	(For official use only)	
File Reference Number:		
Date Received by Department:		
Date Received by Component:		
Form Duly Signed and Dated:		Yes No

PROJECT TITLE

Proposed Dam on Arbeidsgenot Farm, Moorreesburg
Remainder of Farm Bakovend 403, Gouda District.

A. SCOPE AND IMPORTANT INFORMATION

1) This document is to be used to ensure that the request for adopting or defining a Maintenance Management Plan (MMP) in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), Environmental Impact Assessment (EIA) Regulations, 2014 (as amended) is undertaken to the sufficient standard and requirements as defined by the competent authority, the Department of Environmental Affairs and Development Planning of the Western Cape Government (henceforth the Department). It is advised that the determination of applicability regarding the scale of the proposed maintenance/management activity(ies) be undertaken through a pre-application consultation with the Department.

2) The geographical scope of the MMP is limited to watercourses as defined in the EIA Regulations, 2014(as amended). The document does not relate to coastal activities or activities to be undertaken in an estuary.

3) The use of this document for the development of a MMP for a watercourse **will only** be considered when the proposed maintenance activities constitute any one of the following listed activities identified in terms of the NEMA EIA Regulations, 2014 (as amended):

EIA Regulations Listing Notice 1 of 2014 (as amended)

- Activity 19, Listing Notice 1: The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavation, removal or moving of soil, sand, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving-
  (a) will occur behind a development setback;
  (b) is for maintenance purposes undertaken in accordance with a maintenance management plan;
  (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;
  (N.B. Points (d) and (e) does not apply as these activities fall within the coastal zone)

- Activity 27, Listing Notice 1: The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for-

i. The undertaking of a linear activity; or
ii. Maintenance purposes undertaken in accordance with a MMP.

EIA Regulations Listing Notice 2 of 2014 (as amended)

- Activity 15, Listing Notice 2: The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for-
  I. The undertaking of a linear activity; or
  II. Maintenance purposes undertaken in accordance with a MMP.

- Activity 24, Listing Notice 2: The extraction or removal of peat or peat soils, including the disturbance of vegetation or soils in anticipation of the extraction or removal of peat or peat soils, but excluding where such extraction or removal is for the rehabilitation of wetlands in accordance with a MMP.

EIA Regulations Listing Notice 3 of 2014 (as amended)

- Activity 12, Listing Notice 3: The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a MMP.
  i. Western Cape
  i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;
  ii. Within critical biodiversity areas identified in bioregional plans;
  iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or
  v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.
  (NB. Point iii does not apply as this activity falls within the coastal zone)

4) In deciding the request, the competent authority may define conditions related to auditing compliance with the MMP; monitoring requirements; reporting requirements, review; updating and amending the document and period for which the MMP is defined/adopted.

5) The purpose of the MMP is to maintain both man-made and ecological infrastructure in a manner that either improves the current state of, and/or reduces the negative impacts on a watercourse to ensure that ecosystems services are preserved/improved and to prevent further deterioration of the watercourse.

6) Notwithstanding the MMP possibly being defined or adopted by the Competent Authority, any other applicable statutory requirement must still be complied with (e.g. any obligations under the National Water Act, 1998 (Act 36 of 1998) or the Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)).

7) The proponent must note that a MMP for a watercourse **must** be undertaken through consultation with the Department of Water and Sanitation and/or the relevant Catchment Management Agency (responsible water authority). This is to ensure compliance in terms of a

Permissible Water Use as set out in the National Water Act, 1998 (Act No. 36 of 1998). It is recommended that this process for authorisation in terms of the National Water Act be clarified prior to the drafting and submission of the MMP.

8) The development of this document has been done in such a way so as to meet the requirements of both this Department as the competent authority in terms of the NEMA EIA Regulations, 2014 (as amended), as well as the requirements of the delegated water authority, regarding general authorisation considerations for sections 21(c) and (i) of the National Water Act, 1998 (Act No. 36 of 1998), to ensure alignment between the two authorities when defining or adopting the MMP.

9) In situations where a Water Use Licence Application (WULA) is required by the water authority regarding the proposed activities within a MMP, this will not prevent the proponent from submitting a request for a MMP to be defined or adopted by the Department.

10) Unless protected by law, all information contained in, and attached to this document, shall become public information on receipt by the competent authority.

11) A duly dated and originally signed copy of this document together with one hard copy and one electronic copy of the MMP must be posted, to the Department at the postal address given below, or delivered to the Registry Office of the Department.

12) A copy of the final defined/adopted MMP and cover letter **must** be submitted to the responsible water authority.

13) **NOTE: Adopting or defining the MMP does not absolve the** proponent **from complying with any applicable legislation or the general "duty of care" set out in Section 28(1) of the NEMA that states, *"Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment*." (Note: When interpreting this "duty of care" responsibility, cognisance must be taken of the national environmental management principles contained in Section 2 of the NEMA.**

14) **NOTE: This document can be used as a template to assist in the information required and is to be filled out in full. The Department reserves the right to request any additional information during the initial development and submission of the draft MMP.**

15) **NOTE: The Department reserves the right to not adopt the MMP and require that an application be submitted to obtain Environmental Authorisation for the respective activities. Furthermore, consideration for the review should also be aligned to the periodic reviews of the General Authorisation for sections 21 (c) and (i) of the National Water Act, 1998 (Act No. 36 of 1998) to ensure continued alignment and compliance.**

B. MAINTENANCE MANAGEMENT PRINCIPLES

1) The following are overarching principles to be used by landowners and managers when considering the development and implementation of a MMP:

    a. The anticipation and prevention of negative impacts and risks, then minimisation, rehabilitation or 'repair', where a sequence of possible mitigation measures to

avoid, minimize, rehabilitate and/or remedy negative impacts is explicitly considered;

b. Avoid and reduce unnecessary maintenance;
c. Maintenance and management of a watercourse must be informed by the condition of the physical and ecological processes that drive and maintain aquatic ecosystems within a catchment, relative to the desired state of the affected system;
d. Management actions must aim to prevent further deterioration to the condition of affected watercourses and, overall, be guided by a general commitment to improving and maintaining ecological infrastructure for the delivery of ecosystem services;
e. Managers and organs of state must identify, address and, where feasible, eliminate the factors that necessitate intrusive, environmentally-damaging maintenance; and
f. A process of continuous management improvement be applied, namely Planning; Implementing; Checking (monitoring, auditing, determine corrective action) and Acting (management review).

2) The following table provides a simple overview for the determination of the need for a MMP:

	Question	**If the answer to any of the questions is YES, then a MMP may be applicable.**
2.1	Is there a watercourse on or adjacent to the property?	YES
2.2	Has there been a history of flood damage or vandalism to the existing infrastructure or watercourse – erosion and/or sedimentation?	YES
2.3	Is there infrastructure or any community at risk of being damaged by flooding?	NO
2.4	Is the design of infrastructure considered inadequate in terms of managing the risk of flooding, erosion and/or sedimentation?	NO
2.5	Would you consider an improved design to existing infrastructure to reduce maintenance needs?	YES
2.6	Are there specific incidences where the watercourse is obstructed or blockages occur that alter the flow of the river during floods?	NO
2.7	Is there an existing obstruction in the watercourse that has changed the flow of the river under normal conditions?	NO
2.8	Is there a marked increase in the rate of erosion/sedimentation being experienced which threatens operations and assets?	NO
2.9	Is there a presence of alien or bush encroachment vegetation within the watercourse and/or the presence of woody debris after flooding?	NO

3) It is important to consider that the type of maintenance required will impact on the level of assessment needed in terms of the impact the activity will have on the system and how best to mitigate the impact. Types of maintenance can broadly be classified in the following categories, with recognition that maintenance activities vary across the rural and urban context:

Maintenance Category	Types of maintenance activities (examples only)

Category A:
Sediment removal as a result of deposition or sediment deposition as a result of erosion
	• Clearing sediment or placing sediment at:
	  o Pump hole/trench
	  o Return flow (irrigation)
	  o Stormwater outfall
	• Prevent formation of islands in the channel of the river
	• Dredging of in-stream dams

Category B: Emergency repairs – urgent action required to manage risk and damage to assets	• Repair to erosion of river bank or servicing infrastructure (e.g. pipelines/roads) • Removal of material built up as a result of flooding/sedimentation and increasing risk to infrastructure • Manage the condition of flood protection berms, and existing structures such as gabions, canalized and stormwater systems
Category C: Managing alien invasive and bush encroachment plant species	• Clearing of alien invasive vegetation out of a watercourse to reduce maintenance requirements as they relate to erosion and sedimentation • Management of indigenous species categorized as bush encroachment, to improve hydrological flow and reduce associated flooding impacts
Category D: Rehabilitation and restoration activities for maintaining ecological infrastructure	• Development and maintenance of ecological buffering systems to improve and/or restore functioning (e.g. wetlands and stormwater detention ponds) • Actively rehabilitating riparian zones through planting of locally indigenous species • Bank grading and movement/removal of berms and barriers to flow

4) The development of appropriate method statements to mitigate the impact of the maintenance needs, should be aligned within the framework of these considerations:

   a. Watercourses experience a natural process of sedimentation and erosion, with varying rates depending on the geomorphology and the integrity of the land-uses within the catchment;

   b. Manipulation of the watercourse results in increased erosion and/or deposition being experienced further downstream, perpetuating greater need for manipulation and more drastic and costly maintenance interventions;

   c. Locally indigenous riparian and wetland vegetation assists in the stabilization of river banks through effective root structures, while contributing to improve in-stream habitat and water quality conditions;

   d. Invasive alien and bush encroachment vegetation significantly impacts on the functioning of a watercourse, often leading to increased flood associated damage, with further implications and a reduction in water quality and availability;

   e. Persons undertaking maintenance activities have a responsibility to ensure a sense of duty of care is applied as prescribed within NEMA Section 28(1).

5) It is recognized that within urban areas, sedimentation and erosion rates are significantly amplified as a result of development in urban areas and thus systems associated with watercourses in such areas can no longer be considered as 'natural'. In such a context, the drivers of such a process are often located outside the control of the landowner or responsible authority (i.e. Municipality). Therefore, the response taken to address the needs of a maintenance management plan for a watercourse within the urban environment may be limited in mitigating the requirement for maintenance to be undertaken.

C. REQUEST FOR THE COMPETENT AUTHORITY TO DEFINE OR ADOPT A MAINTENANCE MANAGEMENT PLAN FOR A WATERCOURSE IN TERMS OF THE NEMA, EIA REGULATIONS 2014 (AS AMENDED).

The following information must be submitted as part of the request for the competent authority to define or adopt the MMP:

1. PERSONAL DETAILS

Highlight the Departmental Sub-Region(s) in which the maintenance is to be undertaken. (mark the appropriate box with an 'X'). For Departmental details see Annexure A.

REGION 1 (City of Cape Town Metropolitan and West Coast District)	REGION 2 (Cape Winelands District, Overberg District)	REGION 3 (Eden & Central Karoo Districts)
X		

Name of person/authority who will undertake responsibility for the activity:	Arbeidsgenot Farm		
Contact person (if other):	Mr. M.G Hanekom		
Postal address:	P.O. Box 23, Moorreesburg		
Telephone:	022 4332622	Postal code:	6821
Fax:	NA	Cell:	083 441 0193
Email:	marius@foxwireless.co.za		
Name of person who has prepared the MMP:	Eco Impact Legal Consulting (Pty) Ltd		
Contact Person (if other):	Nicolaas Hanekom		
Postal address:	PO Box 45070, Claremont		
Telephone:	021 671 1660	Postal code:	7735
Fax:	021 671 9976	Cell:	066 210 9892
E-mail:	admin@ecoimpact.co.za		
Name of landowner(s) on whose behalf the plan has been developed:*	Same as applicant		
Contact person(s):			
Postal address:			
Telephone:		Postal code:	
Fax:		Cell:	
E-mail:			
Municipality for proposed project:	Swartland Local Municipality		
Farm name(s), erf(s) and	Remainder of Farm Bakovend 403, Gouda District.		

portion number(s) etc*:	
Magisterial District or Town:	Moorreesburg
Name(s) of watercourse(s) in question:	Non-perennial tributary of the Berg River.
***In instances where there is more than one landowner, please attach a list of landowners with their full names, contact details, farm name, farm number, portion number, Erf number, coordinates and signed declaration confirming approval for development and responsibility of the MMP**	

2. DECLARATION

THE PERSON THAT WILL BE UNDERTAKING THE MAINTENANCE

I ……., in my **personal capacity** or **duly authorised** (please circle the applicable option) by …… (name of legal entity) thereto hereby declare that I/we:

- Request the MMP to be adopted by the Competent Authority;
- Regard the information contained herein to be true and correct for this Maintenance Management Plan;
- Am fully aware of my responsibilities in terms of the National Environmental Management Act of 1998 ("NEMA") (Act No. 107 of 1998) and that, notwithstanding the adoption of this MMP, I/we shall comply with any other statutory requirement applicable, which may include, but not limited to the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983), the National Water Act, 1998 (Act No. 36 of 1998) and the Environmental Impact Assessment Regulations, 2014 (as amended) ("EIA Regulations"), in terms of NEMA;
- Am fully aware that the proposed maintenance constitutes a listed activity in terms of the NEMA EIA Regulations, 2014 (as amended) and that an environmental assessment for environmental authorisation may be required for any other listed activities not included as part of this MMP;
- Acknowledge that any activity undertaken that does not form part of the defined and adopted MMP, will be subject to the Section 24(F) of NEMA and that appropriate enforcement and compliance requirements will follow;
- Shall undertake only those tasks described in the MMP, failing which environmental authorisation will be required, where applicable;
- Shall provide the competent authorities with access to all information at my disposal that is relevant to this request;
- Shall be responsible for any costs incurred in complying with environmental legislation;
- Hereby indemnify the government of the Republic, the competent authority and all its officers, agents and employees, from any liability arising out of, inter alia, any loss or damage to property or person as a consequence of undertaking this MMP; and
- Am aware that a false declaration is an offence in terms of Regulation 48(1)(a) GN No. R. 982 of 4 December 2014 (as amended).

Signature of the proponent: Date:

Name of institution/company:

3. BACKGROUND AND INTRODUCTION

Introduction:

This MMP has been compiled for the following:
The construction of instream dam.

The property and proposed dam site are situated west of the Berg River east of the Moorreesburg to Gouda gravel road approximately 23km east of Moorreesburg. The dam's 0.2 km^2 catchment is located in the quaternary catchment G10J. The proposed dam will have a storage capacity of 324 000m^3, dam wall height of 13.5m and a surface area of 6.2ha. The dam wall will be constructed using a cut and fill process. Soil and clay will be cut from the dam basin and dam wall area that will also help to increase the depth of the dam and decrease the catchment basin that will lower water evaporation as the surface of the dam is smaller. The cut material will be used to fill and construct the dam wall. No other material is needed to construct the dam wall.

The overall area is characterised by ploughed and planted lands used for agriculture. The dam will impact on a disturbed tributary of the Berg River which has been classified as an ecological support area. Take note that the tributary has no ecological functioning left other than the transport of water from the agricultural lands.

Associated infrastructure

The farm has two existing abstraction points on the Berg River south and north-east of the farmhouse. The existing pipelines (125 & 165mm dia) from these abstraction points will be upgraded to 250mm dia each to fill the proposed dam. An additional abstraction point with a 250mm dia pipeline (130m long) is proposed just below (to the north) of the proposed dam, which will be the shortest route to fill the dam.

A new power line will be required from the north-eastern abstraction point to the new point. All areas to be irrigated from the new dam will be located within existing cultivated lands. A raft abstraction pump from the dam basin will be used for bulk conveyance to the areas.

This MMP has been prepared principally in compliance with the requirements of "Annexure A – Guideline for Compiling a Maintenance Management Plan".

This document, together with the conditions in the EMPr, Environmental Authorisation, Water Use Authorisation, must be adhered to.

Background:

An Environmental Authorisation and Water Use Licence have been applied for and if granted must be complied with. The applicant has an Existing Lawful Water Use for abstraction of water from the Bergriver as confirmed by the Lower-Bergriver Irrigation Board, dated 01 February 2017.

3.1 DEFINITIONS OF TERMS AND ACRONYMS

Acronyms and technical terms used in the MMP must be defined or clarified so that the person(s) who must implement the plan understands the document clearly.

Definitions:

Auditing:	A systematic and objective assessment of an organization's activities and services conducted and documented on a periodic basis based to a (e.g. ISO 19011:2003) standard.

Biodiversity:	The variety of life in an area, including the number of different species, the genetic wealth within each species, and the natural areas where they are found.
Contractor:	An employer, as defined in section 1 of the Occupational Health and Safety Act 85 of 1993, who performs construction work and includes principal contractors.
Developer:	One who builds on land or alters the use of an existing building for some new purpose.
Environment:	A place where living, non-living and man-made features interact, and where life and diversity is sustained over time.
Evaporation:	The change by which any substance (e.g. water) is converted from a liquid state into and carried off as vapour.
Groundwater:	Subsurface water in the zone in which permeable rocks, and often the overlaying soil, are saturated under pressure equal to or greater than atmospheric.
Independent:	Is independent and has no interest in any business related to the development site, nor will receive any payment or benefit other than fair remuneration for the task undertaken.
Landowner:	Holder of the estate in land with considerable rights of ownership or, simply put, an owner of land.
Monitoring:	A systematic and objective observation of an organisation's activities and services conducted and reported on regularly.
Natural vegetation:	All existing vegetation species, indigenous or otherwise, of trees, shrubs, groundcover, grasses and all other plants found growing on a site.
Pollution:	The result of the release into air, water or soil from any process or of any substance, which is capable of causing harm to man or other living organisms supported by the environment.
Protected Plants:	Plant species officially listed under the Threatened or Protected Species regulations as well as on the Protected Plants List (each province has such a list), and which may not be removed or transported without a permit to do so from the relevant provincial authority.
Red Data Species:	Plant and animal species officially listed in the Red Data Lists as being rare, endangered or threatened.
Rehabilitation:	Making the land useful again after a disturbance. It involves the recovery of ecosystem functions and processes in a degraded habitat. Rehabilitation does not necessarily re-establish the pre-disturbance condition, but does involve establishing geological and hydro logically stable landscapes that support the natural ecosystem mosaic.
Site:	Property or area where the proposed development will take place.

Acronyms:

DEA&DP:	Department of Environmental Affairs and Development Planning
DWS:	Department of Water and Sanitation

ECO:	Environmental Control Officer
EA:	Environmental Authorisation
EIA:	Environmental Impact Assessment
EM:	Environmental Manager
EMP:	Environmental Management Programme
EO:	Environmental Officer
ER:	Engineer's Representative
I&AP:	Interested and Affected Party
IEM:	Integrated Environmental Management
MS:	Method Statement
PM:	Project Manager
SANS:	South African National Standards

4. ENGAGEMENT PROCESS

4.1 AUTHORITY ENGAGEMENT

Please indicate (with an 'x') which of the following authorities have been consulted to provide input based on the proposed maintenance activities:

- X Department of Water and Sanitation
- ☐ Catchment Management Agency
- X CapeNature
- ☐ SANParks
- X Western Cape Department of Agriculture, Directorate: Sustainable Resource Management
- X District Municipality
- X Local Municipality
- X Irrigation Board / Water Users Association
- X Heritage Western Cape
- X Department of Agriculture, Forestry and Fisheries
- X Department of Environmental Affairs & Development Planning
- ☐ Other (please list):

For each of the indicated authorities, please provide an explanation as to their required involvement. Details of interactions with each of the respective authorities should be captured by providing an attendance register and minutes of meetings attended with the authority in question. Comments received from the authorities must be submitted and referenced within the final application.

Please take note that the application is only in the pre-application phase – this section of the report will be populated once comment from the statutory bodes are received.

4.2 PUBLIC PARTICIPATION

You are required to notify any and all potential interested and affected party(ies) of the proposed activity(ies) and allow them the opportunity to comment on the MMP for a watercourse. The detail required is outlined below, however this can be further discussed and determined as part of the pre-consultative meeting with the Department, which would ensure due diligence and good governance principles are applied.

It is noted, that for the development of MMPs for watercourses within the urban area, by Municipalities, public notice can be undertaken through the advertisement of the development of an MMP within local/community newspapers for the respective areas, with the relevant evidence of such an advertisement included in the final submission.

The following public participation recommendations, regarding the different scale or geographical extent of the request, are as follows. If no, then motivation must be given as to why a particular process was not undertaken.

Single property / maintenance and management activities along a watercourse occurring along a stretch of no more than 1 kilometer (≤1000 meters):

(i) Given written notice to the owner or person in control of that land if the person undertaking the maintenance activity is not the owner or person in control of the land.	***Yes / ~~No~~***	***Evidence to be letter from landowner acknowledging development of MMP.***
(ii) Given written notice to adjacent landowners (up to 500m upstream and downstream from furthest upstream and downstream maintenance site and opposite side of the banks) of the development of the MMP.	***Yes / ~~No~~***	***Evidence to be dated letters addressed to landowner and/or manager of adjacent properties.***
(iii) Stakeholder meeting held for adjacent landowners, in which MMP is presented. This must include an opportunity for adjacent landowners to provide comment.	***~~Yes~~ / No***	***Evidence will consist of meeting requests, attendance register of said meeting, minutes / notes of the meeting, and comments provided.***
(iv) Given written notice to any organ of state having jurisdiction in respect of any aspect of the activity(ies) proposed within the development of the MMP.	***Yes / ~~No~~***	***Evidence will include relevant dated letters to the relevant government agencies and departments.***
(v) Provided written notice and confirmation to the relevant Water Users Association (WUA) or Irrigation Board (IB) of the development of the MMP, if applicable.	***Yes / ~~No~~***	***Evidence to be dated letter(s) to management body (secretary and chairperson) for the WUA/IB.***

Single or Multiple properties / WUA / IB / local authority applying for a single MMP to cover a stretch of a watercourse longer than 1 kilometer (>1000 meters) OR a catchment or sub-catchment area

(i) Given written notice to the owner(s) or person(s) in control of the land if the person(s) undertaking the maintenance activity(ies) is not the owner or person in control of the land.	***Yes / No***	***Evidence to be letter from landowner acknowledging development of MMP.***
(ii) Given written notice to non-participating adjacent landowners (up to 1km upstream and downstream from furthest upstream and downstream maintenance site and opposite side of the river banks) of the development of the MMP. *This must also include general notice to adjacent WUA or IB of the proposed MMP development if application is made by a WUA or IB.*	***Yes / No***	***Evidence to be dated letters addressed to landowner and/or manager of adjacent properties.***
(iii) Stakeholder meeting held for all participating and non-participating landowners, in which details and methodology of MMP is presented. A minimum of two meetings are required, to present on the development of the plan and a final draft version of the plan.	***Yes / No***	***Evidence will consist of meeting requests, attendance register of said meeting, minutes/ notes of the meeting, and comments provided.***
(iv) Given written notice to any organ of state having jurisdiction in respect of any aspect of the activity(ies) proposed within the development of the MMP.	***Yes / No***	***Evidence will include dated letters to the relevant government agencies and departments.***
(v) Provide written notice and confirmation to the relevant Water Users Association (WUA) or Irrigation Board (IB), of the development of the MMP *(if a MMP is not requested and managed through a WUA/IB).*	***Yes / No***	***Evidence to be dated letter(s) to management body (secretary and chairperson) for the WUA/IB.***
(vi) Describe any other measures taken to inform the public about this MMP. A complete list of measures that are in place to deal with interactions with the public, if it becomes necessary and required by the competent authority during implementation of the project, must be provided for.	***Yes / No***	***Evidence to be referenced accordingly based on the measures taken and/or developed.***

Kindly note, the Department may request further or allow reduced requirements for public participation, noting the specific circumstances applied to each request to define or adopt an MMP. Please include or delete the respective sections as agreed to with the Department in the pre-consultative meeting, with supporting evidence of this agreement included.

Please circle the appropriate answer above to indicate the public participation process that has been followed to give notice of this request to potential interested and affected parties and attach any comments and/or objections received, with evidence provided and referenced.

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5. DATA COLLECTION AND ASSESSMENT

[This section is intended to provide the required information on the needs for the scientific content and methodology statements of a MMP. It provides headings for the various sections that a MMP must contain, as well as a brief description of typical content and the level of detail required under each heading]

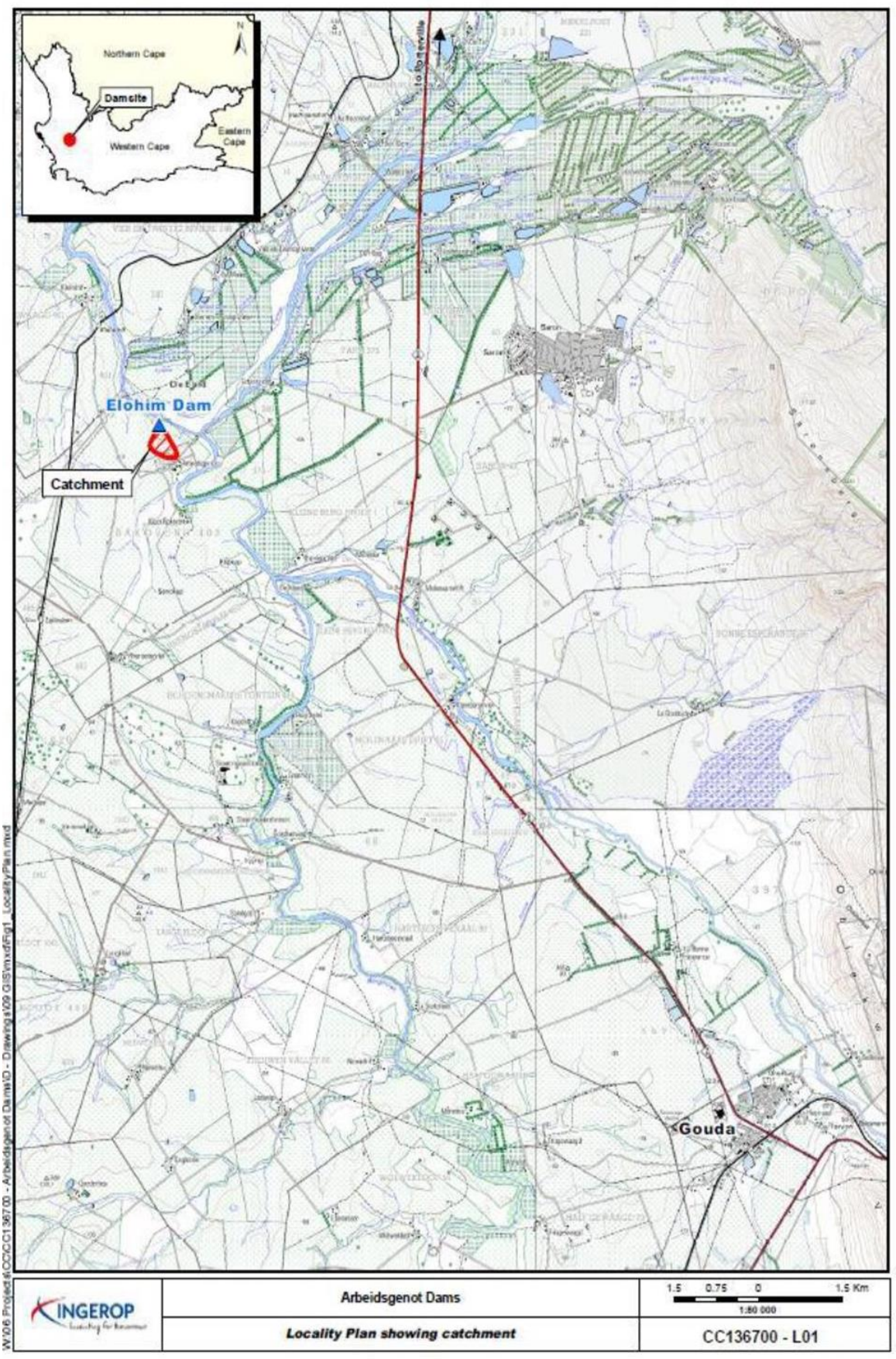
***Note**: Information relating to the specifications and Terms of Reference used for the appointment of all specialist inputs must be provided.*

Information required for *maintenance and management activities for a single~~/ multiple~~ owner along a watercourse.*

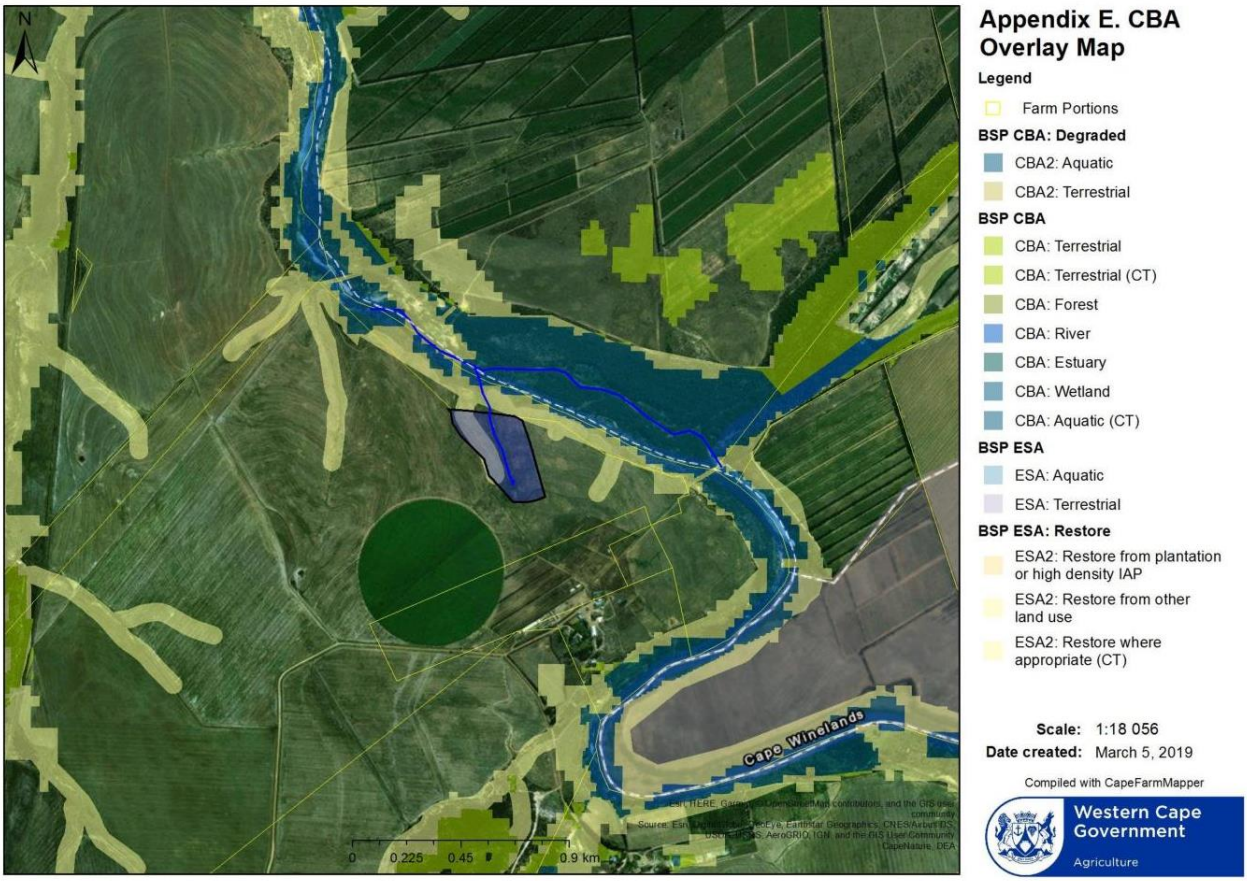
5.1 Provide a map (at an appropriate scale) of the watercourse or stretch of watercourse being applied for within the stretch where maintenance activities will take place being clearly defined – consideration must be made to mapped features relating to Critical Biodiversity Areas (CBAs) and National Freshwater Ecosystem Priority Areas (NFEPAs).

Maps indicating the relevant environmentally sensitive features have been included in this document as follows:

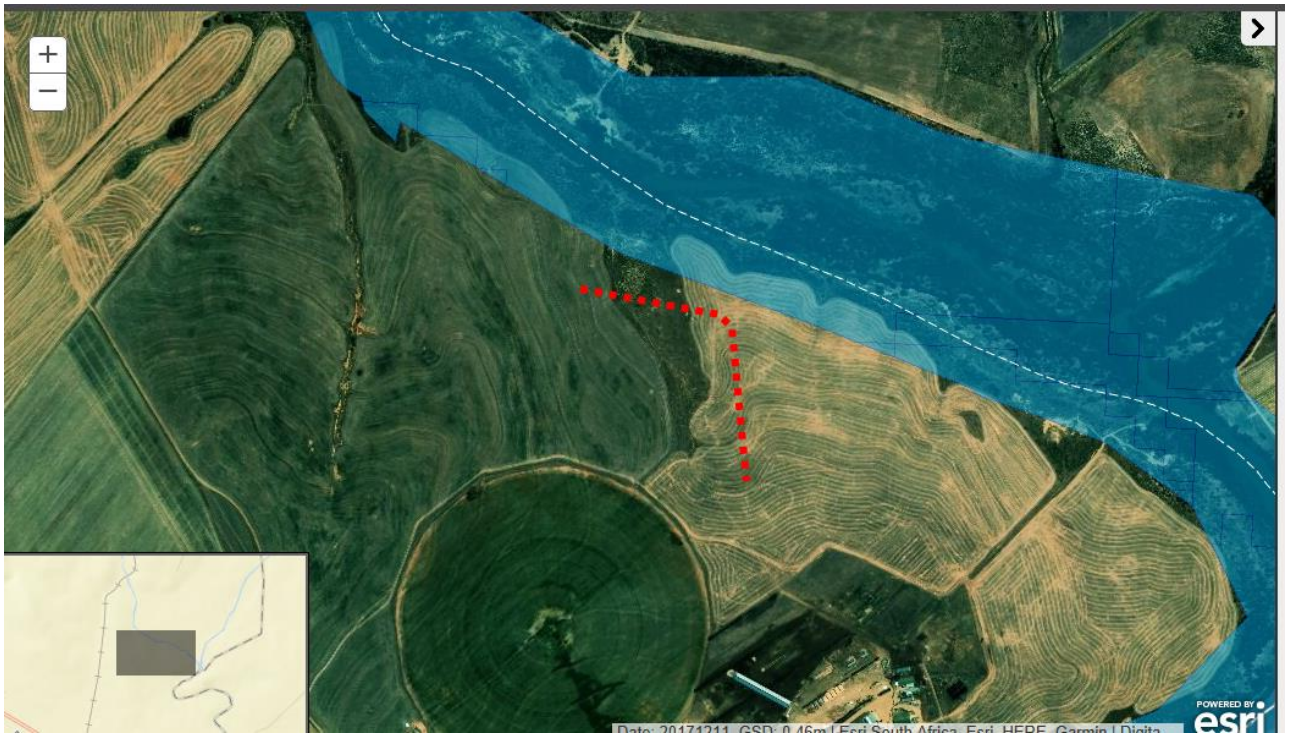
Map 1: Locality map



Map 2: Biodiversity Map



Map 3: NFEPA map



5.2 GPS coordinates must be provided for all site(s) at which maintenance activities will take place and included on the map which defines the stretch of watercourse. Coordinates must be provided in degrees, minutes and seconds using the Hartebeesthoek94 WGS84 co-ordinate system. Where numerous properties/sites are involved (e.g. linear activities), you may attach a list of property descriptions and co-ordinates to this form.

Location of all proposed sites:	The property and proposed dam site is situated west of the Berg River east of the Moorreesburg to Gouda gravel road approximately 23 east of Moorreesburg.					
Farm / Erf name(s) and number(s) (including Portions thereof) for each proposed site:	Remainder of Farm Bakovend 403, Gouda district.					
Property size(s) in m^2 for each proposed site:	282.73 ha					
Development footprint size(s) in m^2:	The dam's catchment of 0.2 km2 is located in the quaternary catchment G10J. The proposed dam will have a storage capacity of 324 000 m3, dam wall height of 13.5 and a surface area of 6.2ha.					
Surveyor General (SG) 21 digit code for each proposed site:	C04600000000040300000					
Coordinates of all the proposed activities on the property or properties (sites):	**Latitude (S):** (deg.; min.; sec)			**Longitude (E):** (deg.; min.; sec.)		
	33°	11'	34"	18°	55'	41"

5.3 Specialist assessment to be undertaken to determine (NOTE: information relating to the specifications and Terms of Reference used for the appointment of all specialist inputs must be provided):

Please refer to the following Specialist studies included as annexures to the BAR:

Appendix F1: Freshwater and Terrestrial Ecology Assessment

5.4 Mapped biodiversity features such as Critical Biodiversity Area, Ecological Support Area, National Freshwater Ecosystem Priority Area (NFEPA), and the National list of Ecosystems that are threatened and in need of protection (2011) gazetted in terms of Section 52 of the National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEMBA), the Western Cape Biodiversity Spatial Plan 2017, as well as relevant provincial specific plans and classifications etc. Please consult the website www.bgis.sanbi.org.za to determine mapped features.

The site is located in the Berg River catchment (DWS Primary Drainage Region G)[1]. The proposed water uses would pass through sections of the G10F quaternary catchment which is drained primarily by the Berg, Diep and Steenbras rivers. The tributary in which the proposed water uses is planned flow into the Berg river. The natural vegetation on site used to be Swartland Shale renosterveld (Critically Endangered conservation status). The impacted and surrounding area is however transformed and disturbed as a result of agricultural activities.

[1] Department of Water and Sanitation, South Africa. January 2017. Determination of Water Resources Classes and Resource Quality Objectives in the Berg Catchment: Evaluation of Scenarios Report. Report No: RDM/WMA9/00/CON/CLA/0417.

Two biodiversity conservation mapping initiatives are of relevance to the freshwater ecosystems within the study area; namely the Western Cape Biodiversity Spatial Plan mapping initiatives that were undertaken on a regional basis and the NFEPA mapping initiative. The Berg River adjacent to the proposed dam (Valley floor unchanneled valley bottom wetland) is the only identified NFEPA features within the regulated zone.

The non-perennial river in which the proposed dam is planned was identified as Ecological Support Areas (ESAs) in the latest Western Cape Biodiversity Spatial Plan (2017). ESA's are supporting zones required to prevent the degradation of Critical Biodiversity Areas (CBAs) and Protected Areas. The Berg River adjacent and downs stream to the dam expansion site was identified as an Aquatic CBA and its buffer areas as an ESA. The proposed dam expansions are however outside the CBA and ESA areas identified. The dam wall and catchment of the dam will be outside the Berg River flood plain and buffer areas.

5.5 Include a description of existing or previous protection measures or reinforcements (eg. gabions or groynes etc.) and infrastructure. Describe any evidence of erosion and/or siltation at the various sites and outlining possible causal factors and maintenance practices.

A photographic record of the impacted area was taken in order to provide a visual record of the condition of the assessment site as observed during the field assessment. The photographs taken are presented (Photos 1-5), followed by a table (Table 4) summarising the observations for the various criteria made during the visual assessment undertaken at each point.

The non-perennial river in which the dam is proposed is a tributary of the Berg River. Flow within the minor tributary would only occur for a short period of time in winter. The dam's catchment of 0.2 km^2 is located in the quaternary catchment G10J. The Water Research Commission MAP indicate a rainfall of 471 mm. The Mean Annual Runoff (MAR) from the catchment is estimated at less than 10 000 m^3 (little runoff from sandy overburden soils) and therefore neglible.The non-perrenial river is fully located in an agricultural ploughed land and surrounded by cultivated lands.

Photo 1: Upstream channelled non-perennial river.

Photo 2: View of non-perennial river downstream of proposed dam

Photo 3: Non-perennial river downstream of dam before flowing into the Berg River

Photo 4: View of dam catchment area

Photo 5: View of Berg river floodplain downstream of the proposed dam

The non- perennial river (proposed dam area) consists of area impacted by the existing agricutural activities that resulted in the degradation of the non-perennial rivers PES. The PES for this section of the river and where the dam is proposed was assessed to have a poor PES status. The riparian system falls into the category E. This indicates that the loss of natural habitat, biota and basic ecosystem functions is extensive.

Table 4: Descriptions of the location of dam in relation to mapped non-perennial river

Characteristics	Dam site	Upstream area	Downstream area
Significance of the point	This point is to be used as a reference point for the site. Any degradation from this point would serve as an indication of impacts on the surrounding area.	This point is to be used as a reference point for the site. Any degradation from this point would serve as an indication of impacts on the surrounding area.	This point is to be used as a reference point for the site. Any degradation from this point would serve as an indication of impacts on the surrounding area.
Surrounding anthropogenic activities	The site is situated at the area where the dam will impact on the non-perennial river.	The site is situated upstream where the dam will impact the non-perennial river.	The site is situated downstream where the dam will impact the non-perennial river.
Riparian zone characteristics	No riparian at this point and it is characterised by alien grasses (*Avena sativa*) as a result of the current and past	No riparian at this point and it is characterised by alien grasses (*Avena sativa*) as a result of the current and past agricultural activities in the area.	Limited riparian at this point. The Berg River in the area are typically dominated by the common reed *Phragmites australis* in the

	agricultural activities in the area.		instream zone and invasive alien trees such as River gums (*Eucalyptus camaldulensis*) and Port Jackson willows (*Acacia saligna*) dominating the riparian zones.

Riparian Vegetation Response Assessment Index (VEGRAI)

The results of the VEGRAI are indicated in Table 5 below.

The overall VEGRAI score of the impacted area

LEVEL 3 ASSESSMENT					
METRIC GROUP	CALCULATED RATING	WEIGHTED RATING	CONFIDENCE	RANK	% WEIGHT
MARGINAL	10.0	3.8	2.7	2.0	60,0
NON MARGINAL	41.7	26.0	2.7	1.0	100,0
2.0					160,0
LEVEL 3 VEGRAI (%)				29.8	
VEGRAI EC				**E**	
AVERAGE CONFIDENCE				2.7	

The score attained for the VEGRAI indicated that the riparian system falls into the category E and this indicates that the loss of natural habitat, biota and basic ecosystem functions is extensive.

Ecological Importance and Sensitivity (EIS)

The results of the EIS are indicated in Table 6 below.

Table 6: Results of the EIS assessment for the affected watercourse

Component	Score	Confidence	Comments/description
Channel type	1	4	Channelled non-perennial river.
Conservation context	0	4	No Status
Vegetation and habitat Integrity	1	4	Largely modified
Connectivity	1	4	Not connected. Downstream connection is lost.
Threat Status of Vegetation Type	1	4	Critically Endangered Vegetation at the dam impact site has a low botanical conservation value
EIS Category	**0.8**		**Low to marginal**

EIS considers a number of biotic and habitat determinants surmised to indicate either importance or sensitivity. The determinants are rated according to a four-point scale. The median of the resultant score is calculated to derive the EIS category.

The non-perennial river is considered to be of low/marginal ecological importance. The non-perennial river and proposed dam areas were also not identified as a Critical Biodiversity Area or important area from a terrestrial ecology and botanical perspective.

The non-perennial river was classified according to the Classification System[2] as an Inland System, located within the Southern Coastal Belt Ecoregion.

Rapid Habitat Assessment

Description of the site

Geomorphic zone
The South Western Coastal Belt is typified by renosterveld-covered plains

Geomorphic Habitat Unit (GHU) characterisation
Alluvial run

Valley shape
U Shape

Channel shape
Broad valley

Longitudinal connectivity at low flows (time of survey)
Unrestricted passage

Types of bars present
Bars absent

Bank shape
Concave

Bank slope
Flat

Bed compaction
Low compaction (2).

Sediment matrix
Matrix dominated

Local Disturbances at the site

The information relates to the Index of Habitat Integrity (IHI) information that is collated to derive the IHI ratings (Kleynhans *et al.* 2008). However, the IHI evaluations of impacts are applicable to the Management Resource Unit (MRU) and not to the site per se. This information required here is applicable to the site and only serves as a record to identify any additional local disturbances or changes. The IHI for the MRU is a requirement as part of the baseline for Ecological Water Resources Monitoring (EWRM) and therefore does not have to be addressed here.

Table 7 identify the disturbance, to provide a comment regarding the disturbance, and to provide a rating (1 – 5). The rating is an evaluation of the extent and severity of the disturbance with 5 relating to a severe disturbance applicable to most of the site. The focus area is the channel condition and the riparian zone as well as any disturbances immediately outside of the riparian zone which impacts on the site.

MODIFICATION	COMMENT	RATING
Abstraction (run of river)	None.	1
Animal farming	Area use for grazing of livestock.	5

[2] Kleynhans, CJ, Thirion, C and Moolman, J (2005). A Level I River Ecoregion classification System for South Africa, Lesotho and Swaziland. Report No. N/0000/00/REQ0104. Resource Quality Services, Department of Water Affairs and Forestry, Pretoria, South Africa.

MODIFICATION	COMMENT	RATING
Artificial covering	Vegetation extremely disturbed as a result of farming activities	5
Bed: material disturbance/removal	Historical agricultural disturbances.	4
Bed: stabilization (e.g. concrete)	None	NA
Buildings	None	NA
Channel Straightening	Historical agricultural disturbances.	4
Construction activities	None	NA
Crossings low water (immediately upstream or downstream)	None	NA
Dams (immediately upstream or downstream)	None	NA
Dry land farming	Ploughed and planted wheat fields	4
Erosion	Minimal	1
Forestry	None	NA
Invasive alien vegetation	*Avena sativa* as a result of the current and past agricultural activities in the area.	5
Irrigation	None	NA
Mining	None	NA
Off-channel dams	None	NA
Recreation	None	NA
Riparian vegetation removal	*Avena sativa* as a result of the current and past agricultural activities in the area.	5
Roads	None	NA
Rubbish dumping	None	NA
Runoff/effluent	None	NA
Trampling	Area use for grazing of livestock.	5
Weirs (immediately upstream or downstream)	None	NA

Geomorphic Habitat Unit (GHU)
Run (RN): Water moving with a relatively smooth, unbroken surface. Low turbulence. (FAST SHALLOW AND OR FAST DEEP). Similar to a glide

Depth
Approximately 0.5m

Velocity
The velocity is judged to be slow considering the characteristics of the bed and banks.

Substrate
Sediment. Low compaction (2).

Cover
Grasses (*Avena sativa*) as a result of the current and past agricultural activities in the area.

Anthropogenic activities
Anthropogenic activities have impacts on in-stream water quality and obvious sources of activities that can result in impaired in-stream water quality (Table 8).

Table 8: Non-perennial river anthropogenic activities recorded for the river reach affected

ANTHROPOGENIC ACTIVITIES	RATING					
	0	1	2	3	4	5

Ploughing along banks						x
Sand-mining	x					
Cattle watering or crossing point						x
Abstraction point	x					
Discharge point	x					
Chemical spill, e.g. abandoned pesticide containers, spillage from pumps, vehicle accidents	x					
Car washing	x					
Laundry washing	x					
In-stream building activities	x					
Litter	x					
Dump site	x					
Other (List, e.g. weir immediately upstream).	x					

Odour

The type of odour that is present at the site, if any (Table 9). NOTE WHETHER ODOURS ARE ASSOCIATED WITH THE SEDIMENT IN THE RIPARIAN ZONE. The following odours have been identified: a. Sewage, b. Cattle, e.g. cattle-watering point, c. Chemical, e.g. chlorine or pesticides, d. Anaerobic, e.g. hydrogen sulphide (or "rotten egg" smell normally associated with sediments) and e. Other: describe if possible

Table 9: Non-perennial river water quality indicator recorded for the river reach affected

WATER QUALITY INDICATOR	RATING						
	NA	0	1	2	3	4	5
Odour type 1 – sewage	x						
Odour type 2 – cattle	x						
Odour type 3 – chemical	x						
Odour type 4 – anaerobic	x						
Odour type 5 – other	x						

Colour

The colour of the water column at the site, if discoloured (Table 10). The following colours can be identified: a. Brown-black, indicating humics or low pH. DO NOT SCORE IF NATURAL, E.G. WESTERN CAPE STREAMS, b. Milky, indicating possible chemical pollution, c. Green, indicating algal growth in the water column and probable eutrophication, d. Orange, indicating presence of iron-oxidizing bacteria or acid mine drainage. NOTE THAT THIS IS NOT TURBIDITY and e. Other: describe if possible

Table 10: Non-perennial river water quality indicator (colour) recorded for the river reach affected

WATER QUALITY INDICATOR	RATING						
	NA	0	1	2	3	4	5
Colour type 1 – brown-black	x						
Colour type 2 – milky	x						
Colour type 3 – green	x						
Colour type 4 – orange	x						
Colour type 5 – other	x						

Clarity

Turbidity can be described as the following levels of clarity (Table 11) if a turbidity meter, turbidity tube or Secchi disk is not available to conduct a quantitative measurement.

Table 11: Non-perennial river water quality indicator (clarity) recorded for the river reach affected

WATER QUALITY INDICATOR	RATING					
	0	1	2	3	4	5
Clarity						

Clarity could not be recorded. No water flow at time of site visit.

0: no turbidity in the water column, 1: slightly turbid, 2: moderately turbid,3: largely turbid,4: seriously turbid and 5: extremely turbid or opaque throughout the site

Water surface and riparian bank and vegetation clues

The presence of deposits on the surface of the water and riparian banks or vegetation may be indicative of potential water quality impairment (Table 12).

Table 12: Non-perennial river surface water quality indicator recorded for the river reach affected

SURFACE WATER QUALITY INDICATOR	RATING						
	NA	0	1	2	3	4	5
Scum (e.g. from elevated organics)	x						
Foam (e.g. detergent use)	x						
Purple / oily sheen (e.g. diesel + oils)	x						
Visible salt deposits on banks and vegetation	x						
Other							

Extent of algal growth on rocks

The presence of algal growth on rocks, i.e. periphyton, may indicate eutrophication or elevated nutrients in the water column (Table 13). It is important to compare these indicators to the natural state as some rivers may have naturally high nutrient levels due to geological and other factors.

Table 13: Extent of algal growth on rocks recorded for the river reach affected

WATER QUALITY INDICATOR	RATING					
	0	1	2	3	4	5
Extent of algal growth on rocks	x					

0: no periphyton growth on rocks, 1: slight periphyton growth, 2: moderate growth, 3: large periphyton growth, 4: serious periphyton growth and 5: extreme coverage of rocks.

Visible biotic response

Any visible biotic responses displayed by megafauna, e.g. fish kills, should be noted and will require an immediate management action (Table 14). A more detailed water quality assessment will need to be conducted immediately, including toxicity testing of in-stream water.

Table 14: Visible biotic response recorded for the river reach affected

VISIBLE BIOTIC RESPONSE	RATING						
	NA	0	1	2	3	4	5
Visible fish kill	x						
Visible other species (note species)	x						

The overall Ecological and Importance of the non-perennial river where the proposed dam expansion is planned is assessed to be Low.

This confirm the assessment results of the NFEPA study and State of the River report findings.

HYDROLOGY AND ENVIRONMENTAL WATER REQUIREMENTS

The proposal is to store 320 000 cubic meters of allocated water from the Berg River in a newly constructed dam that would be constructed within a minor tributary of the Berg. Flow within the minor tributary would only occur for a short period of time in winter. The dam's catchment of 0.2 km^2 is located in the quaternary catchment G10J. The Water Research Commission MAP indicate a rainfall of 471 mm. The Mean Annual Runoff (MAR) from the

catchment is estimated at less than 10 000 m³ (little runoff from sandy overburden soils) and therefore neglible.[3]
No Reserve or environmental water requirement determination was undertaken due to the fact that the water utilized to fill the proposed dam would be from already allocated water from the Berg River. Although the proposed dam would be placed within a minor tributary, the runoff from the streams is small. The abstraction from Berg River should be reduced by the amount impeded from the stream by the dam.

There is only likely to be surface water runoff from the catchment of the minor tributaries between the months of April/May to October. The Environmental Water Requirement of the watercourses within the study area for the recommended ecological category for these streams of an E category (largely modified) would be approximately 20% of the Mean Annual Runoff (MAR) of the watercourses. This would equate to an environmental flow requirement of approximately 2 000 m^3. There is however only a very short stretch of the watercourse (about 30m) downstream of the proposed dam that would benefit from any environmental flow release. The significant section of the non-perennial river that requires water for ecological functioning is flooded from time to time during winter when the Berg River flow is high.

6. METHOD STATEMENTS

6.1 The method statement must provide a step-by-step plan (which may include a schematic diagram etc.) to inform the responsible person(s) on the process and actions to take in a sequential and logical manner, which aims to reduce the impact of undertaking the activity within a reasonable timeframe and cost.

6.2 A method statement should be compiled for each individual activity given the likely specific circumstances and conditions of a site requiring maintenance. However, in situations whereby uniform conditions and circumstances are evident for multiple sites requiring the same type of activity, a method statement can be given for a specific type of activity to be undertaken at multiple sites given the aforementioned requirements.

6.3 The detail of the method statement will be assessed by the Department and other relevant regulatory authorities to ensure actions that are taken are such that they do not perpetuate increased incidences of erosion/deposition of material.

6.4 Time periods must be given within which the maintenance actions contemplated need to be implemented. An indication must be made whether maintenance actions will be repeated, e.g. clearing of silt/debris from under a bridge annually or after flood events.

6.5 The following serves as a general guide required to minimise the spatial impact of the maintenance activity:

- Repairs and maintenance should be undertaken within the dry season, except for emergency maintenance works.

- Where at all possible, existing access routes should be used. In cases where none exist, a route should be created through the most degraded area avoiding sensitive/indigenous vegetation areas.

- Responsible management of pollutants through ensuring handling and storage of any pollutants is away from the watercourse. When machinery is involved, ensure effective operation with no leaking parts and refuel outside of the riparian area, at a safe distance from the watercourse to manage any accidental spillages and pose no threat of pollution.

[3] Mbenga, J & Hagen. D.J. 03 April 2017. Ingerop Engineers. Proposed Elohim Dam, Moorreesburg.

- At no time should the flow of the watercourse be blocked (temporary diversions may be allowed) nor should the movement of aquatic and riparian biota (noting breeding periods) be prevented during maintenance actions.
- No new berms can be created.
- In circumstances which require the removal of any top soil, this must be sufficiently restored through sustainable measures and practices.
- Concerted effort must be made to actively rehabilitate repaired or reshaped banks with indigenous local vegetation.
- No deepening of the watercourse beyond the original, pre-damage determined thalweg, unless such deepening is directly related to the natural improved functioning and condition of such a watercourse.
- Where at all possible, limit the disturbance to the zone of the thalweg. This is due to the ecological importance of the low flow channel and respective habitat being allowed to re-establish improving the ecological condition.
- The build-up of debris/sediment removed from a maintenance site may:
    - be utilised for the purpose of in-filling or other related maintenance actions related to managing erosion, which form part of an adopted MMP;
    - not be used to enlarge the height, width or any extent of existing berms;
    - not be deposited anywhere within the watercourse or anywhere along the banks of a river where such action is not part of the proposed maintenance activity (ies). Material that cannot be used for maintenance purposes must be removed out of the riparian area to a suitable stockpile location or disposal site. Further action and consideration may be required where the possibility of contaminated material may occur, such as in urban watercourses.
- The use of foreign material, such as concrete, rubble, woody debris and/or dry land based soil, is strictly prohibited from being used in maintenance actions, unless for the specific purpose of repairs to existing infrastructure, coupled with appropriate mitigation measures.
- On completion of the maintenance action, the condition of the site in terms of relative topography should be similar to the pre-damaged state (i.e. the shape of the river bank should be similar or in a state which is improved to manage future damage). This ultimately dictates that the channel, banks and bed cannot be made narrower, higher or deepened respectively. Exceptions are considered for systems involved with the management of stormwater and improvements for water quality within the urban context.

METHOD STATEMENTS

Activity A		
Description of maintenance activity	**Alien vegetation removal.**	
Actions	The following actions are anticipated to be undertaken in order to carry out alien vegetation removal: • Removal of the invasive and alien plants should be according to the appropriate invasive alien plant clearing guidelines/methods provided by the Working for Water Programme.	
Impacts of actions	The following impacts are anticipated as a result of undertaking the maintenance activity: • Minor disturbance to the local indigenous vegetation within the aquatic habitats as a result of removal of alien and invasive plants. • Clearance of alien and invasive vegetation from the area and subsequent improvement in the ecological health where construction and rehabilitation has taken place within aquatic habitats.	
Severity of impacts	Minor disturbance to the local vegetation	If all mitigation measures are implemented, the severity of the impact will be Negligible.
	Alien vegetation clearance	• N/A this impact is a POSITIVE
Measures to mitigate the severity of the impact	Minor disturbance to the local vegetation	Mitigation measures listed as follows: • Removal of the invasive and alien plants should be according to the guidelines provided by the Working for Water Programme.
	Alien vegetation clearance	• N/A this impact is a POSITIVE
Remedial measures if mitigation measures are not implemented adequately on site.	There are no additional remedial mitigation measures other than those listed above. As such, all mitigation measures as outlined above should be implemented in full.	
Method of Access to the site	Access to the site could be gained using the access roads and selected demarcated areas.	
Time period of maintenance management activity	The maintenance management activity should be undertaken on a regular basis (at least 12 monthly) after the work is completed. The maintenance management activity will last for approximately 1-2 days.	

Activity B		
Description of maintenance activity	**Site Inspections of the drainage line corridor.** **Inspection of the dam and rehabilitated areas.**	
Actions	Undertake regular inspections to ensure that: • The river channel and associated areas do not become blocked with sediment, debris or nuisance vegetation growth; • No erosion of the dam and associated areas occurs; and • The areas remain clear of invasive alien plants and nuisance plant growth should it serve to block the channel or associated areas. These inspections can be undertaken from the banks where there is access and disturbance of any aquatic habitat is minimal. • All waste within the drainage channel must be removed on a weekly basis. • Sandy areas and riffles must be maintained for frog habitat.	
Impacts of actions	The following impacts are anticipated as a result of undertaking the maintenance activity: • A negligible disturbance to the local vegetation as a result of the inspection process.	
Severity of impacts	Minor disturbance to the local vegetation	If all mitigation measures are implemented, the severity of the impact will be Negligible.
Measures to mitigate the severity of the impact	Minor disturbance to the local vegetation	Mitigation measures are listed as follows: • The minimum area for the maintenance activity to be adequately undertaken should be properly demarcated. Outside of the maintenance activity area should be treated as a no-go area.
Remedial measures if mitigation measures are not implemented adequately on site.	There are no additional remedial mitigation measures other than those listed above. As such, all mitigation measures as outlined above should be implemented in full.	
Method of Access to the site	Access to the site could be gained using the access roads and selected demarcated areas.	
Time period of maintenance management activity	The maintenance management activity should be undertaken on a regular basis after the river works are completed and in particular following significant rainfall events as well as prior to the onset of the winter rainfall period. This maintenance management activity will last for not more than 2 hours.	

Activity C		
Description of maintenance activity	**Erosion Protection along the drainage line and dam infrastructure.**	
Actions	The following actions are anticipated to be undertaken in order to remove blockages from the river channel and associated areas: • All rubble and waste debris in the river channel should be removed out of the river channel and banks by hand. Particular attention should be given to upstream of the structure in the drainage line. • Clearing of nuisance growth of plants within the channel if necessary should also be undertaken by hand during the low/no flow period.	
Impacts of actions	The following impacts are anticipated as a result of undertaking the maintenance activity: • Minor disturbance to the local indigenous vegetation as a result of accessing the site • Disturbance to the river banks due to removal of sediment, debris and nuisance plant growth	
Severity of impacts	Disturbance to the river bed and banks due to removal of sediment, debris or nuisance plant growth	If all mitigation measures are implemented, the severity of the impact will be Negligible.
Measures to mitigate the severity of the impact	Disturbance to the river bed and banks due to removal of sediment, debris or nuisance plant growth Alien vegetation clearance	Mitigation measures listed as follows: • The disturbance of aquatic habitats associated with the maintenance works should be limited (both temporal and spatial extents) as far as possible. • Care should be taken to minimize the sedimentation that would be caused downstream of the works. • Work should preferably be undertaken by hand with no machinery driven into aquatic habitats. • Activities associated with the maintenance work should be undertaken during the low flow period before the onset of the high flows. • Soil, debris and nuisance plant growth removed from the river channel and associated areas should not be dumped within the immediate areas surrounding the aquatic habitats or any indigenous vegetation removed from the site. Removed soil could be used to fill eroded areas.
Remedial measures if mitigation measures are not implemented adequately on site.	There are no additional remedial mitigation measures other than those listed above. As such, all mitigation measures as outlined above should be implemented in full.	
Method of Access to the site	Access to the site could be gained using the access roads and selected demarcated areas.	
Time period of maintenance management activity	The maintenance management activity should be undertaken on a regular basis (at least 6 monthly) after the work is completed. The maintenance management activity will last for approximately 1-2 days.	

Activity D		
Description of maintenance activity	**Removal of Sediment, Debris or Nuisance vegetation growth within the drainage line and dam infrastructure.**	
Actions	The following actions are anticipated to be undertaken in order to remove blockages from the river channel and associated areas: • All rubble and waste debris in the river channel should be removed out of the river channel and banks by hand. Particular attention should be given to upstream of the structures in the drainage line. • Clearing of nuisance growth of plants within the channel if necessary should also be undertaken by hand during the low/no flow period.	
Impacts of actions	The following impacts are anticipated as a result of undertaking the maintenance activity: • Minor disturbance to the local indigenous vegetation as a result of accessing the site; • Disturbance to the river banks due to removal of sediment, debris and nuisance plant growth.	
Severity of impacts	Disturbance to the river bed and banks due to removal of sediment, debris or nuisance plant growth	If all mitigation measures are implemented, the severity of the impact will be Negligible.
Measures to mitigate the severity of the impact	Disturbance to the river bed and banks due to removal of sediment, debris or nuisance plant growth Alien vegetation clearance	Mitigation measures listed as follows: • The disturbance of aquatic habitats associated with the maintenance works should be limited (both temporal and spatial extents) as far as possible. • Care should be taken to minimize the sedimentation that would be caused downstream of the works. • Work should preferably be undertaken by hand with no machinery driven into aquatic habitats. • Activities associated with the maintenance work should be undertaken during the low flow period before the onset of the high flows. • Soil, debris and nuisance plant growth removed from the river channel and associated areas should not be dumped within the immediate areas surrounding the aquatic habitats or any indigenous vegetation removed from the site. Removed soil could be used to fill eroded areas.
Remedial measures if mitigation measures are not implemented adequately on site.	There are no additional remedial mitigation measures other than those listed above. As such, all mitigation measures as outlined above should be implemented in full.	
Method of Access to the site	Access to the site could be gained using the access roads and selected demarcated areas.	
Time period of maintenance management activity	The maintenance management activity should be undertaken on a regular basis (at least 6 monthly) after the work is completed. The maintenance management activity will last for approximately 1-2 days.	

7. MONITORING AND REPORTING

It is important to note that any and all activities undertaken outside the scope of the adopted MMP, in terms of the action outlined within the given method statement, the responsible person(s) will be subject to Section 24(F) of NEMA and that appropriate enforcement and compliance requirements will follow.

The specific reporting information required by the competent authority should be discussed during the consultation phase between the proponent and the Department. The relevant information required should be considered on a case-by-case basis.

The following Forms A and B are to be considered as a guideline in terms of the type of information required. It is proposed that Form A below must be completed by the relevant person(s) before maintenance activities are undertaken and Form B after a maintenance activity has been completed. A copy of each completed Form A & B must be sent to the relevant WUA/IB/local authority management if they have undertaken the development of the MMP. For any individual landowner applications, the landowner is responsible to ensure a record of all maintenance activities is recorded as per Form A & B below. Form A and B must also be sent to the Provincial Department of Agriculture, Directorate: Sustainable Resource Management.

The Department may, within a reasonable notice period, request to evaluate the maintenance activities and assess the maintenance sites as per the adopted MMP.

Form A should be completed at least 7 working days before the commencement of any maintenance activity and Form B at least 3 working days following the completion of the maintenance activity(ies). At least two photographs are required from two different points of perspective (A and B) looking at the site (coordinates of these points are required). When listing the type and reference code, this must be done by specifically listing the relevant detail within the adopted MMP.

REPORTING FOR INTENT TO UNDERTAKE MAINTENANCE ACTIVITIES – FORM A				
Section A: Landowner Details				
Name	**Surname**	**Farm No.**	**Erf No.**	**Today's Date**
Section B: Details of proposed maintenance activity				
WUA/GA reference number and DEA&DP reference number for MMP.	**Activity Type:**	**Reference code (*make reference to MMP*)**	**Footprint area (m^2)**	**Volume of material (m^3)**
Equipment to be used:	**Description of method for planned activity:**			**Date when work will commence:**
Date of last flood event for site:	**Note any further damage and comments regarding the state of the site**			
Section C: Photographs of activity location before maintenance				

Before A **Coordinates:** **S** **E**	
Before B **Coordinates:** **S** **E** **Date of photos taken:**	

REPORTING FOR COMPLETION OF MAINTENANCE ACTIVITIES – FORM B				
Section A: Landowner Details				
Name	**Surname**	**Farm No.**	**Erf No.**	**Today's Date**
Section B: Details of proposed maintenance activity				
WUA/GA reference number and DEA&DP reference number for MMP.	**Activity Type:**	**Reference code (*make reference to MMP*)**	**Footprint area (m^2)**	**Volume of material (m^3)**
Equipment that was used:	**Description of method for completed activity and if commence date changed**			**Date activity completed**
Date of last flood event for site:	**Note any challenges or difficulties experienced in following the MMP method statement**			

Section C: Photographs of activity location after maintenance	
After A **Coordinates:** **S** **E**	
After B **Coordinates:** **S** **E** **Date of photos taken:**	

DEFINITIONS

"Activity" means an activity identified in any notice published by the Minister or MEC in terms of section 24D(1)(a) of the Act as a listed activity or specified activity. Activity in this document refers to the activities as listed in Listing Notice 1, 2 and 3 of the Environmental Impact Assessment Regulations, 2014 (as amended).

"Bush Encroachment" means stands of plants of the kinds specified in column 1 of Table 4 of the Conservation of Agricultural Resources Act (Act No. 43 of 1983) where individual plants are closer to each other than three times the mean crown diameter**.**

"Diverting" as defined in the General Authorisation, in terms of section 39 of the National Water Act, 1998 (Act no 36 of 1998) for Water Uses as defined in Section 21(c) and 21(i) (GN. 509 of 26 August 2016), means to, in any manner, cause the instream flow of water to be rerouted temporarily or permanently.

"Ecological Infrastructure" refers to naturally functioning ecosystems that deliver valuable services to people, such as water and climate regulation, soil formation and disaster risk reduction.

"Estuary" has the meaning assigned to it in the National Environmental Management: Integrated Coastal Management Act, 2008 (Act No. 24 of 2008)

"Flood event" is the event where land is inundated by the overflowing of water from a river channel and where this event causes significant damage to infrastructure or results in watercourse erosion and/or sediment deposition.

NOTE that flooding can be a natural phenomenon in many river or wetland systems which, due to encroachment and human modification of the form and function of the affected system, may have evolved into a potential hazard to life or property.

"Flow-altering" as defined in the General Authorisation, in terms of section 39 of the National Water Act, 1998 (Act no 36 of 1998) for Water Uses as defined in Section 21(c) and 21(i) (GN. 509 of 26 August 2016), means to, in any manner, alter the instream flow route, speed or quantity of water temporarily or permanently.

"General Authorisation" in this document refers to the General Authorisation in terms of section 39 of the National Water Act, 1998 (Act no 36 of 1998) for Water Uses as defined in Section 21(c) or Section 21(i) (GN. 509 of 26 August 2016).

"Impeding" as defined in the General Authorisation, in terms of section 39 of the National Water Act, 1998 (Act no 36 of 1998) for Water Uses as defined in Section 21(c) and 21(i) (GN. 509 of 26 August 2016), means to, in any manner, hinder or obstruct the instream flow of water temporarily or permanently, but excludes the damming of flow so as to cause storage of water.

"Indigenous vegetation" refers to 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.

"Maintenance" means actions performed to keep a structure or system functioning or in service on the same location, capacity and footprint.

"Maintenance Management Plan" means a management plan for maintenance purposes defined or adopted by the competent authority.

"**River Management Plans**" as defined in the General Authorisation, in terms of section 39 of the National Water Act, 1998 (Act no 36 of 1998) for Water Uses as defined in Section 21(c) and 21(i) (GN. 509 of 26 August 2016), any river management plan developed for the purposes of river or storm water management in any municipal/metropolitan area or described river section, river reach, entire river or sub quaternary catchment that considers the river in a catchment context.

"River reach", a length of river characterised by a particular channel pattern and channel morphology, resulting from a uniform set of local constraints on channel form. A river reach is typically hundreds of meters in length.

"Stretch" a section of watercourse, delineated between two or more mapped coordinates, within which proposed maintenance activities are to take place as guided by a MMP.

"Thalweg" refers to the line of lowest elevation within a valley or watercourse.

"Watercourse" means:

(a) a river or spring;
(b) a natural channel in which water flows regularly or intermittently;
(c) a wetland, lake or dam into which, or from which, water flows; and
any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998); and

a reference to a watercourse includes, where relevant, its bed and banks.

"Wetland" means, 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 land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

ACRONYMS

CBA	Critical Biodiversity Area
DEA&DP	Department of Environmental Affairs & Development Planning
DWS	Department of Water & Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
GA	General Authorisation, in terms of the National Water Act, 1998 (Act No. 36 of 1998)
GN	Government Notice
IB	Irrigation Board
MEC	Member of Executive Council
MMP	Maintenance Management Plan
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)
NFEPA	National Freshwater Ecosystem Priority Areas
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PES	Present Ecological State
SANParks	South African National Parks Authority
WUA	Water Users Association
WULA	Water Use Licence Application

REFERENCE GUIDE FOR DRAFTING MMPs FOR A WATERCOURSE

Ecosystem Guidelines for Environmental Assessment in the Western Cape, Edition 2, 2016. Available at: www.bgis.org.za

Wetland offsets: A best practice guideline for South Africa, 2016. Available at: http://www.wrc.org.za

Preliminary guideline for the determination of buffer zones for rivers, wetlands and estuaries, 2014. Available at: http://www.wrc.org.za

National Water Act, 1998 (Act No. 36 of 1998). Available at: http://www.gov.za/documents/national-water-act

General Authorisation, in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for water uses as defined in Section 21(c) or Section 21(i).

ANNEXURE A

DEPARTMENTAL DETAILS

CAPE TOWN OFFICE: REGION 1 (City of Cape Town & West Coast District)	CAPE TOWN OFFICE: REGION 2 (Cape Winelands District & Overberg District)	GEORGE OFFICE: REGION 3 (Central Karoo District & Eden District)
Requests for competent authority to adopt an MMP must be sent to the following details: Department of Environmental Affairs and Development Planning Attention: Directorate: Development Management (Region 1) Private Bag X 9086 Cape Town, 8000 Registry Office 1st Floor Utilitas Building 1 Dorp Street, Cape Town Queries should be directed to the Directorate: Development Management (Region 1) at: Tel: (021) 483-5829 Fax (021) 483-4372	Requests for competent authority to adopt an MMP must be sent to the following details: Department of Environmental Affairs and Development Planning Attention: Directorate: Development Management (Region 2) Private Bag X 9086 Cape Town, 8000 Registry Office 1st Floor Utilitas Building 1 Dorp Street, Cape Town Queries should be directed to the Directorate: Development Management (Region 2) at: Tel: (021) 483-5842 Fax (021) 483-3633	Requests for competent authority to adopt an MMP must be sent to the following details: Department of Environmental Affairs and Development Planning Attention: Directorate: Development Management (Region 3) Private Bag X 6509 George, 6530 Registry Office 4th Floor, York Park Building 93 York Street George Queries should be directed to the Directorate: Development Management (Region 3) at: Tel: (044) 805-8600 Fax (044) 8058650

WESTERN CAPE DEPARTMENT OF AGRICULTURE DETAILS

Francis Steyn
Director: Sustainable Resource Management, LandCare Programme
Western Cape Department of Agriculture
Private Bag X1
Elsenburg
7607
Main Building, Elsenburg, Muldersvlei Road
Tel: 021 808 5090
Email: franciss@elsenburg.com

METHODOLOGIES USED IN THE ASSESSMENT

RIVER HEALTH ASSESSMENTS:
INDEX OF HABITAT INTEGRITY

Assessment of habitat integrity of a river can be seen as a precursor of the assessment of biotic integrity and is a measure of the degree to which a river has been modified from its natural state. Habitat and biotic integrity together constitute ecological integrity (Kleynhans, 1996). A site-based approach was carried out at all sites, where it is based on ground level observations at each monitoring site, but also makes use of other sources of information (maps, local knowledge etc.). The objectives of the Index of Habitat Integrity (IHI) assessment are to put into perspective the significance of various factors in the degradation of the habitat integrity of a specific river (Kleynhans, 1996).

The methodology (Kleynhans, 1996) involves an assessment of the number and severity of anthropogenic impacts on a river and the damage they potentially inflict upon the system. These disturbances include both abiotic and biotic factors, which are regarded as the primary causes of

degradation of a river. The severity of each impact is ranked using a six-point scale with 0 (no impact), 1 to 5 (small impact), 6 to 10 (moderate impact), 11 to 15 (large impact), 16 to 20 (serious impact) and 21 to 25 (critical impact).

Table A1: Criteria evaluated in the Index for Habitat Integrity

Instream Criteria	Weight	Riparian Zone Criteria	Weight
Water abstraction	14	Vegetation Removal	13
Flow modification	13	Exotic Vegetation	11
Bed modification	13	Bank Erosion	12
Channel modification	13	Channel Modification	13
Water quality	14	Water Abstraction	13
Inundation	10	Inundation	12
Exotic macrophytes	9	Flow Modification	14
Exotic fauna	8	Water Quality	12
Solid waste disposal	6		

Based on the relative weights of the criteria, the impacts of each criterion are estimated as follows:

Rating for the criterion/maximum value (25) x weight (percent)

Example: for criterion, which received a rating to 10 in the assessment, with weighting of 14 is calculated as follows:

10/25 x 14 = 5.6

The estimated impacts for all criteria calculated in this way are summed, expressed as a percentage and subtracted from 100 to arrive at a provisional assessment of habitat integrity for the instream and riparian components respectively. The eventual total scores for the instream and riparian zone components are then used to place the habitat integrity in of both in a specific habitat integrity category. These categories are indicated in Table A2 below.

Table A2: Intermediate Habitat Integrity categories (from Kleynhans, 1996)

Category	Description	Score (% of total)
A	Unmodified, natural.	90-100
B	Largely natural with few modifications. A small change in natural habitats and biota may have taken place but the ecosystem functions are essentially unchanged.	80-90
C	Moderately modified. A loss and change of natural habitat and biota have occurred but the basic ecosystem functions are still predominantly unchanged.	60-79
D	Largely modified. A large loss of natural habitat, biota and basic ecosystem functions has occurred.	40-59
E	The loss of natural habitat, biota and basic ecosystem functions is extensive.	20-39
F	Modifications have reached a critical level and the lotic system has been modified completely with almost complete loss of natural habitat and biota. In worst instances basic ecosystem functions have been destroyed and changes are irreversible.	0-19

ECOLOGICAL IMPORTANCE AND SENSITIVITY (EIS)

EIS considers a number of biotic and habitat determinants surmised to indicate either importance or sensitivity. The determinants are rated according to a four-point scale. The median of the resultant score is calculated to derive the EIS category.

Table A3: Definition of the four-point scale used to assess biotic and habitat determinants presumed to indicate either importance or sensitivity

Four point scale	Definition
1	One species/taxon judged as rare or endangered at a local scale.
2	More than one species/taxon judged to be rare or endangered on a local scale.
3	One or more species/taxon judged to be rare or endangered on a Provincial/regional scale.
4	One or more species/taxon judged as rare or endangered on a National scale (i.e. SA Red Data Books)

Table A4: Ecological importance and sensitivity categories (DWAF, 1999)

EISC	General description	Range of median
Very high	Quaternaries/delineations that are considered to be unique on a national and international level based on unique biodiversity (habitat diversity, species diversity, unique species, rare and endangered species). These rivers (in terms of biota and habitat) are usually very sensitive to flow modifications and have no or only a small capacity for use.	>3-4
High	Quaternaries/delineations that are considered to be unique on a national scale based on their biodiversity (habitat diversity, species diversity, unique species, rare and endangered species). These rivers (in terms of biota and habitat) may be sensitive to flow modifications but in some cases may have substantial capacity for use.	>2-≤3
Moderate	Quaternaries/delineations that are considered to be unique on a provincial or local scale due to biodiversity (habitat diversity, species diversity, unique species, rare and endangered species). These rivers (in terms of biota and habitat) are not usually very sensitive to flow modifications and often have substantial capacity for use.	>1-≤2
Low/marginal	Quaternaries/delineations which are not unique on any scale. These rivers (in terms of biota and habitat) are generally not very sensitive to flow modifications and usually have substantial capacity for use.	≤1