Report No: 113223/ 11665

WORKING FOR WETLANDS REHABILITATION PROGRAMME, FREE STATE

BASIC ASSESSMENT REPORT
NOVEMBER 2017

Agriculture, Forestry and Fisheries
Environmental Affairs
Water Affairs and Sanitation

Working for Wetlands

EXPANDED PUBLIC WORKS PROGRAMME
Creating opportunities towards human fullfilment

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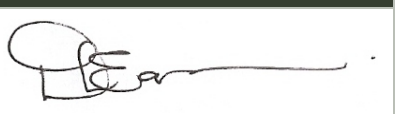
Verifier signature		Approver signature	
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NEMA requirements for Basic Assessment Reports		aurecon
Appendix 1	**Content as required by NEMA**	**Section**
3(1)	A basic assessment report must contain the information that is necessary for the competent authority to consider and come to a decision on the application, and must include -	
(a)	(i) details of the EAP who prepared the report; and	Section 8.2 Appendix D
	(ii) details of the expertise of the EAP, including curriculum vitae;	
(b)	the location of the activity, including-	
	(i) the 21 digit Surveyor General code of each cadastral land parcel;	Section 1.1.1
	(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;	N/A
(c)	a plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is-	Figure 1 Chapter 6
	(i) a linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	N/A
	(ii) on land where the property has not been defined, the coordinates within which the activity is to be undertaken;	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	Chapter 2
	(ii) a description of the activities to be undertaken, including associated structures and infrastructure;	Section 5.2
(e)	a description of the policy and legislative context within which the development is proposed including -	Chapter 2
	(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;	
(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 -	Section 5.3
	(i) details of all the alternatives considered;	
	(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;	Chapter 8
(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;	
(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

CONTENTS

APPENDICES

FIGURES

TABLES

ABBREVIATIONS

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

GLOSSARY OF TERMS

Bedrock: The solid rock that underlies unconsolidated material, such as soil, sand, clay, or gravel (Cowden and Kotze, 2008).

Basic Assessment Report (BAR): A report as required in terms of the 2014 EIA Regulations, of the National Environmental Management Act, No. 107 of 1998 (NEMA), that describes the proposed activities and their potential impacts.

Biophysical: The biological and physical components of the environment (Cowden and Kotze, 2008).

Catchment: All the land area from mountaintop to seashore which is drained by a single river and its tributaries. Each catchment in South Africa has been subdivided into secondary catchments, which in turn have been divided into tertiary catchments. Finally, all tertiary catchments have been divided into interconnected quaternary catchments. A total of 1946 quaternary catchments have been identified for South Africa. These subdivided catchments provide the main basis on which catchments are subdivided for integrated catchment planning and management (Cowden and Kotze, 2008).

Development: The building, erection, construction or establishment of a facility, structure or infrastructure, *including associated earthworks* or borrow pits, that is necessary for the undertaking of a listed or specified activity, including any associated post development monitoring, but *excludes any modification, alteration or expansion* of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and *excluding the redevelopment of the same facility in the same location, with the same capacity and footprint*.

Development Footprint: means *any evidence of physical alteration* as a result of the undertaking of an activity.

Environmental Assessment Practitioner (EAP): The individual responsible for the planning, management and coordination of the environmental impact assessments, strategic environmental assessments, environmental management plans and/or other appropriate environmental instruments introduced through regulations of NEMA.

Ecosystem Services or 'eco services': The services such as sediment trapping or water supply, supplied by an ecosystem (in this case a wetland ecosystem).

Environmental Impact Assessment (EIA): A study of the environmental consequences of a proposed course of action via the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

Environmental Management Programme (EMPr): A detailed plan of action to organise and co-ordinate environmental mitigation, rehabilitation and monitoring during the implementation and maintenance of interventions identified under the WfWetlands Programme such that positive impacts are enhanced and negative impacts are avoided/minimised.

Expansion: The *modification, extension, alteration* or upgrading of a facility, structure or infrastructure at which an activity takes place in such a manner that the *capacity* of the facility or the *footprint* of the activity is increased.

Indigenous Vegetation: Vegetation consisting of indigenous plant species occurring naturally in an area, *regardless of the level of alien infestation* and where the topsoil has not been lawfully disturbed during the preceding ten years.

Interested and Affected Parties (I&APs): People and organisations that have interest(s) in the proposed activities, also referred to as stakeholders.

Environmental Impact: An environmental change caused by some human act.

Implementer: The person or organisation responsible for the construction of WfWetlands rehabilitation interventions.

Intervention: A method of wetland rehabilitation that aims to address the objectives of the particular wetland system, namely to restore the hydrological integrity of the system and support associated biodiversity. It can be in the form of a hard (structures made of hard materials which are fixed (e.g. a concrete weir) or soft intervention (e.g. re-vegetation).

Mitigation: Actions to reduce the impact of a particular activity.

Maintenance: The replacement, repair or the reconstruction of an existing structure within the same footprint, in the same location, having the same capacity and performing the same function as the previous structure ('like for like').

Maintenance Management Plan: A management plan for maintenance purposes defined or *adopted by the competent authority.* [For WfWetlands, this is called a Rehabilitation Plan.]

Public Participation Process (PPP): A process of involving the public in order to identify issues and concerns, and obtain feedback on options and impacts associated with a proposed project, programme or development. Public Participation Process in terms of NEMA refers to: a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to specific project matters.

Project: An area of WfWetlands intervention generally defined by a quaternary catchment or similar management unit such as a national park in which a single implementer operates.

Quaternary Catchment: "A fourth order catchment in a hierarchal classification system in which a primary catchment is the major unit" and that is also the "principal water management unit in South Africa" (DWS, 2011).

Rehabilitation: In the context of wetlands, refers to re-instating the driving ecological forces (including hydrological, geomorphological and biological processes) that underlie a wetland, so as to improve the wetland's health and the ecological services that it delivers.

Significant impact: An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Wetland: "Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water and which in normal circumstances supports or would support vegetation typically adapted to life in saturated soils." (National Water Act, 36 of 1998) *and* "Land where an excess of water is the dominant factor determining the nature of the soil development and the types of plants living there" (Cowden and Kotze, 2008).

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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.

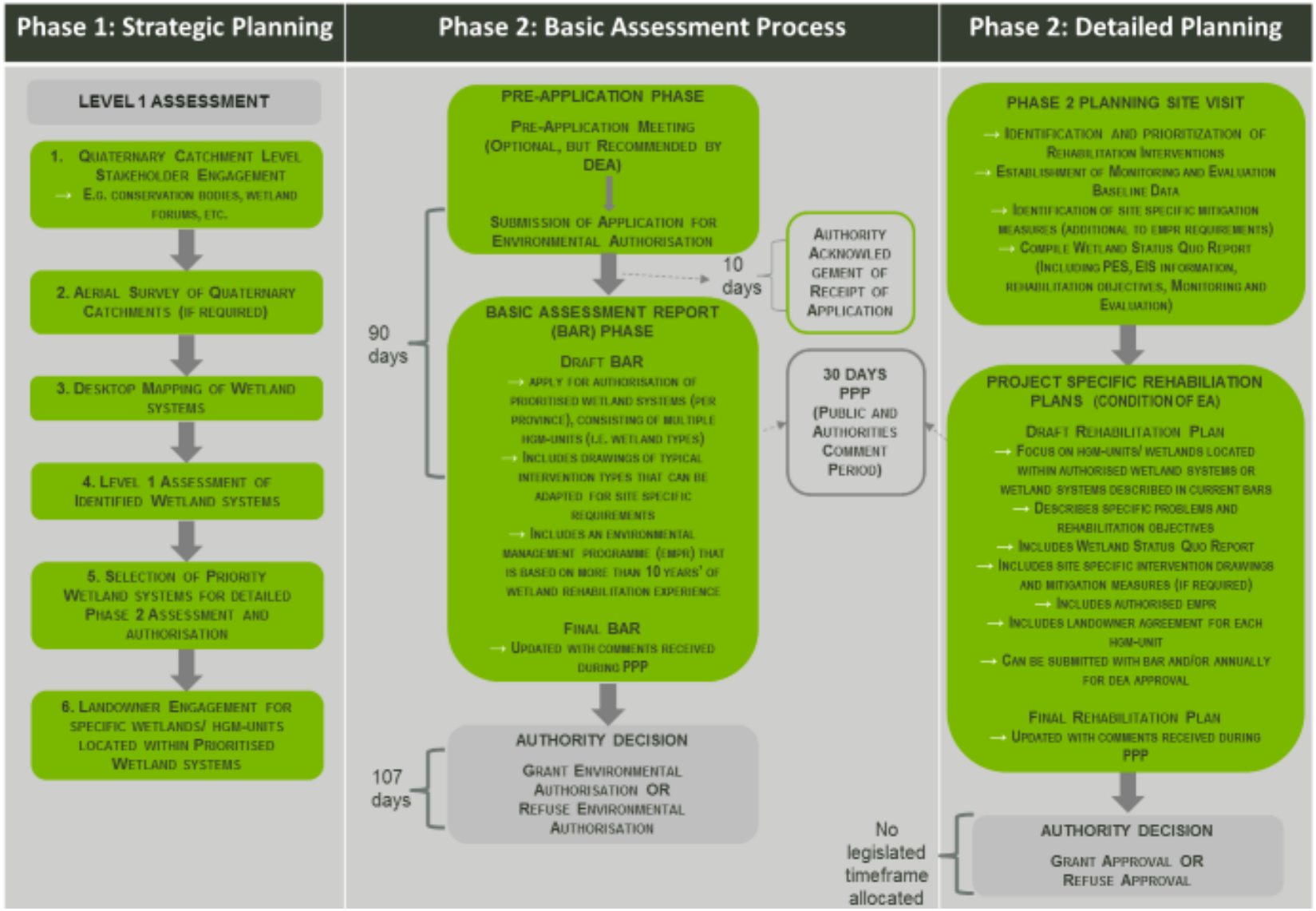

Figure 1: Overview of Phase 1 and 2 as part of the planning process

1.1 Introducing the Project

The WfWetlands Programme is currently managing 37 WfWetlands Projects countrywide, including projects in the Free State Province. WfWetlands has actively been rehabilitating wetlands in the Free State 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 Free State Province as shown in **Table 1** and **Table 2** below.2.2

Table 1: Project details

Project Name	Wetland System	Wetland Number	Lat (DDMMSS)	Long (DDMMSS)
Seekoeivlei	Gansvlei 1	C13C-12	27° 36' 46.51"	27° 36' 46.51"
	Seekoeivlei	C13C-01	27° 33' 45.23"	29° 35' 17.03"
	Seekoeivlei Poort	C13C-08	27° 33' 42.81"	29° 36' 49.64"
	Zeekoeivlei	C13C-09	27° 35' 06.62"	29° 35' 57.42"
	Eben 1	C13C-10	27° 37' 10.49"	29° 35' 48.48"
Upper Wilge	Clifford 2	C81B-06	28° 21' 19.33"	29° 08' 46.31"
	Clifford 3	C81B-09	28° 21' 18.74"	29° 08' 28.01"
	Clifford 4	C81B-07	28° 21' 45.31"	29° 08' 32.01"
	Skoondraai 1	C81B-02	28° 19' 54.61"	29° 14' 26.11"
	Skoondraai 2	C81B-04-	28° 19' 44.03"	29° 14' 05.28"
	Wapad 1	C81A-05	28° 17' 03.08"	29° 27' 50.44"
	Wapad 2	C81A-07	28° 17' 32.93"	29° 28' 00.34"
	Wapad 3	C81A-08	28° 17' 08.74"	29° 28' 20.23"
Maluti	Niewejaar's Vley 1	C81D-09	28° 29' 55.01"	29° 02' 02.92"
	Sedan 1	C81D-10	28° 30' 11.67"	29° 02' 32.36"
	Statherick 1	C81D-11	28° 25' 12.62"	28° 59' 12.79"

Table 2: Farm details for Free Sate projects

Project Name	Wetland System	Property Number	21 digit SG code	Property Size (ha)
Seekoeivlei	Gansvlei 1	243	F03700000000024300000	1782.83
		1149	F03700000000114900000	280.08
		1150	F03700000000115000000	175.45
		1151	F03700000000115100000	312
		1153	F03700000000115300000	393.91
	Seekoeivlei	RE/66	F03700000000006600000	288.07
		1/67	F03700000000006700001	246.28
		RE/70	F03700000000007000000	140.31
		1/70	F03700000000007000001	77.33
		2/70	F03700000000007000002	0.71
		RE/71	F03700000000007100000	192.73
		72	F03700000000007200000	389.65
		7/75	F03700000000007500007	58.94
		14/75	F03700000000007500014	206.97
		242	F03700000000024200000	522.32
		RE/248	F03700000000024800000	805.95
		1/248	F03700000000024800001	49.22
		261	F03700000000026100000	566.71
		RE/359	F03700000000035900003	175.73
		7/412	F03700000000041200007	275.25
		9/412	F03700000000041200009	40.04
		10/412	F03700000000041200010	29.17
		413	F03700000000041300000	1792.69
		1252	F03700000000125200000	150.56
		RE/1316	F03700000000131600000	1455.77
		1/1316	F03700000000131600001	1520.76
		3/1316	F03700000000131600003	1404.10
		2/1350	F03700000000135000002	273.01
	Seekoeivlei Poort	RE/1316	F03700000000131600001	1455.77
Upper Wilge	Clifford 2	214	F01500000000021400000	1469.35
	Clifford 3			
	Clifford 4			
	Skoondraai 2	154	F01500000000015400000	377.00
	Wapad 1	174	F01500000000017400000	430.14
		RE/227	F01500000000022700000	1463.66
		1/227	F01500000000022700001	6.59
		RE/1635	F01500000000163500000	397.08
		1/1635	F01500000000163500001	15.98
	Wapad 2	RE/1635	F01500000000163500000	397.08
		1/1635	F01500000000163500001	15.98

Maluti	Niewejaar's Vley 1	RE/277	F01500000000027700000	945.25
	Sedan 1	RE/277 RE/893	F01500000000027700000 F01500000000089300000	945.25 847.74
	Statherick 1	1/186 RE/692	F01500000000018600001 F01500000000069200000	1922.60 481.43

1.1.2 Project Team

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[1] 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 Free State Province is listed in **Table 3**

Table 3: Planning Team for Free State Province

Role	Representative	Company
ASD	Mathabiso Letsaba	Department of Environmental Affairs
EAP	Dirk Pretorius	Aurecon South Africa (Pty) Ltd
EAP	David Rathobei	Aurecon South Africa (Pty) Ltd
Engineer	Trevor Pike	GroundTruth
Wetlander	Craig Cowden r	GroundTruth

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 undertaken the necessary permitting procedures in terms of the National Heritage Resources Act (Act 25 of 1999) (NHRA). This will not be required for the Free State Province.

[1] These Wetland Specialists are also referred to as Wetlanders in the Programme, and the two terms should be used interchangeably. The individuals are selected based on their expertise in the province, and their involvement in the wetland society of South Africa.

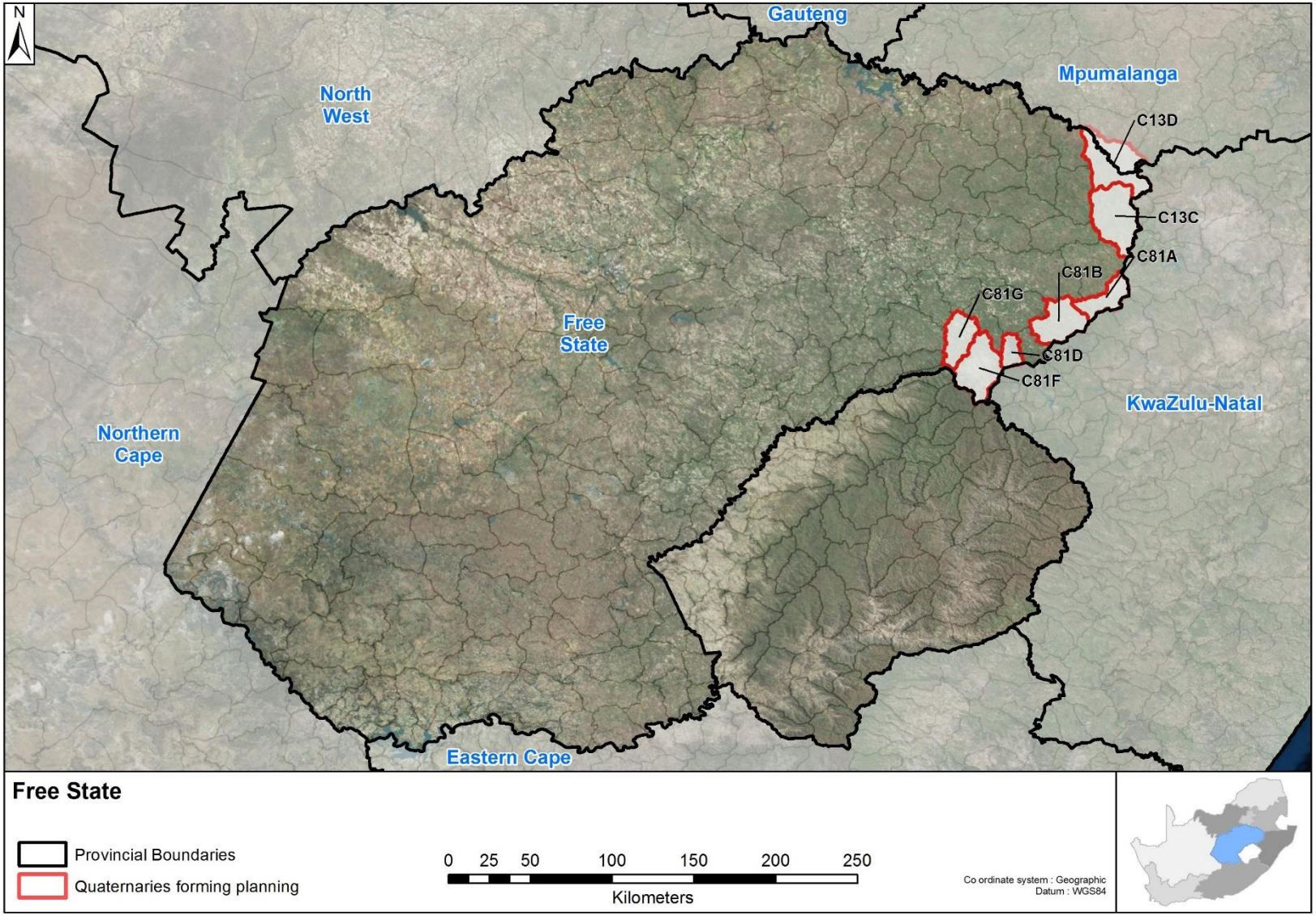

Figure 2: Locality map showing the location of quaternary catchments included in this BAR

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 and 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
Legislation			
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
Natural Heritage Resources Act (Act 25)		National Heritage Resources Agency	1999
World Heritage Conventions Act (Act 49)		Department of Environmental Affairs	1999

Title of legislation, policy or guideline	Applicability to the project	Administering authority	Date
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
National Guidelines			
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
International Conventions			
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, such environmentally positive rehabilitation projects should not 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 Free State Projects

Listed activity	**Description of project activity that triggers listed activity**
Listing Notice 1 (GN R983, as amended)	
Activity 12: The development of- *i.. weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size; or* *ii. infrastructure or structures with a physical footprint of 100 square metres or more;* *where such development occurs-* *a. within a watercourse;* *c. if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.*	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: • The construction of concrete or gabion weirs within a watercourses (wetlands); • 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 • The construction of walkways in public wetlands to limit human impact, and to form part of the educational component of the project.

Listed activity	**Description of project activity that triggers listed activity**
Activity 48: The expansion of- . *i. infrastructure or structures where the physical footprint is expanded by 100 square metres or more; or* *ii. weirs, where the weir, including infrastructure and water surface area, is expanded by 100 square metres or more;* *where such expansion or expansion and related operation occurs-* *a. within a watercourse;* *c. if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.*	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: • The expansion of existing concrete or gabion weirs within watercourses (wetlands). • 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, this listing notice will be triggered because: • Walkways in public wetlands may constitute infrastructure with a footprint exceeding 100m^2.
Listing Notice 3 (GN R985, as amended)	
GN 985: Activity 14 The development of- *i. weirs, where the weir, including infrastructure and water surface area exceeds 10 square metres; or* *ii. infrastructure or structures with a physical footprint of 10 square metres or more;* *where such development occurs -* *a. within a watercourse;* *c. if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *(b) In Free State:* *i. Outside urban areas;* *(aa). A protected area identified in terms of NEMPAA, excluding conservancies;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core of the area biosphere reserve*	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: • The construction of concrete or gabion weirs within watercourses (wetlands); • 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 • The construction of walkways in public wetlands to limit human impact, and to form part of the educational component of the project. The planned wetland projects are located outside of urban areas in the Free State. The wetlands of the Maluti project are located within the Sterkfontein Nature Reserve, and the Upper Wilge and Seekoeivlei wetlands fall within National Protected Area Expansion Strategy (NPAES) areas.

Listed activity	Description of project activity that triggers listed activity
Activity 23: The expansion of- *i. weirs where the weir is expanded by 10 square meters or more in size;* *ii. infrastructure or structures where the physical footprint is expanded by 10 square metres or more;* *where such development occurs* *a. within a watercourse;* *c. if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *(c) In Free State* *ii. Outside urban areas* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(gg) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.*	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: • The construction of concrete or gabion weirs within watercourses (wetlands); • The formalisation of stream crossings to ensure that the integrity of wetland systems downstream and upstream of the crossings are protected from further degradation; • The construction of walkways in public wetlands to limit human impact, and to form part of the educational component of the project. The planned wetland projects are located outside of urban areas in the Free State. The wetlands of the Maluti project are located within the Sterkfontein Nature Reserve, and the Upper Wilge and Seekoeivlei wetlands fall within National Protected Area Expansion Strategy (NPAES) areas.

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

In terms of Section 39 of the NWA, a General Authorisation[2] (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*[3]' and '*altering the bed, banks, course or characteristics of a watercourse*[4]' where they are specifically undertaken for the purposes of rehabilitating[6] 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.

[2]Government Notice No. 1198, 18 December 2009
3Section 21(c) of the NWA, No. 36 of 1998
4Section 21(i) of the NWA, No. 36 of 1998

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)[5] 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.

[5] Also referred to as Provincial Coordinators (PCs).

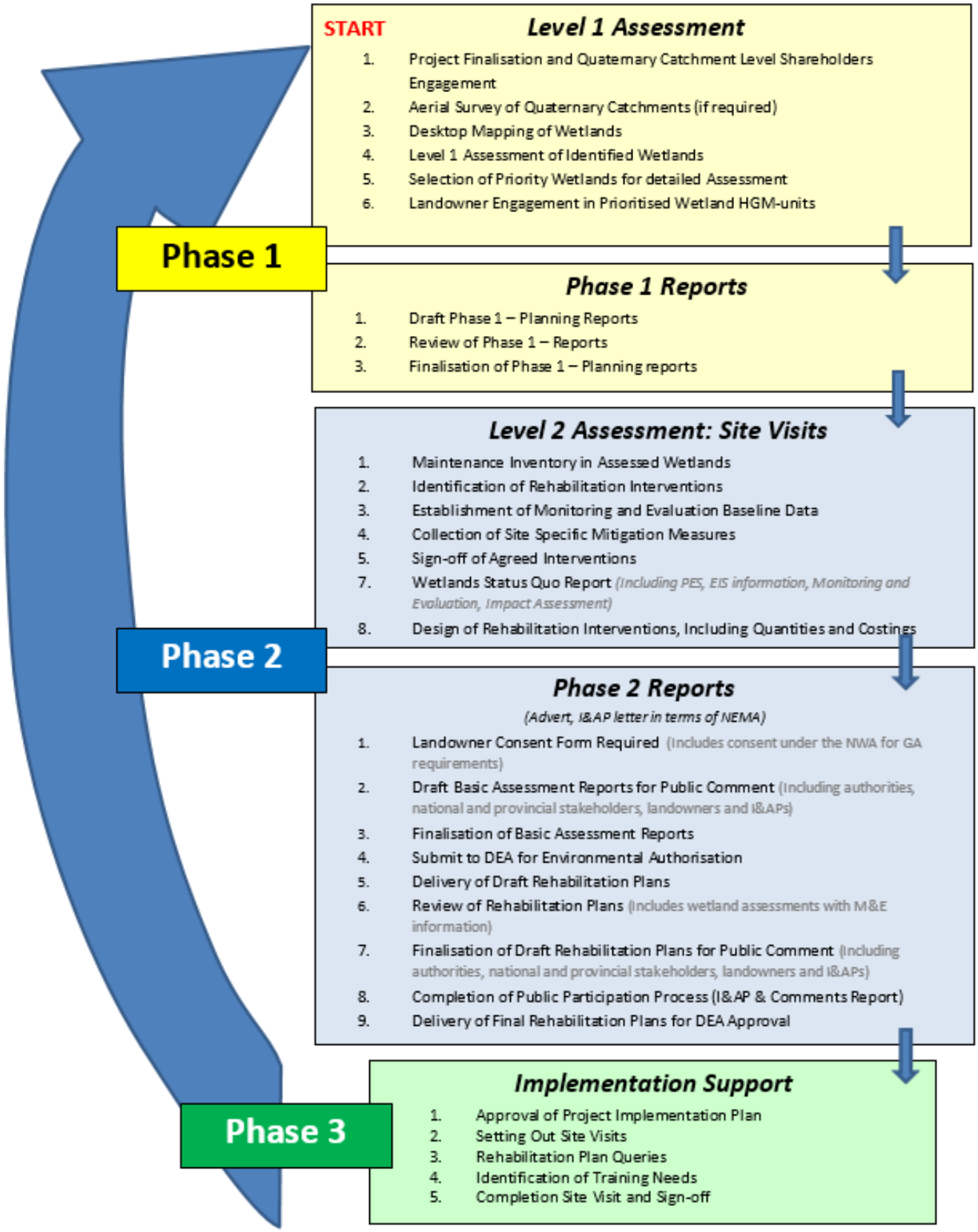

Figure 3: The Working for Wetlands planning process

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). 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 6: Assessment criteria for the evaluation of impacts

Criteria	Category	Description
Spatial influence of impact	**Regional**	Beyond a 10 km radius of the candidate site.
	Local	Between 100m and 10 km radius of the candidate site.
	Site specific	On site or within 100 m of the candidate site.
Magnitude of impact (at the indicated spatial scale)	**High**	Natural and/ or social functions and/ or processes are *severely* altered
	Medium	Natural and/ or social functions and/ or processes are *notably* altered
	Low	Natural and/ or social functions and/ or processes are *slightly* altered
	Very Low	Natural and/ or social functions and/ or processes are *negligibly* altered
	Zero	Natural and/ or social functions and/ or processes remain *unaltered*
Duration of impact (temporal)	**Construction period**	From commencement up to 2 years after construction
	Short Term	From 2 to 5 years after construction
	Medium Term	From 5 to 15 years after construction
	Long Term	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 7**.

Table 7: Definition of significance ratings

Significance ratings	Level of criteria required
High	• High magnitude with a regional extent and long term duration • High magnitude with either a regional extent and medium term duration or a local extent and long term duration • Medium magnitude with a regional extent and long term duration
Medium	• High magnitude with a local extent and medium term duration • High magnitude with a regional extent and construction period or a site specific extent and long term duration • High magnitude with either a local extent and construction period duration or a site specific extent and medium term duration • Medium magnitude with any combination of extent and duration except site specific and construction period or regional and long term • Low magnitude with a regional extent and long term duration
Low	• High magnitude with a site specific extent and construction period duration • Medium magnitude with a site specific extent and construction period duration • Low magnitude with any combination of extent and duration except site specific and construction period or regional and long term • Very low magnitude with a regional extent and long term duration
Very low	• Low magnitude with a site specific extent and construction period duration • Very low magnitude with any combination of extent and construction or short term duration
Neutral	• Zero magnitude with any combination of extent and duration

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 8** and **Table 9**, 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 10**.

Table 8: Definition of probability ratings

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

Table 9: Definition of confidence ratings

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

Table 10: Definition of reversibility ratings

Reversibility ratings	Criteria
Irreversible	The activity will lead to an impact that is in all practical terms permanent.
Reversible	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 2000s. 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 11: Public Participation Process

Activity	Description
Pre-application	
Advertisements	Adverts were placed in the national newspapers: *Die Rapport* (in Afrikaans) on 5 November 2017 and *Sunday Times* (in English) on 12 November 2017 to allow I&APs the opportunity to register their interest in the project.
Site Posters	Posters, notifying I&APs of the proposed rehabilitation projects, were placed on the boundary fences of the properties and at local municipal offices.
Register of I&APs	The existing provincial I&AP database (from previous planning cycles) will be updated with information from new I&APs responding to advertisements and site notices throughout the application process. Proactive identification of I&APs, municipal representatives, organs of state, competent authorities and surrounding landowners was also undertaken to update the database specific to the new planning year.
Basic Assessment Process	
Availability of BAR for public comment	The BARs were made available for a 30-day comment period from **10 November 2017 to 12 December 2017** on Aurecon's website: http://aurecongroup.com/en/public-participation.aspx. All competent authorities and landowners also received an electronic copy (i.e. CD) of the BAR 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: Simamkele.Ntsengwane@aurecongroup.com.
Written Notification	Written notification was given on **8 October 2017** to all registered I&APs regarding the availability of the BAR. Written notification of the availability of the rehabilitation plans will be provided to all registered I&APs.
Register of I&APs	The register for I&APs will continue to be updated during the Basic Assessment Process.
Comments	No comments have been received to date. All comments received will be included in a Comments and Response Report (CRR) and made available in **Appendix 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 just under R1 billion in wetland rehabilitation and has been involved in over 1 300 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 130 million, of which approximately 35% is allocated directly to paying wages. Being part of the EPWP, the WfWetlands Programme has created more than 27 000 jobs and over 3 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 250 000 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. Examples of typical interventions are provided in detail in **Appendix A.** The following points provide a summary of the objectives, and activities.

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 approached 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 12**.

Table 12: Approach to alternatives for the WfWetlands Programme

Alternative	Applicability to WfWetlands
Site Alternatives	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[6]. The earlier site selection processes to determine feasible and reasonable Wetland Projects are described in detail in Section 3.1. 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.
Other Alternatives	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 opinion and are thus considered to be the most suitable and effective interventions to achieve the rehabilitation objectives for the wetland.

[6] Wetland conservation and poverty reduction through job creation and skills development amongst vulnerable and marginalised groups.

Alternative	Applicability to WfWetlands
	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 Appendix A 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.
No-Go Alternative	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.

6 BASELINE DESCRIPTION OF FREE STATE PROJECTS

6.1 Free State Project: Background

Within the Free State region, wetlands have been subjected to high levels of modification and destruction (Kotze et al. 1995; Macfarlane et al. 2012). The factors contributing towards the degradation of the systems vary greatly, but the predominant impacts include urbanisation, abstraction, dams, cultivation, drainage and over-grazing (Macfarlane et al. 2012). The loss of wetland habitat within Free State is considered to be of concern due to the value of wetlands in terms of contributions to water quantity and quality, supporting unique biological diversity and other ecosystem services (Kotze et al. 2007). Taking into consideration the above-mentioned degradation of wetland ecosystems, it is important that the proposed development attempts to maintain the current levels of ecosystem service delivery, and where possible, enhance the systems' ability to supply these benefits and services.

The Golden Gate wetland rehabilitation project is located in the C81F, C81G and C83A quaternary catchments near the town of Phuthaditjhaba in the Free State Province. The focus of the wetland rehabilitation has been the stabilisation of active erosion and the deactivation of drainage canals diverting water out of the identified wetland systems. In 2016, WfWetlands was granted environmental authorisation for all wetland rehabilitation work within the Golden Gate National Park boundaries. Annual rehabilitation plans will be prepared for all rehabilitation work within the National Park to ensure compliance with the conditions of the Environmental Authorisation.

The Maluti wetland rehabilitation project is located in the C81D, C81E and C81H quaternary catchments near the towns of Phuthaditjhaba and Harrismith in the Free State Province The focus of the wetland rehabilitation has been the stabilisation of active erosion and the deactivation of drainage canals diverting water out of the identified wetland systems

The Seekoeivlei wetland rehabilitation project is located in the C13C and C13D quaternary catchments near the towns Vrede and Memel in the Free State Province. The focus of the wetland rehabilitation has been the stabilisation of active erosion and the deactivation of drainage canals diverting water out of the identified wetland systems

The Upper Wilge wetland rehabilitation project is located in the C81A and C81B quaternary catchments near the town Harrismith in the Free State Province. The focus of the wetland rehabilitation has been the stabilisation of active erosion and the deactivation of drainage canals diverting water out of the identified wetland systems.

6.2 Biophysical Environment

The following new wetland systems were identified in the Free State Province (also see **Table 1**) and will be the focus of this Basic Assessment Process. The tables below provide an overview of the biophysical environment of the wetland systems.

- Quaternary catchment C13C:
    - Gansvlei 1
    - Seekoeivlei
    - Zeekoeivlei
    - Seekoeivlei Poort 1
    - Eben 1

- Quaternary catchment C81B:
    - Clifford 2
    - Clifford 3
    - Clifford 4
    - Skoondraai 1
- Quaternary catchment C81A:
    - Skoondraai 2
    - Wapad 1
    - Wapad 2
    - Wapad 3
- Quaternary catchment C81D:
    - Niewejaar's Vley 1
    - Sedan 1
    - Statherick 1
- Quaternary catchment C81G:
    - Ascot 2
    - Ascot 3
    - Ascot 4
    - Initium 1
    - Initium 3
    - Twijfelhoek 1
    - Twijfelhoek 2
- Quaternary catchment C81F:
    - Vredenhof 1

Please refer to **Appendix C** for a selection of maps that show the location and biodiversity sensitivity of the above listed wetland systems.

6.2.1 Quaternary catchment C13C and associated wetland systems

Quaternary Catchment C13C	
General description	Quaternary catchment C13C covers an area of 83 668 ha and drains into the Klip River, a large perennial river system and an important tributary of the Vaal River in the north. The Vaal River supplies the densely populated Gauteng region with water, and is therefore one of the most important catchments in South Africa. The C13C quaternary catchment is situated north of the town of Memel, which is Prussian meaning “surrounded by water” which adequately describes the abundance of watercourses in the area.
Climate	The local climate is defined by a mean annual precipitation (MAP) of 725mm and a mean annual potential evapotranspiration (PET) of 1759.2mm. Therefore, the wetland has a moderately-high sensitivity to hydrological impacts, as indicated by a MAP to PET ration of 0.41 (Macfarlane *et al*. 2007).
Geology and topography	The quaternary catchment is characterised by red, yellow and / or greyish soils with low to medium base status. They may occur associated with one or more of vertic, melanic and plinthic soils (SANBI BGIS, 2017). The erodibility of the soils within the catchment is considered to be intermediate (k-value 0.36), and thus the soils are susceptible to erosion (Kotze et al.

	2007). The landscape is typified low undulating hills of the escarpment near Memel which range from 1700m to 1800m above mean sea level (MSL).
Terrestrial ecology	North-eastern mountain grassland holds 78 endemic and near-endemic plant species, mostly in the Liliaceae, Iridaceae, Asteraceae, Lamiaceae and Orchidaceae families, on Black Reef quartzites. A further 31 endemics are found on dry dolomites. Due to the elevation, the landscape is markedly void of indigenous trees with grassland species (27) dominating the plains. The Seekoeivlei Nature Reserve is host to numerous species of antelope including black wildebeest, red hartebeest, roan with other mammals such as zebras and buffalo also present. [7] Significantly, more than 230 bird's species have been recorded in the Seekoeivlei Nature Reserve. The reserve is mapped as an Important Bird Areas (IBA SA125) Birdlife SA with numerous scarce and endangered species occurring. Among these are three crane species (wattled, crowned and blue) and several bird species that have been listed on the IUCN red list little bittern *Ixobrychus minutus*, grass owl *Tyto capensis* and white-winged flufftail *Sarothrura ayresi*. Many of these species are partially or wholly dependent on the wetland ecosystem for their survival. [8] Other species of that occur in the area include Giant girdled lizard *Cordylus giganteus*, rough-haired golden mole *Chrysospalax villosus*, serval *Felis serval*, African striped weasel *Poecilogale albinucha* and Warren's girdled lizard *Cordylus warreni* range throughout the region. Laminate vlei rat *Otomys laminatus* and many-spotted mountain snake *Anplorhinus multimaculatus* have been recorded in the grassland areas particularly near wetlands.
Aquatic ecology	The wetland is characterized by a variety of fluvial landforms including riverine floodplain with active and abandoned channels, oxbow lakes and low alluvial ridges, as well as river flats, backswamps and seasonally flooded grassland. Within the floodplain, the Klip River bed actively meanders between 3-4 m high alluvial banks within a channel that is approximately 15-30 m wide (McCarthy et al., 2010). The wetland area stretches northward for about 20 km to where the Klip River floodplain narrows, making it the largest floodplain on the Highveld. The numerous seasonal and intermittent freshwater marshes and pools contribute significantly to habitat diversity that supports a range of important wetland species of fauna and flora (NeWater Technical Report – Macfarlane, D.M. and Teixeria-Leite, A., 2009). As the name of the wetlands system relate hippos are prevalent in the main Seekoeivlei system within the reserve. The vlei holds much open water especially in summer with extensive fringing vegetation and some patches of emergent vegetation. The rare rock barbel *Austroglanis sclateri* is reported from the region.
Land use	Land use within this catchment includes agriculture (cultivation and livestock grazing), biodiversity conservation, and urban development.
Gansvlei 1 Wetland System	
Location	The wetland is located within DWS quaternary catchment C13C, in the north-eastern Free State, just outside of the Memel town (about 5km from the Seekoeivlei Nature Reserve).
District and Local municipality	Thabo Mofutsanyane District Municipality. Phumelela Local Municipality.
Reason for selection	The central and upper portions of the channel are actively eroding and provide an opportunity for rehabilitation. Considering its proximity to the Seekoeivlei Nature Reserve and conservation importance of the wetlands in this area it's deemed to be a potential priority site.
Wetland type and size[9]	Channelled Valley-Bottom. 72.2 ha

[7] http://www.saramsar.com/2015/06/seekoeivlei-nature-reserve.html, accessed 2017-11-08

[8] http://www.birdlife.org.za/conservation/important-bird-areas/iba-directory/item/161-sa125-grasslands, accessed 2017-11-08

[9] 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

Conservation status (terrestrial and aquatic)	The system is located within a critical biodiversity area, as well as an ecological support area. It is also in close proximity of a protected area. The majority of the wetland areas adjacent to the channel is characterised by a seasonal wetness regime which supports a hygrophilous grassland vegetation community dominated by *Eragrostis planiculmis*. The channel is dominated by open water with obligate wetland plants such as *Cyperaceae spp*., *Juncus spp*. and *Typha capensis* around the fringes.
Land use	The land is agricultural land and the wetland areas adjacent to the channel are currently utilised as a source of hay by the land owner.
Wetland problems	• The wetland has been subjected to direct and catchment impacts such as over grazing, road crossings, dams and cultivation. • These impacts have caused the stream channel to undergo bank erosion and lateral widening (channel incision). • This has created a strongly channelled base flow pattern of water through the wetland, which has caused desiccation to the adjacent wetland areas.
Seekoeivlei Wetland System	
Location	The Seekoeivlei wetland is located within DWS quaternary catchment C13C, in the north-eastern Free State, just outside of the Memel town.
District and Local municipality	Thabo Mofutsanyane District Municipality. Phumelela Local Municipality.
Reason for selection	Degradation of the wet land system due to commercial farming. These wetlands provide valuable habitat for wetland-dependant species, a number of which are threatened/Red Data Listed species of high conservation significance. Conservation of wetlands inherently provide protection for threatened vegetation types. Wetlands provide a range of important wetland ecosystem services, from sediment trapping and erosion control to stream flow regulation and water purification which is relevant to the downstream areas.
Wetland type and size	Unchannelled valley-bottom and 21.5ha.
Conservation status (terrestrial and aquatic)	The system is located within a critical biodiversity area, as well as an ecological support area. It is also 11km from a protected area (SANBI BGIS, 2017). The Seekoeivlei wetland system is one of South Africa's largest floodplain systems at over 3 000 ha, extending for approximately 45 km in a northerly direction from Memel. The wetland system provides habitat for thousands of birds including 20 IUCN red list species and as such, has been declared Ramsar Wetland of International Importance (site no. 888). The wetland also forms part of a critical grassland IBA (SA125).
Land use	Nature conservation (Seekoeivlei Provincial Nature Reserve and RAMSAR site).
Wetland problems	• Prior to Seekoeivlei being declared as a nature reserve in 1999, the wetland was used for commercial farming purposes which resulted in the system being impacted by artificial drainage channels that have been excavated within the wetland, dating as far back as the 1890's. • These interventions had considerable impacts on wetland geo-hydrological processes which affected the functioning and integrity of the wetland.

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.

Seekoeivlei Poort Wetland System	
Location	The wetland is located within the Seekoeivlei Nature Reserve, which was previously utilised for agriculture (prior to proclamation of the reserve in 1979). It is in the north-eastern Free State, just outside of the Memel town.
District and Local municipality	Thabo Mofutsanyane District Municipality. Phumelela Local Municipality.
Reason for selection	This wetland provides valuable habitat for wetland-dependant species, a number of which are threatened/Red Data Listed species of high conservation significance. Conservation of wetlands inherently provide protection for threatened vegetation types. Wetlands provide a range of important wetland ecosystem services, from sediment trapping and erosion control to stream flow regulation and water purification which is relevant to the downstream areas
Wetland type and size	Un-channelled valley- bottom 95.9 ha.
Conservation status (terrestrial and aquatic)	The system is located within the Seekoeivlei Nature Reserve and mapped as a critical biodiversity area, as well as an ecological support area. It also falls within an IBA.
Land use	Land use in the upstream catchment of Seekoeivlei is primarily in the form of commercial farming, with livestock grazing being the most common form of land use. In areas where soils are arable, maize and wheat are commonly cultivated.
Wetland problems	• Direct and indirect habitat destruction due to dirt road crossings; • Donga, head-cut and other rill erosion originate from old farming activities; • Artificial drainage channels; • Channel incision; • Overgrazing and livestock trampling; and • Exotic vegetation.
Zeekoeivlei Wetland System	
Location	The wetland is located within the Seekoeivlei Nature Reserve, which was previously utilised for agriculture (prior to proclamation of the reserve in 1979). It is in the north-eastern Free State, just outside of the Memel town.
District and Local municipality	Thabo Mofutsanyane District Municipality. Phumelela Local Municipality.
Reason for selection	This wetland provides valuable habitat for wetland-dependant species, a number of which are threatened/Red Data Listed species of high conservation significance. Conservation of wetlands inherently provide protection for threatened vegetation types. Wetlands provide a range of important wetland ecosystem services, from sediment trapping and erosion control to stream flow regulation and water purification which is relevant to the downstream areas
Wetland type and size	Un-channelled valley- bottom 95.9 ha.
Conservation status (terrestrial and aquatic)	The system is located within a critical biodiversity area, as well as an ecological support area.
Land use	Land use in the upstream catchment of Seekoeivlei is primarily in the form of commercial farming, with livestock grazing being the most common form of land use. In areas where soils are arable, maize and wheat are commonly cultivated.

Wetland problems	• Direct and indirect habitat destruction due to dirt road crossings; • Donga, head-cut and other rill erosion originate from old farming activities; • Artificial drainage channels; • Channel incision; • Overgrazing and livestock trampling; and • Exotic vegetation.
Eben 1 Wetland System	
Location	The wetland is located within the Seekoeivlei Nature Reserve, which was previously utilised for agriculture (prior to proclamation of the reserve in 1979) it is in the north-eastern Free State, just outside of the Memel town.
District and Local municipality	Thabo Mofutsanyane District Municipality. Phumelela Local Municipality.
Reason for selection	This wetland provides valuable habitat for wetland-dependant species, a number of which are threatened/Red Data Listed species of high conservation significance. Conservation of wetlands inherently provide protection for threatened vegetation types. Wetlands provide a range of important wetland ecosystem services, from sediment trapping and erosion control to stream flow regulation and water purification which is relevant to the downstream areas
Wetland type and size	Un-channelled Valley-Bottom. 31.2 ha and 6.2 ha.
Conservation status (terrestrial and aquatic)	The system is located within a critical biodiversity area, as well as an ecological support area. It is also in close proximity of a protected area (SANBI BGIS, 2017). The diffuse flow portions of the Eben 1 wetland located upstream of the channel is dominated by a seasonally wet hydrological regime. These areas support a hygrophilous grassland vegetation community dominated by *Pennisetum sp*. The portions of wetland adjacent to the stream channel are dominated by temporary wetness. Common species within this area include *Themeda triandra* and *Helichrysum sp*. The channel is dominated by open water with obligate wetland plants such as *Juncus spp*. and *Typha capensis* around the fringes.
Land use	Agriculture land use.
Wetland problems	Historical and current agricultural land use within the catchment, including over-grazing, dams and cultivation has resulted in the erosion of a channel within the lower and central portions of the Eben 1 wetland. • Erosion of the gully has created a strongly channelled base flow pattern of water through the wetland, which, in combination with a lowered base level, has caused desiccation to the adjacent wetland areas. • Multiple headcuts located at the head of the gully are threatening the integrity of the upper portion of the system and the lower portion of the Eben 1 system. • The upper portion of the Eben 1 gully appears to be at a greater risk to further erosion and therefore provides an opportunity for rehabilitation

6.2.2 Quaternary catchment C81B and associated wetlands

Quaternary Catchment C81B	
General description	The Upper Wilge catchment is located on the inland plateau of South Africa towards the southeast of Harrismith and is a key water supply to the industrial and urban areas of Gauteng including Johannesburg, Pretoria and Vereeniging. The catchment supports large areas of wetland habitat that cover approximately 22km^2 of the catchment area (Le Maitre et al. 2002).

Climate	The local climate in this summer rainfall area is defined by a MAP of 880mm and a mean annual PET of 1716mm. The high-lying areas may receive snowfall in winter with temperatures often falling below the 0ºC mark during the peak of winter (June to July)[10].
Geology and topography	The quaternary catchment is characterised by red, yellow and / or greyish soils with low to medium base status. It has a restricted soil depth, excessive or imperfect drainage, high erodibility (SANBI BGIS, 2017). The catchment varies around the 1700m above MSL with landscape consists of basalt and sandstone cliffs contrasting with the rolling foothills typifying the landscape (average slope around 4.4% but as much as 41.9% where "koppies" protrude).
Terrestrial ecology	The vegetation within the wetland is still largely intact, with moderate encroachment by terrestrial grasses on the periphery of the wetland.
Aquatic ecology	The Upper Wilge catchment is a key water supply catchment to the industrial and urban areas of Gauteng, including Johannesburg, Pretoria and Vereeniging (Le Maitre *et al*. 2002). The Wilge River is still in relatively good condition when compared to adjacent catchments and downstream reaches of the heavily-impacted upper Olifants Catchment (Pollard & Retief, 2017)
Land use	The predominant land-use practices within the catchment include grazing, dryland cultivation (mostly for maize production) and irrigated agriculture.
Skoondraai Wetland System	
Location	The Schoondraai wet land is situated in quaternary catchment C81B, approximately 15km from Harrismith, and is part of the Wilge Wetland Rehabilitation project.
District and Local municipality	Thabo Mofutsanyane District Municipality. Maluti a Phofung Local Municipality.
Reason for selection	The wetland is considered to be important at a landscape level due to its size and proximity to the Wilge River. Due to historical and current land-use practices within the Wilge catchment, the wetlands identified for rehabilitation have mainly been impacted upon by erosion.
Wetland type and size	Channelled valley-bottom 29.8ha.
Conservation status (terrestrial and aquatic)	The system is located within a critical biodiversity area, as well as an ecological support area (ESA according to the Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA), 2015. No protected areas (state or private) are located in close proximity to the wetland, and the nearest national protection area expansion strategy (NPAES) area is located approximately 4 km north of the wetland). This also applies to the wetland itself, which displayed evidence of significant utilisation in the form of grazing. Rehabilitation is planned within this wetland with the intention of maintaining the wetland in the landscape by preventing channel erosion and subsequent desiccation.
Land use	The predominant land use is grazing.
Wetland problems	Several multiple headcuts with finger- like channels were identified at the base of the wetland. These headcuts are likely to erode upstream, with subsequent channel development and desiccation. Several large headcuts were identified eroding up the eastern side of the wet land, leading to subsequent channel incision and wet land desiccation.
Clifford 2, 3 and 4 Wetland System	
Location	The Clifford wetland systems are located approximately 8km south of the town of Harrismith.
District and Local municipality	Thabo Mofutsanyane District Municipality. Maluti a Phofung Local Municipality.

[10] http://www.saexplorer.co.za/south-africa/climate/harrismith_climate.asp, date accessed 2017-11-08

Reason for selection	The wetland is located on private farm land and has been subjected predominantly to catchment related impacts including overgrazing and dams. These disturbances have caused erosion within the catchment which caused sediment deposited within the central portion of the wetland.
Wetland type and size	These wetland systems are all Channelled valley-bottom Clifford 2 is 3.2 ha, Clifford 3 is 0.7 ha and Clifford 4 is 6.1 ha.
Conservation status (terrestrial and aquatic)	The majority of the wetland areas adjacent to the channel are characterised by a terrestrial to temporary wetness conditions which supports a grassland vegetation community dominated by terrestrial and facultative negative species. The channel is dominated permanent wetness conditions and is characterised by obligate wetland plants such as *Cyperaceae spp*., *Juncus effuses*, *Phragmites australis* and *Arundinella nepalensis*. Portions of the channel have been colonised by the alien invasive species cf *Pyracantha angustifolia.*
Land use	The predominant land use is grazing.
Wetland problems	Clifford 2 wetland system has a within-channel headcut located towards the toe end of the wetland that is at risk of eroding up the length of channel, which would cause further lowering of the water level within the channel. Clifford 3 shows that erosion of the gully is currently taking place in the form of multiple headcuts which threatens to deepen the existing gully. The gully has caused severe desiccation to the outskirts of the wetland through lowing of the water level. Clifford 4 has three headcuts are present at the toe of the wetland, which are at risk of migrating up the wetland to the dam wall, which could ultimately cause the dam wall to fail, thus threatening the existence of the *Phragmites australis* reed bed. Considering the extent of erosion within the catchment, the sediment trapping ability of the reed bed and the proximity of the wetland to the Wilge floodplain, it is important that the reed bed is protected and secured.

6.2.3 Quaternary catchment C81A and associated wetlands

Quaternary Catchment C81A	
General description	The Wilge wetland rehabilitation project area is situated in quaternary catchments C81A and C81B. These catchments are drained by the upper reaches of the Wilge River, an important tributary of the Vaal River which supplies water to the Gauteng area. Wetland rehabilitation has been carried out in the Wilge project area for a number of years and the proposed work will be a continuation of previously planned and prioritised work.
Climate	The local climate in this summer rainfall area is defined by a MAP of 880mm and a mean annual PET of 1716mm. The high-lying areas may receive snowfall in winter with temperatures often falling below the 0^{o}C mark during the peak of winter (June to July)[11].
Geology and topography	The quaternary catchment is characterised by red, yellow and / or greyish soils with low to medium base status. It has restricted soil depth, excessive or imperfect drainage, high erodibility. Furthermore, the soils are classified as undifferentiated structure less soils (SANBI BGIS, 2017). The catchment elevation ranges from approximately 1630m to 1740m above MSL with landscape consists of sandstone hills with some exposed cliffs contrasting with the rolling foothills and shallow valleys.
Terrestrial ecology	The vegetation within the wetland is still largely intact although heavily overgrazed, with moderate encroachment by terrestrial grasses on the periphery of the wetland.
Aquatic ecology	The Upper Wilge catchment is a key water supply catchment to the industrial and urban areas of Gauteng, including Johannesburg, Pretoria and Vereeniging (Le Maitre *et al*. 2002).

[11] http://www.saexplorer.co.za/south-africa/climate/harrismith_climate.asp, date accessed 2017-11-08

Land use	The predominant land-use practices within the catchment include grazing, dryland cultivation (mostly for maize production) and irrigated agriculture.
Skoondraai 2 Wetland System	
Location	The wetland system is located approximately 12km south-east of the Town of Harrismith.
District and Local municipality	Thabo Mofutsanyane District Municipality. Maluti a Phofung Local Municipality.
Reason for selection	This wetland provides valuable habitat for wetland-dependant species, a number of which are threatened/Red Data Listed species of high conservation significance. Conservation of wetlands inherently provide protection for threatened vegetation types. Wetlands provide a range of important wetland ecosystem services, from sediment trapping and erosion control to stream flow regulation and water purification which is relevant to the downstream areas.
Wetland type and size	Channelled valley-bottom, 7.9 ha.
Conservation status (terrestrial and aquatic)	The system is located within a critical biodiversity area, furthermore it is in close proximity of an ESA. The wetland is characterised by seasonal wetness within the channelled portion of the system and temporary wetness within the adjacent diffuse flow areas. Due to the extent of channel incision and gully erosion and the location of the dam at the head of the system, the areas of wetland adjacent to the channel rely on lateral water inputs from the surrounding slopes rather than overbank topping. The channelled areas support a vegetation community dominated by *Juncus effuses*. The adjacent areas are characterised by a hygrophilous grass community dominated by disturbance tolerant species such as *Sporobolus spp*. and *Eragrostis spp.*
Land use	Agriculture (extensive grazing)
Wetland problems	The wetland is located on private farm land and has been subjected to direct and catchment related impacts including overgrazing, road crossings and dams. These impacts have caused the stream channel to undergo bank erosion and lateral widening (channel incision) and gully formation to occur within the areas that historically were not channelled.
Wapad 1, 2 and 3 Wetland System	
Location	These wetlands are located approximately 30km east of the Town of Harrismith.
District and Local municipality	Thabo Mofutsanyane District Municipality. Maluti a Phofung Local Municipality.
Reason for selection	Due to historical and current land-use practices within the Wilge catchment, the wetlands identified for rehabilitation have mainly been impacted upon by erosion.
Wetland type and size	Channelled valley-bottom, un-channelled valley bottom, 42.3, 2.6 and 6.2 ha.
Conservation status (terrestrial and aquatic)	The wetlands are dominated by seasonal wetness in the areas of diffuse water flow. The fringe wetland areas and the areas impacted upon by the gullies are characterised by temporary wetness conditions. Permanent wetness areas within this system are generally limited. These hydrological conditions support a hygrophilous grass community including *inter alia Agrostis lachnantha, Pennisetum sphacelatum* and *Eragrostis spp. Cyperaceae* and *Juncaceae* species cover is generally limited to the gully areas.
Land use	The predominant land-use practices within the catchment include grazing, dryland cultivation (mostly for maize production) and irrigated agriculture (Le Maitre et al. 2002)

Wetland problems	Wapad 1, 2 and 3 have been subjected to a level of direct and catchment related impacts including dams, overgrazing and trampling. These disturbances have negatively impacted upon the wetland through sediment deposition in the toe of the wetland, initiated gully erosion within portions of the system, and deep flooding of wetland habitat associated with the dam within the wetland.

6.2.4 Quaternary catchment C81G and associated wetlands

Quaternary Catchment C81G	
General description	The project is situated in the Golden Gate Highlands National Park, which includes the upper reaches of the Klerkspruit river system. This perennial river system forms part of the broader catchment of the Elands and Wilge Rivers, which ultimately supply water to the Gauteng area.
Climate	The local climate in this summer rainfall area is defined by a MAP of 722.9mm and a mean annual PET of 1847.8mm. The high-lying areas may receive snowfall in winter with temperatures often falling below the 0°C mark during the peak of winter (June to July)[12].
Geology and topography	The quaternary catchment is characterised by red, yellow and / or greyish soils with low to medium base status. The soils have minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils. Lime rare or absent in the landscape.Soil may receive water runoff from associated rock; water-intake areas (SANBI BGIS, 2017).
Terrestrial ecology	The historical dominant vegetation type present would have been the Mesic Highveld Grassland. The bioregion comprised characteristic vegetation groups, including: Basotho Montane Shrubland (Gm 5); and Eastern Free State Sandy Grassland (Gm-4).
Aquatic ecology	According to the available NFEPA wetlands coverage, the majority of the wetland systems within the study area and the broader landscape have been classified as 'low priority' NFEPA wetlands. In the north-eastern boundary of the study site, two small Freshwater Ecosystem Priority Areas (FEPA's) wetlands were identified based on there been Crane sightings. According to the available NFEPA river coverage, the Klerkspruit, Elands and Caledon River systems have been classified as 'low priority' are located within the study area. The Little Caledon system was classified as a FEPA River.
Land use	Nature conservation (Golden Gate Highlands National Park).
Ascot 2, 3 and 4 Wetland System	
Location	The Golden Gate wetland rehabilitation project is located in the C81G quaternary catchment near the town of Phuthaditjhaba in the Free State Province. The project is situated in the upper reaches of the Klerkspruit river system.
District and Local municipality	Thabo Mofutsanyane District Municipality. Maluti a Phofung Local Municipality.
Reason for selection	The headcuts within the hillslope seeps are actively eroding and undermining the extent and integrity of the wetland systems and, without any means of stabilisation, these will continue to move through the system; further desiccating the wetlands.
Wetland type and size	Ascot 2 is a hillslope seep system and its size is 2.44ha. Ascot 3 is a hillslope seepage system fed predominantly by sub-surface flows, and its size is 0.94ha. Ascot 4 is a large channelled valley-bottom wetland its size is 16.24ha.

[12] http://www.saexplorer.co.za/south-africa/climate/harrismith_climate.asp, date accessed 2017-11-08

Conservation status (terrestrial and aquatic)	The systems are located within a protected area and they are roughly 3km away from critical biodiversity area as well as ESA (SANBI BGIS, 2017).
Land use	Nature conservation (Golden Gate Highlands National Park).
Wetland problems	Each of the headcuts within the hillslope seeps are actively eroding and undermining the extent and integrity of the wetland systems and, without any means of stabilisation, these will continue to move through the system; further desiccating the wetlands. The stabilisation and deactivation of these headcuts will protect further erosion of the hillslope seep wetlands and improve the integrity of the wetlands within the greater system
Initium 1 and 3 Wetland System	
Location	Initium 1 and 3 are situated along the Regional (R712) road from Harrismith towards Clarens, C81G-10 is a tributary of the large Klerkspruit wetland reed bed (C81G-08) which is situated 2km to the north of the site.
District and Local municipality	Thabo Mofutsanyane District Municipality. Maluti a Phofung Local Municipality.
Reason for selection	These wetlands provide valuable habitat for wetland-dependant species, a number of which are threatened/Red Data Listed species of high conservation significance. Conservation of wetlands inherently provide protection for threatened vegetation types. Wetlands provide a range of important wetland ecosystem services, from sediment trapping and erosion control to stream flow regulation and water purification which is relevant to the downstream areas.
Wetland type and size	Un-channelled valley-bottom both wetlands are 1.69 ha.
Conservation status (terrestrial and aquatic)	The systems are located within a protected and they are in close proximity of a critical biodiversity area as well as ESA (SANBI BGIS, 2017). The majority of the wetlands appear to be seasonally to permanently saturated and vegetated with a form of hygrophilous (moisture-loving) grassland that features a range of indigenous grasses and species of rushes adapted to wet conditions. Channelled sections of the wetland (i.e. the eroded gullies) were found to be vegetated with similar rushes and sedges as well as stands of Bulrushes (Typha capensis) and the Common reed, Phragmites australis.
Land use	Nature conservation (Golden Gate Highlands National Park).
Wetland problems	A large erosion gulley has formed within the lower section of the wetland and is probably linked to the tarred road (R712), in combination with the shallow dispersive soils in the area, the steeper wetland gradient and the effects of wildlife/cattle trampling.
Twijfelhoek 1 and 2 Wetland System	
Location	This wetland system is 8km from Phuthaditjhaba located in the Free State Province.
District and Local municipality	Thabo Mofutsanyane District Municipality. Maluti a Phofung Local Municipality.
Reason for selection	These wetlands provide valuable habitat for wetland-dependant species, a number of which are threatened/Red Data Listed species of high conservation significance. Conservation of wetlands inherently provide protection for threatened vegetation types. Wetlands provide a range of important wetland ecosystem services, from sediment trapping and erosion control to stream flow regulation and water purification which is relevant to the downstream areas.
Wetland type and size	Twijfelhoek 1 is a Hillslope seepage and is 0.79ha. Twijfelhoek 2 is an unchannelled valley-bottom wetland its size is 4.18ha

Conservation status (terrestrial and aquatic)	The system is located within a critical biodiversity area, as well as an ecological support area ESA (SANBI BGIS, 2017).
Land use	The wetland system has been artificially modified as a result of a road, which dissects the wetland and directs water through a culvert under the road.
Wetland problems	A headcut within the hillslope seep wetland is actively eroding back through the wetland, desiccating a portion of the system

6.2.5 Quaternary catchment C81F and associated wetlands

Quaternary Catchment C81F	
General description	The Monontsha wetland covers an area of approximately 260 ha, which can be classified as a discontinuously channelled valley-bottom system. The wetland is surrounded by a steep, sandstone dominated catchment.
Climate	The local climate in this summer rainfall area is defined by a MAP of 894.4mm and a mean annual PET of 1741.3mm. The high-lying areas may receive snowfall in winter with temperatures often falling below the 0°C mark during the peak of winter (June to July)[13].
Geology and topography	The quaternary catchment is characterised by soils with minimal development, usually shallow, on hard or weathering rock, with or without intermittent diverse soils. Lime rare or absent in the landscape. The soils may receive water runoff from associated rock; water-intake areas (SANBI BGIS, 2017).
Terrestrial ecology	The historical dominant vegetation type present would have been the Mesic Highveld Grassland. The bioregion comprised characteristic vegetation groups, including: Basotho Montane Shrubland (Gm 5); and Eastern Free State Sandy Grassland (Gm-4).
Aquatic ecology	According to the available NFEPA wetlands coverage, the majority of the wetland systems within the study area and the broader landscape have been classified as 'low priority' NFEPA wetlands. In the north-eastern boundary of the study site, two small Freshwater Ecosystem Priority Areas (FEPA's) wetlands were identified based on there been Crane sightings. According to the available NFEPA river coverage, the Klerkspruit, Elands and Caledon River systems have been classified as 'low priority' are located within the study area. The Little Caledon system was classified as a FEPA River.
Land use	The wetland is surrounded by peri-urban settlements, where some of the community members are reliant on the wetland as a natural resource, particularly for the grazing of livestock, agricultural practices and in some portions sand mining.
Vredenhof 1 Wetland System	
Location	This wetland system is 7km from Phuthaditjhaba located in the Free State Province.
District and Local municipality	Thabo Mofutsanyane District Municipality. Maluti a Phofung Local Municipality.
Reason for selection	This wetland provides valuable habitat for wetland-dependant species, a number of which are threatened/Red Data Listed species of high conservation significance. Conservation of wetlands inherently provide protection for threatened vegetation types. Wetlands provide a range of important wetland ecosystem services, from sediment trapping and erosion control to stream flow regulation and water purification which is relevant to the downstream areas
Wetland type and size	Un-channelled valley- bottom, 32.37 ha.

[13] http://www.saexplorer.co.za/south-africa/climate/harrismith_climate.asp, date accessed 2017-11-08

Conservation status (terrestrial and aquatic)	The system is located within a protected area and is roughly 3km away from critical biodiversity area as well as ESA.
Land use	Nature Reserve, historical cultivation.
Wetland problems	Erosion; High levels of sewage content being discharged into the wetland; Heavy grazing; and Illegal mining.

6.2.6 Quaternary catchment C81D and associated wetlands

Quaternary Catchment C81D	
General description	The major feature of the C81D catchment is the Sterkfontein Dam which is located on the Nuwejaarspruit, a tributary of the Wilge River in the upper catchment area of the Vaal River. The dam which was commissioned in 1977 forms part of the part of the Tugela-Vaal Water Project and the Drakensberg Pumped Storage Scheme. The catchment area is characterised by indigenous montane grassland grazed by antelope with a few informal dirt roads and small residential structures surrounded by planted *Eucalyptus spp*. There are small impacts in the form of fences, limited dirt roads, soil erosion and small areas affected by alien invasive species (principally *Seriphium plumosum, Eucalyptus spp., Salix spp*. and *Acacia mearnsii*).
Climate	The local climate in this summer rainfall area is defined by a MAP of 735.8mm and a mean annual PET of 1797.7mm. The high-lying areas may receive snowfall in winter with temperatures often falling below the 0^{o}C mark during the peak of winter (June to July)[14].
Geology and topography	The quaternary catchment is characterised by red, yellow and / or greyish soils with low to medium base status. The soils as classified as undifferentiated structure less soils (SANBI BGIS, 2017). The catchment varies around the 1700m above MSL with landscape consists of basalt and sandstone towards the south. However, the major feature in landscape is the Sterkfonteindam which drains the C81D catchment.
Terrestrial ecology	The historical dominant vegetation type present would have been a combination of two bioregions, namely the Drakensberg Grassland and the Mesic Highveld Grassland bioregions. Each bioregion comprised characteristic vegetation groups, including: Northern Drakensberg Highland Grassland (Gd 5); and Eastern Free State Sandy Grassland (Gm 4) (SANBI BGIS, 2017). The Sterkfontein Dam Nature Reserve has been identified as an IBA because it supports supports some highly threatened grassland species. The reserve is also known to hold the following threatened or endemic herptiles: *C. giganteus* (VU), *Tetradactylus breyeri* (VU) and *Bradypodion dracomontanum*. The mammal *Myotis lesueri* (VU) is known to occur in the surrounding grassland.[15]
Aquatic ecology	According to the available NFEPA wetlands coverage, the majority of the wetland systems within the study area and the broader landscape have been classified as 'low priority' NFEPA wetlands. According to the available NFEPA river coverage, the Elands River and Nuwejaarspruit systems has been classified as 'low priority' are located within the study area. The Fraserspruit and Modderspruit systems to the East of Sterkfontein Dam as FEPA Rivers, with the portion of the Fraserspruit below their confluence been classified and a fish support area.
Land use	Land use in the catchment was historically characterized by livestock grazing and limited cultivation. Current land use is mainly in the form of nature and wildlife conservation as well some cultivation.

[14] http://www.saexplorer.co.za/south-africa/climate/harrismith_climate.asp, date accessed 2017-11-08
[15] http://datazone.birdlife.org/site/factsheet/7110, date accessed 2017-11-08

Niewejaar's Vley 1 Wetland System	
Location	This wetland system is 21km from Phuthaditjhaba and roughly 26km away from Harrismith which are both located in the Free State Province.
District and Local municipality	Thabo Mofutsanyane District Municipality. Maluti a Phofung Local Municipality.
Reason for selection	The wetland has been severely eroded, possibly as a result of the Sterkfontein Dam wave action driving the erosion from the toe of the wetland.
Wetland type and size	Channelled valley bottom. 2.17 ha.
Conservation status (terrestrial and aquatic)	The system is located within a protected area and is roughly 2.5km away from critical biodiversity area as well as ESA. Despite the erosion, the gully is largely well vegetated, with small areas where the bedrock is visible. The wetland area upstream of the dam wall is relatively intact, except for the access road, and the rehabilitation of the system downstream is worth implementing to secure the wetland habitat above the dam and the functional wetland habitat present within the gully (SANBI BGIS, 2017).
Land use	Nature Reserve (conservation), gravel road.
Wetland problems	The wetland has been severely eroded by numerous actively eroding headcuts along the length of a gully, which ends just before a rock layer.
Sedan 1 Wetland System	
Location	This wetland system is 22km from Phuthaditjhaba and roughly 26km away from Harrismith which are both located in the Free State Province.
District and Local municipality	Thabo Mofutsanyane District Municipality. Maluti a Phofung Local Municipality.
Reason for selection	This wetland provides valuable habitat for wetland-dependant species, a number of which are threatened/Red Data Listed species of high conservation significance. Conservation of wetlands inherently provide protection for threatened vegetation types. Wetlands provide a range of important wetland ecosystem services, from sediment trapping and erosion control to stream flow regulation and water purification which is relevant to the downstream areas.
Wetland type and size	Un-channelled valley-bottom.
Conservation status (terrestrial and aquatic)	The system is located within a protected area and is roughly 2.5km away from critical biodiversity area as well as ESA. The vegetation has been slightly disturbed as a result of historic cultivation practises, with the encroachment of disturbance and terrestrial species into the wetland habitat.
Land use	Nature Reserve (conservation), gravel road.
Wetland problems	A headcut was identified within the wetland system and a road crossing cut through the upper portions of the wetland. A bare area downstream of the headcut was identified, which was assumed to have been caused by game; using the area as a wallow pit. As a result, a total loss of vegetation has occurred, potentially becoming a source of sediment into the Sterkfontein Dam.
Statherick 1 Wetland System	
Location	This wetland system is 16km from Phuthaditjhaba and roughly 21km away from Harrismith which are both located in the Free State Province.
District and Local municipality	Thabo Mofutsanyane District Municipality. Maluti a Phofung Local Municipality.

Reason for selection	This wetland provides valuable habitat for wetland-dependant species, a number of which are threatened/Red Data Listed species of high conservation significance. Conservation of wetlands inherently provide protection for threatened vegetation types. Wetlands provide a range of important wetland ecosystem services, from sediment trapping and erosion control to stream flow regulation and water purification which is relevant to the downstream areas.
Wetland type and size	Channelled valley-bottom 6.05 ha.
Conservation status (terrestrial and aquatic)	The system is located within a protected area and is in close proximity of critical biodiversity area as well as ESA (SANBI BGIS, 2017).
Land use	Nature Reserve (conservation)
Wetland problems	The catchment has multiple remnant cultivation plots, which have led to a slight disturbance of the vegetation within the catchment. The system has a large, deeply incised gully that has eroded through the majority of the system; which may have been as a result of wave action associated with fluctuating water levels within the dam.

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

Table 13 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 27 000 jobs and over 3 million person-days of paid work by using local SMMEs to implement the approved wetland rehabilitation plans. Local teams generally consist 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 250 000 days of training in vocation and life skills.

Table 13: Economic profile of applicable local municipalities

	Phumelela	Maluti a Phofung
Population		
Young (0-14)	31,7%	32,7%
Working age (15-64)	62,3%	62%
Elderly (65+)	6%	5,3%
Dependency ratio	60,5	61,2
Level of education (aged 20+)		
No schooling	11,3%	8,9%
Higher education	6,5%	7,9%
Matric	19,4%	26,8%
Level of Employment (%)		
Unemployment rate	25,3%	41,8%
Youth Unemployment rate	34,6%	53%
Economic Profile		
No income	9,4%	13,5%
R1 - R4,800	5%	9%
R4,801 - R9,600	8,3%	13,7%
R9,601 - R19,600	25,8%	23,7%
R19,601 - R38,200	25,5%	20,7%
R38,201 - R76,4000	13,7%	9%
R76,401 - R153,800	6,3%	5,2%
R153,801 - R307,600	3,6%	3,3%

R307,601 - R614,400	1,6%	1,4%
R614,001 - R1,228,800	0,4%	0,3%
R1,228,801 - R2,457,600	0,2%	0,1%
R2,457,601+	0,1%	0,1%

Source: http://www.statssa.gov.za/?page_id=964

The anticipated benefit of the WfWetlands Programme nationally is presented below in **Table 14.**

Table 14: 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[16]
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%

[16] 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 D**), and as such its implementation will become a binding requirement should environmental authorisation be received from DEA.

The following subsections assess each impact according to the construction and operational phase in which they are likely to occur. It should be highlighted that this assessment does not consider the decommissioning of the proposed interventions. The purpose of the implementation of a specific intervention is to rehabilitate the affected wetland system and prevent further degradation. Furthermore, many of the soft interventions are made from biodegradable materials (see **Appendix A**). If these begin to degrade, they will not have a negative impact on the system. The hard interventions serve as a more permanent feature within the wetland, as the sensitive environments (which includes dispersive soils in some of them, for example) could be negatively impacted by new soil disturbance activities when removing interventions. Maintenance surveys are undertaken by WfWetlands and if a hard structure should begin to lose its function/ require maintenance, the intervention would be reconsidered either for maintenance, or the need to redesign the structure in response to landscape changes.

7.1 CONSTRUCTION PHASE

7.1.1 Job creation

Phase	Pre-Construction	**Construction**	Operational	Decommissioning
Impact description	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. 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. 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. Should the project not be authorised or implemented, the potential jobs would not be created. Where projects already have active teams implementing interventions, this would have a high negative impact as the contractors would not be able to keep their teams busy. Where projects do not have			

	active teams, the impact would however be neutral as the impact would not be worse against the baseline, i.e. jobs would not be taken away, they just would not be created.		
	Pre-Mitigation	**Post-Mitigation**	**No-go Alternative**
Type	Positive	Positive	Negative
Extent	Site Specific	Site Specific	Site Specific
Magnitude	Medium	Low	High Zero
Duration	Long-term	Long-term	Long-term
Significance	**MEDIUM (+)**	**HIGH (+)**	**High (-)** **Neutral**
Probability	Definite	Definite	Definite
Confidence	Certain	Certain	Certain
Reversibility	Irreversible	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
Impact description	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. Fires are part of a natural biophysical cycle in most ecosystems and are therefore likely to still occur without the construction activities of the WfWetlands construction teams taking place.			
	Pre-Mitigation	**Post-Mitigation**	**No-go Alternative**	
Type	Negative	Negative	Negative	
Extent	Site Specific	Site Specific	Site Specific	
Magnitude	Medium	Low	Low	
Duration	Short-term	Short-term	Short-term	
Significance	**MEDIUM (-)**	**LOW (-)**	**LOW (-)**	
Probability	Unlikely	Unlikely	Likely	
Confidence	Sure	Sure	Sure	
Reversibility	Irreversible	Irreversible	Irreversible	
Mitigation measures				
• Ensure that workers are aware of the potential for fires and the damage that could be caused. • 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.				

7.1.3 Nuisance impacts

Phase	Pre-Construction	**Construction**	Operational	Decommissioning
Impact description	Construction can result in nuisance impacts, particularly for landowners. These impacts include: • Noise from construction activities, personnel and vehicles. • An increase in the amount of litter being generated. • Dust. • Security concerns such as theft or leaving gates open. • Non-use of sanitation facilities. • Temporary loss of access to areas due to construction activities. 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. Should the project not be authorised or implemented, no nuisance impacts would occur.			

	Pre-Mitigation	**Post-Mitigation**	**No-go Alternative**
Type	Negative	Negative	Neutral
Extent	Site Specific	Site Specific	Site Specific
Magnitude	Medium	Low	Zero
Duration	Short-term	Short-term	Long-term
Significance	**LOW (-)**	**VERY LOW (-)**	**NEUTRAL**
Probability	Definite	Definite	Definite
Confidence	Certain	Certain	Certain
Reversibility	Reversible	Reversible	Reversible

Mitigation measures

- All site workers to undergo environmental induction training (“toolbox talks”) before undertaking work so that they are aware of the various environmental requirements.
- 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.
- Ensure that closed gates are kept closed. When in doubt, the landowner should be consulted.
- Follow the EMPr with regard to sanitation facilities, waste management, noise and site management
- Utilise local labour wherever possible to reduce potential friction within the community caused by bringing outside personnel in.
- Ensure that all workers wear the yellow/blue attire indicative of WfWetlands personnel so that they are not mistaken for trespassers.

7.1.4 Heritage resources

Phase	Pre-Construction	**Construction**	Operational	Decommissioning
Impact description	No significant heritage resources within the wetlands were identified during the desktop research, I&AP interactions or site visit (where rehabilitation work has been undertaken in the wetland in previous years) for the proposed projects. 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. Should the interventions not be implemented, natural weathering would still occur. However, given the low potential of heritage resources in the area, this is anticipated to remain neutral for the no-go alternative.			

	Pre-Mitigation	**Post-Mitigation**	**No-go Alternative**
Type	Negative	Negative	Negative
Extent	Site Specific	Site Specific	Site Specific
Magnitude	Medium	Zero	Zero
Duration	Long-term	Long-term	Long-term
Significance	**VERY LOW (-)**	**NEUTRAL**	**NEUTRAL**
Probability	Definite	Definite	Definite
Confidence	Sure	Sure	Sure
Reversibility	Irreversible	Irreversible	Irreversible

Mitigation measures

- Should any heritage resource or suspected resources be identified during the Phase 2 planning site visit, a suitably qualified heritage specialist shall be consulted.
- 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.

7.1.5 Worker safety

Phase	Pre-Construction	**Construction**	Operational	Decommissioning
Impact description	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. Crime and poor water quality could also have a negative impact on worker safety and health, especially in urban areas. Furthermore, workers may also come into contact with dangerous animals such as snakes or even predators when working in conservation areas. If the interventions are not implemented, the construction workers will not be affected by the danagers associated with working within the selected wetlands.			
	Pre-Mitigation	**Post-Mitigation**	**No-go Alternative**	
Type	Negative	Negative	Negative	
Extent	Site Specific	Site Specific	Site Specific	
Magnitude	Medium	Low	Zero	
Duration	Long-term	Long-term	Long-term	
Significance	**MEDIUM (-)**	**LOW (-)**	**NEUTRAL**	
Probability	Definite	Definite	Definite	
Confidence	Certain	Certain	Certain	
Reversibility	Irreversible	Irreversible	Irreversible	
Mitigation measures				
• 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. • Where required, security teams must be provided to protect the teams on site. • Follow Occupational Health and Safety requirements. • Personal Protective Equipment (PPE) shall be worn at all times on site.				

7.1.6 Flora and fauna

Phase	Pre-Construction	**Construction**	Operational	Decommissioning
Impact description	Habitat disturbance 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. Disturbance of protected species Construction activities could potentially result in disturbance to habitats required by protected species). 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. Alien species invasion 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. 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.			
	Pre-Mitigation	**Post-Mitigation**	**No-go Alternative**	
Type	Negative	Negative	Negative	
Extent	Site Specific	Site Specific	Site Specific	
Magnitude	Medium	Low	Low	
Duration	Long-term	Long-term	Long-term	
Significance	**MEDIUM (-)**	**LOW (-)**	**MEDIUM (-)**	
Probability	Definite	Definite	Likely	
Confidence	Certain	Certain	Sure	
Reversibility	Irreversible	Irreversible	Irreversible	
Mitigation measures				
• 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. • 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. • Implement the provisions of the EMPr regarding stockpiling borrowed material and rehabilitation after construction				

7.1.7 Aquatic ecosystems

Phase	Pre-Construction	**Construction**	Operational	Decommissioning
Impact description	Temporary alteration to stream flow patterns 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. Sedimentation 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. Pollution of water-courses 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. Disturbance of wetland vegetation and stream banks 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. Pursuing the no-go option would result in the current negative ecosystem impacts continuing. These impacts would include desiccation, erosion, channel incision, etc.			
	Pre-Mitigation		**Post-Mitigation**	
Type	Negative		Negative	
Extent	Site Specific		Site Specific	
Magnitude	Medium		Low	
Duration	Long-term		Long-term	
Significance	**MEDIUM (-)**		**LOW (-)**	
Probability	Definite		Definite	
Confidence	Certain		Certain	
Reversibility	Irreversible		Irreversible	
Mitigation measures				
• Work shall predominantly take place during low rainfall periods. • No foreign vegetation matter (e.g. mulch) shall be allowed on site (especially from alien species). • 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. • Stockpiles and revegetated areas shall be covered with mulch or cloth (geotextile) and kept moist. • Implement the provisions of the EMPr regarding stockpile location and site management. • Sandbags used to temporarily divert water shall be in a good condition to prevent additional sedimentation and/ or failure. • Sand/ earth to fill the bags shall be obtained from and returned to existing excavation points where feasible.				

- Soil required for the construction of interventions shall be stabilised as per the engineer's recommendations to counteract dispersive tendencies.
- Water abstracted above the General Authorization limits must be authorized by DWS prior to such abstraction taking place.

7.1.8 Sourcing borrow material

Phase	Pre-Construction	**Construction**	Operational	Decommissioning
Impact description	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. 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. Should the borrow material not be required, the potential impact would be neutral.			

	Pre-Mitigation	**Post-Mitigation**	**No-go Alternative**
Type	Negative	Negative	Negative
Extent	Site Specific	Site Specific	Site Specific
Magnitude	Medium	Low	Zero
Duration	Long-term	Long-term	Long-term
Significance	**MEDIUM (-)**	**LOW (-)**	**NEUTRAL**
Probability	Definite	Definite	Definite
Confidence	Certain	Certain	Certain
Reversibility	Irreversible	Irreversible	Irreversible

Mitigation measures

- Implement the provisions of the EMPr.
- Any quantities in excess of the minimum requirements for a borrow pit licence will require authorisation through Department of Mineral Resources.
- Borrow areas will need to be properly re-sloped and re-vegetated after use.

7.1.9 Work within conservation areas

Phase	Pre-Construction	**Construction**	Operational	Decommissioning
Impact description	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.			
	Pre-Mitigation	**Post-Mitigation**	**No-go Alternative**	
Type	Negative	Negative	Negative	
Extent	Site Specific	Site Specific	Site Specific	
Magnitude	Medium	Low	Zero	
Duration	Long-term	Long-term	Long-term	
Significance	**MEDIUM (-)**	**LOW (-)**	**NEUTRAL**	
Probability	Definite	Definite	Definite	
Confidence	Certain	Certain	Certain	
Reversibility	Irreversible	Irreversible	Irreversible	
Mitigation measures				
• Close cooperation is required with the conservation authorities. Any specific requirements need to be included in the applicable wetland rehabilitation plan. • Implement the provisions of the EMPr.				

7.2 OPERATIONAL PHASE

7.2.1 Changes in land use

Phase	Pre-Construction	Construction	Operational	Decommissioning
Impact description	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. Potential positive impacts associated with increased wetland area and improved grazing conditions would 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.			

	Pre-Mitigation	Post-Mitigation	No-go Alternative
Type	Positive and Negative	Positive and Negative	Negative
Extent	Site Specific	Site Specific	Site Specific
Magnitude	Medium	Low	Medium
Duration	Long-term	Long-term	Long-term
Significance	**LOW (+)** **MEDIUM (-)**	**MEDIUM (+)** **LOW (-)**	**MEDIUM (-)**
Probability	Definite	Definite	Likely
Confidence	Certain	Certain	Sure
Reversibility	Irreversible	Irreversible	Irreversible

Mitigation measures

- Ensure good access for landowners in the form of crossing points, where such measures be of the lowest impact type and design possible.
- Provision of watering points for stock to minimise extensive trampling in the wetlands (especially in the wetter times of year).

7.2.2 Increased water storage and reduced treatment costs

Phase	Pre-Construction	Construction	**Operational**	Decommissioning
Impact description	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. 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. Furthermore, with lower water quality in the systems, more human treatment processes (i.e. water treatment plants) would be required to ensure that water is fit for human use which would require significant engineering and procurement cost.			

	Pre-Mitigation	**Post-Mitigation**	**No-go Alternative**
Type	Positive	Positive	Negative
Extent	Site Specific	Site Specific	Site Specific
Magnitude	Medium	Low	Medium
Duration	Long-term	Long-term	Long-term
Significance	**MEDIUM (+)**	**MEDIUM (+)**	**MEDIUM (-)**
Probability	Definite	Definite	Definite
Confidence	Certain	Certain	Certain
Reversibility	Irreversible	Irreversible	Irreversible

Mitigation measures

- No mitigation measures are proposed

7.2.3 Reduced soil erosion

Phase	Pre-Construction	Construction	**Operational**	Decommissioning
Impact description	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. If the proposed interventions are not implemented, erosion would continue and even accelerate over time. This would reduce the agricultural potential of farmland, as well as increase damages to properties and infrastructure during flood events.			

	Pre-Mitigation	**Post-Mitigation**	**No-go alternative**
Type	Positive	Positive	Negative
Extent	Site Specific	Site Specific	Site Specific
Magnitude	Medium	Low	Medium
Duration	Long-term	Long-term	Long-term
Significance	**MEDIUM (+)**	**MEDIUM (+)**	**MEDIUM (-)**
Probability	Definite	Definite	Definite
Confidence	Certain	Certain	Certain
Reversibility	Irreversible	Irreversible	Irreversible

Mitigation measures
• No mitigation measures are proposed

7.2.4 Employment opportunities

Phase	Pre-Construction	Construction	Operational	Decommissioning
Impact description	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. If the interventions are not implemented, and the teams are not provided with these skills, the impact will be neutral as there will be no change to the *status quo*.			

	Pre-Mitigation	Post-Mitigation	No-go Alternative
Type	Positive	Positive	Positive
Extent	Site Specific	Site Specific	Site Specific
Magnitude	Medium	Low	Zero
Duration	Long-term	Long-term	Long-term
Significance	**MEDIUM (+)**	**MEDIUM (+)**	**NEUTRAL**
Probability	Definite	Definite	Definite
Confidence	Certain	Certain	Certain
Reversibility	Irreversible	Irreversible	Irreversible

Mitigation measures
• No mitigation measures are proposed

7.2.5 Public safety

Phase	Pre-Construction	Construction	Operational	Decommissioning
Impact description	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. It is possible that even if the interventions are not implemented, the individuals who might be at risk from the use of the wetlands would still be at risk in degraded wetlands. It is even possible that degraded systems could have hidden risks such as stuck branches or boulders that could become dislodged.			

	Pre-Mitigation	Post-Mitigation	No-go Alternative
Type	Negative	Negative	Negative
Extent	Site Specific	Site Specific	Site Specific
Magnitude	Medium	Low	Medium
Duration	Long-term	Long-term	Long-term
Significance	**MEDIUM (-)**	**LOW (-)**	**MEDIUM (-)**
Probability	Definite	Definite	Likely
Confidence	Certain	Certain	Certain
Reversibility	Irreversible	Irreversible	Irreversible

Mitigation measures
• 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.

7.2.6 Ecosystem functioning

Phase	Pre-Construction	Construction	Operational	Decommissioning
Impact description	Restoring wetland corridors 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. Changes in water quality and quantity 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. This improvement in water quality and a more reliable supply of water is particularly important given the water scarcity that faces South Africa. Should the proposed interventions not be implemented, the wetland systems selected as priority wetlands for rehabilitation, would continue to degrade. This degradation would lead to a loss in ecosystem services, and could result in large downstream impacts such as flooding.			

	Pre-Mitigation	Post-Mitigation	No-go Alternatives
Type	Positive	Positive	Negative
Extent	Site Specific	Site Specific	Site Specific
Magnitude	Medium	Low	Medium
Duration	Long-term	Long-term	Long-term
Significance	**MEDIUM (+)**	**HIGH (+)**	**MEDIUM (-)**
Probability	Definite	Definite	Likely
Confidence	Certain	Certain	Sure
Reversibility	Irreversible	Irreversible	Irreversible

Mitigation measures
• ***Note:*** 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. • 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[17] and the EPWP requirements would not be realised. • No mitigation measures are proposed.

[17] Wetland conservation and poverty reduction through job creation and skills.

7.2.7 Flora and fauna

Phase	Pre-Construction	Construction	**Operational**	Decommissioning
Impact description	Increased habitat 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 Free State wetlands are utilised by the vulnerable and endangered species Increased biodiversity 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. Change in species composition 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. Should the interventions not be implemented, the positive benefits described above would not be realised. The fauna and flora would respond to the wetland degrading, and would likely result in a loss of biodiversity.			

	Pre-Mitigation	**Post-Mitigation**	**No-go Alternative**
Type	Positive	Positive	Negative
Extent	Site Specific	Site Specific	Site Specific
Magnitude	Medium	Low	Medium
Duration	Long-term	Long-term	Long-term
Significance	**MEDIUM (+)**	**MEDIUM (+)**	**MEDIUM (-)**
Probability	Definite	Definite	Definite
Confidence	Certain	Certain	Certain
Reversibility	Irreversible	Irreversible	Irreversible

Mitigation measures

- ***Note:*** 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.
- 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.
- No mitigation measures are proposed.

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 EMPr. Given that no significant heritage resources have been found for these project sites to date, the anticipated impact on heritage resources is **Very Low (-)** which can be mitigated to **Neutral**. 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.

The impacts detailed above in **Chapter 7** are summarised below in **Table 15.**

Table 15: Impact summary table

COLOUR KEY			
High Negative	Red	Neutral	White
Medium Negative	Orange	Low Positive	Light Blue
Low Negative	Yellow	Medium Positive	Blue
Very Low Negative	Light Yellow	High Positive	Green

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

8.2 Level of Confidence in Assessment and Recommendation of the EAP

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 whole country.

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.

Please find a signed EAP declaration signed in **Appendix E.**

8.3 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.

9 REFERENCE LIST

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