species	High numbers of endemic species are expected in the project area
Protected area	Irrelevant: No protected areas can be found in close proximity to the project area. The Pamula Park Private Nature reserve is the closest and it is 10.7 km from the project area
National Protected Areas Expansion Strategy (NPAES)	Irrelevant: 40.4 km from the Vaal Grassland NPAES
Biome	Located in the Grassland Biome
Gauteng Ridges	This dataset shows the project area in relation to the Gauteng Ridges data, this ridge classified as a class 4 is however an old mine dump and not a true ridge
Vegetation Type	The project area occurs in the Soweto Highveld Grassland which is Endangered
Strategic Water Source Areas (SWSA)	Irrelevant: 48km from the closest SWSA
City of Johannesburg wetlands	Irrelevant: falls outside of the spatial data footprint
National Freshwater Ecosystems Priority Areas (NFEPA)	The 500 m regulated area does overlap with unclassified wetland areas

7.1.1 Desktop Vegetation Assessment

7.1.2 Soweto Highveld Grassland

The Soweto Highveld Grassland vegetation type is found in Mpumalanga, Gauteng and to a lesser extent in the neighbouring Free State and North-West Provinces. This vegetation type typically comprises of an undulating landscape on the Highveld plateau supporting short to medium-high, dense, tufted grassland dominated almost entirely by *Themeda triandra* and accompanied by a variety of other grasses such as *Elionurus muticus*, *Eragrostis racemosa*, *Heteropogon contortus* and *Tristachya leucothrix*. Scattered small wetlands, narrow stream

alluvia, pans and occasional ridges or rocky outcrops interrupt the continuous grassland cover (Mucina & Rutherford, 2006).

7.1.2.1 Important Plant Taxa

Important plant taxa are those species that have a high abundance, a frequent occurrence or are prominent in the landscape within a particular vegetation type (Mucina & Rutherford, 2006). The following species are important in the Soweto Highveld Grassland.

Graminoids: *Andropogon appendiculatus*, *Brachiaria serrata*, *Cymbopogon pospischilii*, *Cynodon dactylon*, *Elionurus muticus*, *Eragrostis capensis*, *E. chloromelas*, *E. curvula*, *E. plana*, *E. planiculmis*, *E. racemosa*, *Heteropogon contortus*, *Hyparrhenia hirta*, *Setaria nigrirostris*, *S. sphacelata*, *Themeda triandra*, *Tristachya leucothrix*, *Andropogon schirensis*, *Aristida adscensionis*, *A. bipartita*, *A. congesta*, *A. junciformis* subsp. *galpinii*, *Cymbopogon caesius*, *Digitaria diagonalis*, *Diheteropogon amplexens*, *Eragrostis micrantha*, *E. superba*, *Harporchloa falx*, *Microchloa caffra*, *Paspalum dilatatum* (Mucina & Rutherford, 2006).

Herbs: *Hermannia depressa*, *Acalypha angustata*, *Berkheya setifera*, *Dicoma anomala*, *Euryops gilfillanii*, *Geigeria aspera* var. *aspera*, *Graderia subintegra*, *Haplocarpha scaposa*, *Helichrysum miconiifolium*, *H. nudifolium* var. *nudifolium*, *H. rugulosum*, *Hibiscus pusillus*, *Justicia anagalloides*, *Lippia scaberrima*, *Rhynchosia effusa*, *Schistostephium crataegifolium*, *Selago densiflora*, *Senecio coronatus*, *Vernonia oligocephala*, *Wahlenbergia undulata* (Mucina & Rutherford, 2006).

Geophytic Herbs: *Haemanthus humilis* subsp. *hirsutus*, *H. montanus*. **Herbaceous Climber:** *Rhynchosia totta* (Mucina & Rutherford, 2006).

Low Shrubs: *Anthospermum hispidulum*, *A. rigidum* subsp. *pumilum*, *Berkheya annectens*, *Felicia muricata*, *Ziziphus zeyheriana* (Mucina & Rutherford, 2006).

7.1.2.2 Conservation Status of the Vegetation Type

According to Mucina & Rutherford (2006), this vegetation type is classified as Endangered. The national target for conservation protection for both these vegetation types is 24%, but only a few patches are statutorily conserved in Waldrift, Krugersdorp, Leeuwkuil, Suikerbosrand, Rolfe's Pan Nature Reserves or privately conserved in Johanna Jacobs, Tweefontein, Gert Jacobs, Nikolaas and Avalon Nature Reserves, Heidelberg Natural Heritage Site.

By 2006 nearly half of the area of occupancy of this vegetation type had already been transformed by cultivation, urban sprawl, mining and building of road infrastructure. The amount of area transformed has most likely increased substantially. Some Soweto Grassland areas have been flooded by dams including Grootdraai, Leeukuil, Trichardtsfontein, Vaal and Willem Brummer.

7.2 Field Assessment

The project area was found in a range of two dominant conditions: transformed and disturbed. This was determined by the degree and extent of the impacts, most arising from an anthropogenic source in this case. Certain areas were transformed from its original state where other areas were regarded as disturbed grassland. Transformed areas represents all areas of urban area and infrastructure such as building and roads. This habitat is regarded as transformed due to the nature of the modification of the area to such a point where it wouldn't

be able to return to its previous state. Disturbed areas are regarded as areas that has been impacted by edge effects of transformed areas as well as direct impacts from livestock, dumping and infringement. The disturbed areas contain indigenous vegetation, but has been and is currently is being impacted. These areas will not recover to a more natural state without considerable intervention and will most likely continue degrading due to the surrounding land use. It is the opinion of the specialists that the project area does not support species of conservation concern anymore as the habitat has been altered.

The wetland habitats are the more sensitive areas that have been identified in The Biodiversity Company Wetland assessment (2020). Even though disturbed, the ecological integrity, importance and functioning of these areas play a crucial role as a water resource system and an important habitat for various fauna and flora. The preservation of this system is the most important aspect to consider for the proposed development.



Figure 7-1 Current land use of the project area: A) Disturbed areas associated with the wetlands, B) Wetland, C and D) Transformed.

7.3 Habitat Summary and Sensitivity

The project area is transformed/disturbed due to human influence and presence, and has been assigned a low sensitivity due to the disturbed areas, whereas the wetlands were assigned a high sensitivity. A change to the land use is not envisioned to have an effect to the project area due to the current transformed/disturbed state of the area. The project area does represent the low plant sensitivity as per the screening report for the sewage pipeline .The project area does not represent the medium plant sensitivity as per the screening report for the bulk water pipeline (Figure 7-3), as it has been determined to be low.

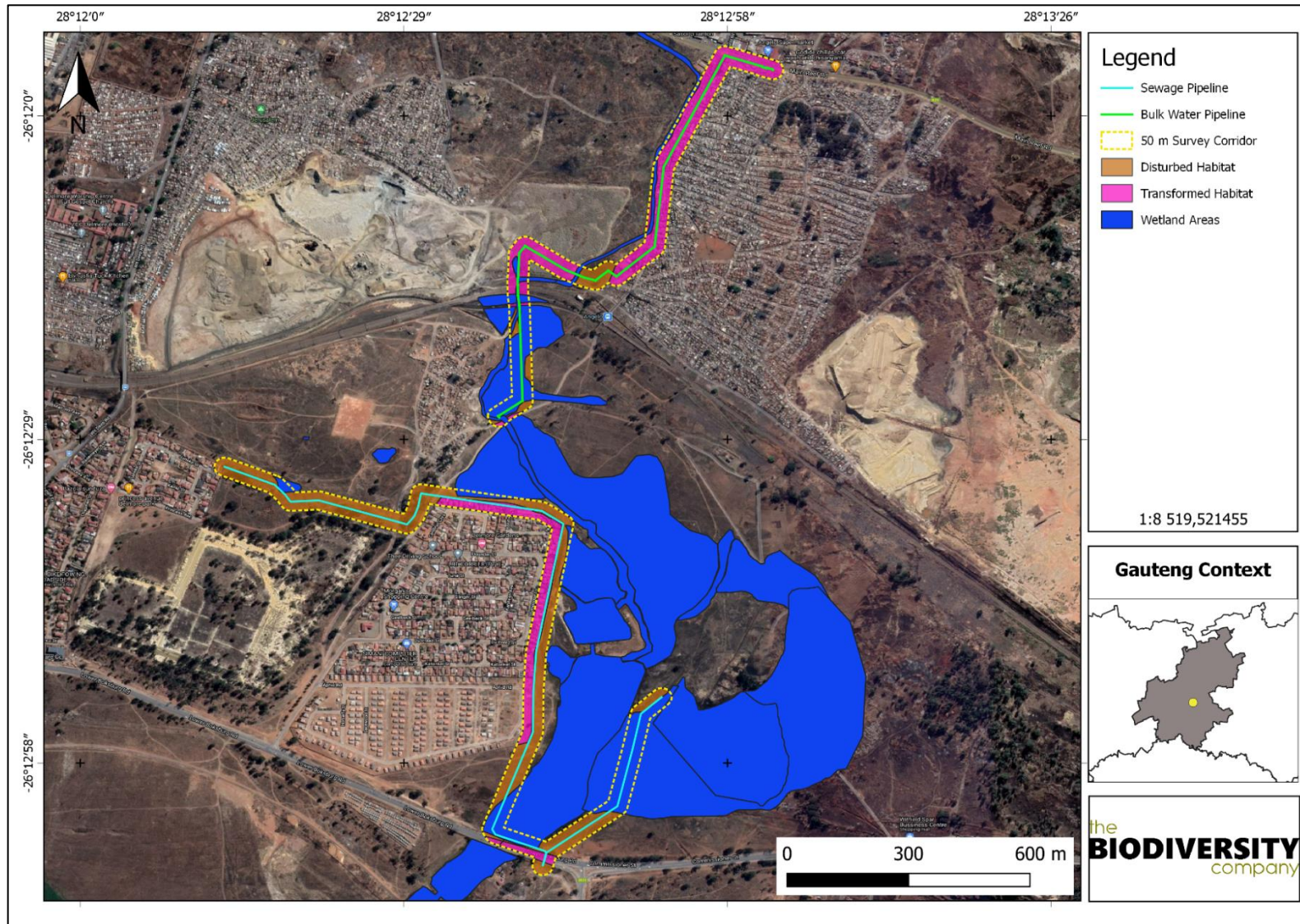


Figure 7-2 The sensitivity of the project area

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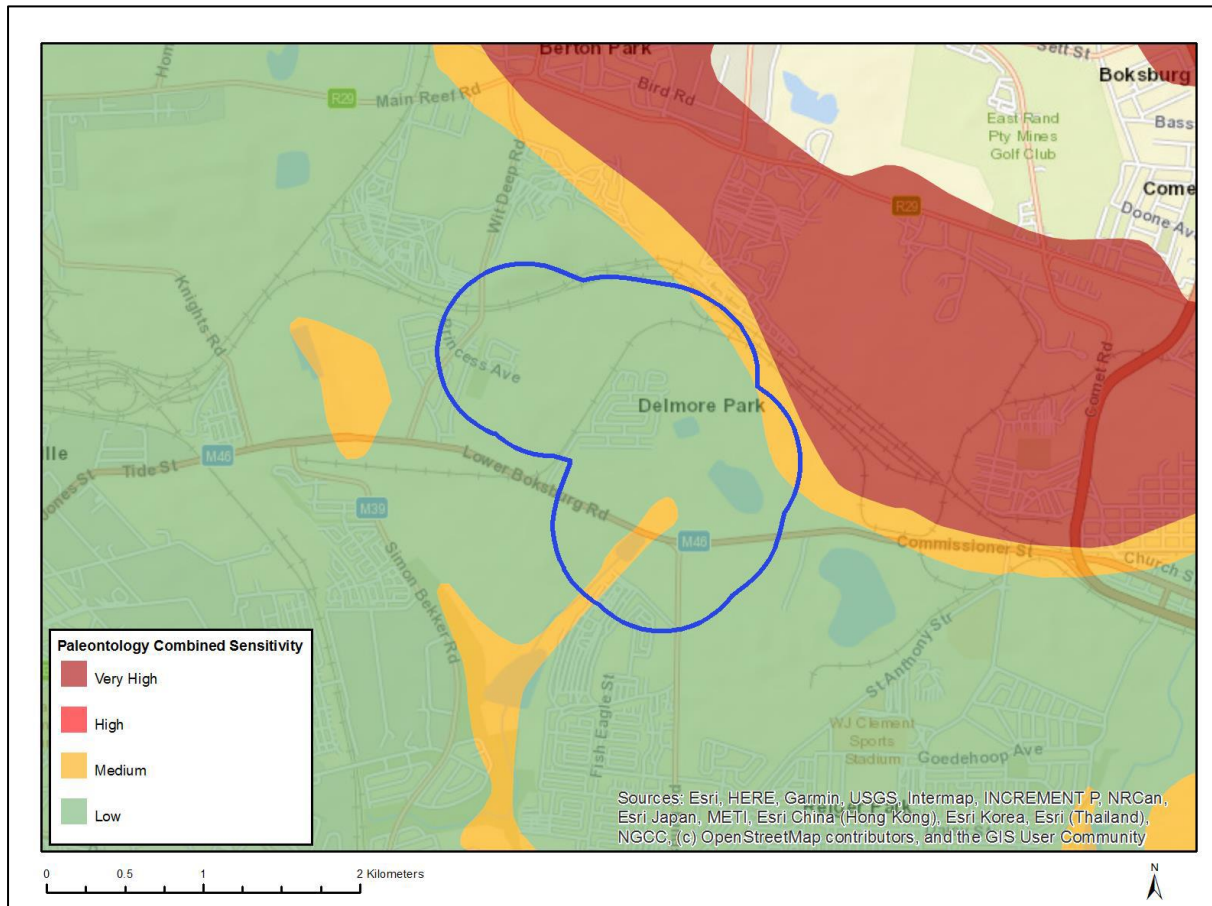


Figure 7-3 Map depicting relative plant theme sensitivity of the sewage pipeline (National Environmental Screening Tool, 2020).

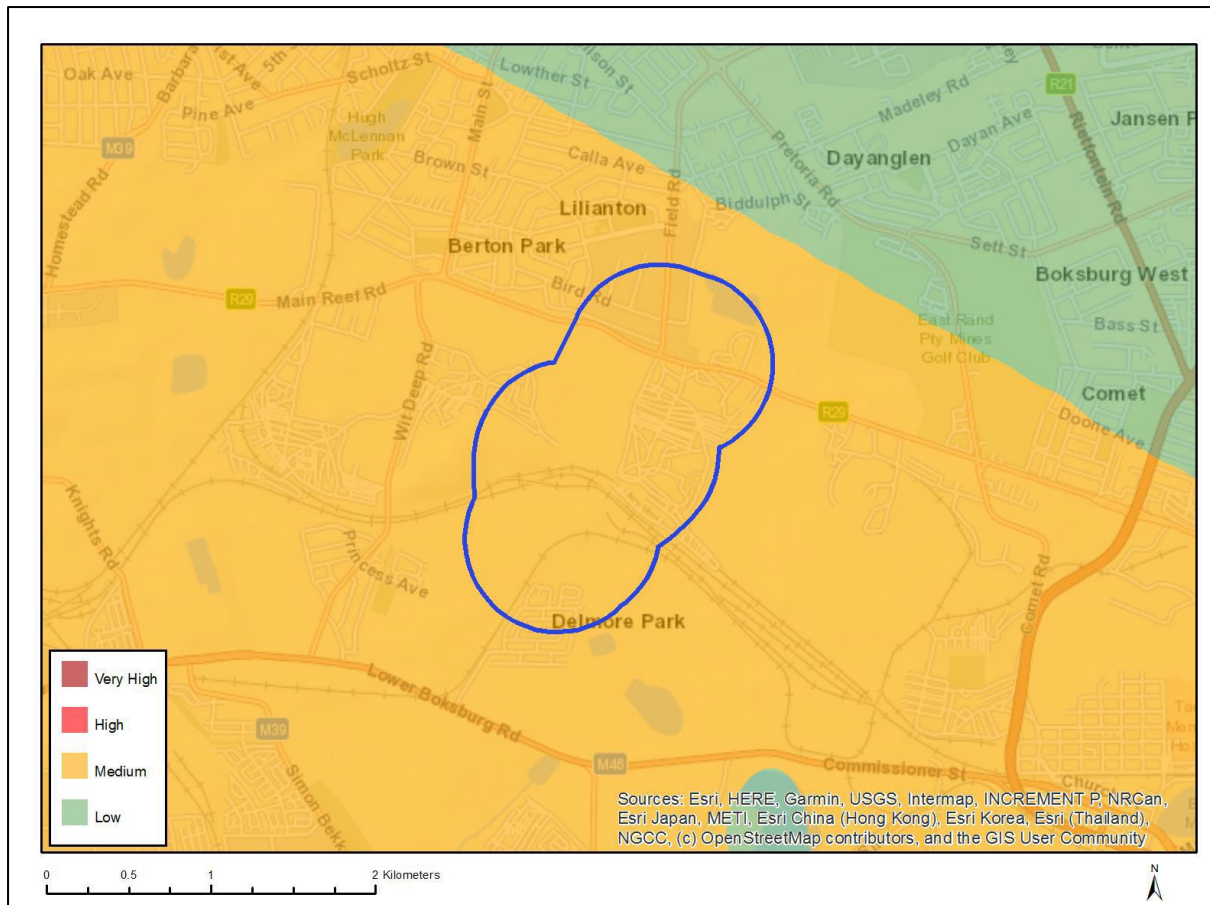


Figure 7-4 Map depicting relative plant theme sensitivity of the bulk water pipeline (National Environmental Screening Tool, 2020).

8 Proposed Impact Management Outcomes

The area has been altered from its original state however it can still affect species in the surrounding area by means of erosion, dust, fire, alien vegetation introduction and proliferation, poor waste management resulting in increase in pest numbers, as well as chemical spills therefore the following generic management outcomes were suggested and should be included into the Environmental Management Programme (EMPr) (Table 8-1).

Table 8-1 Impact Management Outcomes

Management outcome: Vegetation and Habitats				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
<p>All construction/operational and access must make use of the existing roads that can be found in and around the project area.</p> <p>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. No servicing of equipment on site during construction unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers</p> <p>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.</p> <p>Leaking equipment and vehicles must be repaired immediately or be removed from project area to facilitate repair</p> <p>Monitor Storm Water run-off & Discharge Water Quality</p> <p>A fire management plan needs to be complied and implemented to restrict the impact fire might have on the surrounding areas.</p>	Construction/Operational Phase	Environmental Officer & Design Engineer	Roads and paths used	Ongoing
	Life of operation	Environmental Officer & Contractor	Spill events, Vehicles dripping.	Ongoing
	Operational Phase	Environmental Officer & Contractor	Assess the state of rehabilitation and encroachment of alien vegetation	Quarterly for up to two years after the closure
	Life of operation	Environmental Officer & Contractor	Leaks and spills	Ongoing
	Life of operation	Environmental Officer & Design Engineer	Water Quality	Monthly
	Closure Phase/Rehabilitation phase	Environmental Officer & Contractor	Fire Management	During Phase

Management outcome: Fauna				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
<p>A qualified environmental control officer must be on site when construction begins. The area must be walked though 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.</p>	Life of operation	Environmental Officer, Contractor	Presence of any faunal SCC.	Ongoing

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Management outcome: Alien Vegetation				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
Compilation of and implementation of an alien vegetation management plan.	Life of operation	Project manager, Environmental Officer & Contractor	Assess presence and encroachment of alien vegetation	Quarterly monitoring
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	Life of operation	Environmental Officer & Health and Safety Officer	Presence of waste	Life of operation
A pest control plan must be put in place and implemented; it is imperative that poisons not be used.	Life of operation	Environmental Officer & Health and Safety Officer	Evidence or presence of pests	Ongoing
Management outcome: Dust				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
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.	Construction phase	Contractor	Dustfall	As per the air quality guidelines
Management outcome: Waste management				
Impact Management Actions	Implementation		Monitoring	
	Phase	Responsible Party	Aspect	Frequency
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	Life of operation	Environmental Officer & Health and Safety Officer	Presence of waste	Life of operation
The presence of litter, spills, fuels, chemicals and human waste in and around the project area, needs to be monitored.	Construction/Closure Phase	Environmental Officer & Health and Safety Officer	Presence of Waste	Daily
A minimum of one toilet must be provided per 10 persons. Portable toilets must be pumped dry to ensure the system does not degrade over time and spill into the surrounding area.	Life of operation	Environmental Officer & Health and Safety Officer	Number of toilets per staff member. Waste levels	Daily

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<p>The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility. Where a registered disposal facility is not available close to the project area, the Contractor shall provide a method statement with regard to waste management. Under no circumstances may domestic waste be burned on site. Refuse bins will be emptied and secured. Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 10 days.</p>	Life of operation	Environmental Officer & Health and Safety Officer	Availability of bins and the collection of the waste.	Ongoing
	Life of operation	Environmental Officer, Contractor & Health and Safety Officer	Collection/handling of the waste.	Ongoing
	Life of operation	Environmental Officer, Contractor & Health and Safety Officer	Management of bins and collection of waste	Ongoing

9 Conclusion

The project area has been transformed/disturbed from its original state by the anthropogenic presence and the associated edge effects. It does not support any SCCs. The project area does represent the low plant sensitivity as per the screening report for the sewage pipeline. The project area does not represent the medium plant sensitivity as per the screening report for the bulk water pipeline, as it is determined to be low. The project area has an overall low sensitivity, except for the wetland habitats which were given a high sensitivity. Although no sensitive species were found in the project area it is still likely that such species could occur nearby or access/forage in the project area. It is thus important that the management outcomes be adhered to in order to mitigate an impact that might stem from the development.

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11 Appendices

Appendix A Specialist declarations

DECLARATION

I, Martinus Erasmus, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.



Martinus Erasmus

Terrestrial Ecologist

The Biodiversity Company

November 2020

DECLARATION

I, Andrew Husted, declare that:

- I act as the independent specialist in this application;
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority; and the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of Section 24F of the Act.



Andrew Husted

Terrestrial Ecologist

The Biodiversity Company

November 2020

Martinus Erasmus

B-Tech Nature Conservation (*Cand Sci Nat*)

Cell: +27 82 448 1667

Email: martinus@thebiodiversitycompany.com

Identity Number: 9209035136082

Date of birth: 03 September 1992



Profile Summary

Working experience throughout South Africa and Africa.

Specialist experience with mining, hydropower, renewable energy, development and veld management.

Specialist guidance, support and facilitation for the compliance with legislative processes, for in-country requirements.

Specialist expertise includes Botany and Terrestrial Ecology.

Areas of Interest

Mining, Oil & Gas, Renewable Energy & Bulk Services Infrastructure Development, Sustainability and Conservation.

Key Experience

- Environmental, Social and Health Impact Assessments (ESHIA)
- Terrestrial Ecological Assessments
- Rehabilitation Plans and Monitoring
- Botany, especially in the Limpopo, Mpumalanga, Gauteng and North-West provinces in South-Africa.
- Veld management and Veld Condition

Countries worked in

Guinea
Lesotho
Liberia
Mozambique
Nigeria
South Africa
Swaziland

Nationality

South African

Languages

English – Proficient
Afrikaans – Proficient

Qualifications

- B-Tech in Nature Conservation, Tshwane University of Technology, Pretoria, South Africa.
- National Diploma in Nature Conservation, Tshwane University of Technology, Pretoria, South Africa.
- Cand Sci Nat (118630)
- SASS Accredited

SELECTED PROJECT EXPERIENCE

Project Name: A biodiversity baseline and impact assessment for the proposed Umsimbithi Emakhazeni Coal Mining Project, in Mpumalanga Province, South Africa.

Personal position / role on project: Terrestrial Ecologist.

Location: Mpumalanga Province, South Africa (2017).

Main project features: To conduct a dual season terrestrial ecology baseline and impact assessment for the expected impact footprint area.

Project Name: Biodiversity Assessment associated with eThembeni Integrated Mixed-use Housing Development, KwaZulu-Natal province.

Personal position / role on project: Terrestrial Ecologist

Location: South Africa (2017).

Main project features: Conduct a detailed terrestrial ecology basic assessment for the expected impact footprint area.

Project Name: A biodiversity baseline and impact assessment for the proposed Pavua Hydropower Project, in Sofala Province, Central Mozambique.

Personal position / role on project: Assistant Botanist

Location: Sofala Province, Mozambique (2017).

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the expected impact footprint area, including Gorongosa National. The study was required to meet national and IFC requirements, including a Critical Habitat assessment.

Project Name: A biodiversity baseline and impact assessment for the proposed Gold Mine Project, in Grand Cape Mt Province, Liberia.

Personal position / role on project: Assistant to specialist/ field technician

Location: Grand Cape Mt Province, Liberia (2015).

Main project features: To conduct a dual season ecological baseline assessment for the expected impact footprint area. The study was required to meet national and IFC (International Finance Corporation) requirements, including a Critical Habitat assessment.

Project Name: A biodiversity baseline and impact assessment for the proposed Siguiri Gold Mine Project, in Kankan Province, Guinea.

Personal position / role on project: Terrestrial Ecologist

Location: Siguiri, Guinea, West-Africa (2018)

Main project features: To conduct a dual season terrestrial ecological baseline and impact assessment for the expected impact footprint area. The study was required to meet national and IFC (International Finance Corporation) requirements, including a Critical Habitat assessment.

Project Name: A biodiversity baseline and impact assessment for the proposed Nondvo Dam Project in Eswatini, Southern Africa

Personal position / role on project: Terrestrial Ecologist (Botany)

Location: Swaziland (2019)

Main project features: To conduct a dual season terrestrial ecological baseline and impact assessment for the expected impact footprint area. The study was required to meet national and IFC (International Finance Corporation) requirements, including a Critical Habitat assessment.

Project Name: Biodiversity Baseline & Impact Assessment for the proposed Cuamba 15MW Solar PV Plant, Cuamba, Mozambique

Personal position / role on project: Terrestrial Ecologist (Botany)

Location: Mozambique (2019)

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the proposed development.

OVERVIEW

An overview of the specialist technical expertise includes the following:

- Terrestrial Ecological Assessments.
- Faunal surveys which includes mammals, birds, amphibians and reptiles.
- Floral surveys
- Rehabilitation Plans and Monitoring for the terrestrial component.
- Botany, especially in the Limpopo, Mpumalanga, Gauteng and North-West provinces in South-Africa.
- Veld management
- Environmental Control Officer (ECO) experience

EMPLOYMENT EXPERIENCE

CURRENT EMPLOYMENT: The Biodiversity Company (August 2017 – Present)

I started working at The Biodiversity Company in mid-2017.

The team at The Biodiversity Company have conducted stand-alone specialist studies and provided overall guidance of studies with a pragmatic approach for the management of biodiversity that takes into account all the relevant stakeholders, most importantly the environment that is potentially affected. We manage risks to the environment to reduce impacts with practical, relevant and measurable methods.

My roles include:

- Faunal and Floral surveys for baseline, basic or impact assessments;
- Floral surveys for vegetation verifications, management plans and alien invasive species control;
- Report writing;
- Equipment management;
- Technical assistant for fieldwork for the aquatics and wetland departments; and
- Specialist inputs to the above mention services.

EMPLOYMENT: Enviro-Insight (January 2015 – July 2017)

Enviro-Insight assigned me to the role of general and field assistant. I assisted most specialists in field but also had administrative duties:

- The processing and uploading of several organisms to the ADU (Animal Demography Unit) virtual museum, which assists in obtaining spatial data concerning those species.
- Assisted with the generation of the companies' DNA database which distributes the DNA samples to the South African National Biodiversity Institute (SANBI).
- Assisted with field work involving all the different specialist work which includes mammalogy, herpetology and botany.

ADDITIONAL EXPERIENCE

<i>Compliance audits</i>	Conducting site investigations in order to determine the level of compliance attained, ensuring that the client maintains an appropriate measure of compliance with environmental regulations by means of a legislative approach
<i>Control officer</i>	Acting as an independent Environmental Control Officer (ECO), acting as a quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts
<i>Public consultation</i>	The provision of specialist input in order to communicate project findings as well as assist with providing feedback if and when required.
<i>Closure</i>	Primarily the review of closure projects, with emphasis on the closure cost calculations. Support was also provided by assisting with the measurements of structures during fieldwork.

ACADEMIC QUALIFICATIONS

B-Tech in Nature Conservation, Tshwane University of Technology, Pretoria, South Africa:

Title: The expansion of the distribution of *Xenopus muelleri*.

National Diploma in Nature Conservation , Tshwane University of Technology, Pretoria, South Africa

Andrew Husted

M.Sc Aquatic Health (*Pr Sci Nat*)

Cell: +27 81 319 1225

Email: andrew@thebiodiversitycompany.com

Identity Number: 7904195054081

Date of birth: 19 April 1979



Profile Summary

Working experience throughout South Africa, West and Central Africa and also Armenia.

Specialist experience with on-shore drilling, mining, engineering, hydropower and renewable energy.

Experience with project management of national and international multi-disciplinary projects. Including managing and compiling ESHIAs and EMPs

Specialist guidance, support and facilitation for the compliance with legislative processes, for in-country requirements, and international lenders.

Specialist expertise include Instream Flow and Ecological Water Requirements, aquatic ecology and wetlands resources.

Areas of Interest

Mining, Oil & Gas, Renewable Energy & Bulk Services
Infrastructure Development, Sustainability and Conservation.

Key Experience

- Familiar with World Bank, Equator Principles and the International Finance Corporation requirements
- Environmental, Social and Health Impact Assessments (ESHIA)
- Environmental Management Programmes (EMP)
- Ecological Water Requirement determination experience
- Wetland delineations and ecological assessments
- Terrestrial Ecological Assessments
- Aquatic Ecological Assessments
- Rehabilitation Plans and Monitoring
- Aquaculture

Country Experience

Botswana, Cameroon
Democratic Republic of Congo
Ghana, Ivory Coast, Lesotho
Liberia, Mali, Mozambique
Nigeria, Republic of Armenia, Senegal
Sierra Leone, South Africa
Swaziland, Tanzania

Nationality

South African

Languages

English – Proficient

Afrikaans – Conversational

German - Basic

Qualifications

- MSc (University of Johannesburg) – Aquatic Health.
- BSc Honours (Rand Afrikaans University) – Aquatic Health
- BSc Natural Science
- Pr Sci Nat (400213/11)
- Certificate of Competence: Mondri Wetland Assessments
- Certificate of Competence: Wetland WET-Management
- SASS 5 (Expired) – Department of Water Affairs and Forestry for the River Health Programme
- EcoStatus application for rivers and streams

Publication of scientific journals
and articles.

SELECTED PROJECT EXPERIENCE

Project Name: The Environmental and Social Impact Assessment (ESIA) the proposed Nondvo Dam

Client: WSP

Personal position / role on project: Project Manager.

Location: Swaziland

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the proposed dam. The study was required to meet national and IFC requirements, including a Critical Habitat assessment.

Project Name: The environmental flow assessment for the Mara River system

Client: IHE Delft Institute for Water Education

Personal position / role on project: Project Manager / Freshwater Ecologist

Location: Tanzania

Main project features: To conduct a dual season campaign to the Lower Mara River Basin in Tanzania to collect hydrological and ecological information as part of an environmental flow assessment on the Tanzanian side of the Mara River in collaboration with GIZ and NBI-NELSAP.

Project Name: The Environmental and Social Impact Assessment (ESIA) the proposed solar photovoltaic facility and transmission in Cuamba

Client: WSP

Personal position / role on project: Project Manager.

Location: Mozambique

Main project features: To conduct a single season terrestrial and aquatic ecological baseline and impact assessment for the proposed dam. The study was required to meet national and IFC requirements, including a Critical Habitat assessment.

Project Name: A biodiversity baseline assessment for the proposed Siguiri Gold Mine Project, in Kankan Province, Guinea.

Client: SRK Consulting.

Personal position / role on project: Project Manager.

Location: Siguiri, Guinea, West-Africa (2018).

Main project features: To conduct a dual season ecological baseline assessment for the expected impact footprint area. The study was required to meet national and IFC requirements, including a Critical Habitat assessment.

Project Name: A biodiversity baseline and impact assessment for the proposed Lesotho Bulk Water Supply Scheme, Lesotho.

Client: WSP.

Personal position / role on project: Wetland & Aquatic Ecologist, PROBFLO and Project Manager.

Location: Mohale's Hoek, Lesotho (2018).

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the pipeline route and proposed weir. The study was required to meet national and IFC requirements, including a Critical Habitat assessment. The study also contributed to prescribing Instream Flow Requirements using PROBFLO for the system.

Project Name: A biodiversity baseline and impact assessment for the proposed Pavua Hydropower Project, in Sofala Province, Central Mozambique.

Client: Mott MacDonald.

Personal position / role on project: Project Manager.

Location: Sofala Province, Mozambique (2017).

Main project features: To conduct a dual season terrestrial and aquatic ecological baseline and impact assessment for the expected impact footprint area, including Gorongosa National. The study was required to meet national and IFC requirements, including a Critical Habitat assessment. The study also contributed to prescribing Instream Flow Requirements for the system.

EMPLOYMENT EXPERIENCE

CURRENT EMPLOYMENT: The Biodiversity Company (January 2015 – Present)

I founded The Biodiversity Company in 2015, now consisting of experienced ecologists who provide technical expertise and policy advice to numerous sectors, such as mining, agriculture, construction and natural resources. The team at The Biodiversity Company have conducted stand-alone specialist studies, and provided overall guidance of studies with a pragmatic approach for the management of biodiversity that takes into account all the relevant stakeholders, most importantly the environment that is potentially affected. We manage risks to the environment to reduce impacts with practical, relevant and measurable methods.

EMPLOYMENT: Digby Wells Environmental (October 2013 – December 2014)

Digby Wells assigned me to the role of Country Manager for the United Kingdom. This was a new endeavour for the company as the company's global footprint continues to increase. The primary responsibilities for the role included the following:

- **Client liaison** to be able to interact more efficiently and personally with current mining clients, mining industry service providers, legal firms and banking institutions in order to introduce Digby Wells as a services provider with the aim of securing work.
 - **Project management** for international projects which may require a presence in the United Kingdom, this was dependent on the location and needs of the client. These projects would mostly be based on the Equator Principles (EP) and International Finance Corporation (IFC) Performance Standards.
 - **Technical input** to provide specialist technical expertise for projects, this included fauna, aquatic ecology, wetlands and rehabilitation. Continued with the design and implementation of Biodiversity and Land Management Plans to assist clients with managing the natural
-

resources. Responsibilities also included the mentorship and management (including reviewing and guiding) other expertise such as flora, fauna and pedology.

EMPLOYMENT: Digby Wells Environmental (March 2012 – September 2013)

Manager of a multi-disciplinary department of scientists providing specialist services in support of national and international requirements as well as best practice guidelines, primarily focussing on the mining sector. In addition to managing the department, I was also expected to contribute specialist services, most notably focusing on water resources. Further responsibilities also included the management of numerous projects on a national or international scale. A general overview of the required responsibilities are as follows:

- **Project management** for single as well as multi-disciplinary studies on a national and international scale. This included legislation and commitments for the respective country being operated in, as well as included the World Bank (WB), EP and IFC requirements.
- **Individual and/or team management** in order to provide mentoring and supportive structures for development and growth in support of the company's strategic objectives.
- **Scientific report writing** to ensure that the relevant standards and requirements have been attained, namely local country legislation, as well as WB, EP and IFC requirements.
- **Report reviewing** in order to ensure compliance and consideration of relevant legislation and guidelines and also quality control.
- **Specialist management** to facilitate the collaboration and integration of specialist skills for the respective projects. This also included the development of Biodiversity and Land Management Plan for clients.
- **Client Resource Manager** for numerous clients in order to establish as well as maintain working relationships.

An overview of the tenure working with the company is provided below:

- **October 2013 – December 2014: London Operations Manager** – Deployed to establish a presence for the company (remote office) in the United Kingdom by means of generating project work to support the employment of staff and operation of a business structure.
- **March 2012 – September 2013: Biophysical Department Manager** – Responsible for the development and growth of the department to consist of four specialist units. This included the development of a new specialist unit, namely Rehabilitation.
- **January 2011 - February 2012: Ecological Unit Manager** – In addition to implementing aquatic and wetland specialist services, the role required the overall management of additional specialist services which included fauna & flora.
- **June 2010 - December 2010: Aquatic Services Manager** – This required the marketing and implementation of specialist programmes for the client base such as biomonitoring and wetland off-set strategies. In addition to this, this also included expanding on the existing skill set to include services such as toxicity, bioaccumulation and ecological flow assessments.
- **August 2008: Aquatic ecologist** – Employed as a specialist to establish the aquatic services within the company. In addition to this, wetland specialist services were added to the existing portfolio.

PREVIOUS EMPLOYMENT: Econ@UJ (University of Johannesburg)

- June 2007 – July 2008: Junior aquatic ecologist
 - Researcher
 - Technical assistant for fieldwork
 - Reporting writing
 - Project management

ADDITIONAL EXPERIENCE

<i>Compliance audits</i>	Conducting site investigations in order to determine the level of compliance attained, ensuring that the client maintains an appropriate measure of compliance with environmental regulations by means of a legislative approach
<i>Control officer</i>	Acting as an independent Environmental Control Officer (ECO), acting as a quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts
<i>Screening studies</i>	Project investigations in order to determine the level of complexity for the environmental and social studies required for a project. This is a form of risk assessment to guide the advancement of the project.
<i>Public consultation</i>	The provision of specialist input in order to communicate project findings as well as assist with providing feedback if and when required.
<i>Water use licenses</i>	Consultation with the relevant authorities in order to establish the project requirements, as well as provide specialist (aquatics/wetland) input for the application in order to achieve authorisation.
<i>Closure</i>	Primarily the review of closure projects, with emphasis on the closure cost calculations. Support was also provided by assisting with the measurements of structures during fieldwork.
<i>Visual</i>	The review of visual studies as well as the collation of field data to be considered for the visual interpretation for the project.

ACADEMIC QUALIFICATIONS

University of Johannesburg, Johannesburg, South Africa (2009): MAGISTER SCIENTIAE (MSc)
- Aquatic Health:

Title: *Aspects of the biology of the Bushveld Smallscale Yellowfish (Labeobarbus polylepis): Feeding biology and metal bioaccumulation in five populations.*

Rand Afrikaans University (RAU), Johannesburg, South Africa (2004): BACCALAUREUS SCIENTIAE CUM HONORIBUS (Hons) – Zoology

Rand Afrikaans University (RAU), Johannesburg, South Africa (2001 - 2004): BACCALAUREUS SCIENTIAE IN NATURAL AND ENVIRONMENTAL SCIENCES. Majors: Zoology and Botany.

PUBLICATIONS

Mahomed D, Husted A, Fry C, Downsa CT and O'Brien GC. 2019. Spatial shifts and habitat partitioning of ichthyofauna within the middle-lower region of the Pungwe Basin, Mozambique, *Journal of Freshwater Ecology*, 34:1, 685-702, DOI: 10.1080/02705060.2019.1673221

Tate RB and Husted, A. 2015. Aquatic Biomonitoring in the upper reaches of the Boesmanspruit, Carolina, Mpumalanga, South Africa. *African Journal of Aquatic Science*.

Tate RB and Husted A. 2013. Bioaccumulation of metals in *Tilapia zillii* (Gervai, 1848) from an impoundment on the Badeni River, Cote D'Ivoire. African Journal of Aquatic Science.

O'Brien GC, Bulfin JB, Husted A. and Smit NJ. 2012. Comparative behavioural assessment of an established and new Tigerfish (*Hydrocynus vittatus*) population in two manmade lakes in the Limpopo catchment, Southern Africa. African Journal of Aquatic Science.

Tomschi, H, Husted, A, O'Brien, GC, Cloete, Y, Van Dyk C, Pieterse GM, Wepener V, Nel A and Reisinger U. 2009. Environmental study to establish the baseline biological and physical conditions of the Letsibogo Dam near Selebi Phikwe, Botswana. EC Multiple Framework Contract Beneficiaries.8 ACP BT 13 – Mining Sector (EDMS). Specific Contract N° 2008/166788. Beneficiary Country: Botswana. By: HPC HARRESS PICKEL CONSULT AG

Husted A. 2009. Aspects of the biology of the Bushveld Smallscale Yellowfish (*Labeobarbus polylepis*): Feeding biology and metal bioaccumulation in five populations. The University of Johannesburg (Thesis).
