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WORKING FOR WETLANDS REHABILITATION PROGRAMME, WESTERN CAPE

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 fulfilment

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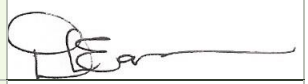
Author signature		Approver signature	
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NEMA requirements for Basic Assessment Reports		aurecon
Appendix 1	**Content as required by NEMA**	**Section**
3(1)	A basic assessment report must contain the information that is necessary for the competent authority 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

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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 Evapotranspiration
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).

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.

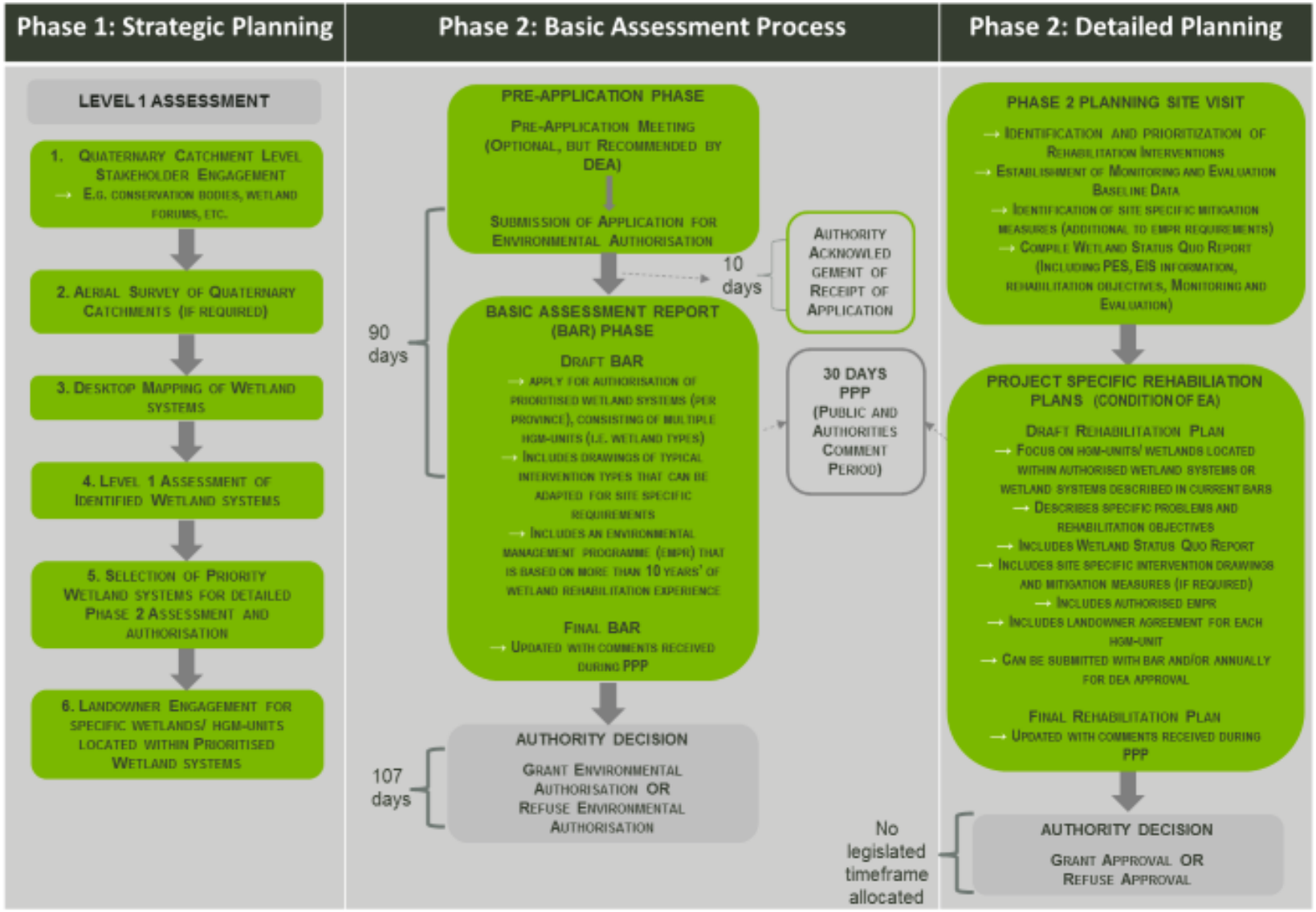

Figure 1: Overview of Phase 1 and 2 as part of the planning process

1.1 Introducing the Project

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

Table 1: Project details

Project Name	Wetland System	Quaternary Catchment	Lat (DDMMSS)	Long (DDMMSS)
Peninsula	Upper Kuils River	G22E	33°50'36.19"S	18°40'04.54"E
	Haasendal	G22E	33°54'54.74"S	18°42'31.57"E
	Kayelitsha Wetland Park	G22E	34° 02'42.73"S	18°41'40.83"E
	Edith Stephens Wetland Park	G22D	34° 00'07.54"S	18°33'13.27"E
	Zandvlei Promenade	G22D	34° 05'47.48"S	18°28'02.83" E
	Rondebosch Common	G22C	33°57'13.32" S	18°28'54.84 E
West Coast	Watervals	G10E	33° 20' 52.75"S	19° 07' 13.08"E
	Fonteintjiesberg	H10H	33° 33' 21.94"S	19° 20' 21.18"E
	De Tronk road	G10G	33° 04' 23.34"S	19° 06' 05.61"E
Table Mountain National Park	Orange Kloof	G22B	34° 00'36.47"S	18°23' 24.99"E
	Roodeberg	G22A	34° 08' 19.54"S	18°23' 01.43"E
	Silvermine	G22A	34° 04'31.63"S	18°24' 01.25"E
Agulhas	Breedevlei	G50B	34°29'24.72"S	19°45'27.36"E

Table 2: Farm details for Western Cape projects

Project Name	Wetland Name	Property number	21 Digit SG Code	Property size (ha)
Peninsula	Upper Kuils River	RE/1165	C01600000000116500000	574.53
	Haasendal	1757	C06700200000175700000	4.60
	Kayelitsha Wetland Park	18332	C01600630001833200000	440
	Edith Stephens Wetland Park	99422	C01600070009942200000	588.9
	Zandvlei Promenade	71272	C01600070007127200000	0.09
	Rondebosch Common	31921	C01600070004430600000	990.8
West Coast	Watervals	RE/378	C07500000000037800000	79.10
	Fonteintjiesberg	209	C08500000000020900000	860.89
	De Tronk road	192	C05800000000019200000	5126.36
		6/189	C05800000000018900006	907.14
		RE/195	C05800000000019500000	2531.24
		6/189	C05800000000018900006	907.14
		2/189	C05800000000018900002	317.03
		4/189	C05800000000018900004	182.88
		10/187	C05800000000018700010	211.95
Table Mountain National Park	Orangekloof	RE/148	C01600100000014800000	146.50
	Roodeberg	548	C01600090000054800000	26.95
	Silvermine	6/1121	C01600000000112100006	57.61
Agulhas	Breedevlei	134	C01100000000013400000	313.46
		1/136	C01100000000013600001	760.54

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 Western Cape Province includes the following professionals:

Table 3: Planning Team for Western Cape Province

Role	Representative	Company
ASD	Heidi Nieuwoudt	Department of Environmental Affairs
EAP	Franci Gresse	Aurecon South Africa (Pty) Ltd

[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.

Role	Representative	Company
Engineers	Lloyd Fisher-Jeffes Fareed Nagdi Rod Blackhurst	Aurecon South Africa (Pty) Ltd
Wetlander	Kate Snaddon	Freshwater Consulting Group

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 Eastern Cape Province.

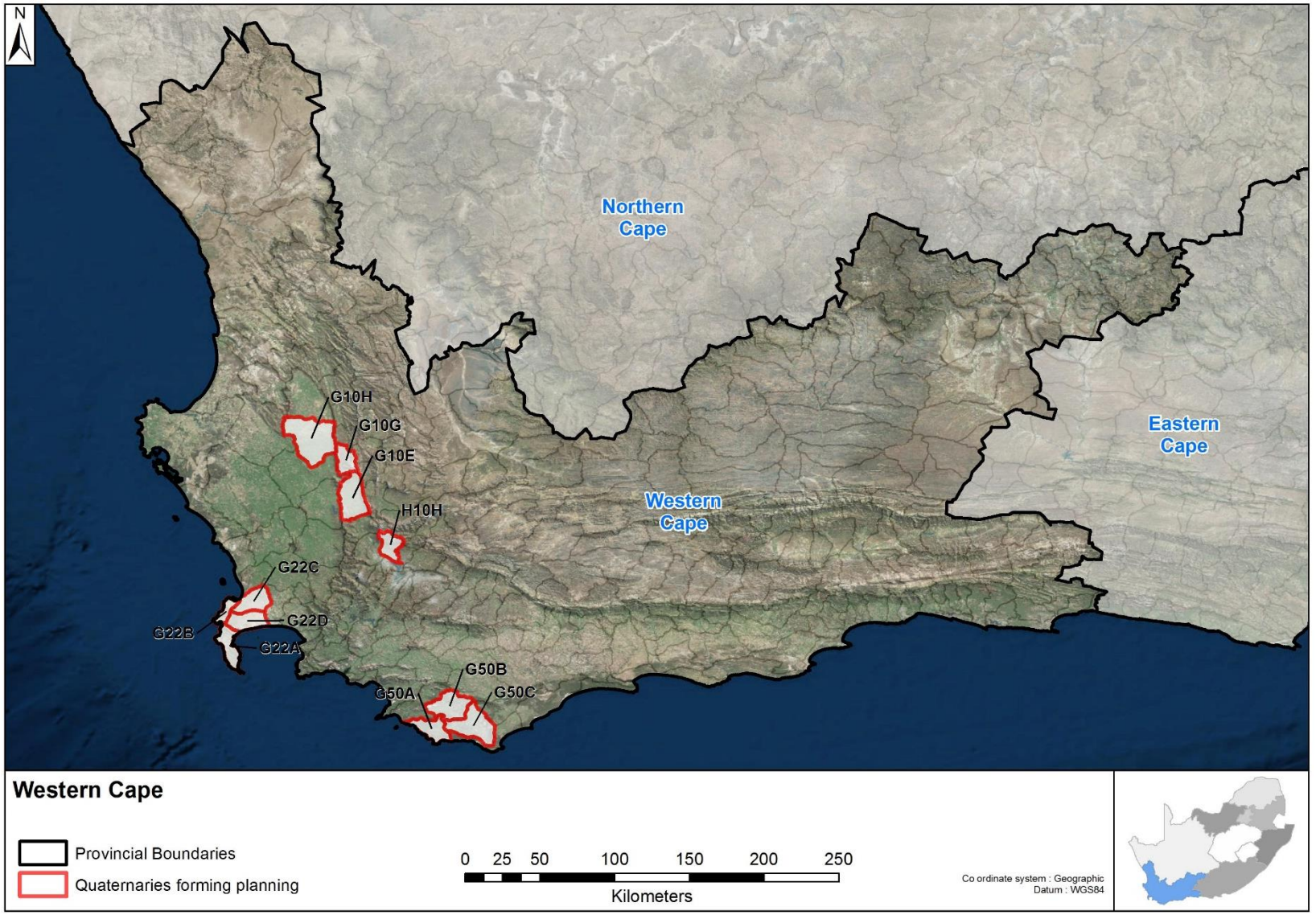

Figure 2: Locality map showing the location of quaternary catchments included in this BAR

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 4Table 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
Provincial Bylaws, Frameworks, Plans and Policies			
Western Cape State of Biodiversity	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.	CapeNature	2012
Biodiversity economy strategy		Western Cape Government	2016
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.		

2.1.1 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.**

2.1.1.1 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 Western Cape 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.
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-*	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.

Listed activity	**Description of project activity that triggers listed activity**
a. within a watercourse; *c. if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse.*	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;* *In Western Cape:* *(i) Outside urban areas:* *(aa) A protected area identified in terms of NEMPAA, excluding conservancies;* *(bb) National Protected Area Expansion Strategy Focus areas;* *(cc) World Heritage Sites;* *(dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;* *(ee) Sites or areas listed in terms of an international convention;* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(gg) Core areas in biosphere reserves;*	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 project areas identified by WfWetlands includes the Table Mountain National Park and a Wilderness Area managed by CapeNature (Groot Winterhoek Nature Reserve) which are protected in terms of NEMPAA, the National Protected Area Expansion Strategy and includes sensitive areas included in environmental management frameworks adopted on a national level (i.e. Table Mountain National Park). Furthermore, both Table Mountain National Park and the Groot Winterhoek Wilderness Area are located within the UNESCO Cape Floral Region World Heritage Site. Lastly, one of the sites (Watervals Nature Reserve is a core area within the Cape Winelands Biosphere Reserve.
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; In Western Cape :* (i) Outside urban areas:	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;

Listed activity	Description of project activity that triggers listed activity
(aa) A protected area identified in terms of NEMPAA, excluding conservancies; *(bb) National Protected Area Expansion Strategy Focus areas;* *(cc) World Heritage Sites;* *(dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;* *(ee) Sites or areas listed in terms of an international convention;* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(gg) Core areas in biosphere reserves;*	• The construction of walkways in public wetlands to limit human impact, and to form part of the educational component of the project. The project areas identified by WfWetlands includes the Table Mountain National Park and a Wilderness Area managed by CapeNature (Groot Winterhoek Nature Reserve) which are protected in terms of NEMPAA, the National Protected Area Expansion Strategy and includes sensitive areas included in environmental management frameworks adopted on a national level (i.e. Table Mountain National Park). Furthermore, both Table Mountain National Park and the Groot Winterhoek Wilderness Area are located within the UNESCO Cape Floral Region World Heritage Site. Lastly, one of the sites (Watervals Nature Reserve is a core area within the Cape Winelands Biosphere Reserve.

2.1.2 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.

2.1.3 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
[3]Section 21(c) of the NWA, No. 36 of 1998
[4]Section 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[6] 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).
[6] Where possible, the most recent provincial Wetland Forum minutes are included in Appendix E.

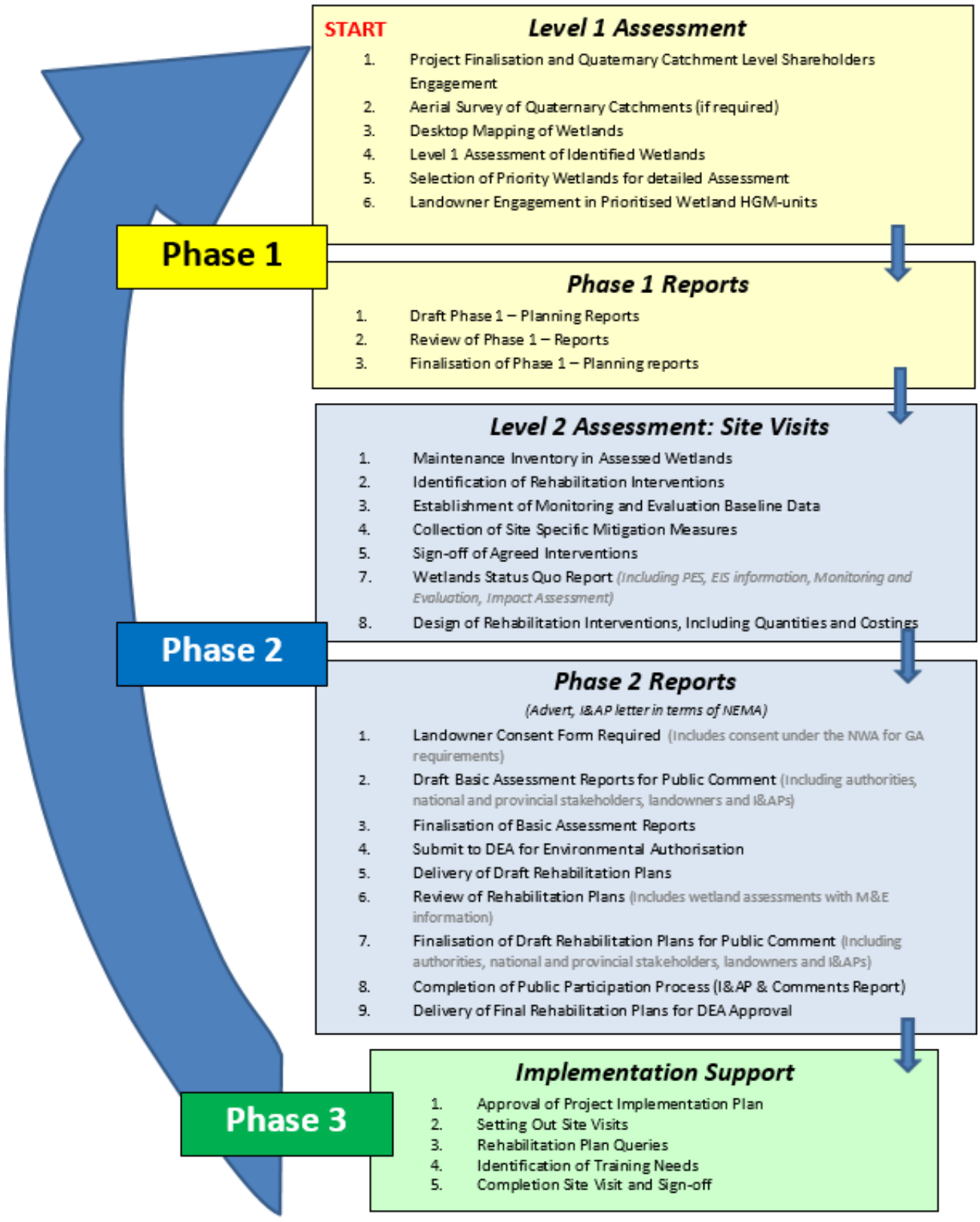

Figure 3: The Working for Wetlands planning process

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 3commence 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). The IAs 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 2000's. Additional site specific impacts/ mitigation measures, focusing on the Wetland Unit and proposed intervention, will only be identified during the planning phase and will be included in the applicable rehabilitation plan.

3.3.2 Gaps in knowledge

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

4 PUBLIC PARTICIPATION

4.1 Public Participation Process

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

Table 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 November 2017** to all registered I&APs regarding the availability of the Basic Assessment Report. 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. Following the 30-day comment period, 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. 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;
b) the type of activity to be undertaken;
c) the design or layout of the activity;
d) the technology to be used in the activity;
e) the operational aspects of the activity; and
f) 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 objectives7. 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. 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

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

Alternative	Applicability to WfWetlands
	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 WESTERN CAPE PROJECTS

6.1 Western Cape Project: Background

Wetland Projects for the 2017/2018 planning cycle were identified during the Phase 1 activities associated with the WfWetlands Programme. Catchment and wetland prioritisation assessments were undertaken by the Wetland Specialist/s to identify priority catchments and associated wetlands within which rehabilitation work needed 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.

WfWetlands has been rehabilitating wetlands in the Western Cape Province for over ten years. The 2016/2017 planning cycle, focused on wetlands within the G22A, G22B, G22C, G22D, G22E, G10G, G10E, H10H and G50B quaternary catchments with the primary focus is wetland rehabilitation; the protection, rehabilitation and sustainable use of those wetlands.

The Peninsula project focuses on wetland systems in the urban Southern Suburbs, all of which are located within the Municipal boundary of the City of Cape Town which are located in G22D and G22E quaternary catchment. These are important wetland systems for maintaining ecology and biodiversity of the area, the wetland systems are also important for flood attenuation, erosion control and sediment trapping and enabling protection of downstream wetlands, watercourses and developments.

The Table Mountain National Park (TMNP) wetland rehabilitation project is located within quaternary catchments G22A and G22B to the west in the Western Cape Province within the Municipal boundary of the City of Cape Town. The proposed wetland systems were identified due to the important services they provide such as flood attenuation, erosion control and sediment trapping and enabling protection of downstream wetlands, watercourses and developments.

The West Coast rehabilitation project is located within quaternary catchments G10E, G10G, G10H and H10H in the Western Cape Province within the West Coast Municipal boundary. The project is located within three ecoregions - South Western Coastal Belt, Western Coastal Belt and Western Fold Mountains. The focus of the wetland rehabilitation would be the stabilisation of active erosion around tracks, roads and pathways. Rehabilitation objectives for the 2017/2018 planning include securing and improving the overall hydrological integrity of the wetland systems, particularly focussing on the stabilisation of head-cut erosion.

The Agulhas rehabilitation project is located in quaternary catchment G50B. Working for Wetlands has been rehabilitating wetlands in the Agulhas area since 2004. The focus was initially only on wetlands within the Agulhas National Park but in more recent years also included wetlands within the Agulhas Plains. This has been made possible through collaboration with the Agulhas Biodiversity Initiative (ABI) carried out by the Cape Action for People and the Environment (C.A.P.E.).

6.2 Biophysical Environment

The following new wetland systems were identified in the Eastern Cape Province 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 G22A:

Table Mountain National Park (i.e. Silvermine and Roodeberg)

- Quaternary catchment G22B:
  - Table Mountain National Park (i.e. Orangekloof)
- Quaternary catchment G22C:
  - Rondebosch Common
- Quaternary catchment G22D:
  - Edith Stephens Wetland Park
  - Zandvlei Promenade
- Quaternary catchment G22E:
  - Kayelitsha Wetland Park
  - Haasendal
  - Upper Kuils River
- Quaternary catchment G10G:
  - Groot Winterhoek Wilderness Area (i.e. De Tronk road)
- Quaternary catchment G10E:
  - Watervals Nature Reserve
- Quaternary catchment H10H:
  - Fonteintjiesberg
- Quaternary catchment G50B:
  - Breedevlei

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 G22A and associated wetland systems

Quaternary Catchment G22A	
General description	Quaternary catchment G22A is located west of Steenbras Estate in Cape Town and is located within the Lower Berg Water Management Area (WMA) (NFEPA 2017).
Climate	The broad Cape Town area is situated in a semi-arid Mediterranean Climatic zone, which is strongly influenced by the cold Benguela ocean current and coastal winds. The Cape Town climate is characterised by dry warm summer months (October to April) and wetter cool winter months (from May to September) with most rainfall occurring between May and August (MacFarlane et al, 2007). The mean annual rainfall for the region is 572 mm per annum. The mean maximum annual temperature for most of the region falls within a range of 23 ºC – 25 ºC, with the mean minimum annual temperature between 6 ºC – 15 ºC. An understanding of the climate, i.e. the sensitivity of catchments to hydrological impacts influences rehabilitation planning activities.
Geology and topography	The geology of the Table Mountain National Park consists of the Malmesbury Group (approximately 540 million years old), Cape Granite (also approximately 540 million years old) and the Table Mountain Group (approximately 520 million years old). The Table Mountain Group further includes formations that are characterised by sandstones and mudstones.[8]

[8] Source: https://www.sanparks.org/parks/table_mountain/conservation/geology.php

Terrestrial ecology	Catchment G22A includes the Table Mountain National Park, which is a protected area proclaimed in perpetuity. Vegetation types include: Peninsula Sandstone Fynbos, Peninsula Granite Fynbos (critically endangered), Cape Flats Dune Strandveld (endangered), Southern Afrotemperate Forest, Cape Seashore Vegetation and Hangklip Sand Fynbos (endangered) (BGIS, 2017).
Aquatic ecology	The City of Cape Town's wetlands map classified wetlands into the following categories: Critical Biodiversity Areas (CBAs), Critical Ecological Support Areas (CESAs) and OESA (Other Ecological Support Areas). The criteria that were used to categorise wetlands were biodiversity-related, where wetlands were rated according to their contribution to the conservation of biodiversity pattern and process. Most of the City's wetlands fall within the CBA2 (the CBA category is divided into CBA1: very good condition, and CBA2: good condition) and OESA categories, indicating that most of the wetlands are in good or very poor condition, with fewer being in very good or moderate condition. The wetland types that showed the highest proportion in a good to fair condition were all within the sandstone fynbos vegetation types, particularly the seeps (Snaddon et al., 2009). These are also the best protected of all wetland types, often being located at higher altitudes in Protected Areas. A fairly high proportion of granite fynbos seeps also ranked highly, but these systems – all hillslope seeps at higher altitudes – are not currently well protected. There are only two FEPA sub-catchments in the Peninsula project area, both of which are on the Cape Peninsula, within the Table Mountain National Park. Both these FEPA sub-catchments are locations of fish sanctuaries – the Silvermine River sub-catchment is a known location of *Galaxias mollus* (*Galaxias* sp. '*zebratus* cf. *Mollus*'), while the Klaasjagers River protects *Galaxias zebra* (Galaxias zebratus) and the Cape kurper, *Sandelia capensis*.
Land use	Land use with G22A mainly consists of conservation and residential.
Silvermine Wetland System	
Location	The wetland system is located approximately 9.9 km south east of Noordhoek and 34 km south of Cape Town central. It is adjacent to the Silvermine Dam and the Silvermine River runs through it. The system falls within the boundaries of the Table Mountain National Park.
District and Local municipality	The wetland system falls within the City of Cape Town municipal area.
Reason for selection	Erosion linked to a road is causing significant problems. Benefits can however be achieved for this watercourse by creating a drift that would present less of an impact on the hydrology of the wetland system.
Wetland type and size	The size of the wetland system is 3.5 hectares. It is classified as a channelled valley-bottom wetland system.
Conservation status (terrestrial and aquatic)	The wetland system is located in the Table Mountain National Park which is also within the UNESCO Cape Floral Region World Heritage Site.
Land use	The main land use within the Silvermine wetland system is conservation.
Wetland problems	Erosion has had a significant impact on the biophysical drivers of the wetland system. Problems within the Silvermine wetland system include; • bank erosion; • alien invasion; and • loss of road fill.

Rehabilitation objectives	Due to the location of the wetland system within the nature reserve, it is important to protect these systems to both avoid unnecessary erosion of the system and secure and improve the overall functioning and integrity of the system. The main objectives for rehabilitation within the Silvermine wetland system are: • to preserve the hydrological integrity of the system; • enhancing water quality; and • mitigating the impacts of erosion.
Roodeberg Wetland System	
Location	The wetland system is located just outside the Capri residential area in Noordhoek. In 2000/2001 two illegal dams were constructed on a seep / mountain stream in this catchment, which was previously on what was known as Solole Game Reserve. SANParks recently bought the properties for incorporation into the Table Mountain National Park.
District and Local municipality	The wetland system falls within the City of Cape Town municipal area.
Reason for selection	The illegal disruption of flow caused by the two dams at Roodeberg presents a perfect opportunity to work towards reverting the system to a more natural hydrological regime.
Wetland type and size	The wetland system is 1.2 hectares in size and is classified as a seep.
Conservation status (terrestrial and aquatic)	The wetland system is located in the Table Mountain National Park which is also within the UNESCO Cape Floral Region World Heritage Site.
Land use	The main land use within the Silvermine wetland system is conservation.
Wetland problems	The dams have effectively halted surface flow completely along the watercourse, thus currently storing 100% of the surface flow in the stream channel. The reduction in flushing flows down the length of the watercourse below the dams has led to the encroachment of plants into the channel and valley-bottom wetland that extends downstream from the lower dam, including several alien species.
Rehabilitation objectives	A major aim of rehabilitation of the wetland system is to limit erosion and headcuts caused by concentrated flows from the illegal dams built within the wetland system that are ineffective and currently are affecting the pattern and distribution of water flows and sediment.

6.2.2 Quaternary Catchment G22B and associated wetland systems

Quaternary Catchment G22B	
General description	The quaternary catchment G22B is found south west of Cape Town in the Western Province with in the Berg WMA.
Climate	This quaternary catchment receives 276mm of rain per year and has a Mediterranean climate. It receives the lowest rainfall (10mm) in January and highest (36mm) in July.
Geology and topography	Mainly gritty sand and scree overlying granite of the Cape Peninsula Pluton, Cape Granite Suite, as well as quaternary calcareous Coastal dune sand of the Witzand Formation and alluvium.
Terrestrial ecology	All vegetation occurring within the quaternary catchment are either endangered or critically endangered. These include: Hangklip Sand Fynbos, Peninsula Sandstone Fynbos, Cape Flats Dune Strandveld, Peninsula Granite Fynbos, Peninsula Shale Renosterveld and Peninsula Shale Fynbos.

Aquatic ecology	The entire quaternary catchment is classified as a NFEPA water management area. Historic anthropogenic disturbances related to deforestation practices for ship-building purposes have had a significant impact on the aquatic ecosystem in the Hout Bay area.
Land use	Land use mainly consists of conservation and residential.
Orangekloof Wetland System	
Location	The Orangekloof wetland system is located on the Disa River, within the Table Mountain National Park. The Disa River is the main source stream of the Hout Bay River, rising on the ridges of Table Mountain, and flowing through the Orangekloof Forest.
District and Local municipality	The wetland system falls within the City of Cape Town municipal area.
Reason for selection	The Orangekloof wetland system is fairly stable, but there has been a loss of peat from the catchment. Headcut erosion is threatening the upper reaches of the wetland system that is in a good condition. Furthermore, the peat is eroded in some areas due to the channelization and incision of the stream, which effectively drains the wetlands. Invasive alien plant species also alter the hydrology of the system, leading to desiccation of the riparian wetlands.
Wetland type and size	The Orangekloof wetland system consists of channelled valley bottom and seep hydrogeomorphic units. The wetland system is 12.47 hectares in size.
Conservation status (terrestrial and aquatic)	The wetland system is located in the Table Mountain National Park which is also within the UNESCO Cape Floral Region World Heritage Site.
Land use	The main land use within the Orangekloof wetland system is conservation.
Wetland problems	The biophysical drivers of the wetland system have been significantly impacted upon by historical agricultural activities and will be further impacted upon into the future by: • headcut erosion; • down-cutting of the river; and • agricultural land use practices (private gardens, pathways, etc.).
Rehabilitation objectives	The primary objective of the wetland rehabilitation is to secure and improve the overall integrity of the systems, particularly focusing on maintaining and improving the hydrological conditions where possible. In turn the overall functioning of the systems and the conditions that support a range of wetland dependant fauna and flora will be secured and enhanced.

6.2.3 Quaternary Catchment G22C and associated wetland systems

Quaternary Catchment G22C	
General description	Quaternary catchment G22C is located mainly in an urban area and has been modified significantly due to historical agricultural and later industrial activities. The Liesbeeck River occurs within this quaternary catchment and is considered a River FEPA.
Climate	Similar to quaternary catchment G22B, the climate can be described as Mediterranean.
Geology and topography	The geology consists mainly of quaternary quartz sand of the Springfontein Formation with occasional quaternary calcareous coastal dune sand of the Witzand Formation (Cape Farm Mapper, 2017).
Terrestrial ecology	All vegetation types are classified as critically endangered or endangered: Cape Flats Sand Fynbos, Cape Flats Dune Strandveld, Swartland Shale Renosterveld, Peninsula Shale Renosterveld, Peninsula Shale Fynbos, Swartland Silcrete Renosterveld and Swartland Granite Renosterveld.

Aquatic ecology	As mentioned earlier, the Liesbeeck River occurs within the quaternary catchment and is a River FEPA. According to the WRC's book *Rivers and wetlands of Cape Town* (2009), the biota has declined significantly which could be the result of reduced river flow and pollution.
Land use	The quaternary catchment is located in an urban environment.
Rondebosch Common Wetland	
Location	The commonage is located north of Rondebosch in Cape Town.
District and Local municipality	The wetland falls within the City of Cape Town municipal area.
Reason for selection	The commonage has high public amenity value. Although there is reluctance from CoCT to rehabilitate this wetland prior to the pine trees being removed, it is felt that previous rehabilitation work on the commonage should be supported through the re-introduction of appropriate soils and revegetation.
Wetland type and size	The wetland is 2.4 hectares in size and classified as a depression wetland.
Conservation status (terrestrial and aquatic)	The Rondebosch Common forms part of the City of Cape Town's Biodiversity Network and is a proclaimed protected area. The property is considered important on a local, national and international level. Any loss of habitat could result in the extinction of species which in turn would have a negative impact on conservation targets (SANBI, BGIS).
Land use	Conservation, but with the allowance of low impact recreation and environmental education activities.
Wetland problems	This seasonal wetland is located along the western edge of the Common but a large proportion of the wetland was impacted by the construction of a car park on this side of the Common, and by the alien pine trees. In 2006/2007, a rehabilitation plan was compiled for the old car park on the western side of the Common, and this was implemented with some success. Since then, however, some of the areas that were excavated and re-shaped have lost their topsoil, with only the old laterite remaining from the old car park. There has been little to no establishment of plants on these areas.
Rehabilitation objectives	The primary objective of the wetland rehabilitation is to secure and improve the overall integrity of the wetland, particularly focusing on maintaining and/or improving the hydrological conditions and biodiversity value where possible.

6.2.4 Quaternary Catchment G22D and associated wetland systems

Quaternary Catchment G22D	
Climate	Similar to quaternary catchment G22B, the climate can be described as Mediterranean.
Geology and topography	The soils are deep white to grey sands, of quaternary marine origin, and are on a transitional geological boundary between the slightly alkaline Witzand formation and the slightly acidic Springfontein formation. Analysis of soils on the site have shown pH to vary from 7.0 to 7.7.
Terrestrial and aquatic ecology	The False Bay Nature Reserve Important Bird Area (IBA) is located in quaternary catchment G22D, as is the recently proclaimed Ramsar site, False Bay Nature Reserve, which incorporates Rondevlei, Zeekoeivlei, and the Strandfontein Waste Water Treatment Plant. The City of Cape Town is currently engaged in a process of pursuing accreditation as a Ramsar accredited wetland City, due to the diversity and density of wetlands within the City boundaries. Vegetation types occurring in G22D are all critically endangered or endangered. These include: Peninsula Granite Fynbos, Cape Flats Sand Fynbos, Cape Flats Dune Strandveld and Peninsula Sandstone Fynbos.

Land use	The quaternary catchment is located in an urban environment, although conservation areas (as mentioned above) also occur.
Edith Stephens Wetland Park	
Location	The wetland is located in Philippi between Govan Mbeki Road and Jakes Gerwel Drive.
District and Local municipality	The wetland system falls within the City of Cape Town municipal area.
Reason for selection	The Edith Stephens Wetland park has great biodiversity and public amenity value. It has received significant attention from the Biodiversity Management Branch of the City of Cape Town and has been well studied.
Wetland type and size	The wetland size is 19 hectares and comprises a number of natural and artificial ponds, seasonal wetlands and terrestrial vegetation.
Conservation status (terrestrial and aquatic)	The Edith Stephens Wetland Park has been proclaimed a protected area in perpetuity. Significant rehabilitation has been undertaken by the City of Cape Town, the Table Mountain Fund and SANBI on this property due to its high biodiversity value. The Working for Water Programme has also assist with the removal of alien vegetation[9].
Land use	Conservation, but with the allowance of low impact recreation and environmental education activities.
Wetland problems	The Edith Stephens Wetland Park is located within a highly disturbed environment being bordered by two major roads (Govan Mbeki Road and Jakes Gerwel Drive) and a light industrial area. The area to the east and south of the Education Centre and Park office consists largely of landfill while other parts of the Park have been significantly impacted by historical agricultural activities (i.e. ploughing). In addition, it has been found that the surface water (which includes road and stormwater runoff) have high levels of conductivity which may point towards pollution entering the site from the surrounding roads and industrial area.
Rehabilitation objectives	Maintaining the high water table within the Park is critically important as this is most likely the most important determinant of the botanical community structure.
Zandvlei Promenade	
Location	The Zandvlei Promenade wetland is located between the Promenade Road and the Southern Suburbs railway line, just west of the Zandvlei Estuary Nature Reserve.
District and Local municipality	The wetland system falls within the City of Cape Town municipal area.
Reason for selection	The proposed recreated wetland on this site would link with an ecological corridor from the mountain to the Zandvlei Estuary Nature Reserve. The site has high public amenity value, and a created wetland would provide good quality wetland habitat.
Wetland type and size	This depression wetland is 0.2 hectares in size.
Conservation status (terrestrial and aquatic)	The property has been identified as an ecological support area (i.e. OESA) in terms of the City's Biodiversity Network and is considered essential in support of adjacent natural ecosystems.
Land use	The property is currently being used as a public open space.
Wetland problems	Currently, the site infested with kikuyu grass with limited value as an ecological corridor.

[9] Source: http://pedi.org.za/edith-stephens-wetland-park-2/

Rehabilitation objectives	The main objective is to rehabilitate the corridor so that it provides natural habitat connecting with the mountain and the estuary which in turn would allow movement of flora and fauna between these ecosystems.

6.2.5 Quaternary Catchment G22E and associated wetland systems

Quaternary Catchment G22E	
General description	Quaternary catchment G22E is located south east of Cape Town and falls within the Berg River WMA.
Climate	Similar to quaternary catchment G22B, the climate can be described as Mediterranean.
Geology and topography	The geology can be described as being mainly quaternary calcareous coastal dune sand of the Witzand Formation as well as quaternary limestone and calcrete of the Langebaan Formation (Cape Farm Mapper 2017).
Terrestrial and aquatic ecology	A number of FEPA wetlands and rivers, as well as critical biodiversity areas have been identified in the City of Cape Town's Biodiversity Network. Remaining natural areas are often experiencing significant impacts from surrounding landuses and are consistently threatened by developments and pollution. Vegetation occurring within G22E mostly belong to critically endangered or endangered vegetation types (Cape Flats Sand Fynbos, Cape Flats Dune Strandveld, Swartland Shale Renosterveld and Swartland Granite Renosterveld). Boland Granite Fynbos also occurs within the area and is listed as vulnerable.
Land use	The quaternary catchment is located in an urban environment, although conservation areas (as mentioned above) also occur.
Kayelitsha Wetland Park	
Location	The Kayelitsha Wetland Park is an urban park that is located along the Kuils River within Kayelitsha, close to the N2.
District and Local municipality	The wetland system falls within the City of Cape Town municipal area.
Reason for selection	The wetland park has great public amenity value, and with some input from the Working for Wetlands Programme an improvement in access to this wetland can be achieved for those using the waterbody for canoeing, which in turn would raise awareness and contribute to environmental education.
Wetland type and size	The Kayelitsha Wetland Park is a floodplain wetland that covers an area of 42.6 hectares.
Conservation status (terrestrial and aquatic)	The wetland is located within an aquatic critical biodiversity area (i.e. CBA 1b). According to the City of Cape Town's Biodiversity Network, the vegetation within this wetland is critically endangered and of high and medium quality. It is considered to be irreplaceable and in a good condition.
Land use	The Kayelitsha Wetland Park is currently being used for low impact recreation and environmental education activities.
Wetland problems	The banks of the wetland are eroded, forming a short, steep drop from the grassed area into the water. Water quality is fairly poor due to industrial effluent and wastewater being discharged in the Kuils River further upstream. Poor services in informal settlements in the catchment also contribute to water pollution.

Rehabilitation objectives	The Kayelitsha Wetland Park is used extensively by the local community, and there is a keen group of kayakers who regularly take to the water from this south-eastern corner. The kayakers require an access point where the kayaks can be put in the water and easily entered. This is also an opportunity to increase the diversity of wetland plants along the margin of the wetland, and thus improve the wetland habitat and amenity value of the wetland.
Haasendal Wetland System	
Location	The Haasendal Nature Reserve is located on the slopes of Bottelaryberg above the Bottelary River, in Kuils River. The site is located on the boundary between City of Cape Town and Stellenbosch Municipality.
District and Local municipality	The wetland system falls within the City of Cape Town municipal area.
Reason for selection	Haasendal is in a newly declared nature reserve and requires extensive rehabilitation to improve its biodiversity value.
Wetland type and size	The wetland system is 0.4 hectares in size and is classified as a watercourse and depression wetland type.
Conservation status (terrestrial and aquatic)	The wetland system is located in a recently proclaimed protected area. According to the City of Cape Town's Biodiversity Network, the Reserve is considered to be of local, national and international significance as the loss of habitat would most likely result in the extinction of threatened plant species occurring on the property. The Reserve has a substantial number of remnant plant species of the Critically Endangered Cape Flats Sand Fynbos vegetation type - 168 species have been recorded, of which 14 are threatened (Emms, 2014).
Land use	The main landuse is conservation.
Wetland problems	A watercourse channel has clearly been altered through shaping of the bed and banks and alien tree invasion and is now a uniformly V- or U-shaped channel running in a north-westerly direction across the site.
Rehabilitation objectives	The main purpose of rehabilitation within the Haasendal Nature Reserve would be to improve the natural flow regime of the system by recreating wetlands along the altered watercourse and to improve its biodiversity value.
Upper Kuils River Wetland System	
Location	The Upper Kuils River wetland system is surrounded by the residential area of Durbanville approximately 2.8 km from the source of the river. The section of the river flows through a green corridor in a sand-bed channel.
District and Local municipality	The wetland system falls within the City of Cape Town municipal area.
Reason for selection	The site forms part of a greenbelt that is used extensively for recreation by locals. The river channel however, is incised and straightened, and has lost much of its wetland character (which can be seen downstream).
Wetland type and size	The wetland system is 12.3 hectares in size and is classified as a channelled valley-bottom wetland and watercourse. It is likely that this section of the Kuils River was associated with either Unchannelled or channelled valley-bottom wetlands, which would have extended on either side of the watercourse.
Conservation status (terrestrial and aquatic)	The wetland system is not located in a protected area. It is however considered a critical biodiversity support area of which the original vegetation type occurring on site should belong to the Cape Flats Sand Fynbos vegetation type (critically endangered). However, vegetation on site mainly consists of arum lilies, *Thypa capensis,* kikuyu grass, watercress and Patterson's curse.

Land use	The main landuse is recreation.
Wetland problems	The extent of the wetland system has been reduced due to the extensive residential and road development in the area. This has resulted in the development of steep banks along the extent of the Kuils River. In addition, the biodiversity value of the wetland habitat has been reduced due to extensive occurrence of kikuyu grass.
Rehabilitation objectives	The main purpose of rehabilitation would be to improve the natural flow regime of the system by recreating wetlands along the altered watercourse and to improve its biodiversity value.

6.2.6 Quaternary Catchment G10G and G10H and associated wetland systems

Quaternary Catchment G10G and G10H	
General description	The quaternary catchments lie within the Berg WMA. Catchment G10G lie in the South Western Coastal Belt Level 1 ecoregion. Quaternary Catchment G10E is located in the Berg River catchment area (G10) which covers an area of 4 215 hectares. These quaternary catchments, together with quaternary catchments G10F G10H and G10J, provides water to the Berg River, including the Klein Berg River, which feeds Voëlvlei Dam. As such the eastern subcatchments in this area have been identified as strategic water supply areas.
Climate	During the winter months, temperatures can be very cold falling to below freezing level. Heavey frost and snow can also occur. The average rainfall is 1450 mm of which most occur between April and September. Summer months are generally dry with moderate temperatures.
Geology and topography	The landscape within the quaternary catchment is characterised by the Groot Winterhoek mountain range consisting Table Mountain sandstones which stretch from Porterville to Tulbagh. The mountain is rugged with altitudes of 1000 to 2077m above sea-level.
Terrestrial ecology	Mountain fynbos is the dominant vegetation type which includes various rare, threatened and endemic species such as *Sorocephalus scrabridus*. The Wilderness Area is a refuge for Sandstone Fynbos, and the fauna that inhabit this vegetation type, such as klipspringer, grey rhebok, leopard and grysbok (River Health Programme, 2004).
Aquatic ecology	Most of the river length within these quaternary catchments is in a moderate to poor state (classes C and D), with a few exceptions. The Watervals River in G10E is in good condition, despite the upper sub-catchment of this system being under pine plantations until recently. The pines have now been removed, which should result in further improvement in the condition of this important water supply sub-catchment that has been identified as a FEPA. Over half of the total wetland area in the G10 tertiary catchment was mapped by the NFEPA project as Z1, i.e. overlapping with an artificial wetland (most likely farm dams). A large proportion of wetlands in this tertiary catchment is in a moderate condition (category C) and is classified as channelled valley-bottom systems. A large number of floodplain wetlands are also found and are mostly associated with the middle reaches of the Berg River as it flows through the catchment.
Land use	Conservation and agricultural practices are the two main land uses within the quaternary catchment.
De Tronk Wetland System (Groot Winterhoek Wilderness Area)	
Location	The wetland system is located within the Groot Winterhoek Wilderness Area, close to Porterville. *Please note that it also extends into the G10H quaternary catchment but will not be discussed separately as the information contained below is also applicable to this section of the wetland system.*
District and Local municipality	The wetland system falls within the Berg River Municipality and the West Coast District Municipality.

Reason for selection	The De Tronk wetland system is located within an important water source area and ensures year-round supply of water to the Groot Kliphuis River/ Twenty-Four Rivers system, as well as the Voëlvlei Dam. It also has high biodiversity value due to the occurrence of various rare, threatened and endangered plant species.
Wetland type and size	The wetland is 0.7 hectares in size and is classified as a seep wetland
Conservation status (terrestrial and aquatic)	The wetland falls within the Groot Winterhoek Wilderness Area which is managed by CapeNature. Various rare, threatened and endangered plant species occur in this area, such as the critically endangered protea, *Sorocephalus scabridus*. The red *Disa uniflora* grows in abundance along streams in this area, while the rare yellow form also occurs here, as does *Ixianthes retzioides*, a shrub that is endemic to mountain streams in the Wilderness Area (RHP, 2004).
Land use	The main land use is conservation.
Wetland problems	The main impacts on this wetland system can be summarised as follow: • Head-cut and gully erosion, leading to channelization of flow and loss of seep wetlands (that are important for year-round supply of water in the catchment, and sediment trapping); • Contribution of sediment in the form of road fill material to important wetlands and downstream rivers; and • Diversion of water away from wetlands as a result of tracks creating preferential flow paths along the road instead of seeping through wetlands.
Rehabilitation objectives	The main rehabilitation objectives for the De Tronk Wetland System would be to sstabilise head-cuts and trap sediment to improve the natural flow regime and protect biodiversity.

6.2.7 Quaternary Catchment G10E and associated wetland systems

Quaternary Catchment G10E	
General description	Quaternary catchment G10E is located south east of the town of Tulbagh within the Witzenberg Local Municipal area. The catchment is part of the Berg WMA.
Climate	The quaternary catchment has a Mediterranean climate and receives most of its rainfall (approximately 567mm per annum) between May and October. Snowfall can also occur. The average minimum temperature can be as low as 5.2˚C during June while the average maximum temperature can reach up to 30.8˚C in February (Witzenberg SDF, 2012).
Geology and topography	G10E can be described as a broad valley surrounded by mountains. The geology is derived from the Cape Fold Belt and consists of sandstone soils belonging to the Malmesbury Group and the Cape Supergroup (Witzenberg SDF, 2012).
Terrestrial ecology	Cape Flats Dune Strandveld, Cape Flats Sand Fynbos, Swartland Granite Renosterveld and Swartland Shale Renosterveld are the main vegetation types occurring within G10E and are all considered to be critically endangered or endangered. The quaternary catchment includes various conservation areas including the Watervals Nature Reserve, Witzenberg Nature Reserve and Grootvlei Nature Reserve. The Eastern False Bay mountains important bird area (IBA) also occurs within the catchment.
Aquatic ecology	The G10E quaternary catchment includes the Watervals and Boontjies rivers. The Boontjies River flows into the Klein Berg River. The Watervals River rises up on Zuurvlak, on a gently sloping valley floor or plateau, with seeps and streams feeding into the river from the side slopes. A high (approximately 50 – 60 m) waterfall separates the wetland plateau from downstream, leading to the isolation of this plateau from the rest of the catchment. Zuurvlak was afforested with pine trees until recent years, but is still heavily invaded by alien vegetation species.

Land use	The main land use in the area is conservation and agriculture.
Watervals Nature Reserve Wetland System	
Location	The wetland is located within the Watervals Nature Reserve, which is located close to Tulbagh.
District and Local municipality	This wetland falls within the Witzenberg Local Municipality and Cape Winelands District Municipality.
Reason for selection	The Watervals Nature Reserve is a protected area that includes areas of high biodiversity value, as well as an important water source area. Water moving through this quaternary catchment also provides water to the Voëlvlei Dam.
Wetland type and size	The wetland system is 16.4 hectares in size and is classified as a channelled valley-bottom wetland.
Conservation status (terrestrial and aquatic)	The Wetland is located within the Cape Winelands Biosphere Reserve. The Eastern False Bay mountains important bird area (IBA) extends to include the Watervals River catchment. Furthermore, the sub-catchment in which the Watervals wetland system has been prioritised as a FEPA sub-catchment, due to the relatively good condition of the river reaches in this catchment.
Land use	The land use in the area is conservation.
Wetland problems	The Watervals wetland system is has been impacted on by surrounding landuse, as well as the occurrence of a recent fire and flood events. As a result, the river has been incised which has led to the loss of wetland areas along its bank. The dried out wetland soils are dispersive (i.e. easily eroded, even in slow-flowing or still water), and will continue to erode, if the system is not stabilised.
Rehabilitation objectives	The main rehabilitation objectives would be to stabilise erosion and prevent further loss of wetland soils to improve the natural flow regime and protect biodiversity.

6.2.8 Quaternary Catchment H10H and associated wetland systems

Quaternary Catchment H10H	
General description	Quaternary catchment H10H is located north east of Wellington and falls within the Breede River WMA.
Climate	This quaternary catchment receives 276mm of rain per year, mostly during the winter months. The climate conditions can thus be described as Mediterranean.
Geology and topography	The geology is characterized mainly by quarzitic sandstone of the Peninsula Formation, Nardouw Subgroup and Table Mountain Group, separated by a thin shale band of the Cederberg Formation.
Terrestrial ecology	Vegetation types occurring within the quaternary wetland includes South Hex Sandstone Fynbos (least threatened), Breede Shale Renosterveld (vulnerable), Breede Alluvium Fynbos (endangered) and Western Afromontane Sandstone Fynbos (least threatened).
Aquatic ecology	The quaternary catchment includes a Phase 2 FEPA. Phase 2 FEPAs were identified by the NFEPA project in moderately modified rivers (C ecological category), only in cases where it was not possible to meet biodiversity targets for river ecosystems in rivers that were still in good condition (A or B ecological category). The condition of these Phase 2 FEPAs should not be degraded further, as they may in future be considered for rehabilitation once FEPAs in good condition (A or B ecological category) are considered fully rehabilitated and well managed." The eastern part the catchment is considered to be a Strategic Water Source Area (SWSA), providing more than 50% of the runoff to the total for the primary catchment.
Land use	The main land use in the quaternary catchment is conservation and agriculture.

Fonteintjiesberg Wetland System	
Location	The Fonteintjiesberg wetland system is 22.1 km south west of Wellington and located inside the Fonteintjiesberg Nature Reserve.
District and Local municipality	The wetland system falls within the Witzenberg Local Municipality and Cape Winelands District Municipality.
Reason for selection	The Fonteintjiesberg Nature Reserve is a protected area that includes areas of high biodiversity value, as well as an important water source area.
Wetland type and size	The wetland system is 6.7 hectares in size and classified as a seep/channelled valley-bottom wetland type.
Conservation status (terrestrial and aquatic)	The Fonteintjiesberg wetland system is located within a protected area and a FEPA sub-catchment due to the good condition of the river flowing through it.
Land use	The main land use is conservation.
Wetland problems	The gully created by erosion of an old pathway is leading to desiccation of the slopes above the channel, and thus the loss of hillslope wetlands. The dried out soils are dispersive, and must be stabilised.
Rehabilitation objectives	The main rehabilitation objectives for this wetland system would be to trap sediment, restore natural flow conditions and protect biodiversity.

6.2.9 Quaternary Catchment G50B and associated wetland systems

Quaternary Catchment G50B	
General description	The area, located within the Agulhas Plain, is covered by the Overberg East sub water management area (WMA) of the Breede WMA. The Jan Swartskraal River begins in the upper reaches of the mountains in the northern region of G50B and meets the Koue River from the eastern boundary to form the Nuwejaar River approximately 2km north of the quaternary catchment's only town, Elim.
Climate	The local climate can be described as being Mediterranean with hot dry summers and cold wet winters. The average rainfall is 540 mm and mainly occurs between May and October. The mean annual temperature is 16.9˚C with the maximum mean temperature rising to 26.6 ˚C during January. The lowest mean temperature is recorded as 6.6 ˚C. Prevailing winds are westerly in the winter months and easterly during summer (SANParks, 2008).
Geology and topography	The geology mainly consists of calcareous sands of the Tertiary age while the mountains are Cape Fold Belt sandstones, which includes the Table Mountain Group sandstones (SANParks, 2008).
Terrestrial ecology	According to Mucina and Rutherford (2006), vegetation in the quaternary catchment includes: Overberg Sandstone Fynbos (Critically Endangered (CR)), Elim Ferricrete Fynbos (CR), Western Coastal Shale Band Vegetation, Cape Lowland Freshwater Wetlands, Cape Inland Salt Pans (Least Threatened (LT)) and Agulhas Sand Fynbos (Endangered (E)). Elim Ferricrete Fynbos is threatened specifically from agricultural practices due to the competition for arable land. The whole of the Agulhas Plain is considered an important bird area (IBA). The area specifically comprises three IBAs – the Overstrand, Overberg Wheatbelt and De Hoop Nature Reserve IBAs.

Aquatic ecology	The Koue and Nuwejaar rivers have been categorised as being a critically endangered Class C: Moderately Modified River of the Southern Coastal Platform (SANBI, 2015). Surrounding these rivers, an intricate network of NFEPA wetland systems web out through the catchment. Two wetland ecosystem types dominate the catchment namely, Southwest Sandstone Fynbos in the mountainous areas and Southwest Ferricrete Fynbos in the central valley (SANBI, 2015). There are 16 species of frogs that have been recorded in and around Agulhas, of which three are threatened. These are *Amietrophrynus pantherinus* (Western Leopard Toad – endangered), *Microbatrachella capensis* (Micro Frog - critically endangered) and *Xenopus gilli* (Cape platanna – endangered). (Minter et al., 2004) *A. pantherinus* is associated with sandy coastal lowlands, or in valleys and hillslopes near the coast. The toad is always found near rivers, coastal lakes, vleis and pans. The Micro Frog, *M. capensis*, is restricted to wetlands in low-lying coastal areas on neutral to acid sands, and is known to occur in Soetendalsvlei. The Cape platanna inhabits black water, sandy-based wetlands in low-lying coastal areas. These can be seasonal or permanent. Agulhas is home to at least ten indigenous fish species, of which seven are marine and the remainder freshwater (Russell and Impson, 2006). A number of sub-catchments in the Agulhas area have been identified as FEPA fish sanctuaries, fish support areas (FSAs) or catchments important for fish migration (Figure 1.2). All the FSAs on Agulhas have been identified as requiring rehabilitation for the protection of threatened fish species.
Land use	Quaternary catchments G50B are dominated by cultivated lands in the flatter area running through the centre of the catchments with the mountainous areas in the northern border.
Breedevlei Wetland System (G50B)	
Location	The Breedevlei wetland system is located on a privately owned farm, on the upper reaches of the Jan Swartskraal River, which near Bredasdorp.
District and Local municipality	The wetland system is located within the Cape Agulhas Local Municipality and the Overberg District Municipality.
Reason for selection	The wetland system contains deep peat stores, covered by wetland vegetation, which occurs only in a small number of locations in South Africa. The aquatic vegetation is primarily Palmiet (*Prionium serratum*), an indigenous aquatic species that is unique to South Africa. The system is also suitable for *Sandelia capensis* (Cape kurper), *Pseudobarbus sp. 'burchelli cf. 'Heuningnes' sp* (red-finned minnow – critically endangered), and *Galaxias Heuningnes* (*Galaxias sp. 'zebratus cf. Heuningnes'*) (endangered galaxiid). The site is thus considered to have high biodiversity value.
Wetland type and size	Pietersielieskloof is a Southwest Ferricrete Fynbos Floodplain wetland located in the eastern region of the quaternary catchment. The size of the wetland system is 44.7 hectares.
Conservation status (terrestrial and aquatic)	The land is not formally protected although it does classified as critical biodiversity area and includes a FEPA river corridor. The vegetation type is Elim Ferricrete Fynbos, according to Mucina & Rutherford (2006), which is critical endangered.
Land use	The property is being used for agricultural purposes.
Wetland problems	Wetland problems include head-cut erosion in the river channel which leads to the loss of peat soils, wetland soils and vegetation (including palmiet).

Rehabilitation objectives	The main rehabilitation objectives would be to: • Stabilise head-cuts in order to prevent them from moving up into intact Unchannelled valley-bottom wetland; • Slow down surface flow to reduce the erosive potential of the flowing water; • Local re-wetting of wetland soils in order to allow recovery of drained soils in order to allow recovery of drained wetland areas; • Trap sediment in the wetlands to allow build-up of wetland soils and seedbanks; and • Prevent the downstream transport of sediment, which smothers wetland habitat.

6.3 Cultural and Heritage Environment

A Notice of Intent to Develop (NID) (Appendix E4) has been completed by a heritage specialist, Dr Jason Orton due to some of the sites being located in the Cape Floral Region World Heritage Site. The specialist indicated that no significant negative impacts are expected, although the impact could be considered positive in terms of scientific value (plant and animal habitats will be improved) and aesthetic value (appearance of the landscape). 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 consists of a minimum of 55% women, 55% youth and 2% disabled persons.

The EPWP focus on local unemployed people with the intent of making them part of the productive economic sector, assist with skills development and increase their capacity to earn an income. In terms of basic education and training of adults and skills transfer, the WfWetlands Programme has provided 250 000 days of training in vocation and life skills.

Table 13: Economic profile of applicable local municipalities

	City of Cape Town	Breede Valley	Witzenberg	Berg River
Population				
Young (0-14)	24.8%	27.8%	25.4%	24.9%
Working age (15-64)	69.6%	66.9%	70.4%	68.1%
Elderly (65+)	5.5%	5.3%	4.2%	7%
Dependency ratio	43.6	49.5	42	46.9
Level of education (aged 20+)				
No schooling	1.8%	4.9%	6.6%	6.4%
Higher education	16.6%	8.3%	5.8%	7.7%
Matric	29.8%	24.9%	18.2%	22.3%
Level of Employment (%)				
Unemployment rate	23.9%	14.4%	7.6%	6.8%
Youth Unemployment rate	31.9%	20.2%	9.9%	9.6%

Economic Profile				
No income	13.7%	12%	6.4%	9.3%
R1 - R4,800	2.7%	1.7%	1.9%	1.4%
R4,801 - R9,600	4.0%	2.9%	4%	1.9%
R9,601 - R19,600	10.6%	14.9%	18.5%	13.5%
R19,601 - R38,200	16.0%	22.2%	25.8%	22.3%
R38,201 - R76,4000	14.5%	19%	20.9%	22.4%
R76,401 - R153,800	13.0%	12.6%	10.4%	14%
R153,801 - R307,600	11.9%	8.5%	6.8%	9.1%
R307,601 - R614,400	8.7%	4.7%	3.9%	4.4%
R614,001 - R1,228,800	3.6%	1%	0.9%	0.8%
R1,228,801 - R2,457,600	0.9%	0.3%	0.3%	0.4%
R2,457,601+	0.5%	0.2%	0.2%	0.4%

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[10]
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%

[10] 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, there just would not be any opportunities.		
	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 dangers 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**	**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	Definite
Confidence	Certain	Certain	Certain
Reversibility	Irreversible	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.

7.1.10 Working in peatlands

Phase	Pre-Construction	**Construction**	Operational	Decommissioning
Impact description	Peatlands are sensitive ecosystem types and construction activities could degrade the soils if not properly mitigated, resulting in habitat destruction, loss of carbon storage capacity and water retention ability of the system. The direct impact of working within peatlands is the potential harm that can be caused through incorrect management on site. By not implementing interventions in peatlands, sensitive environments would be lost and carbon would be released into the atmosphere. In addition, once peatlands are dried out, they become hydrophobic and prone to fires that are very difficult to manage and stop.			

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

Mitigation measures
• Mitigation measures included in the EMPr shall be implemented. • Topsoil stockpiles should be protected from drying out as per the requirements of the EMPr. • No fires are permitted on site.

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 Heritage resources

Phase	Pre-Construction	Construction	Operational	Decommissioning
Impact description	No significant negative impacts are expected at any of the proposed intervention sites, but the restoration of wetlands will create a positive impact on the Cape Floral Region World Heritage Site in terms of scientific value (plant and animal habitats will be improved) and aesthetic value (appearance of the landscape).			

	Pre-Mitigation	Post-Mitigation	No-go Alternative
Type	Positive	Positive	Negative
Extent	Regional	Regional	Regional
Magnitude	Low	Low	Low
Duration	Long-term	Long-term	Long-term
Significance	**MEDIUM (+)**	**MEDIUM (+)**	**MEDIUM (-)**
Probability	Definite	Definite	Definite
Confidence	Sure	Sure	Sure
Reversibility	Reversible	Reversible	Irreversible

Mitigation measures

- No mitigation measures are proposed.

7.2.3 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.

7.2.4 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.				

7.2.5 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				

7.2.6 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.

7.2.7 Ecosystem functioning

Phase	Pre-Construction	Construction	Operational	Decommissioning
Impact description	<u>Restoring wetland corridors</u> 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. <u>Changes in water quality and quantity</u> 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[11] and the EPWP requirements would not be realised. • No mitigation measures are proposed.			

7.2.8 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 Eastern Cape 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

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

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.

7.2.9 Working in peatlands

Phase	Pre-Construction	Construction	**Operational**	Decommissioning
Impact description	Peatlands, only covering 3% of the Earth's land, store a third of the global soil carbon (Joosten 2010). This means that as an **indirect positive impact**, undertaking this rehabilitation project would ensure that carbon is stored in the soils and not released into the atmosphere as a greenhouse gas, which has been shown to contribute to global warming.			
	Pre-Mitigation	**Post-Mitigation**	**No-go Alternative**	
Type	Negative	Negative	Negative	
Extent	Local	Local	International	
Magnitude	Medium	Medium	High	
Duration	Long-term	Long-term	Long-term	
Significance	**MEDIUM (-)**	**MEDIUM (+)**	HIGH (-)	
Probability	Definite	Definite	Likely	
Confidence	Certain	Certain	Certain	
Reversibility	Irreversible	Irreversible	Irreversible	
Mitigation measures				
• Mitigation measures included in the EMPr shall be implemented. • Topsoil stockpiles should be protected from drying out as per the requirements of the EMPr. • No fires are permitted on site.				

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);
- Improving the scientific and aesthetic value of the Cape Floral Region World Heritage Site; and
- Empowerment of local communities.

The impacts detailed above in **Chapter 7** are summarised below in Error! Reference source not found..

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
Increased awareness of wetland importance	Medium (+)	High (+)	Medium (-)
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
Working in peatlands	Medium (-)	Low (-)	High (-)
Operational Phase: Description of Impact			
Changes in land use	Low (+) / Medium (-)	Medium (+) / Low (-)	Medium (-)
Heritage resources	Medium (+)	Medium (+)	Medium (-)
Increased water storage and reduced treatment costs	Medium (+)	Medium (+)	Medium (-)
Reduced soil erosion	Medium (+)	Medium (+)	Medium (-)
Employment	Medium (+)	Medium (+)	Medium (-)
Ecosystem functioning	Medium (+)	High (+)	High (-)
Flora and fauna	Medium (+)	Medium (+)	Medium (-)
Public safety	Medium (-)	Low (-)	Medium (-)
Working in peatlands	Low (+)	Medium (+)	High (-)

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.

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