



# WORKING FOR WETLANDS REHABILITATION PROGRAMME, LIMPOPO

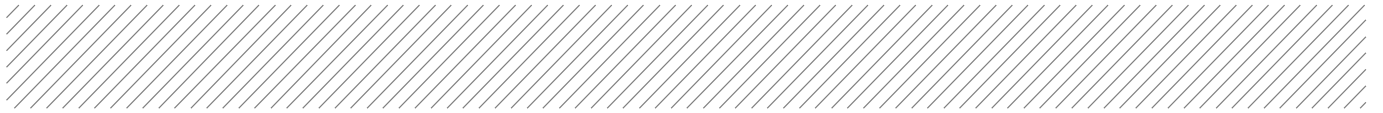
## BASIC ASSESSMENT REPORT MARCH 2018



Agriculture, Forestry and Fisheries  
Environmental Affairs  
Water Affairs and Sanitation



**EXPANDED PUBLIC WORKS PROGRAMME**  
Creating opportunities towards human fulfillment



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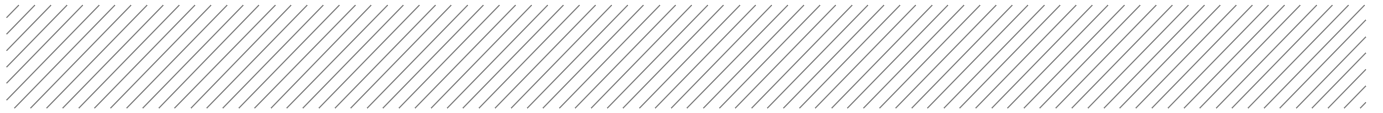
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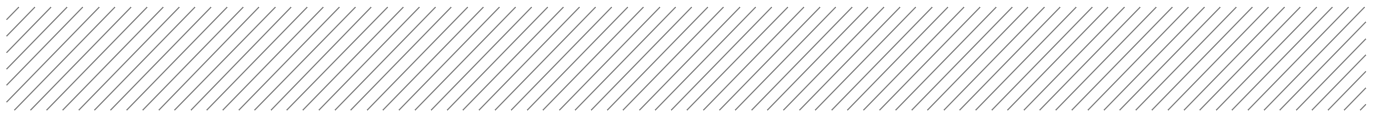
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## NEMA requirements for Basic Assessment Reports

Appendix 1	Content as required by NEMA	Section
3(1)	A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include -	
(a)	(i) details of the EAP who prepared the report; and (ii) details of the expertise of the EAP, including curriculum vitae;	Section 8.2 Appendix D
(b)	the location of the activity, including- (i) the 21 digit Surveyor General code of each cadastral land parcel; (ii) where available, the physical address and farm name; (iii) where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	Section 1.1.1  N/A
(c)	a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is- (i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or (ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	Figure 1 Chapter 6  N/A  N/A
(d)	a description of the scope of the proposed activity, including- (i) all listed and specified activities triggered and being applied for; and (ii) a description of the activities to be undertaken, including associated structures and infrastructure;	Chapter 2  Section 5.2
(e)	a description of the policy and legislative context within which the development is proposed including - (i) an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and (ii) how the proposed activity complies with and responds to the legislation and policy context, plans, guidelines, tools frameworks, and instruments;	Chapter 2
(f)	a motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 5.1
(g)	a motivation for the preferred site, activity and technology alternative;	Chapter 5
(h)	a full description of the process followed to reach the proposed preferred alternative within the site, including - (i) details of all the alternatives considered;	Section 5.3
	(ii) details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Chapter 4 Appendix B
	(iii) a summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	
	(iv) the environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 6
	(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Chapter 7
(vi) the methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives;	Section 3.2	
(vii) positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Chapter 7	



	(viii) the possible mitigation measures that could be applied and level of residual risk;	
	(ix) the outcome of the site selection matrix;	N/A
	(x) if no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such and	Section 5.3
	(xi) a concluding statement indicating the preferred alternatives, including preferred location of the activity;	N/A
(i)	a full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including -	Chapter 3 and 7
	(i) a description of all environmental issues and risks that were identified during the environmental impact assessment process; and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;	
(j)	an assessment of each identified potentially significant impact of risk, including -	Chapter 7
	(i) cumulative impacts;	
	(ii) the nature, significance and consequences of the impact and risk;	
	(iii) the extent and duration of the impact and risk;	
	(iv) the probability of the impact and risk occurring;	
	(v) the degree to which the impact and risk can be reversed;	
	(vi) the degree to which the impact and risk may cause irreplaceable loss of resources; and (vii) the degree to which the impact and risk can be avoided, managed or mitigated;	
(k)	where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Chapter 8
(l)	an environmental impact statement which contains -	
	(i) a summary of the key findings of the environmental impact assessment;	
	(ii) a map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and (iii) a summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;	
(m)	based on the assessment, and where applicable, impact management measures from specialist reports, the recording of the impact management outcomes for the development for inclusion in the EMPr;	Chapter 8
(n)	any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	
(o)	a description of any assumptions, uncertainties, and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 3.3
(p)	a reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 8.2
(r)	an undertaking under oath or affirmation by the EAP in relation to-	Appendix E
	(i) the correctness of the information provided in the report;	
	(ii) the inclusion of comments and inputs from stakeholders and interested and affected parties; and (iii) any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties;	
(s)	where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	N/A
(t)	any specific information that may be required by the competent authority; and	N/A
(u)	any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A



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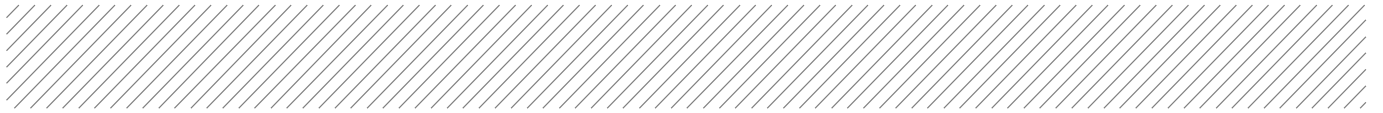
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## ABBREVIATIONS

<b>AMSL</b>	Above mean sea level
<b>ASD</b>	Assistant Director: Wetlands Programmes
<b>BAR</b>	Basic Assessment Report
<b>BGIS</b>	Biodiversity Geographic Information Systems
<b>CBA</b>	Critical Biodiversity Area
<b>CPP</b>	Catchment Prioritisation Process
<b>CSIR</b>	Council for Scientific Research
<b>DAFF</b>	Department of Agriculture, Forestry and Fisheries
<b>DEA</b>	Department of Environmental Affairs
<b>DWS</b>	Department of Water and Sanitation
<b>EA</b>	Environmental Authorisation
<b>EAP</b>	Environmental Assessment Practitioner
<b>ECO</b>	Environmental Control Officer
<b>EIA</b>	Environmental Impact Assessment
<b>EIS</b>	Ecological Importance and Sensitivity
<b>EMF</b>	Environmental Management Framework
<b>EMPr</b>	Environmental Management Programme
<b>EPWP</b>	Expanded Public Works Programme
<b>ESA</b>	Ecological Support Area
<b>GA</b>	General Authorisation
<b>GIS</b>	Geographic Information System
<b>GPS</b>	Geographical Positioning System
<b>IA</b>	Implementing Agent
<b>I&amp;AP</b>	Interested and Affected Party
<b>IDP</b>	Integrated Development Plan
<b>M&amp;E</b>	Monitoring and Evaluation
<b>MAP</b>	Mean Annual Precipitation
<b>NEMA</b>	National Environmental Management Act (Act 107 of 1998)
<b>NEM:BA</b>	National Environmental Management: Biodiversity Act (Act 10 of 2004)
<b>NEM:WA</b>	National Environmental Management: Waste Act (Act 59 of 2008)
<b>NFEPA</b>	National Freshwater Ecosystem Priority Area
<b>NHRA</b>	National Heritage Resources Act (Act 25 of 1999)
<b>NWA</b>	National Water Act (Act 36 of 1998)
<b>NWI</b>	National Wetland Inventory Project
<b>PET</b>	Potential Evapotranspiration
<b>PPP</b>	Public Participation Process
<b>SDF</b>	Spatial Development Framework
<b>SMME</b>	Small, Medium and Micro Enterprises
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organisation
<b>WfWetlands</b>	Working for Wetlands



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## 1 INTRODUCTION AND BACKGROUND

Working for Wetlands (WfWetlands) is a government programme managed by the Natural Resource Management (NRM) Programme of the Department of Environmental Affairs (DEA), and is a joint initiative with the Departments of Water and Sanitation (DWS), and Agriculture, Forestry and Fisheries (DAFF). In this way the programme is an expression of the overlapping wetland-related mandates of the three parent departments, and besides giving effect to a range of policy objectives, it also honours South Africa's commitments under several international agreements, especially the Ramsar Convention on Wetlands.

The programme is mandated to protect pristine wetlands, promote their wise-use and rehabilitate those that are damaged throughout South Africa, with an emphasis on complying with the principles of the Expanded Public Works Programme (EPWP) and using only local Small, Medium and Micro Enterprises (SMMEs). The EPWP seeks to draw significant numbers of unemployed people into the productive sector of the economy, gaining skills while they work and increasing their capacity to earn an income.

Due to the nature of the project, it is important to note that the very objectives of the WfWetlands Programme are to improve both environmental and social circumstances. The legislation protecting the environment in South Africa was not written with the intention of preventing wetland rehabilitation efforts, but rather of curtailing development in sensitive environments.

Throughout this report there will therefore be sections which guide the reader to understand how the minimum legal requirements (as required by the amended 2014 Environmental Impact Assessment (EIA) Regulations) will be met. It is important to note that the planning cycle of the WfWetlands Programme occurs annually, and continuously builds on existing information (dating back to the early 2000s). Each project cycle occurs within three phases (Refer to Section 3.1), with Phase 1 and Phase 2 occurring prior to implementation. Figure 1 on the following page provides an overview of how Phase 1 and 2 relate to the basic assessment process.

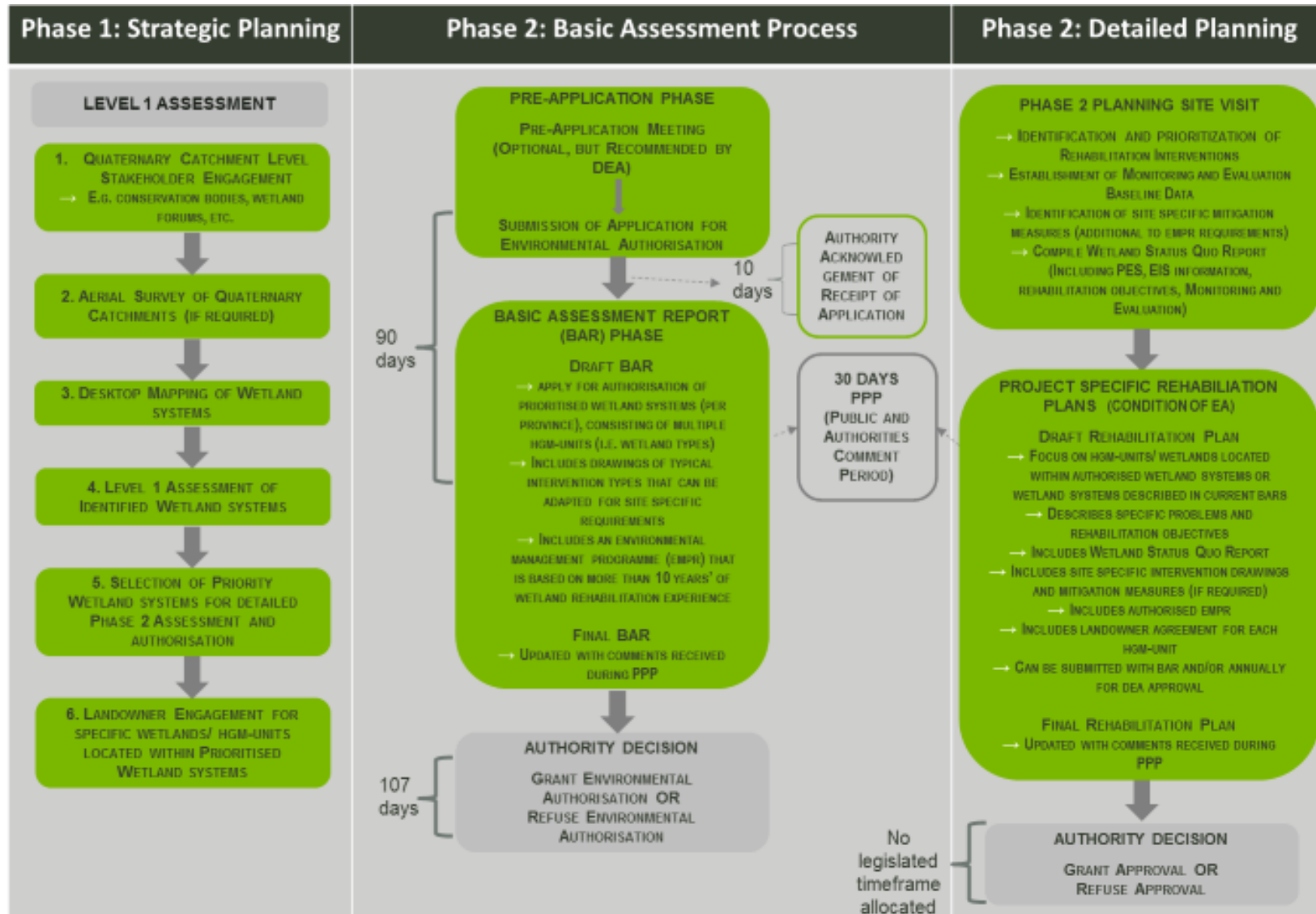


Figure 1: Overview of Phase 1 and 2 as part of the planning process

## 1.1 Introducing the Project

The WfWetlands Programme is currently managing 37 WfWetlands Projects countrywide, including projects in the Limpopo Province. WfWetlands has actively been rehabilitating wetlands in the Limpopo Province since the early 2000s. Priority wetland systems requiring rehabilitation were identified during Phase 1 of the WfWetlands Programme. Catchment and wetland prioritisation assessments were undertaken by the provincial Wetland Specialist/s to identify priority catchments and associated wetlands within which rehabilitation work needs to be undertaken. A review was undertaken to determine local knowledge and identify existing studies of the quaternary catchments in the province. The Programme's current five-year strategic plans were further used as a guide to identify wetlands, as well as data from the National Freshwater Ecosystem Priority Areas (NFEPA) project. Decisions on priority areas were informed by input from wetland forums, biodiversity/ conservation plans, municipalities, state departments and various other stakeholders.

### 1.1.1 Project Location

Based on the above, the following new wetland systems were identified in the Limpopo Province as shown in **Table 1** and **Table 2** below.

**Table 1: Project details**

Project Name	Wetland System	Quaternary Catchment	Lat (DDMMSS)	Long (DDMMSS)
Sekhukhune	Ai. Sekhukhune	B51C	24°45'56.68"S	29°33'53.36"E
Waterberg	Bi Nylsoog	A61A	24°46'12.96"S	28°15'22.17"E
Mutale	Ci. Nyahlawe	A92B	22°45'31.00"S	30°31'44.6"E

**Table 2: Farm details for Limpopo projects**

Project Name	Wetland System	Property Number	21-digit SG code	Property Size (ha)
Sekhukhune	Sekhukhune	RE/828	T0KS00000000082800000	2435.737
Waterberg	Nylsoog	10/447	T0KR00000000044700010	1380.434
		3/447	T0KR00000000044700003	326.653
		RE/5/447	T0KR00000000044700005	399.383
Mutale	Nyahlawe	RE/255	T0MT00000000025500000	7733.401

The Aurecon team, in partnership with GroundTruth, comprises Design Engineers and Environmental Assessment Practitioners (EAPs) who undertake the planning, design and authorisation components of the project. The team is assisted by an external team of Wetland Specialists who provide scientific insight into the operation of wetlands and expert local knowledge of the wetlands. The project team is also complimented by the Assistant Director for Wetlands Programme (ASDs) who are each responsible for a province.

The project team for Limpopo Province includes the following professionals:

Table 3: Planning Team for Limpopo Province

Role	Representative	Company
ASD	Collin Silima	Department of Environmental Affairs
EAP	Franci Gresse	Aurecon South Africa (Pty) Ltd
Engineer	Cilliers Blaauw	Aurecon South Africa (Pty) Ltd
Wetlander	Anton Linstrom	Wet-Earth Eco-Specs

The delivery of the final basic assessment reports (BARs) and rehabilitation plans are managed by Aurecon's Cape Town office where Ms Franci Gresse provides the role of the main EAP and project leader. Ms Gresse has been part of the WfWetlands Programme since 2010 and is involved with the technical planning component for the Limpopo, Northern Cape and Western Cape Provinces, as well as the management and delivery of the project. Ms Gresse's signed EAP declaration and curriculum vitae (CV) can be found in **Appendix E**.

Specialist input is provided within this BAR by the provincial wetland specialist, however a specialist report does not accompany the report. The wetland specialist provides two deliverables, the first being a high-level strategy during Phase 1, and a detailed assessment of the wetland system and proposed interventions at Phase 2 based on the WET-Health methodology. The Phase 2 reports will be included as an appendix to the project specific rehabilitation plans.

Should any heritage resources be identified on site (refer to Section 6.3) a heritage specialist will be appointed to undertake the necessary permitting procedures in terms of the National Heritage Resources Act (Act 25 of 1999) (NHRA).

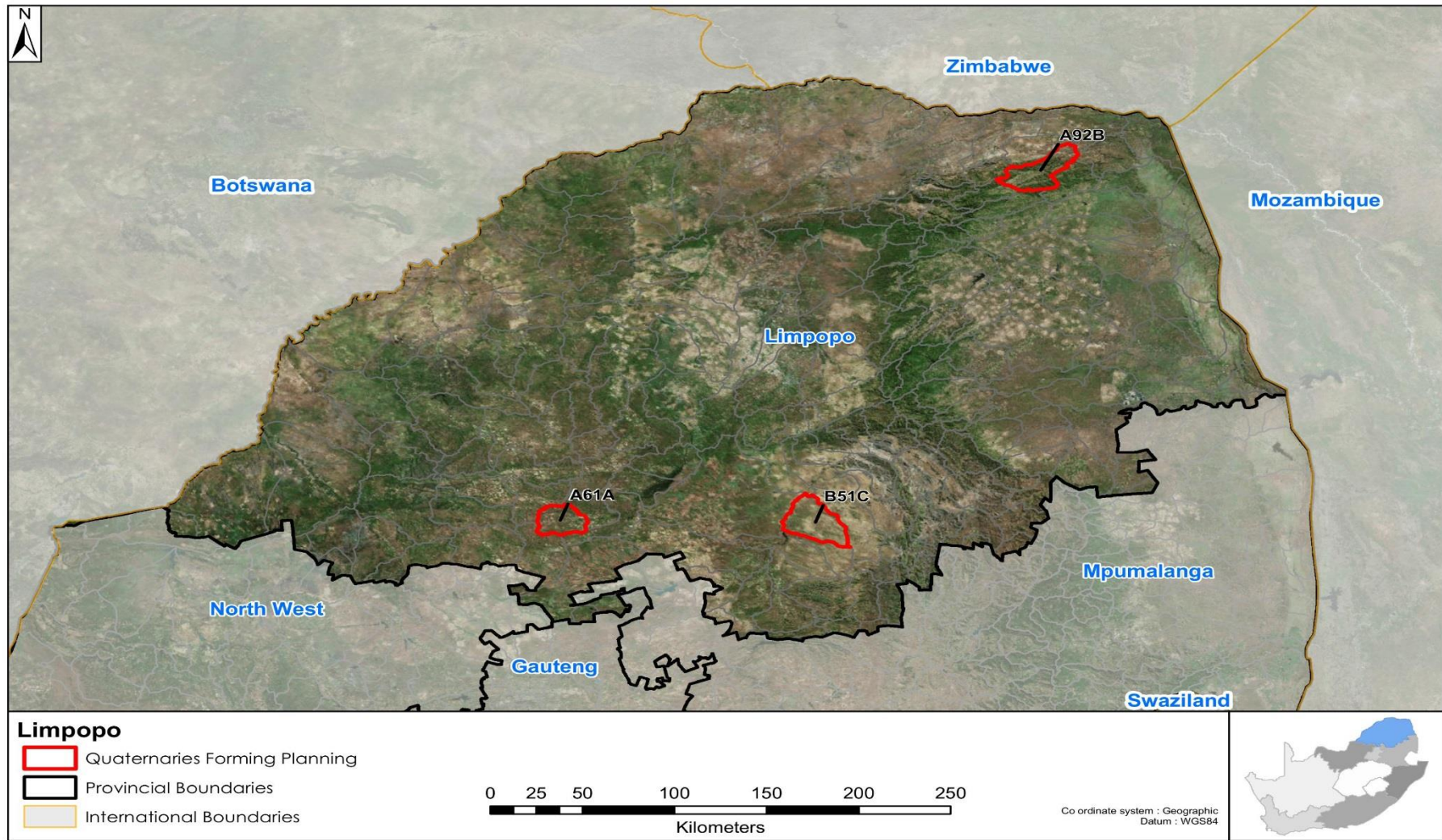


Figure 2: Locality map showing the location of quaternary catchments included in this BAR

## 2 LEGAL AND PLANNING CONTEXT

One of the core purposes of the WfWetlands Programme is the preservation of South Africa's valuable wetland systems through rehabilitation and restoration.

South Africa has rigorous and comprehensive environmental legislation aimed at preventing degradation of the environment, including damage to wetland systems. The following legislation is of relevance:

- The National Environmental Management Act, No. 107 of 1998 (NEMA), as amended
- The National Water Act, No.36 of 1998 (NWA)
- The National Heritage Resources Act, No. 25 of 1999 (NHRA)

Development proposals within or near any wetland system are subject to thorough bio-physical and socio-economic assessment as mandatory processes of related legislation. These processes are required to prevent degradation of the environment and to ensure sustainable and environmentally conscientious development.

### Memorandum of Understanding for Working for Wetlands Programme

A Memorandum of Understanding (MoU) has been entered into between DEA, DAFF and DWS for the WfWetlands Programme. Through co-operative governance and partnerships, this MoU aims to streamline the authorisation processes required by the National Environmental Management Act (Act 107 of 1998), the National Water Act (Act 36 of 1998), and the National Heritage Resources Act (Act 25 of 1999) to facilitate efficient processing of applications for authorisation of wetland rehabilitation activities.

### 2.1 Relevant Legislation

There are a host of legal and policy documents and guidelines to consider when undertaking such a project.

Table 4 provides an overview of all the relevant legislation.

**Table 4: Relevant Legislation, policies and guidelines considered in preparation of the Basic Assessment Report**

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
<b>Legislation</b>			
The Constitution of South Africa (Act 108)	The WfWetlands Programme is a rehabilitation proposal that aims to protect and conserve South Africa's wetland ecosystems. As such the listed legislation, policies and guidelines are all of relevance to the project.	National Government	1996
National Environmental Management Act (107) (NEMA)		Department of Environmental Affairs	1998
National Environmental Management Act (Act 107), Amendment Act (NEMA)		Department of Environmental Affairs	1998
The National Water Act (Act 36)		Department of Water and Sanitation	1998
Conservation of Agricultural Resources Act (Act 43)		Department of Agriculture, Forestry & Fisheries	1983



Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
National Heritage Resources Act (Act 25)		National Heritage Resources Agency	1999
World Heritage Conventions Act (Act 49)		Department of Environmental Affairs	1999
The National Environmental Management: Biodiversity Act (Act 10)		Department of Environmental Affairs	2004
National Environmental Management: Protected Areas Act (Act 57)		Department of Environmental Affairs	2003
The Mountain Catchments Areas Act (Act 63)		Department of Water and Sanitation	1970
<b>National Guidelines</b>			
EIA Guideline Series, in particular: Guideline 5 – Companion to the NEMA EIA Regulations, 2010 (DEA, October 2012) Guideline 7 – Public Participation in the EIA process, 2012 (DEA, October 2012) Guideline 9 – Guideline on Need and Desirability, 2010 (DEA, October 2014)	The WfWetlands Programme is a rehabilitation proposal that aims to protect and conserve South Africa's wetland ecosystems. As such the listed legislation, policies and guidelines are all of relevance to the project.	Department of Environmental Affairs	2012 - 2014
<b>Provincial Bylaws, Frameworks, Plans and Policies</b>			
Limpopo Conservation Plan Version 2	The WfWetlands Programme is a rehabilitation proposal that aims to protect and conserve South Africa's wetland ecosystems. As such the listed legislation, policies and guidelines are all of relevance to the project.	Limpopo Department of Economic Development, Environment & Tourism	2013
<b>International Conventions</b>			
The Ramsar Convention Convention on Biological Diversity United Nations Conventions to Combat Desertification New Partnership for Africa's Development (NEPAD) The World Summit on Sustainable Development (WSSD)	The WfWetlands Programme is a rehabilitation proposal that aims to protect and conserve South Africa's wetland ecosystems. As such the listed legislation, policies and guidelines are all of relevance to the project.		

## 2.2 National Environmental Management Act, No. 107 of 1998 (NEMA)

The implementation of various interventions aimed at wetland rehabilitation require Environmental Authorisation (EA) from the Department of Environmental Affairs (DEA) in terms of Regulations pursuant to NEMA, as amended. It has been determined together with DEA that a **Basic Assessment Report (BAR)** will be prepared for each Province where work is proposed by the WfWetlands Programme. The EAs would be inclusive of all Listed Activities for these wetland systems and would essentially authorise any typical wetland rehabilitation activities required during the WfWetlands Programme implementation phase.

The intention is that **rehabilitation plans** would be prepared every year after sufficient field work has been undertaken in the wetlands that have an EA. These rehabilitation plans would be made available to registered Interested and Affected Parties (I&APs) before being submitted to DEA for approval as a condition of the EA for each of the Provinces. The rehabilitation plans would describe the combination and number of interventions selected to meet the rehabilitation objectives for each Wetland Project, as well as an indication of the approximate location and approximate dimensions of each intervention. These interventions would vary but a booklet of typical hard engineering designs is included in **Appendix A** of this report. The rehabilitation plans would also provide site photographs of the general landscape as well as photographs of the proposed locations for each intervention.

### The WfWetlands Programme is not a development proposal

It is important to note that the very objectives of the WfWetlands Programme are to **improve both environmental and social circumstances**. The WfWetlands Programme **gives effect to a range of policy objectives of environmental legislation**, and also **honours South Africa's commitments under several international agreements**, especially the Ramsar Convention on Wetlands. The legislation protecting the environment in South Africa was not written with the intention of preventing wetland rehabilitation efforts, but rather of curtailing development in sensitive environments. It is important to remember that **the WfWetlands Programme is not a development proposal**, and although this programme technically requires Environmental Authorisation in terms of Regulations pursuant to NEMA, as such environmentally positive rehabilitation projects shouldn't need to be assessed for negative environmental impact. Therefore, legislative processes aimed at preventing negative environmental impact through development are really not applicable to a project of this nature and the **project activities that trigger Listing Notices are only being undertaken to benefit the environment**.

### 2.2.1 Listed Activities

The following listed activities, as shown in **Table 5**, have been identified as being applicable to the proposed rehabilitation interventions:

**Table 5: Listed activities triggered by the proposed Limpopo Projects**

Listed activity	Description of project activity that triggers listed activity
<b>Listing Notice 1 (GN R983, as amended)</b>	
<p><b>Activity 12: The development of-</b></p> <p><i>i. dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</i></p> <p><i>ii infrastructure or structures with a physical footprint of 100 square metres or more;</i></p>	<p>In order to achieve the objectives of wetland rehabilitation, changes must be made to artificial drainage lines or eroding water channels if the wetland systems are to be returned to their original statuses. The following may be necessary:</p> <ul style="list-style-type: none"> <li>The construction of concrete or gabion weirs within a watercourses (wetlands);</li> </ul>

Listed activity	Description of project activity that triggers listed activity
<p>where such development occurs-</p> <p>a. within a watercourse;</p> <p>c. if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.</p>	<ul style="list-style-type: none"> <li>The formalisation of stream crossings to ensure that the integrity of wetland systems downstream and upstream of the crossings are protected from further degradation; and</li> <li>The construction of walkways in public wetlands to limit human impact, and to form part of the educational component of the project.</li> </ul>
<p><b>Activity 19:</b> The infilling or depositing of any material of more than 10 m<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; but excluding where such infilling, depositing, dredging, excavation, removal or moving –</p> <p>b. is for maintenance purposes undertaken in accordance with a maintenance management plan</p>	<p>In order to implement the proposed rehabilitation interventions, soil would need to be moved as part of the site preparation and/or construction activities, for example:</p> <ul style="list-style-type: none"> <li>Excavations may be required to build weirs, etc.</li> <li>Erosion channels may be filled with rocks or soil.</li> <li>Eroded embankments may need to be sloped for MacMat R to be applied, etc.</li> </ul>
<p><b>Activity 27:</b> The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan</p>	<p>In order for WfWetlands to achieve rehabilitation objectives, the removal of alien invasive species could be required.</p>
<p><b>Activity 48:</b> The expansion of-</p> <p>i. infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or</p> <p>ii. dams or weirs, where the dam or weir, including infrastructure and water surface area, is expanded by 100 square metres or more;</p> <p>where such expansion or expansion and related operation occurs-</p> <p>a. within a watercourse;</p> <p>c. if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.</p>	<p>In order to achieve the objectives of wetland rehabilitation, changes must be made to artificial drainage lines or eroding water channels if the wetland systems are to be returned to their original statuses. The following may be necessary:</p> <ul style="list-style-type: none"> <li>The expansion of existing concrete or gabion weirs within watercourses (wetlands).</li> <li>Furthermore, some educational infrastructure may be required to limit human impact on the wetland system. Even though the interventions are intended to improve ecological status and habitats.</li> <li>Walkways in public wetlands may constitute infrastructure with a footprint exceeding 100m<sup>2</sup>.</li> </ul>

Listed activity	Description of project activity that triggers listed activity
<b>Listing Notice 3 (GN R985, as amended)</b>	
<p><b>Activity 12:</b> <i>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</i></p> <p><b>Limpopo</b></p> <p><i>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...</i></p> <p><i>ii. Within critical biodiversity areas identified in bioregional plans; or</i></p> <p><i>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 or proclamation in terms of NEMPAA.</i></p>	<p>In order for WfWetlands to achieve rehabilitation objectives, the removal of alien invasive species could be required.</p> <p>The Sekhukhune Project wetland catchments occur in close proximity to the Leswena Nature Reserve and Schuinsdraai Nature Reserve which are formally protected areas. The Limpopo Central Bushveld forms part of the greater Sekhukhune area and is a focus area of the National Protected Area Expansion Strategy (NPAES, 2010).</p> <p>The Waterberg project is currently focussing on two key conservation areas in the Waterberg (a) the Welgevonden Nature Reserve and the (b) Nyl Floodplain upstream which is located within a CBA.</p>
<p><b>Activity 14:</b> <i>The development</i></p> <p><i>i. dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres or more,</i></p> <p><i>ii. infrastructure or structures with a physical footprint of 10 square metres or more;</i></p> <p><i>where such development occurs –</i></p> <p><i>a. within a watercourse;</i></p> <p><i>c. if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</i></p> <p><b>(e) Limpopo:</b></p> <p><i>i. Outside urban areas, in:</i></p> <p><i>(bb) National Protected Area Expansion Strategy Focus areas;</i></p>	<p>In order to achieve the objectives of wetland rehabilitation, changes must be made to artificial drainage lines or eroding water channels if the wetland systems are to be returned to their original statuses. The following may be necessary:</p> <ul style="list-style-type: none"> <li>• The construction of concrete or gabion weirs within watercourses (wetlands);</li> <li>• The formalisation of stream crossings to ensure that the integrity of wetland systems downstream and upstream of the crossings are protected from further degradation; and</li> <li>• The construction of walkways in public wetlands to limit human impact, and to form part of the educational component of the project.</li> </ul> <p>The Sekhukhune Project wetland catchments occur in close proximity to the Leswena Nature Reserve and Schuinsdraai Nature Reserve which are formally protected areas. The Limpopo Central Bushveld forms part of the greater Sekhukhune area and is a focus</p>

Listed activity	Description of project activity that triggers listed activity
<p>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.</p>	<p>area of the National Protected Area Expansion Strategy (NPAES, 2010).</p> <p>The Waterberg project is currently focussing on two key conservation areas in the Waterberg (a) the Welgevonden Nature Reserve and the (b) Nyl Floodplain upstream which is located within a CBA.</p>
<p><b>Activity 23: The expansion of-</b></p> <p>i. dams or weirs where the dam or weir is expanded by 10 square meters or more, or</p> <p>ii. infrastructure or structures where the physical footprint is expanded by 10 square metres or more;</p> <p>where such development occurs</p> <p>a. within a watercourse;</p> <p>c. if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p><b>(e) Limpopo:</b></p> <p>i. Outside urban areas, in:</p> <p>(bb) National Protected Area Expansion Strategy Focus areas;</p> <p>(ee) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.</p>	<p>In order to achieve the objectives of wetland rehabilitation, changes must be made to artificial drainage lines or eroding water channels if the wetland systems are to be returned to their original statuses. The following may be necessary:</p> <ul style="list-style-type: none"> <li>• The construction of concrete or gabion weirs within watercourses (wetlands);</li> <li>• The formalisation of stream crossings to ensure that the integrity of wetland systems downstream and upstream of the crossings are protected from further degradation;</li> <li>• The construction of walkways in public wetlands to limit human impact, and to form part of the educational component of the project.</li> </ul> <p>The Sekhukhune Project wetland catchments occur in close proximity to the Leswena Nature Reserve and Schuinsdraai Nature Reserve which are formally protected areas. The Limpopo Central Bushveld forms part of the greater Sekhukhune area and is a focus area of the National Protected Area Expansion Strategy (NPAES, 2010).</p> <p>The Waterberg project is currently focussing on two key conservation areas in the Waterberg (a) the Welgevonden Nature Reserve and the (b) Nyl Floodplain upstream which is located within a CBA.</p>

### 2.3 National Water Act, No. 36 of 1998 (NWA)

In terms of Section 39 of the NWA, a General authorisation<sup>3</sup> (GA) has been granted for certain activities that usually require a Water Use License; as long as these activities are undertaken for wetland rehabilitation. These activities include ‘impeding or diverting the flow of water in a watercourse<sup>4</sup>’ and ‘altering the bed, banks, course or characteristics of a watercourse<sup>5</sup>’ where they are specifically undertaken for the purposes of rehabilitating<sup>6</sup> a wetland for conservation purposes. The WfWetlands Programme is required to register the ‘water use’ in terms of the GA.

### 2.4 National Heritage Resource Act, No. 25 of 1999 (NHRA)

Section 38 of the NHRA requires that any person who intends to undertake a development as categorised in the NHRA must at the very earliest stages of initiating the development notify the responsible heritage resources authority, namely the South African Heritage Resources Agency (SAHRA) or the relevant provincial heritage

agency. These agencies would in turn indicate whether or not a full Heritage Impact Assessment (HIA) would need to be undertaken. Should a permit be required for the damaging or removal of specific heritage resources, a separate application will be submitted to SAHRA or the relevant provincial heritage agency for the approval of such an activity.

In the past, where projects could potentially impact on heritage resources, specialists were appointed to undertake heritage impact assessments and the requisite permitting process. Furthermore, should any archaeological and/ or heritage resources be exposed during the implementation of the interventions, the Implementation Team will follow the process described in the Environmental Management Plan (Appendix D of the rehabilitation plans). This process includes ceasing the implementation of all interventions in the immediate areas, cordoning off the discovery, notifying the relevant Heritage Authorities of the discovery, and following their recommendations to investigate or secure the discovery. **Table 6** below sets out the applicability of the NHRA requirements with reference to the projects in the Western Cape.

**Table 6: Applicability of NHRA requirements in terms of the proposed wetland rehabilitation activities**

NHRA Section	Applicability to WfWetlands
<b>Section 27: National heritage sites and provincial heritage sites</b>	
(18) No person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site.	None of the proposed wetland systems fall within national or provincial heritage sites.
<b>Section 28: Protected areas</b>	
(3) No person may damage, disfigure, alter, subdivide or in any other way develop any part of a protected area unless, at least 60 days prior to the initiation of such changes, he or she has consulted the heritage resources authority which designated such area in accordance with a procedure prescribed by that authority.	None of the proposed wetland systems fall within protected areas as defined by the Act. Furthermore, the objective of the proposed rehabilitation activities are to restore natural wetland systems and are not considered to be development activities. These rehabilitation activities would in fact have a positive impact on the area with regards to its scientific and aesthetic value.
<b>Section 38(1): Development categories</b>	
(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;	Although some of the proposed rehabilitation interventions could be perceived to involve linear barriers (e.g. berms, as shown in Appendix A) to control or direct the flow of water, none of these interventions would exceed the threshold of 300m in length.
(b) the construction of a bridge or similar structure exceeding 50m in length;	Even though some of the potential rehabilitation interventions extend across watercourses (namely gabion and concrete weirs, see Appendix A), none of these structures would exceed the threshold of 50m in length.

<p>(c) any development or other activity which will change the character of a site -</p> <ul style="list-style-type: none"> <li>(i) exceeding 5 000m<sup>2</sup> in extent; or</li> <li>(ii) involving three or more existing erven or subdivisions thereof; or</li> <li>(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or</li> <li>(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;</li> </ul>	<p>WfWetlands is not a development project but involves wetland rehabilitation measures to restore natural wetland systems by addressing erosion problems and threats to ecological functioning (i.e. maintaining the natural character of the site). Each intervention is localised and only occurs on one property. However more extensive interventions may include soft measures such as brush packing or clearing of listed alien plant species. In such cases these species are not considered part of the cultural landscape.</p>
<p>(d) the re-zoning of a site exceeding 10 000m<sup>2</sup> in extent; or</p>	<p>N/A</p>
<p>(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,</p>	<p>N/A</p>

## 3 METHODOLOGY

### 3.1 Approach to the Project

In order to manage the **WfWetlands Programme**, wetlands have been grouped into “projects”, and each **Wetland Project** encompasses several smaller wetland systems which are each divided into smaller, more manageable and homogenous wetland units. These Wetland Projects may be located within one or more quaternary catchments within a Province.

Each Wetland Project is managed in three phases (as shown in the flow diagram in **Figure 3**) over a two-year cycle. The first two phases straddle the first year of the cycle and involve planning, identification, design and authorisation of interventions. The third phase is implementation, which takes place during the second year.

In order to undertake these three phases, a collaborative team has been established as follows. The **Programme Team** currently comprises two subdirectories: a) Implementation and After Care and b) Planning, Monitoring and Evaluation. The Assistant Directors for Wetlands Programmes (ASDs)<sup>1</sup> report to the Implementation and After Care Deputy Director and are responsible for the identification and implementation of projects in their regions. The Programme Team is further supported by a small team that fulfil various roles such as Geographical Information Systems (GIS) and training. Independent Design Engineers and Environmental Assessment Practitioners (EAPs) are appointed to undertake the planning, design and authorisation components of the project. The project team is assisted by a number of wetland specialists who provide scientific insight into the operation of wetlands and bring expert and often local knowledge to the project teams. They are also assisted by the landowners and implementers who have valuable local knowledge of these wetlands.

The first phase is the identification of suitable wetlands which require intervention. The purpose of Phase 1 and the associated reporting is to identify:

- Priority catchments and associated wetlands/ sites within which rehabilitation work needs to be undertaken; and
- Key stakeholders who will provide meaningful input into the planning phases and wetland selection processes, and who will review and comment on the rehabilitation proposals.

**Phase 1** commences with a catchment and wetland prioritisation process for every province. The Wetland Specialist responsible for a particular province undertakes a desktop study to determine the most suitable wetlands for the WfWetlands rehabilitation efforts. The involvement of Provincial Wetland Forums and other key stakeholders is a critical component of the wetland identification processes since these stakeholders are representative of diverse groups with shared interests (e.g. from government institutions to amateur ecological enthusiasts). This phase also involves initial communication with local land-owners and other Interested and Affected Parties (I&APs) to gauge the social benefits of the work. Aerial surveys of the areas in question may be undertaken, as well as limited fieldwork investigations or site visits to confirm the inclusion of certain wetland projects or units. Once wetlands have been prioritised and agreed on by the various parties, specific rehabilitation objectives are determined for each wetland following a rapid wetland assessment undertaken by the Wetland Specialist.

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<sup>1</sup> Also referred to as Provincial Coordinators (PCs).



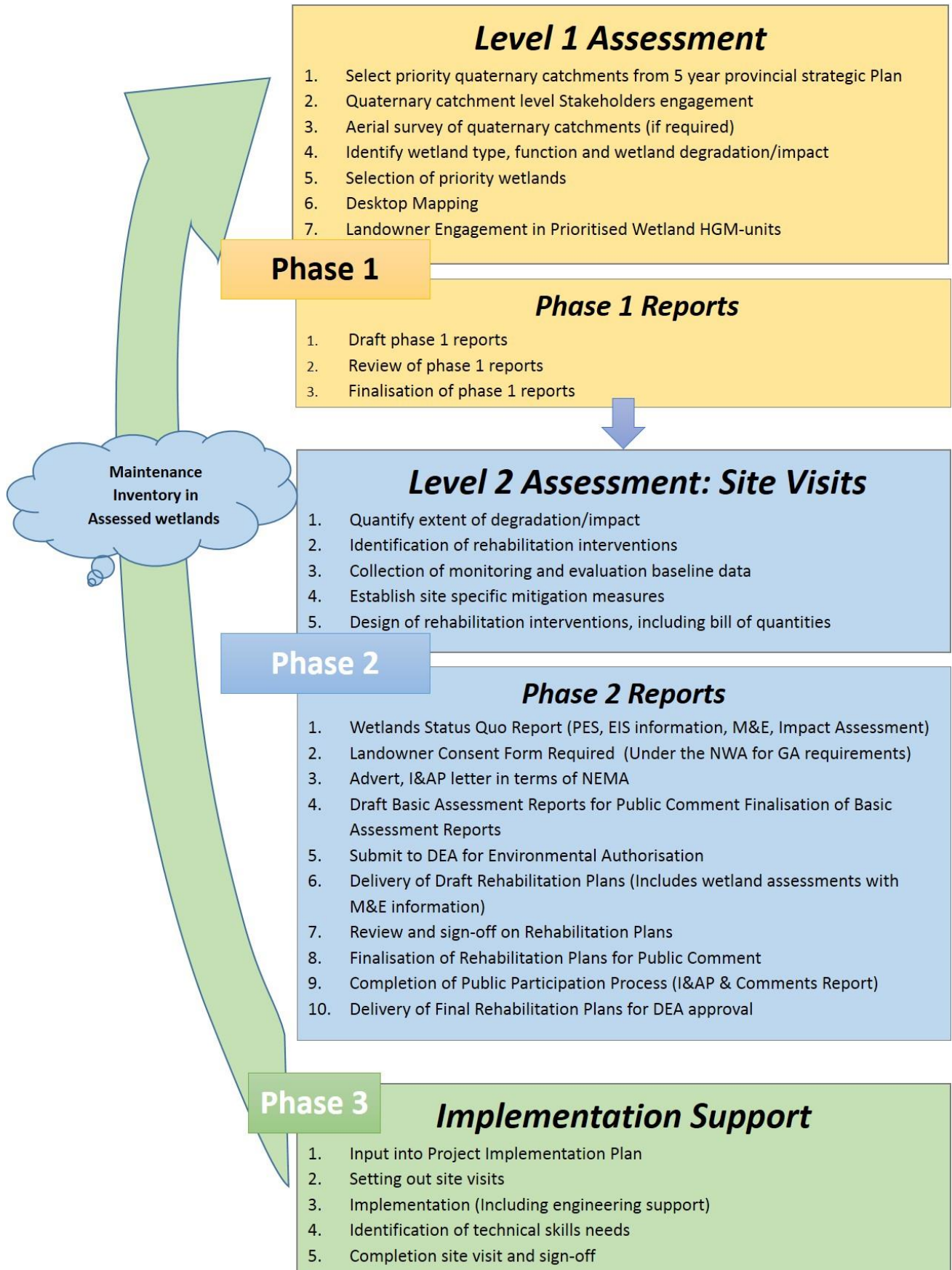


Figure 3: The Working for Wetlands planning process

**Phase 2** requires site visits attended by the fieldwork team comprising a Wetland Specialist, a Design Engineer, an EAP, and an ASD. Other interested stakeholders or authorities, landowners and in some instances the Implementing Agents (IAs) may also attend the site visits. This allows for a highly collaborative approach, as options are discussed by experts from different scientific disciplines, as well as local inhabitants with deep anecdotal knowledge. While on site, rehabilitation opportunities are investigated. The details of the proposed interventions are discussed, some survey work is undertaken by the engineers, and Global Positioning System (GPS) coordinates and digital photographs are taken for record purposes. Furthermore, appropriate dimensions of the locations are recorded in order to design and calculate quantities for the interventions. At the end of the site visit the rehabilitation objectives together with the location layout of the proposed interventions are agreed upon by the project team.

During Phase 2, monitoring systems are put in place to support the continuous evaluation of the interventions. The systems monitor both the environmental and social benefits of the interventions. As part of the Phase 2 site visit, a maintenance inventory of any existing interventions that are damaged and/or failing and thus requiring maintenance is compiled by the ASD, in consultation with the Design Engineer.

Based on certain criteria and data measurements (water volumes, flow rates, and soil types); the availability of materials such as rock; labour intensive targets; maintenance requirements etc., the interventions are then designed. Bills of quantity are calculated for the designs and cost estimates made. Maintenance requirements for existing interventions in the assessed wetlands are similarly detailed and the costs calculated. The Design Engineer also reviews and, if necessary, adjusts any previously planned interventions that are included into the historical rehabilitation plans.

Phase 2 also requires that Environmental Authorisations are obtained before work can commence in the wetlands during Phase 3. Provincial level BARs and rehabilitation plans are prepared for each Wetland Project. The rehabilitation plans include details of each intervention to be implemented, preliminary construction drawings and all necessary documentation required by applicable legislation. The rehabilitation plans are considered to be the primary working document for the implementation of the project via the construction/undertaking of interventions listed in the Plan.

**Phase 3** commence upon approval of the BARs and wetland rehabilitation plans by DEA. The work detailed for the project would be implemented within a year followed by on-going monitoring. It is typically at this point in the process when the final construction drawings are issued to the Implementing Agents (IAs). Seventeen IAs are currently employed in the WfWetlands Programme and are responsible for employing contractors and their teams (workers) to construct the interventions detailed in each of the rehabilitation plans. For all interventions that are based on engineering designs (typically hard engineered interventions), the Design Engineer is required to visit the site before construction commences to ensure that the original design is still appropriate in the dynamic and ever-changing wetland system. The Design Engineer assist the IAs in pegging and setting-out interventions. Phase 3 concludes with the construction of the interventions, but there is an on-going monitoring and auditing process that ensures the quality of interventions, the rectification of any problems, and the feedback to the design team regarding lessons learnt.

**Landowner consent** is an important component of each phase in each Wetland Project. The flow diagram, **Figure 3**, demonstrates the point at which various consent forms must be approved via signature from the directly affected landowner. The ASDs are responsible for undertaking the necessary landowner engagement and for ensuring that the requisite landowner consent forms required as part of Phase 1 and 2 of this project are signed. Without these signed consent forms the WfWetlands Programme will not be able to implement rehabilitation interventions on the affected property.

### 3.2 Impact Assessment Methodology

This section outlines the proposed method for assessing the significance of the potential environmental impacts during the construction and operational phase.

For each impact, the **EXTENT** (spatial scale), **MAGNITUDE** and **DURATION** (time scale) is described. These criteria were used to ascertain the **SIGNIFICANCE** of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place. The mitigation described in the EIR represents the full range of plausible and pragmatic measures but does not necessarily imply that they will be implemented.

The tables on the following pages show the scale used to assess these variables, and defines each of the rating categories.

**Table 7: Assessment criteria for the evaluation of impacts**

Criteria	Category	Description
<b>Spatial influence of impact</b>	<b>Regional</b>	Beyond a 10-km radius of the candidate site.
	<b>Local</b>	Between 100m and 10 km radius of the candidate site.
	<b>Site specific</b>	On site or within 100 m of the candidate site.
<b>Magnitude of impact (at the indicated spatial scale)</b>	<b>High</b>	Natural and/ or social functions and/ or processes are <i>severely</i> altered
	<b>Medium</b>	Natural and/ or social functions and/ or processes are <i>notably</i> altered
	<b>Low</b>	Natural and/ or social functions and/ or processes are <i>slightly</i> altered
	<b>Very Low</b>	Natural and/ or social functions and/ or processes are <i>negligibly</i> altered
	<b>Zero</b>	Natural and/ or social functions and/ or processes remain <i>unaltered</i>
<b>Duration of impact (temporal)</b>	<b>Construction period</b>	From commencement up to 2 years after construction
	<b>Short Term</b>	From 2 to 5 years after construction
	<b>Medium Term</b>	From 5 to 15 years after construction
	<b>Long Term</b>	More than 15 years after construction

The **SIGNIFICANCE** of an impact is derived by taking into account the temporal and spatial scales and magnitude. The means of arriving at the different significance ratings is explained in **Table 8**.

Table 8: Definition of significance ratings

Significance ratings	Level of criteria required
<b>High</b>	<ul style="list-style-type: none"> <li>High magnitude with a regional extent and long-term duration</li> <li>High magnitude with either a regional extent and medium-term duration or a local extent and long-term duration</li> <li>Medium magnitude with a regional extent and long-term duration</li> </ul>
<b>Medium</b>	<ul style="list-style-type: none"> <li>High magnitude with a local extent and medium-term duration</li> <li>High magnitude with a regional extent and construction period or a site-specific extent and long-term duration</li> <li>High magnitude with either a local extent and construction period duration or a site-specific extent and medium-term duration</li> <li>Medium magnitude with any combination of extent and duration except site specific and construction period or regional and long term</li> <li>Low magnitude with a regional extent and long-term duration</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>High magnitude with a site-specific extent and construction period duration</li> <li>Medium magnitude with a site-specific extent and construction period duration</li> <li>Low magnitude with any combination of extent and duration except site specific and construction period or regional and long term</li> <li>Very low magnitude with a regional extent and long-term duration</li> </ul>
<b>Very low</b>	<ul style="list-style-type: none"> <li>Low magnitude with a site-specific extent and construction period duration</li> <li>Very low magnitude with any combination of extent and construction or short-term duration</li> </ul>
<b>Neutral</b>	<ul style="list-style-type: none"> <li>Zero magnitude with any combination of extent and duration</li> </ul>

Once the significance of an impact has been determined, the **PROBABILITY** of this impact occurring as well as the **CONFIDENCE** in the assessment of the impact, was determined using the rating systems outlined in **Table 9** and **Table 10**, respectively. It is important to note that the significance of an impact should always be considered in concert with the probability of that impact occurring. Lastly, the **REVERSIBILITY** of the impact is estimated using the rating system outlined in **Table 11**.

Table 9: Definition of probability ratings

Probability ratings	Criteria
<b>Definite</b>	Estimated greater than 95 % chance of the impact occurring.
<b>Probable</b>	Estimated 5 to 95 % chance of the impact occurring.
<b>Unlikely</b>	Estimated less than 5 % chance of the impact occurring.

**Table 10: Definition of confidence ratings**

Confidence ratings	Criteria
<b>Certain</b>	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact.
<b>Sure</b>	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact.
<b>Unsure</b>	Limited useful information on and understanding of the environmental factors potentially influencing this impact.

**Table 11: Definition of reversibility ratings**

Reversibility ratings	Criteria
<b>Irreversible</b>	The activity will lead to an impact that is in all practical terms permanent.
<b>Reversible</b>	The impact is reversible within 2 years after the cause or stress is removed.

### 3.3 Assumptions and Limitations

#### 3.3.1 Assumptions

In undertaking this investigation and compiling the BAR, the following has been assumed:

- The strategic level investigations undertaken during Phase 1 are acceptable and robust.
- The information provided by the applicant and wetland specialists is accurate.
- The scope of this investigation is limited to assessing the over-all environmental impacts that have been identified over time since the WfWetlands Programme commenced in the early 2000's. Additional site specific impacts/ mitigation measures, focusing on the Wetland Unit and proposed intervention, will only be identified during the planning phase and will be included in the applicable rehabilitation plan.

#### 3.3.2 Gaps in knowledge

The planning for the proposed rehabilitation projects is at a wetland system level and the specific details of the interventions that would be required to implement rehabilitation interventions are not available at this stage of the Basic Assessment process. The intention is that rehabilitation plans would be prepared every year after sufficient field work has been undertaken in the wetlands that have an EA. These rehabilitation plans would be made available to registered Interested and Affected Parties (I&APs) before being submitted to DEA for approval as a condition of the EA for each of the Provinces. The rehabilitation plans would describe the combination and number of interventions selected to meet the rehabilitation objectives for each Wetland Project, as well as an indication of the approximate location and approximate dimensions of each intervention.

## 4 PUBLIC PARTICIPATION

### 4.1 Public Participation Process

South African legislation and guidelines have formalised stakeholder engagement in the BAR process and refer to it as the Public Participation Process (PPP). PPP forms an integral component of the environmental impact assessment process and enables I&APs to identify issues, concerns, and suggestion through the review of documents/ reports at various stages throughout the BAR process as described in Chapter 6 of GN R982, as amended. For more detail on the PPP undertaken to date (e.g. copies of advertisements, poster locations, comments received, etc.), please refer to **Appendix B**.

Table 12: Public Participation Process

Activity	Description
<b>Pre-application</b>	
<b>Advertisements (Appendix B1)</b>	Adverts were placed in The Sunday Times (in English) on <b>12 November 2017</b> and in Die Rapport (in Afrikaans) on <b>5 November 2017</b> to allow I&APs the opportunity to register their interest in the project.
<b>Site Posters (Appendix B2)</b>	Posters, notifying I&APs of the proposed rehabilitation projects, were placed on the boundary fences of the properties and at local municipal offices.
<b>Register of I&amp;APs (Appendix B3)</b>	The existing provincial I&AP database (from previous planning cycles) has been updated with information from new I&APs responding to advertisements and site notices. Proactive identification of I&APs, municipal representatives, organs of state, competent authorities and surrounding landowners were also undertaken to update the database specific to the new planning year.
<b>Basic Assessment Process</b>	
<b>Availability of BAR for public comment</b>	The BAR and associated rehabilitation plan(s) were made available for a 30 day comment period from <b>5 March 2018 to 6 April 2018</b> on Aurecon's website: <a href="http://aurecongroup.com/en/public-participation.aspx">http://aurecongroup.com/en/public-participation.aspx</a> .  All competent authorities and landowners also received an electronic copy (i.e. CD) of the BAR and rehabilitation plan(s) to review and comment on. Should any registered I&APs have problems accessing the documents, please contact Mr Simamkele Ntsengwane at Tel: 021 526 9560 and/or Email: <a href="mailto:Simamkele.Ntsengwane@aurecongroup.com">Simamkele.Ntsengwane@aurecongroup.com</a> .
<b>Written Notification (Appendix B4)</b>	Written notification was given on <b>2 March 2018</b> to all registered I&APs regarding the availability of the Basic Assessment Report and associated wetland rehabilitation plans for public comment.
<b>Register of I&amp;APs (Appendix B3)</b>	The register for I&APs will continue to be updated during the Basic Assessment Process.
<b>Comments (Appendix B5)</b>	All comments received will be included in a Comments and Response Report (CRR) and made available in <b>Appendix B5</b> , with copies of the original comments received. Registered I&APs who submitted comments, will receive a copy of the CRR.

Following the 30 day public comment period, the BARs and rehabilitation plans will be updated by incorporating any I&AP comments received on the reports (where relevant). All comments will be recorded and responded to in a Comments and Response Report which will be circulated to all who have provided comment. The updated BARs and/or rehabilitation plans will then be submitted to DEA for their decision-making process. Once DEA has made their decision on the proposed projects, all registered I&APs will be notified of the outcome of the decision within fourteen (14) calendar days of the decision and the right to appeal.

## 5 PROJECT DESCRIPTION

### 5.1 Need and Desirability: National Importance of the WfWetlands Programme

South Africa is a dry country, but is endowed with exceptionally rich biodiversity. The nation has a pressing reason to value the water-related services that wetlands provide. It is estimated that by 2025, South Africa will be one of fourteen African countries classified as “*subject to water scarcity*” (UNESCO, 2000). The conservation of wetlands is fundamental to the sustainable management of water quality and quantity, and wetland rehabilitation is therefore essential to conserving water resources in South Africa.

The guiding principles of the NWA recognise the need to protect water resources. In responding to the challenge of stemming the loss of wetlands and maintaining and enhancing the benefits they provide, government has recognised that, in order to be truly effective, strategies for wetland conservation need to include a combination of proactive measures for maintaining healthy wetlands, together with interventions for rehabilitating those that have been degraded. These objectives are currently being expressed in a coordinated and innovative way through the WfWetlands Programme.

Working for Wetlands pursues its mandate of wetland protection, wise use and rehabilitation in a manner that maximises employment creation, supports small emerging businesses, and transfers skills amongst **vulnerable** and **marginalised** groups. In the 13 years since 2004, the WfWetlands Programme has invested over R765 million in wetland rehabilitation and has been involved in over 980 wetlands, thereby improving or securing the health of over 70 000 hectares of wetland environment. The WfWetlands Programme has a current budget of just over R 110 million, of which R 38.5 million is allocated directly to paying wages. Being part of the EPWP, the WfWetlands Programme has created more than 21 000 jobs and over 2.5 million person-days of paid work. The local teams are made up of a minimum of 55% women, 55% youth and 2% disabled persons.

Wetlands are not easy ecosystems to map at a broad scale as they are numerous, often small and difficult to recognise and delineate on remotely sensed imagery such as satellite photos. The WfWetlands Programme houses the National Wetlands Inventory Project (NWI) which aims to provide clarity on the extent, distribution and condition of South Africa’s wetlands. The project clarifies how many and which rivers and wetlands have to be maintained in a natural condition to sustain economic and social development, while still conserving South Africa’s freshwater biodiversity.

The National Freshwater Ecosystem Priority Areas (NFEPA) has used the NWI data to produce the most comprehensive national wetland map to date, called the NFEPA Atlas. This atlas enables the planning of wetland rehabilitation on a catchment scale.

Other activities that form part of the WfWetlands Programme include:

- Raising awareness of wetlands among workers, landowners and the general public; and
- Providing adult basic education and training, and technical skills transfer (in line with the emphasis of the EPWP on training, the WfWetlands Programme has provided 225 000 days of training in vocation and life skills).

### 5.2 Activities to be undertaken

The successful rehabilitation of a wetland requires that the cause of damage or degradation is addressed, and that the natural flow patterns of the wetland system are re-established (flow is encouraged to disperse rather than to concentrate). Approximately 800 interventions are implemented every year in the WfWetlands Programme. The key objectives of implementing interventions include:



- Restoration of hydrological integrity (e.g. raising the general water table or redistributing the water across the wetland area);
- Recreation of wetland habitat towards the conservation of biodiversity; and
- Job creation and social upliftment.

Typical activities undertaken within the projects include:

- Plugging artificial drainage channels created by development or historical agricultural practices to drain wetland areas for other land use purposes;
- Constructing structures (gabions, berms, weirs) to divert or redistribute water to more natural flow paths, or to prevent erosion by unnatural flow rates that have resulted from unsustainable land use practices or development; and
- Removing invasive alien or undesirable plant species from wetlands and their immediate catchments (in conjunction with the Working for Water initiative).

Methods of wetland rehabilitation may include hard engineering interventions (see Section 5.3 and **Appendix A**) such as:

- Earth berms or gabion systems to block artificial channels that drain water from or divert polluted water to the wetland;
- Concrete and gabion weirs to act as settling ponds, to reduce flow velocity or to re-disperse water across former wetland areas thereby re-establishing natural flow paths;
- Earth or gabion structure plugs to raise channel floors and reduce water velocity;
- Concrete or gabion structures to stabilise head-cut or other erosion and prevent gullies;
- Concrete and/or reno mattress strips as road crossings to address channels and erosion in wetlands from vehicles; and
- Gabion structures (mattresses, blankets or baskets) to provide a platform for the growth of desired wetland vegetation.

Soft engineering interventions (see Section 5.3 and **Appendix A**) also offer successful rehabilitation methods, and the following are often used together with the hard engineering interventions:

- The use of biodegradable or natural soil retention systems such as eco-logs, MacMat-R plant plugs, grass or hay bales, and brush-packing techniques;
- The re-vegetation of stabilised areas with appropriate wetland and riparian plant species;
- Alien invasive plant clearing, which is an important part of wetland rehabilitation (this is supported by the Working for Water Programme).
- The fencing off of sensitive areas within the wetland to keep grazers out and to allow for the re-establishment of vegetation;
- In some instances, the use of appropriate fire management and burning regimes. The removal of undesirable plant and animal species; and
- In some wetlands, it may be possible to involve the community to develop a management plan for wise use within a wetland. This can involve capacity building through educating and training the community members who would monitor the progress. A plan could involve measures such as rotational grazing with long term benefits for rangeland quality.

### 5.3 Alternatives

“**Alternatives**”, in relation to a proposed activity, refers to different means of meeting the general purpose and requirements of the activity, which may include alternatives to—

- a) the property on which or location where it is proposed to undertake the activity;
- the type of activity to be undertaken;
- the design or layout of the activity;
- the technology to be used in the activity;
- the operational aspects of the activity; and
- the option of not implementing the activity.

Due to the WfWetlands Programme not being a development proposal, the use of alternatives as normally applied in terms of the NEMA is not appropriate. As explained earlier in Chapter 3, a comprehensive phased approach is applied each year to identify wetlands with a high rehabilitation priority (Phase 1), rehabilitation objectives for each wetland unit and the most appropriate interventions to achieve these objectives (Phase 2). During Phase 3, these interventions are again scrutinised during setting-out to take into account changes that have occurred within the landscape since the original planning took place. Should any significant changes be required to the intervention, the Project Team will be informed by the engineer to ensure that the proposed design changes would not compromise the rehabilitation objectives identified for the specific wetland. For more information on how alternatives are being considered for the WfWetlands Programme, please refer to **Table 13**.

**Table 13: Approach to alternatives for the WfWetlands Programme**

Alternative	Applicability to WfWetlands
<b>Site Alternatives</b>	<p>All quaternary catchments within the province are considered for possible wetland rehabilitation work in the earlier stages of the WfWetlands Programme (Phase 1 catchment and wetland prioritisation processes), and only those that meet the prioritisation criteria are selected for the current planning cycle. Wetlands within the selected Quaternary Catchments undergo a similar prioritisation process, which includes a consultation component with the relevant stakeholders and interest groups, and the Wetland Projects presented in this report are those that are finally selected. Wetland Units within each Wetland Project are investigated by the Wetland Specialist and these are selected based on their suitability in terms of the overall WfWetlands Programme objectives<sup>2</sup>. The earlier site selection processes to determine feasible and reasonable Wetland Projects are described in detail in Section 3.1.</p> <p>All wetland site alternatives have therefore already been considered in the earlier phases of the WfWetlands Programme, and only the preferred wetland systems (site locations) are presented here. For the purpose of this report, no feasible or reasonable wetland site alternatives exist.</p>
<b>Other Alternatives</b>	<p>One form of alternative considered during the WfWetlands Programme is a design alternative, where all possible intervention options that may achieve a desired rehabilitation objective are contemplated during the Phase 2 field work component of a particular Wetland Unit. The design team comprising a Wetland Specialist, a Design Engineer, an EAP, and an ASD (and in some instances other interested stakeholders such as authorities and/or landowners who may attend the site visit) will discuss and select the most appropriate intervention option for a particular problem. Each of the intervention options selected, as well as the determination of the most appropriate location for these within the Wetland Unit are therefore based on expert</p>

<sup>2</sup> Wetland conservation and poverty reduction through job creation and skills development amongst vulnerable and marginalised groups.

Alternative	Applicability to WfWetlands
	<p>opinion and are thus considered to be the most suitable and effective interventions to achieve the rehabilitation objectives for the wetland.</p> <p>Decisions regarding the choice of interventions will only be made if EA is granted for a Wetland Project. It is therefore not possible to present the preferred interventions for each Wetland Project in this report. Rather all possible types of interventions are presented as the preferred design alternative and a booklet of potential intervention designs that are appropriate to the WfWetlands Programme is presented in <b>Appendix A</b>. The intention is that rehabilitation plans would be prepared on an annual basis and submitted to DEA for approval as a condition of the EA. The rehabilitation plans would describe the combination and number of interventions selected from this booklet for each Wetland Project.</p>
<p><b>No-Go Alternative</b></p>	<p>If the no-go alternative is pursued, the prioritised wetlands will continue to deteriorate, resulting in an overall negative impact on aquatic and terrestrial ecosystems, habitats and species of conservation significance. In the absence of rehabilitation, the important role of these wetlands in flood attenuation, nutrient retention and water quality amelioration, as well as ecological services will not be realised. In many instances the current degradation results in severe erosion, which may impact on the agricultural or land use potential of adjacent sites, as well as result in sedimentation and eutrophication impacts for downstream users.</p>

## 6 BASELINE DESCRIPTION OF LIMPOPO PROJECTS

### 6.1 Limpopo Project: Background

#### A. Sekhukhune Project

WfWetlands have been rehabilitating wetlands in the Limpopo province for over ten years. The Sekhukhune project focusses on new wetlands within in the B51C catchment and was identified as a new project during the 2016/2017 planning cycle. The study area is situated approximately 5 km south-west of the R579 and less than a kilometer south of the settlement of Makhutsho and includes the settlement of Mogaladi in its south-western section. It falls under the Sekhukhune District Municipality, Makhuduthamaga Local Municipality, Limpopo Province, and covers the following three farms: Hopefield 800 KS, Kopje Alleen 828 KS and Buffelsfontein 829 KS. According to Mucina & Rutherford (2006), the study area falls within the Central Sandy Bushveld vegetation unit. The dominant land use in this area relates to cultivation and grazing. The southern portion of the wetland's catchment is fairly built up, with extensive hardened surfaces. The study area falls within quaternary catchment B51C, which forms part of the Middle Olifants Sub-water Management Area, Olifants Water Management Area and the area does not lie within a River FEPA or any other prioritised sub-quaternary catchment. The wetland catchments occur near the Leswena Nature Reserve and Schuinsdraai Nature Reserve which are formally protected areas. The Limpopo Central Bushveld forms part of the greater Sekhukhune area and is a focus area of the National Protected Area Expansion Strategy (NPAES, 2010). The wetland falls within a rural area and forms part of the Mogaladi community. The rehabilitation of these wetland systems within this area is therefore likely to contribute towards the protection of natural habitat that contributes towards services such as grazing, water for stock and the maintenance of the biodiversity within a region that has already been over-utilised and degraded.

#### B. Waterberg Project

The Waterberg project started in 2007, it is located within the Waterberg Mountains and form part of the larger Limpopo River Catchment. In the Waterberg area the terrain is rugged, steep and rocky and coupled with the hot, semi-arid climate and sandy soils. The wetland habitats are generally confined to long narrow bands along the bottom of the valley systems. Other than the Nyl floodplain complex, substantial wetlands areas are uncommon. The WfWetlands project is currently focussing on two key conservation areas in the Waterberg (a) the Nylsvley Nature Reserve and the (b) Nyl Floodplain upstream. This application is however only for the upstream area of the Nyl Floodplain. Land use within the catchments are conservation and eco-tourism with limited changes to the catchments characteristics. However, a significant degree of disturbance has occurred due to anthropogenic activities such as diversion of cultivation run-off (using a system of berms and water tracts) into the wetland and the construction of dams, drains and roads (WfW 2015).

#### B. Mutale Project

The Mutale project was initiated in 2005 and is located within the Soutpansberg Centre of Endemism. The quaternary catchment that constitute this project has two dominant vegetation types, Mukuleke Sandy Bushveld, which is found along the banks of the Mutale River, and Soutpansberg Mountain Bushveld. Both vegetation types belong to the Savannah Biome and are classified as Vulnerable.

The wetland habitats are generally confined to an intricate mosaic of habitats and microclimates which exist in this region as a result of a complex relationship between the topography and microclimates. Diverse plant and animal communities occur within this area. The study area falls within quaternary catchment A92B which is located in the Mutale and Levuvhu catchments. The Luvuvhu and Letaba water management area also forms

part of the Limpopo River Basin, which is an international river shared by South Africa, Botswana, Zimbabwe and Mozambique. This wetland area is heavily utilised for agriculture and as a water source. Local communities also depend on the wetlands for their fibre and protein needs. These wetlands are important to local communities, for cultural and subsistence reasons. However, land use changes and utilisation have impacted negatively on these wetlands. Impacts are specifically from overgrazing, rural urbanisation and cultivation within the wetlands. Downstream users are affected by the health of the wetland as they depend on ecological services such as flood attenuation, filtration and base-flow maintenance. It is thus important that the wetlands within the Mutale catchment adapt, not only to changing land use patterns, but also to changing environmental conditions such as flooding, droughts and climate related impacts (SANBI, 2014).

## 6.2 Biophysical Environment

The following new wetland systems were identified in the Limpopo Province (also see **Table 1**) and will be the focus of this Basic Assessment Process:

- Quaternary catchment B51C (Project Name: Sekhukhune)
  - Sekhukhune
- Quaternary catchment A61A (Project Name: Waterberg)
  - Nylsoog
- Quaternary catchment A92B (Project Name: Mutale)
  - Nyahlawe

Please refer to Appendix C for maps showing the location of CBAs in relation to the wetland systems described below.

### 6.2.1 Quaternary catchment B51C and associated wetland system

Quaternary Catchment B51C	
<b>General description</b>	Quaternary catchment B51C is located in close proximity to the Leswena Nature Reserve (approximately 2 km) and Schuinsdraai Nature Reserve (approximately 11 km), which are formally protected areas. The Limpopo Central Bushveld forms part of the greater Sekhukhune area and is a focus area of the National Protected Area Expansion Strategy (NPAES, 2010). The study area is situated approximately 5 km south-west of the R579. It is less than a kilometre south of the settlement of Makhutsho and includes the settlement of Mogaladi in its south-western corner. It also extends slightly into a small settlement in the far north-western corner.
<b>Climate</b>	The climate of the area is typical of the Savanna biome, with summer rainfall characterised by warm, moist summer months and cool, dry winter months. The Mean Annual Precipitation (MAP) for the area is low at 621 mm (WorldClim database, Hijmans et al., 2005). Rainfall is at the highest in high-altitude areas due to orographic factors and becomes lower as the elevation decreases.
<b>Geology and topography</b>	Sekhukhune is located on an open flood plain area. Topographically it is characterised by undulating hills while the geology of the region is dominated by ultramafic substrates of the Rustenburg Layered Suite. The soils of the area are dominated by lithosols, with minimal development, usually shallow on hard weathering rock with and without intermittent diverse soils, as well as sandy soils. The study area covers two land types namely Ae388 and Fa264 which entails mainly coarse-grained grey to pink granite of the Nebo Granite, occasionally fine-

	grained pink porphyritic granite of the Klipkloof Granite; both of the Lebowa Granite Suite (Linström, 2017).
<b>Terrestrial ecology</b>	<p>The dominant wetland vegetation within the study area is sedge species, often indicative of moist soils. Vegetation that dominates in the wet conditions include: <i>Miscanthus junceus</i>, <i>Kyllinga alata</i>, <i>Cyperus fastigiatus</i>, <i>Cyperus denudatus</i>, <i>Juncus exsertus</i>, <i>Phragmites australis</i>, <i>Typha capensis</i>, <i>Schoenoplectus brachyceras</i>, <i>Andropogon eucomus</i>, <i>Eragrostis plana</i>, etc.</p> <p>In the drier wetland areas, species that are abundant include: <i>Aristida congesta</i>, <i>Persicaria decipiens</i>, <i>Senecio coronatus</i>, <i>Setaria sphacelata</i>, <i>Cynodon dactylon</i>, etc. especially common along the edge of the wetland. Several tree species were encountered in and adjacent to the wetland areas: <i>Ziziphus mucronata</i>, <i>Acacia tortilis</i>, <i>Acacia robusta</i>, <i>Euclea divinorum</i>, <i>Terminalia sericea</i>, <i>Dichrostachys cinerea</i>, etc.</p> <p>Several alien and invasive plant species were noted, and include: <i>Centella asiatica</i>, <i>Senna didymobotrya</i>, <i>Senna pendula</i>, <i>Opuntia ficus-indica</i>, <i>Agave americana</i>, <i>Cereus jamacaru</i>, <i>Tagetes minuta</i>, <i>Cirsium vulgare</i>, <i>Verbena bonariensis</i>, etc. occurring in disturbed areas (Linström, 2017).</p> <p>Futhermore, the Savanna and Grassland biomes are the two characteristic biomes found in Makhuduthamaga Local Municipality and surrounding wetland areas<sup>3</sup>. Dominant vegetation types in the area include broad leaved <i>Combretum</i> woodland on shallow rocky or gravely soils, species of <i>Acacia</i>, <i>Ziziphus</i> and <i>Euclea</i> are found on the lower slopes. <i>Acacia tortilis</i> dominates some areas along the valley with grass-dominant herbaceous layers<sup>4</sup>. According to Mucina and Rutherford (2006) the area falls within the Central Sandy Bushveld vegetation unit which is considered to be least threatened. The vegetation occurs in low undulating areas that are sometimes located between mountains and sandy plains. The area is also characterised by portions of Rand Highveld Grassland which is considered a vulnerable ecosystem (Linström, 2017).</p>
<b>Aquatic ecology</b>	The study area forms part of the Middle Olifants Sub-Water Management Area (WMA), but is not located within a National Freshwater Ecosystem Priority Area (NFEPA) river or any other prioritised sub-quaternary catchment. According to the Limpopo river layer of NFEPA the Motseleope River lies less than 1 km to the north-east of the study area, where there are two unnamed rivers that run through the study area. According to NFEPA, the wetlands in the area drain into tributaries of the Olifants river.
<b>Land use</b>	The upper portion of the wetland's catchment is fairly built-up, with extensive hardened surfaces. Historic cultivation scars are obvious and cover large portions of the catchment. Several road tracks are present. Extensive grazing and trampling by cattle, donkeys and goats occurs. Land use activities contribute towards the degradation of this catchment (Linström, 2017).
<b>Sekhukhune Wetland System</b>	
<b>Location</b>	The study area is situated about 1.5 km north-east of the settlement of Mogaladi and about 7 km south-west of the R579.
<b>District and local municipality</b>	Makhuduthamaga Local Municipality Sekhukhune District Municipality

<sup>3</sup> South African National Biodiversity Institute, SANBI. 2015

<sup>4</sup> Linström, Anton, Wet-Earth Eco-Specs. 2016. Wetland status Quo Report: Sekhukhune Project: Wetland: Sekhukhune B51C\_01-02.

<b>Reason for selection</b>	Reasons for selection include the following: <ul style="list-style-type: none"> <li>• Grazing and trampling which has caused erosion in places. This has also caused hardening of surfaces producing preferential flows in some areas. Less vegetation has decreased habitat availability, reducing the wetland's biodiversity integrity;</li> <li>• Roads crossing the wetland act as a barrier and influence its hydrology. Concentrated flows result in erosion and desiccation downstream thereof;</li> <li>• Dams in the wetland drain wetland habitat causing loss of specialised wetland-dependent species;</li> <li>• Surface erosion degrades wetland habitat;</li> <li>• Desiccation of wetland habitat due to drainage channel and</li> <li>• Historic cultivation.</li> </ul>
<b>Wetland type and size<sup>5</sup></b>	The wetland is classified as a Valley Bottom Wetland with a channel. The catchment is approximately 103ha. The catchment of the wetland is reasonably steep and conveys water via longitudinal and lateral flows towards the gently sloped target wetland area. The key driver is lateral drainage which occurs via seep zones feeding the valley bottom system (Linstrom, 2017).
<b>Conservation status (terrestrial and aquatic)</b>	The vegetation component is dominated by shrubs and grasses with some sedge species. Species of an obligate nature do occur with many facultative wetland species. Due to the dry nature of the wetland it is expected that some facultative terrestrial species will occur. Alien species, including ruderal and agrestal weeds would be absent. According to Mucina & Rutherford (2006), the study area falls within the Central Sandy Bushveld vegetation unit. There are no NFEPA rivers running through the study area.
<b>Land use</b>	The wetland system is located in a rural landscape. Current and historic cultivation is obvious and overgrazing and trampling by cattle and goats is common.
<b>Wetland problems</b>	<ul style="list-style-type: none"> <li>• Erosion;</li> <li>• Overgrazing;</li> <li>• Increased peak flows from upstream hardened surfaces;</li> <li>• Cultivation;</li> <li>• Incorrect burning regime;</li> <li>• Drainage affecting water distribution and retention patterns; and</li> <li>• A number of smaller impacts such as cattle movement and alien trees that further reduce the health of the wetland.</li> </ul>

### 6.2.2 Quaternary catchment A61A and associated wetland system

Quaternary Catchment A61A	
<b>General description</b>	Quaternary catchment A61A is located southwest of the Modimolle town in a mountainous area. The catchment is part of the Limpopo Water Management Area (WMA).
<b>Climate</b>	The catchment experiences summer rainfall with a mean annual precipitation of 710 mm and a cool- temperate climate.
<b>Geology and topography</b>	The geology in the area is dominated by coarse, clastic sedimentary sandstone, quartzite, conglomerate or shale of the Kransberg Subgroup (SANBI BGIS, 2017)

<sup>5</sup> The approximate size of each wetland system is provided as the intention is to positively influence the entire area through the implementation of smaller interventions. Since the specific interventions required to address specific problems are only determined during Phase 2 site visits, the actual intervention footprints will only be available for inclusion in the rehabilitation plans which will also be made available to registered I&APs for review before being submitted to DEA for approval.

<b>Terrestrial ecology</b>	Catchment A61A is, covered with grassland (and accompanying rocky outcrops) dominated by wiry tussock grasses. Patches of open <i>Protea caffra</i> savannoid vegetation and open shrubland with <i>Englerophytum magalimontanum</i> and <i>Landolphia capensis</i> are common and typical of this sourveld vegetation type (SANBI BGIS, 2017). The two main vegetation types occurring within the area is Waterberg Mountain Bushveld and Central Sandy Bushveld of which neither is listed as critically endangered, endangered or vulnerable.
<b>Aquatic ecology</b>	One perennial river, the Great Nyl, flows through the study site, as well as several non-perennial rivers. According to NFEPA, the Great Nyl River has a condition of 'D', which means that it is largely modified; such that a large loss of natural habitat, biota and basic ecosystem functions has occurred. The study area falls within a Fish Support Area (FSA #561). FSAs are fish sanctuaries that are in a lower than A or B ecological condition. Fish sanctuaries, which include both river FEPAs and FSAs, are rivers and their associated sub-quaternary catchments that are essential for protecting threatened and near threatened fish; consequently, there should be no further deterioration in the condition of the associated rivers. This particular FSA (#561), as well as the adjacent FSA to the north (#520), both support the Near Threatened fish <i>Barbus sp. 'Waterberg'</i> . In addition, the Snake Catfish ( <i>Clarias theodora</i> ) is supported by the adjacent FSA to the west (Working for Wetlands Programme, 2018).
<b>Land use</b>	The main land uses within the catchment are conservation and eco-tourism with limited mining also taking place.
<b>Nylsoog Wetland System</b>	
<b>Location</b>	The wetland system is located approximately 1.5 km north of the Great Nyl River and 10 km north of the town Bela-Bela. The wetland is part of the WMA of Limpopo and sub catchment Mogalakwena (SANBI BGIS, 2017)
<b>District and local municipality</b>	Bela-Bela Local Municipality Waterberg District Municipality
<b>Reason for selection</b>	The Nyl River catchment has been highlighted as an important water source area for the downstream aquatic systems and water users. The Nylsoog Wetland System is located within the headwaters of the Great Nyl River that feeds into the Nylsvlei Ramsar Site. This Nylsvlei Wetland is of international biodiversity and eco-tourism value and has been declared a Ramsar site. It is also one of South Africa's largest wetlands (Working for Wetlands, 2016).
<b>Wetland type and size</b>	The wetland system is classified as an un-channelled valley bottom.
<b>Conservation status (terrestrial and aquatic)</b>	A review of the Limpopo Biodiversity Conservation Plan (LBCP) highlights that the majority of the Nylsoog project area is comprised of Critical Biodiversity Areas. Several biodiversity features were incorporated into the LBCPv2, and the rivers, wetlands, priority catchments and strategic water source areas from within the study area form a critical backbone to the LBCPv2 (Working for Wetlands Programme, 2018).
<b>Land use</b>	The main land use in this wetland system is conservation and game farming.
<b>Wetland problems</b>	<ul style="list-style-type: none"> <li>• Head cut erosion</li> <li>• Alien invasion</li> <li>• Eroding agricultural drains</li> </ul>



### 6.2.3 Quaternary catchment A92B and associated wetland system

Quaternary Catchment A92B	
<b>General description</b>	Quaternary catchment A92B is located within the Luvuvhu and Mutale catchment area, north of the town of Thoyondandou in Limpopo. The catchment area (A92B) is mountainous with typical valley bottom wetland systems. A variety of wetlands, ranging from swamp forest to floodplains, occur here and cover an area of approximately 57850.9 ha. The study area is located near the town of Tshandama in the northern part of the Limpopo Province. The catchment falls mainly on communal land owned by the Thikundamalema Traditional Council, the Mphaphuli Traditional Council and the Thengwe Tribal Authority, all within the Mutale and Thulamela Local Municipalities. The catchment areas is heavily utilised for agriculture and as a water source.
<b>Climate</b>	The climate of the area is typical of the Savanna biome, with summer rainfall characterised by warm, moist summer months and cool, dry winter months. The Mean Annual Precipitation for the area is low at 621 mm (WorldClim database, Hijmans et al., 2005). Rainfall is at the highest in high-altitude areas due to orographic factors and becomes lower as the elevation decreases.
<b>Geology and topography</b>	<p>Mutale is located on a mountainous area. Topographically it is characterised by undulating hills while the geology of the region is dominated by substrates of the Soutpansberg salt pan. The geology of the area is sand stone with typical vegetation related to well-drained soil types such as <i>Terminalia sericia</i>. (SANBI BGIS, 2017).</p> <p>The catchment comprises two low mountain ranges on either side of the valley, The mountain surfaces are rocky with a high proportion of hardened surfaces (SANBI, 2009).</p>
<b>Terrestrial ecology</b>	<p>The dominant wetland vegetation within the study area is sedge and grass species, often indicative of drier soil conditions. Under natural conditions the wetland vegetation is characterized by <i>Cyperus latifolius</i>, <i>Phragmites mauritianum</i> and <i>hygrophilous grassland</i>. Furthermore, The cultivation of the wetland area has a substantial effect on the natural vegetation, and this is reflected in the vegetation integrity of the system (SANBI, 2009).</p> <p>The Savanna biome characterises the terrestrial ecology found in Mutale Local Municipality and surrounding wetland areas<sup>6</sup>. Dominant vegetation types in the area include broad leaved <i>Combretum</i> woodland on shallow rocky or gravely soils, species of <i>Acacia</i>, <i>Ziziphus</i> and <i>Euclea</i> are found on the lower slopes. <i>Acacia tortilis</i> dominates some areas along the valley with grass-dominant herbaceous layers<sup>7</sup>. According to Mucina and Rutherford (2006) the area falls within the Mukuleke Sandy Bushveld vegetation unit which is underlain by sandstones, lesser shales and basalts, which is considered Vulnerable.</p>
<b>Aquatic ecology</b>	The study area forms part of the Luvuvhu and Letaba WMA and sub-catchment Luvuvhu/Mutale, but is not located within a National Freshwater Ecosystem Priority Area (NFEPA). According to the Limpopo river layer the Mutale River lies approximately 1.6 km to the south-east of the study area, the wetlands in the area drain into tributaries of the Mutale river (SANBI, 2009).

<sup>6</sup> South African National Biodiversity Institute, SANBI. 2015

<sup>7</sup> Linstrom, Anton, Wet-Earth Eco-Specs. 2016. Wetland status Quo Report: Sekhukhune Project: Wetland: Sekhukhune B51C\_01-02.

<b>Land use</b>	The dominant land use within the catchment area is subsistence agriculture, characterized by communal grazing, harvesting of wetland material for house thatching. Historic cultivation scars are obvious and cover some portions of the catchment. Several road tracks are present. Extensive grazing and trampling by cattle, donkeys and goats occurs. Areas of the catchment are fairly built up for communal housing within the communal area. At present it is for the most part lightly disturbed, with the hardened surfaces associated with human habitation accounting for 15% to 20% of the catchment area. Land use activities contribute towards the degradation of this catchment (SANBI, 2009).
<b><i>Nyahlawe Wetland System</i></b>	
<b>Location</b>	The Nyahlawe wetland system is situated on the Nyahlawe River, a tributary of the Mutale River, near the town of Tshandama in the northern part of the Limpopo Province. This Wetland is part of the Luvuvhu and Letaba WMA and sub-catchment Luvuvhu/Mutale.
<b>District and local municipality</b>	Vhembe District Municipality Mutale Local Municipality
<b>Reason for selection</b>	The Mutale river system supports a substantial population, who rely on the river as a source of fresh water as well as to irrigate subsistence crops. The area around the confluence of the Mutale and Luvuvhu Rivers has also been proposed as a future Ramsar site. With this in mind, and in view of the value of wetlands in attenuating floods, regulating stream-flow and enhancing water quality, wetland rehabilitation within this catchment is justified (SANBI, 2009).
<b>Wetland type and size</b>	The Wetland unit is characterised as an unchannelled valley bottom of approximately 48.5 ha and an estimated length of 2.4 km with a catchment of 1293 ha, and is associated with the Nyahlawe stream.
<b>Conservation status (terrestrial and aquatic)</b>	The vegetation unit belong to the Mukuleke Sandy Bushveld and Soutpansberg Mountain Bushveld, which are both considered Vulnerable. (Mucina & Rutherford, 2006). No NFEPA wetland overlaps with the Nyahlawe wetland but there are Critical Biodiversity Areas (CBA1) and Ecological Support Area (ESA) (SANBI BGIS, 2017).
<b>Land use</b>	The surrounding area has been extensively cultivated for semi-commercial and subsistence crop production. Communal grazing also constitutes land use in this wetland area.
<b>Wetland problems</b>	The biophysical drivers of the wetland is impacted on by headcut erosion.

### 6.3 Cultural and Heritage Environment

As the project aims to rehabilitate wetlands threatened by erosion, no impact is expected to occur on cultural or historic features. However, should any such features be identified during the Phase 2 site visit, a heritage specialist will be consulted and the relevant heritage authorities will be notified.

### 6.4 Socio-economic Environment

#### Economic profile of local municipalities

Table 14 below provides a summary of the socio-economic profile of the local municipalities within which the proposed wetland rehabilitation projects will take place. Being part of the EPWP, the WfWetlands Programme has created more than 21 000 jobs and over 2.5 million person-days of paid work by using local SMMEs to implement the approved wetland rehabilitation plans. Local teams generally consists of a minimum of 55% women, 55% youth and 2% disabled persons.

The EPWP focus on local unemployed people with the intent of making them part of the productive economic sector, assist with skills development and increase their capacity to earn an income. In terms of basic education and training of adults and skills transfer, the WfWetlands Programme has provided 225 000 days of training in vocation and life skills.

#### 6.4.1 Economic profile of local municipalities

Table 14: Economic profile of applicable local municipalities

	Makhuduthamaga	Bela-Bela	Mutale
<b>Population</b>			
Young (0-14)	38.1%	28.1%	38,2%
Working age (15-64)	53.9%	66%	55,6%
Elderly (65+)	8%	5.9%	6,2%
Dependency ratio	85.4	51.6	79,9
<b>Level of education (aged 20+)</b>			
No schooling	23.4%	9.7%	18,8%
Higher education	5.7%	9.5%	7,8
Matric	20.5%	26.2%	18,8
<b>Level of Employment (%)</b>			
Unemployment rate	62.7%	22.5%	48,8%
Youth Unemployment rate	74%	29.8%	62,2%
<b>Economic Profile</b>			
No income	13.1%	12.8%	13,2%
R1 - R4,800	7.3%	3.1%	8,9%
R4,801 - R9,600	14.5%	5.7%	17,5%
R9,601 - R19,600	25.5%	19.5%	24,0%
R19,601 - R38,200	23.7%	24.5%	19,1%
R38,201 - R76,4000	7.2%	15.5%	7,4%
R76,401 - R153,800	4.4%	9.2%	4,9%
R153,801 - R307,600	2.9%	6%	3,3%
R307,601 - R614,400	1%	2.5%	1,3%

	Makhuduthamaga	Bela-Bela	Mutale
<b>R614,001 - R1,228,800</b>	0.2%	0.7%	0,3%
<b>R1,228,801 - R2,457,600</b>	0.1%	0.2%	0,1%
<b>R2,457,601+</b>	0.1%	0.2%	0,2%

Source: [http://www.statssa.gov.za/?page\\_id=964](http://www.statssa.gov.za/?page_id=964)

#### 6.4.2 Socio-economic value of the activity

Table 15: Socio-economic value of the WfWetlands Programme

Aspect	Response
What is the expected capital value of the activity on completion?	~ R 130 000 000
How many new employment opportunities will be created in the development and construction phase of the activity/ies?	~ 120 <sup>8</sup>
What is the expected value of the employment opportunities during the development and construction phase?	~R54.4 million in wages
What percentage of this will accrue to previously disadvantaged individuals?	~70%

<sup>8</sup> Employment opportunities are created only during the construction phase and for many of the projects there are already EPWP teams (team size averages around 20-35 individuals) working on them. However, Working for Wetland principles ensure that a very large percentage of those employed are from local communities.

## 7 IMPACT ASSESSMENT

The WfWetlands Programme has been rehabilitating wetlands across South Africa since the early 2000's and are considered to be specialists when it comes to working in sensitive wetland environments. Their significant experience and knowledge is actively being transferred to Implementing Agents and Contractors not only verbally by the provincial ASDs, but also through training and the use of important tools such as the Environmental Management Programme (EMPr). It must be noted that the EMPr is considered a living document and is updated on a regular basis to incorporate lessons learned and/or in response to changing environments (legal, biological, etc.). In addition, the requirements of the EMPr are supplemented with site specific mitigation measures, included in the relevant rehabilitation plan, as identified by the wetland specialist and EAP during the Phase 2 planning site visits.

This chapter focus on the key potential impacts (direct, indirect and cumulative) that have been identified for the WfWetlands Programme over time. For each impact assessed, mitigation measures have been proposed to reduce and/or avoid negative impacts and enhance positive impacts. These mitigation measures are also incorporated into the EMPr to ensure that they are implemented during the planning/pre-construction, construction and operational phases. The EMPr forms part of the BAR (**Appendix C**), and as such its implementation will become a binding requirement should environmental authorisation be received from DEA.

### 7.1 CONSTRUCTION PHASE

#### 7.1.1 Job creation

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	<p>One of the primary objectives of the WfWetlands Programme is to create jobs and to teach transferrable skills to unemployed members of the local community so that they can be drawn into the permanent job market.</p> <p>The potential impact of this is significant and has a number of indirect positive impacts such as improvement in quality of life of the workers, increased spending in the local economy and the support of small business in the local area.</p> <p>Cumulatively, the impact of the WfWetlands projects is judged to be of high positive significance. The programme has a budget of approximately R130 million per annum, has created in the region of 27 000 jobs and transferred skills to numerous previously unskilled persons.</p>			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Positive		Positive	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	
<b>Significance</b>	<b>MEDIUM (+)</b>		<b>HIGH (+)</b>	
<b>Probability</b>	Definite		Definite	
<b>Confidence</b>	Certain		Certain	
<b>Reversibility</b>	Irreversible		Irreversible	

**Mitigation measures**

- Ensure that the required project workers are sourced from local communities and that maximum employment numbers are maintained throughout the project duration.
- Project implementers to support local businesses (e.g. local quarry owners to obtain rock for gabions) where possible.

**7.1.2 Fire risk**

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	Construction usually takes place in the dry months when the danger of veld fires is highest. There is a possibility that construction workers could light a fire on site that could become out of control. The risk of this happening is assessed to be low, although the significance in terms of the economic damage that could be caused (especially in a commercial forestry area) is high. Adequate site supervision would considerably mitigate this impact.			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Negative		Negative	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Short-term		Short-term	
<b>Significance</b>	<b>MEDIUM (-)</b>		<b>LOW (-)</b>	
<b>Probability</b>	Unlikely		Unlikely	
<b>Confidence</b>	Sure		Sure	
<b>Reversibility</b>	Irreversible		Irreversible	
<b>Mitigation measures</b>				
<ul style="list-style-type: none"> <li>• Ensure that workers are aware of the potential for fires and the damage that could be caused.</li> <li>• Ensure that a fire response procedure is in place and that all dry season work is organized in liaison with the landowners so that it fits into their firebreak/fire protection programme.</li> </ul>				

### 7.1.3 Nuisance impacts

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	<p>Construction can result in nuisance impacts, particularly for landowners. These impacts include:</p> <ul style="list-style-type: none"> <li>Noise from construction activities, personnel and vehicles.</li> <li>An increase in the amount of litter being generated.</li> <li>Dust.</li> <li>Security concerns such as theft or leaving gates open.</li> <li>Non-use of sanitation facilities.</li> <li>Temporary loss of access to areas due to construction activities.</li> </ul> <p>Given the isolated working environment (i.e. far from communities and public routes), the relatively few number of people on site and constant supervision by the project implementer, the above impacts are likely to be of low magnitude.</p>			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Negative		Negative	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	
<b>Significance</b>	<b>LOW (-)</b>		<b>VERY LOW (-)</b>	
<b>Probability</b>	Definite		Definite	
<b>Confidence</b>	Certain		Certain	
<b>Reversibility</b>	Irreversible		Irreversible	
<b>Mitigation measures</b>				
<ul style="list-style-type: none"> <li>All site workers to undergo environmental induction training (“toolbox talks”) before undertaking work so that they are aware of the various environmental requirements.</li> <li>Landowners should be consulted regarding the placement of stockpile sites and toilets as well as access routes. This must be indicated on the site camp layout plan.</li> <li>Ensure that closed gates are kept closed. When in doubt, the landowner should be consulted.</li> <li>Follow the EMPr with regard to sanitation facilities, waste management, noise and site management</li> <li>Utilise local labour wherever possible to reduce potential friction within the community caused by bringing outside personnel in.</li> <li>Ensure that all workers wear the yellow/blue attire indicative of WfWetlands personnel so that they are not mistaken for trespassers.</li> </ul>				

## 7.1.4 Heritage resources

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	<p>No significant heritage resources within the wetlands were identified during the desktop research, I&amp;AP interactions or site visit (where rehabilitation work has been undertaken in the wetland in previous years) for the proposed projects.</p> <p>Given the low likelihood of heritage sites being disturbed and provided that construction is immediately stopped should a heritage resource be encountered then the magnitude of this impact should be zero.</p>			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Negative		Negative	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	
<b>Significance</b>	<b>VERY LOW (-)</b>		<b>NEUTRAL (-)</b>	
<b>Probability</b>	Definite		Definite	
<b>Confidence</b>	Certain		Certain	
<b>Reversibility</b>	Irreversible		Irreversible	
<b>Mitigation measures</b>				
<ul style="list-style-type: none"> <li>Should any heritage resource or suspected resources be identified during the Phase 2 planning site visit, a suitably qualified heritage specialist shall be consulted.</li> <li>Should any artefact or suspected artefact (including fossils and grave sites), or any site of cultural significance be encountered during construction, then the Contractor must immediately stop work in the vicinity of the artefact and alert the relevant authorities. The area around the discovery shall be cordoned off until such time that work is authorised to proceed.</li> </ul>				



7.1.5 Worker safety

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	<p>Alien clearing requires very specific training and involves high risk equipment such as chainsaws. It sometimes involves large trees and therefore extreme caution needs to be exercised.</p> <p>Crime and poor water quality could also have a negative impact on worker safety and health, especially in urban areas.</p> <p>Furthermore, workers may also come into contact with dangerous animals such as snakes or even predators when working in conservation areas.</p>			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Negative		Negative	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	
<b>Significance</b>	<b>MEDIUM (-)</b>		<b>LOW (-)</b>	
<b>Probability</b>	Definite		Definite	
<b>Confidence</b>	Certain		Certain	
<b>Reversibility</b>	Irreversible		Irreversible	
<b>Mitigation measures</b>				
<ul style="list-style-type: none"> <li>• All site workers to undergo specific safety training before undertaking this work so that they are aware of the various risks and measures to be taken in emergency situations.</li> <li>• Where required, security teams must be provided to protect the teams on site.</li> <li>• Follow Occupational Health and Safety requirements.</li> <li>• Personal Protective Equipment (PPE) shall be worn at all times on site.</li> </ul>				

7.1.6 Flora and fauna

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	<p><u>Habitat disturbance</u> Habitat disturbance during the construction stage is typically temporary. In addition most species are relatively tolerant of disturbance and would be able to utilise the similar alternative habitat available in the study area. The area of habitat loss is also likely to be small and limited to the immediate surroundings of the intervention being constructed.</p>			
	<p><u>Disturbance of protected species</u> Construction activities could potentially result in disturbance to habitats required by protected species such as bullfrogs (critically endangered). It can however be almost completely mitigated by liaising with the appropriate conservation bodies whose local representatives can advise on appropriate measures and construction timeframes.</p>			
	<p><u>Alien species invasion</u> A potential construction-related impact on vegetation is the possibility of an increase in alien invasive species due to disturbance and weed seeds being brought in with borrow and construction material.</p>			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Negative		Negative	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	
<b>Significance</b>	<b>MEDIUM (-)</b>		<b>LOW (-)</b>	
<b>Probability</b>	Definite		Definite	
<b>Confidence</b>	Certain		Certain	
<b>Reversibility</b>	Irreversible		Irreversible	
<b>Mitigation measures</b>				
<ul style="list-style-type: none"> <li>Should any protected species need to be removed or relocated, e.g. indigenous tree ferns, the appropriate permits shall be required. These activities shall take place under strict guidance from the ASD and/or appropriate authority.</li> <li>Should any protected species occur on site, the ASD and project manager or implementer must liaise prior to site establishment with the relevant conservation body to determine measures required during the construction period to limit potential disturbances to protected species.</li> <li>Implement the provisions of the EMPr regarding stockpiling borrowed material and rehabilitation after construction</li> </ul>				

7.1.7 Aquatic ecosystems

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	<u>Temporary alteration to stream flow patterns</u> Construction must often take place in areas that are permanently wet. This requires that water be diverted away from working areas, leading to temporary alterations in the current drainage characteristics. Water diversion is typically done using sand bags to slow/block flow and then a pump to remove water and discharge it further downstream. This can result in a slight drying in the working areas and may affect aquatic organisms. This will however be of a temporary nature and is unlikely to significantly alter flow patterns.			
	<u>Sedimentation</u> Construction activities can result in additional sediment ending up in the water course (e.g. due to earthworks or breakage of sandbags used to divert water away from working areas). Sediment can result in silt build-up downstream, increase the turbidity of the water and result in habitat changes. However, as wetlands are typically low-energy systems, much of the excess sediment is likely to be trapped before it is washed far downstream. Also, given the limited nature of the earthworks, sedimentation is not anticipated to occur to a significant degree.			
	<u>Pollution of water-courses</u> Construction activities close to a water-course/wetland carry the attendant risk that construction-related pollutants could end up in the wetland system. Typical pollutants include hydrocarbons (e.g. from fuel leaks, shutter oil and lubricating fluid spills), litter, cement and contaminated wash-down water.			
	<u>Disturbance of wetland vegetation and stream banks</u> Some disturbance to stream banks and wetland vegetation will be inevitable in order to construct the proposed interventions. This impact generally occurs on a small scale and can be mitigated via good management practices			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Negative		Negative	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	
<b>Significance</b>	<b>MEDIUM (-)</b>		<b>LOW (-)</b>	
<b>Probability</b>	Definite		Definite	
<b>Confidence</b>	Certain		Certain	
<b>Reversibility</b>	Irreversible		Irreversible	
<b>Mitigation measures</b>				
<ul style="list-style-type: none"> <li>• Work shall predominantly take place during low rainfall periods.</li> <li>• No foreign vegetation matter (e.g. mulch) shall be allowed on site (especially from alien species).</li> <li>• Soils shall be stockpiled according to the different soil layers as per the soil profile in order not to mix layers of leached and organic soils.</li> <li>• Stockpiles and revegetated areas shall be covered with mulch or cloth (geotextile) and kept moist.</li> <li>• Implement the provisions of the EMPr regarding stockpile location and site management.</li> <li>• Sandbags used to temporarily divert water shall be in a good condition to prevent additional sedimentation and/ or failure.</li> <li>• Sand/ earth to fill the bags shall be obtained from and returned to existing excavation points where feasible.</li> <li>• Soil required for the construction of interventions shall be stabilised as per the engineer’s recommendations to counteract dispersive tendencies.</li> <li>• Water abstracted above the General Authorization limits must be authorized by DWS prior to such abstraction taking place.</li> </ul>				

7.1.8 Sourcing borrow material

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	<p>Borrow material (earth and rocks) is not always sufficiently available on site, and has to be sourced elsewhere. This can have a negative biophysical impact to the area where it is sourced.</p> <p>The quantities required are not such that they require a borrow pit licence. Costs increase the further one gets from site and therefore borrow material is sourced as close to site as possible. Sources include existing borrow areas on neighbouring farms, decommissioned dam walls, man-made berms which are no longer required.</p>			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Negative		Negative	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	
<b>Significance</b>	<b>MEDIUM (-)</b>		<b>LOW (-)</b>	
<b>Probability</b>	Definite		Definite	
<b>Confidence</b>	Certain		Certain	
<b>Reversibility</b>	Irreversible		Irreversible	
<b>Mitigation measures</b>				
<ul style="list-style-type: none"> <li>• Implement the provisions of the EMPr.</li> <li>• Any quantities in excess of the minimum requirements for a borrow pit licence will require authorisation through Department of Mineral Resources.</li> <li>• Borrow areas will need to be properly re-sloped and re-vegetated after use.</li> </ul>				

## 7.1.9 Work within conservation areas

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	A number of the projects fall within conservation areas which requires a more astute attitude on the part of the implementers to the surrounding environment and the possible negative impacts they can have on it.			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Negative		Negative	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	
<b>Significance</b>	<b>MEDIUM (-)</b>		<b>LOW (-)</b>	
<b>Probability</b>	Definite		Definite	
<b>Confidence</b>	Certain		Certain	
<b>Reversibility</b>	Irreversible		Irreversible	
<b>Mitigation measures</b>				
<ul style="list-style-type: none"> <li>• Close cooperation is required with the conservation authorities. Any specific requirements need to be included in the applicable wetland rehabilitation plan.</li> <li>• Implement the provisions of the EMPr.</li> </ul>				

## 7.2 OPERATIONAL PHASE

### 7.2.1 Changes in land use

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	The increase in wetland area may have both positive and negative impacts for landowners. Wetlands are often utilised for grazing during the dry season and an increase in wetland area will thus improve grazing conditions for the farmer. However the increase in wet areas may also make previously accessible areas inaccessible for farming purposes. The extent and magnitude of this impact will depend to a large degree on how much value each individual landowner places on wetland conservation. It is however assumed that if the landowner is willing to allow wetland rehabilitation to take place on their property that they see the value in the WfWetlands Programme and are willing to accept the increase in wetland area.			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Positive and Negative		Positive and Negative	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	
<b>Significance</b>	<b>LOW (+)</b>		<b>MEDIUM(+)</b>	
	<b>MEDIUM (-)</b>		<b>LOW (-)</b>	
<b>Probability</b>	Definite		Definite	
<b>Confidence</b>	Certain		Certain	
<b>Reversibility</b>	Irreversible		Irreversible	
<b>Mitigation measures</b>				
<ul style="list-style-type: none"> <li>• Ensure good access for landowners in the form of crossing points, where such measures be of the lowest impact type and design possible.</li> <li>• Provision of watering points for stock to minimise extensive trampling in the wetlands (especially in the wetter times of year).</li> </ul>				

### 7.2.2 Reduced water storage and treatment costs and reduced soil erosion

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	<p>Wetlands can offer valuable stream flow regulation and filtration services. By restoring wetland area it is likely that downstream users will benefit by having a more reliable and possibly cleaner source of water. In addition, by addressing erosion, wetland rehabilitation can decrease the amount of sediment downstream. This can help to reduce water treatment costs for downstream users and will also reduce the sedimentation of downstream water storage facilities such as dams.</p> <p><b>Reduced soil erosion</b></p> <p>By reducing exposed ground surfaces and surface runoff velocity, the sediment load in surface runoff is reduced, thereby contributing to better water quality in the sub-catchment area.</p>			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Positive		Positive	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	
<b>Significance</b>	<b>MEDIUM (+)</b>		<b>MEDIUM (+)</b>	
<b>Probability</b>	Definite		Definite	
<b>Confidence</b>	Certain		Certain	
<b>Reversibility</b>	Irreversible		Irreversible	
<b>Mitigation measures</b>				
<ul style="list-style-type: none"> <li>No mitigation measures are proposed</li> </ul>				

### 7.2.3 Employment opportunities

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	Ideally, the skills learned by the project team during the construction phase – such as how to work with concrete, build gabions etc. – can be used to assist them to find permanent employment.			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Positive		Positive	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	
<b>Significance</b>	<b>MEDIUM (+)</b>		<b>MEDIUM (+)</b>	
<b>Probability</b>	Definite		Definite	
<b>Confidence</b>	Certain		Certain	
<b>Reversibility</b>	Irreversible		Irreversible	
<b>Mitigation measures</b>				
<ul style="list-style-type: none"> <li>No mitigation measures are proposed</li> </ul>				



7.2.4 Public safety

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	Interventions such as gabion weirs, for example, could potentially be used for stream crossings or a swimming hole by local communities which could potentially have serious health and safety risks. However, the purpose of the rehabilitation interventions is not to provide watering holes or public infrastructure, but to trap sediment (i.e. filling up dongas, erosion channels, etc.) and reduce overland flow-velocities.			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Negative		Negative	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	
<b>Significance</b>	<b>MEDIUM (-)</b>		<b>LOW (-)</b>	
<b>Probability</b>	Definite		Definite	
<b>Confidence</b>	Certain		Certain	
<b>Reversibility</b>	Irreversible		Irreversible	
<b>Mitigation measures</b>				
<ul style="list-style-type: none"> <li>Consult with landowners and the local community to ensure that they are aware of, and educated in, the ecological values and sensitivity of the wetland environments, as well as the exact location of the intervention structures to be implemented.</li> </ul>				

7.2.5 Ecosystem functioning

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	<p><u>Restoring wetland corridors</u></p> <p>In areas where wetlands have been artificially drained, restoration can result in the re-wetting of areas and link up previously wet areas, thus creating and extending a network of wetland areas. These wetland corridors can provide valuable refuges for wetland species and allow for greater ecosystem connectivity.</p>			
	<p><u>Changes in water quality and quantity</u></p> <p>More natural stream flow patterns within the wetland, as well as an improvement in water quality and quantity (due to improved ecosystem services) can be expected after rehabilitation.</p>			
	<p>This improvement in water quality and a more reliable supply of water is particularly important given the water scarcity that faces South Africa.</p>			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Positive		Positive	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	
<b>Significance</b>	<b>MEDIUM (+)</b>		<b>HIGH (+)</b>	
<b>Probability</b>	Definite		Definite	
<b>Confidence</b>	Certain		Certain	
<b>Reversibility</b>	Irreversible		Irreversible	
<b>Mitigation measures</b>				
<ul style="list-style-type: none"> <li>• <b>Note:</b> The interventions identified for the proposed rehabilitation project were identified during a screening process that was undertaken to ensure that the most suitable intervention was identified, developed and assessed for each rehabilitation site. During this screening process the project team also took into account environmental, social and economic considerations, as well as the rehabilitation objectives identified for the wetland.</li> <li>• Should these interventions not be implemented, the current rate of degradation at the assessed wetlands would continue and in some cases even result in the permanent loss of the integrity and functioning of these systems. It would also not be possible to achieve the rehabilitation objectives identified for the wetlands. Without the implementation of wetland rehabilitation as part of the WfWetlands project, the overall programme objectives<sup>9</sup> and the EPWP requirements would not be realised.</li> <li>• No mitigation measures are proposed.</li> </ul>				

<sup>9</sup> Wetland conservation and poverty reduction through job creation and skills.

7.2.6 Flora and fauna

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	<p><u>Increased habitat</u> Increasing the wetland area through rehabilitation will result in an increase in habitat for wetland-dependent species. This is a positive impact, especially in light of the fact that a number of the Limpopo wetlands are utilised by the vulnerable and endangered species</p>			
	<p><u>Increased biodiversity</u> A large proportion of the natural vegetation in the greater area has already been lost to forestry and agriculture. Restoring wetland habitat will help to increase the species richness of the overall area by encouraging the re-establishment of wetland species.</p>			
	<p><u>Change in species composition</u> In wetlands that have been subject to desiccation, plants that are tolerant of drier conditions are likely to have become established. With the restoration of the wetland, these species are likely to be replaced with wetland-adapted vegetation. This change in composition reflects a shift back to historical species composition and is thus considered positive.</p>			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Positive		Positive	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	
<b>Significance</b>	<b>MEDIUM (+)</b>		<b>MEDIUM (+)</b>	
<b>Probability</b>	Definite		Definite	
<b>Confidence</b>	Certain		Certain	
<b>Reversibility</b>	Irreversible		Irreversible	
<b>Mitigation measures</b>				
<ul style="list-style-type: none"> <li>• <b>Note:</b> The interventions identified for the proposed rehabilitation project were identified during a screening process that was undertaken to ensure that the most suitable intervention was identified, developed and assessed for each rehabilitation site. During this screening process the project team also took into account environmental, social and economic considerations, as well as the rehabilitation objectives identified for the wetland.</li> <li>• Should these interventions not be implemented, the current rate of degradation at the assessed wetlands would continue and in some cases even result in the permanent loss of the integrity and functioning of these systems. It would also not be possible to achieve the rehabilitation objectives identified for the wetlands. Without the implementation of wetland rehabilitation as part of the WfWetlands project, the overall programme objectives and the EPWP requirements would not be realised.</li> <li>• No mitigation measures are proposed.</li> </ul>				

### 7.3 NO-GO OPTION

Phase	Pre-Construction	Construction	Operational	Decommissioning
<b>Impact description</b>	<p><u>Ecosystem functioning</u> Pursuing the no-go option would result in the current negative ecosystem impacts continuing. These impacts include desiccation, erosion, channel incision etc.</p>			
	<p><u>Flora and Fauna</u> The no-go alternative would mean that the positive impacts identified above would not be realised. Continued wetland degradation and habitat loss is likely to result in exponential increase in the significance of the no-go alternative, leading to an eventual loss of biodiversity and disruption of floral and faunal ecosystems. In addition, it would also negatively affect the achievement of conservation objectives for the area.</p>			
	<p><u>Socio-economic/ Employment</u> The no-go alternative would mean that the positive impacts identified above would not be realised.</p>			
	<p><u>Changes in land use</u> Potential positive impacts associated with increased wetland area and improved grazing conditions will not be realised should rehabilitation activities not be implemented. Furthermore, drained wetlands are often more susceptible to erosion, resulting in the removal of fertile topsoil and thereby reducing the agricultural potential of the site.</p>			
	<p><u>Reduced water storage and treatment costs</u> The no-go alternative would mean that the positive impacts identified above would not be realised. In addition, the water retention and storage potential of the system and catchment would continue to decrease, while damage to properties and infrastructure resulting from flood events would increase.</p>			
	<p><u>Reduced soil erosion</u> The no-go alternative would mean that the positive impacts identified above would not be realised. Erosion would continue and even accelerate over time, reducing the agricultural potential of farms, as well as increasing damages to properties and infrastructure during flood events.</p>			
	<p><u>Public Safety</u> As mentioned before, wetlands function as a buffer during flood events by reducing the flow velocity of floods and retaining some of the water. Should the wetlands continue to degrade this important function/ service would be reduced in and/or removed from the catchment and the negative impact of floodwater would increase significantly, e.g. the risk of damage to road infrastructure would increase, as well as flooding of towns/ dwellings located in close proximity to watercourses and/or wetlands</p>			
	<b>Pre-Mitigation</b>		<b>Post-Mitigation</b>	
<b>Type</b>	Negative		Negative	
<b>Extent</b>	Site Specific		Site Specific	
<b>Magnitude</b>	Medium		Low	
<b>Duration</b>	Long-term		Long-term	

Significance	HIGH (-) <sup>10</sup>	HIGH (-)
	MEDIUM (-) <sup>11</sup>	MEDIUM (-)
Probability	Definite	Definite
Confidence	Certain	Certain
Reversibility	Irreversible	Irreversible
<b>Mitigation measures</b>		
<ul style="list-style-type: none"> <li>• <b>Note:</b> If the no-go alternative is pursued, then the operational-related impacts will not be realised. However, the overall impact of the no-go option on the aquatic ecosystem is likely to be negative, especially in the long-term as rehabilitation activities will not take place and the existing problems (such as erosion) in the wetland will continue. Over time these existing problems are likely to have a greater negative impact than the short-term and fairly minor construction related impacts.</li> </ul>		

<sup>10</sup> Significance for ecosystem functioning

<sup>11</sup> Significance for fauna and flora, socio-economic/employment, changes in land use, reduced storage and treatment costs, reduced soil erosion and public safety.

## 8 CONCLUSION AND WAY FORWARD

### 8.1 Conclusion

Based on the above, it is the opinion of the EAP that the positive long-term bio-physical and socio-economic aspects of the project as a whole greatly outweigh the minor negative construction related impacts, particularly since effective mitigation measures to reduce the negative impacts exist. There are no indications to suggest that the preferred alternative will have a significant detrimental impact on the environment. Instead, a long-term positive impact is anticipated. This is discussed in further detail below:

#### Construction Phase:

It is most likely that all identified construction related impacts would be limited to the duration of this phase. Impacts on the bio-physical environment are generally considered to be of **Medium (-)** to **Low (-)** significance, which can be reduced to **Low (-)** and **Very Low (-)** with the implementation of appropriate mitigation measures. Construction related impacts can generally be very effectively managed through the implementation and regular auditing of an EMP. The impact on the socio-economic environment is expected to be **Medium to High (+)** due largely to the creation of jobs and up-skilling of local workers.

#### Operational Phase:

Potential Operational Phase related impacts for both the bio-physical and socio-economic environments are generally considered to be of **Medium to High (+)** significance. These positive impacts are expected to arise due to the following:

- Improved wetland habitat for red data species;
- Improved wetland services (which has benefits for downstream as well as local users); and
- Empowering of local community.

Table 16: Impact summary table

COLOUR KEY			
High Negative	Red	Neutral	White
Medium Negative	Green	Low Positive - low	Light yellow
Low Negative	Blue	Medium Positive	Yellow
Very Low Negative	Light Blue	High Positive	Orange
Construction Phase: Description of Impact	Significance of Impact		
	Preferred Alternative		No-Go
	No Mitigation	With mitigation	
Job creation	Medium (+)	High (+)	Medium (-)
Increased awareness of wetland importance	Medium (+)	High (+)	Medium (-)
Fire risk	Medium (-)	Low (-)	Neutral
Nuisance impacts	Low (-)	Very Low (-)	Neutral

Construction Phase: Description of Impact	Significance of Impact		
	Preferred Alternative		No-Go
	No Mitigation	With mitigation	
Impact on heritage resources	Very Low (-)	Neutral	Neutral
Worker safety	Medium (-)	Low (-)	Neutral
Flora & fauna	Medium (-)	Low (-)	Medium (-)
Aquatic ecosystem impacts	Medium (-)	Low (-)	Medium (-)
Sourcing borrow material	Medium (-)	Low (-)	Neutral
Work within conservation areas	Medium (-)	Low (-)	
Working in peatlands	Medium(-)	Low (-)	
Operational Phase: Description of Impact			
Changes in land use	Low (+)	Medium (+)	Medium (-)
	Medium (-)	Low (-)	
Reduced water storage and treatment costs	Medium (+)	Medium (+)	Medium (-)
Employment	Medium (+)	Medium (+)	Medium (-)
Ecosystem functioning	Medium (+)	High (+)	High (-)
Flora and fauna	Medium (+)	Medium (+)	Medium (-)
Reduced soil erosion	Medium (+)	Medium (+)	Medium (-)
Public safety	Medium (-)	Low (-)	Medium (-)

## 8.2 Recommendations and Opinion of the EAP

Based on the above, it is the opinion of the EAP that the positive long-term bio-physical and socio-economic aspects of the project as a whole greatly outweigh the minor negative construction related impacts, particularly since effective mitigation measures to reduce the negative impacts exist. There are no indications to suggest that the preferred alternative will have a significant detrimental impact on the environment. Instead, a long-term positive impact is anticipated. This is discussed in further detail below:

### Construction Phase:

It is most likely that all identified construction related impacts would be limited to the duration of this phase. Impacts on the bio-physical environment are generally considered to be of **Medium (-)** to **Low (-)** significance, which can be reduced to **Low (-)** and **Very Low (-)** with the implementation of appropriate mitigation measures. Construction related impacts can generally be very effectively managed through the implementation and regular auditing of an EMP. The impact on the socio-economic environment is expected to be **Medium to High (+)** due largely to the creation of jobs and up-skilling of local workers.

### Operational Phase:

Potential Operational Phase related impacts for both the bio-physical and socio-economic environments are generally considered to be of **Medium to High (+)** significance. These positive impacts are expected to arise due to the following:

- Improved wetland habitat for red data species;
- Improved wetland services (which has benefits for downstream as well as local users); and
- Empowering of local community.

### 8.3 Level of Confidence in Assessment

Based on the information provided in this report, the outcome of the impact assessment and the supporting documentation it is the recommendation of the EAP that authorisation be granted for the following reasons:

- a) The proposed rehabilitation activities are likely to have significant positive bio-physical and socio-economic benefits, not just for the local community for the country as a whole.
- b) Effective mitigation measures exist to manage the limited negative impacts that were identified.
- c) The proposed rehabilitation activities are in line with the principles of NEMA (in particular: people and their needs – particularly women and children – are placed at the forefront of development via the EPWP; the development can be considered to be socially, environmentally and economically sustainable; the environmental impacts of the activity are not unfairly distributed and the potential environmental impacts have been assessed and evaluated).
- d) The WfWetlands Programme is an important part of the government's EPWP and given that the impacts of the proposed activities are not likely to be detrimental to the environment, this programme should be supported in the spirit of co-operative governance.

It is recommended that the following conditions should be included by the Department of Environmental Affairs in the Environmental Authorisation (should a positive decision be reached):

- Mitigation measures listed in this BAR should be referenced as conditions of approval.
- Construction activities must take place in accordance to the requirements of the attached EMPr, which also includes general requirements from the WfWetlands Best Management Practices Plan.
- Regular auditing of the EMPr must take place.

### 8.4 Way Forward

The work proposed in the above-mentioned wetland systems will be further detailed in a project specific Rehabilitation Plan, consisting of work that will be planned for the following years' implementation cycle.

Each Rehabilitation Plan will include a detailed description of the wetland system, the problems affecting the wetland as well as the proposed rehabilitation strategy. Input into this report is provided by the project engineer, wetland specialist, EAP, and WfWetlands ASD. The Rehabilitation Plan will also include the engineering drawings and bill of quantities of the specific intervention planned to address the site-specific issue.

A general Environmental Management Programme (EMPr) (**Appendix D**) is included in both the BAR and Rehabilitation Plan and provides a set of guidelines and requirements for the implementing teams to ensure that each intervention does not do unnecessary harm to the environment. Where site-specific mitigation measures are required, these will be included in the intervention booklets provided as an annexure to the Rehabilitation Plan.



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