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PROPOSED DEVELOPMENT OF FOXWOOD DAM & ASSOCIATED INFRASTRUCTURE

PRE-CONSTRUCTION ENVIRONMENTAL MANAGEMENT PROGRAMME

DRAFT

November 2015

[DEA Reference - 14/12/16/3/3/1/2/817]





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for DWS

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AMENDMENTS PAGE

Date	Nature of Amendment	Amendment No.	Signature
November 2015	Draft for Authorities and Public Review	0	

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS & ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DEDEAT	Department Economic Development, Environmental Affairs and Tourism
DEAT	Department of Environmental Affairs and Tourism
DMR	Department of Mineral Resources
DWS	Department of Water and Sanitation
EC	Eastern Cape
ECDRPW	Eastern Cape Department of Roads and Public Works
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
FSL	Full Supply Level
GIS	Geographical Information System
GN	Government Notice
ha	Hectare
HIV	Human Immunodeficiency Virus
I&AP	Interested and Affected Party
km	Kilometre
m	Metre
MPRDA	Mineral and Petroleum Resources Development Act (Act No. 28 of 2002)
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEM:WA	National Environmental Management: Waste Act (Act No. 59 of 2008)
NDP	National Development Plan
NWA	National Water Act (Act No. 36 of 1998)
NWRS2	National Water Resource Strategy 2
SANS	South African National Standard

DEFINITION OF KEY TERMS

Auditing	*A systematic and objective assessment of an organisation's activities and services conducted and documented on a periodic basis.*
Competent	*Combination of knowledge, qualifications and experience specific to the work or task being performed.*
Construction Area	*Immediate site influenced by specific construction activities, as approved by the Project Manager.*
Construction Domain	*Entire footprint required for the construction of the overall project components.*
Dam	*Any barrier dam and any other form of impoundment used for the storage of water.*
Environment	*The surroundings in which humans exist and which comprise:* • *The land, water and atmosphere of the earth.* • *Micro-organisms, plant and animal life.* • *Any part or combination of a) and b) and the interrelationships among and between them.* • *The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that can influence human health and well-being.*
Environmental Aspect	*Those components of the company's activities, products and services that are likely to interact with the environment.*
Environmental Feature	*Elements and attributes of the biophysical, economic and social environment.*
Environmental Impact	*The change to the environment resulting from an environmental aspect, whether desirable or undesirable. An impact may be the direct or indirect consequence of an activity.*
Environmental Management Programme (EMPr)	*A detailed plan of action prepared to ensure that recommendations for enhancing positive impacts and/or limiting or preventing negative environmental impacts are implemented during the life-cycle of a project.*
Environmental Objective	*Overall environmental goal pertaining to the management of environmental features.*
Environmental Target	*Performance requirement that arises from the environmental objectives and that needs to be set and met in order to achieve those objectives.*
Impervious	*Not permeable; not allowing liquid to pass through. Resistant to movement of water.*
Government Waterworks	*A waterwork (e.g. water storage dams, water transfer schemes and flood attenuation works) owned or controlled by the Minister of Water and Environmental Affairs and includes the land on which it is situated.*
Monitoring	*A systematic and objective observation of an organisation's activities and services conducted and reported on regularly.*
Project Area	*The greater area within which the project is executed. Extends beyond the construction domain.*

Reserve	*In terms of the National Water Act (Act No. 36 of 1998), the Reserve is the quantity and quality of water required -* *(a) to satisfy basic human needs by securing a basic water supply, as prescribed under the Water Services Act, 1997 (Act No. 108 of 1997), for people who are now or who will, in the reasonably near future, be relying upon, taking water from, or being supplied from, the relevant water resource; and* *(b) to protect aquatic ecosystems in order to secure ecologically sustainable development and use of the relevant water resource.*
Sensitive environmental features	*Environmental features protected by legislation (e.g. heritage resources), or identified during the EIA as sensitive through specialists' findings and input received from Interested and Affected Parties.*
Watercourse	*A geomorphological feature characterized by the presence of a streamflow channel, a floodplain and a transitional upland fringe seasonally or permanently conveying surface water. According to the National Water Act (Act 36 of 1998), a watercourse constitutes a river or spring, a natural channel in which water flows regularly or intermittently, 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, and a reference to a watercourse includes, where relevant, its bed and banks.*
Weir	*An overflow structure built across an open channel to raise the upstream water level and/or to measure the flow of water. A measuring or gaging weir is calibrated for depth of flow over the crest. A weir generally consists of a rectangular, trapezoidal, triangular, or other shaped notch, located in a vertical, thin plate over which water flows.*

1 PURPOSE OF THIS DOCUMENT

The Department of Water and Sanitation (DWS) is investigating the feasibility of developing a multi-purpose dam on the Koonap River outside of Adelaide in the Eastern Cape (EC). The proposed site is known as the Foxwood Dam site.

The proposed project consists of the following:

- Major storage dam (Foxwood Dam);
- Bulk water supply pipeline and pump station;
- Gauging weir;
- Access roads (construction and operational phases);
- Quarry and borrow areas;
- Eskom supply to the dam and gauging weir;
- Relocate existing infrastructure (including water supply canal, R344, MR00639, Telkom telephone line and Eskom power line);
- Construction camp; and
- Permanent offices and accommodation for dam operator.

This document serves as the **Environmental Management Programme** (EMPr) for the pre-construction phase, as contemplated in Regulation 23 of Government Notice (GN) No. R. 982 (4 December 2015), for the proposed development of Foxwood Dam and the associated infrastructure. It was developed in support of the Environmental Impact Assessment (EIA) for the project

2 DOCUMENT ROADMAP

As a minimum, the EMPr aims to satisfy the requirements stipulated in Appendix 4 of GN No. R. 982 (4 December 2014). **Table 1** presents the document's composition in terms of the aforementioned regulatory requirements.

Table 1: EMPr Roadmap in relation to GN No. R. 982

Chapter	Title	Correlation with GN No. R. 982
1	Purpose of this Document	–
2	Document Roadmap	–
3	Project Background and Motivation	(a) Details of - (i) The EAP who prepared the EMPr; and (ii) The expertise of that EAP to prepare an EMPr, including a curriculum vitae.
4	Overview of Project	–
5	EMPr Framework	–
6	Environmental Assessment Practitioner	–
7	Environmental Governance Framework	–
8	Roles & Responsibilities	–
9	Monitoring	(g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f).
		(h) The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f).
		(k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f).
		(l) A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations.
10	Environmental Training & Awareness Creation	(m) An environmental awareness plan describing the manner in which- (i) The applicant intends to inform his or her employees of any environmental risk which may result from their work; (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment.
11	EMPr Review	–
12	Environmental Activities, Aspects and Impacts	(b) A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.
13	Sensitive Environmental Features	(c) A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.
14	Implementation Programme	(d) A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental

Chapter	Title	Correlation with GN No. R. 982
		impact assessment process for all phases of the development including- (i) Planning and design; (ii) Pre-construction activities; (iii) Construction activities; (iv) Rehabilitation of the environment after construction and where applicable post closure; and (v) Where relevant, operation activities.
		(e) A description and identification of impact management outcomes required for the aspects contemplated in paragraph (d).
		(f) A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to - (i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) Comply with any prescribed environmental management standards or practices; (iii) Comply with any applicable provisions of the Act regarding closure, where applicable; and (iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.
		(i) An indication of the persons who will be responsible for the implementation of the impact management actions.
		(j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented.

3 PROJECT BACKGROUND AND MOTIVATION

3.1 DWS Project Life-cycle

The standard DWS project life-cycle consists of the phases presented in **Figure 1**.

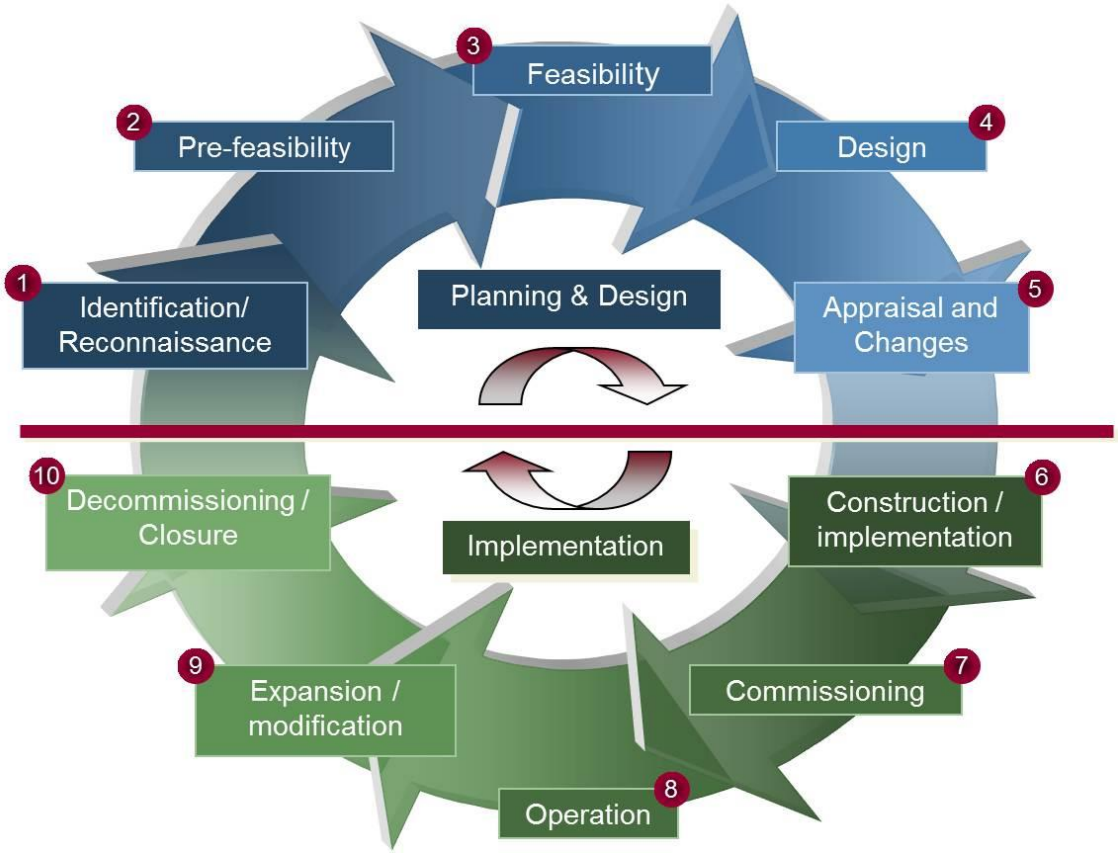

Figure 1: Generic DWS Project Life Cycle for Water Resource Management

The DWS is investigating the feasibility of developing the proposed Foxwood Dam as a multi-purpose dam on the Koonap River outside of Adelaide in EC. A Technical Feasibility Study was completed by Arup (Pty) Ltd at sufficient detail to refine the scheme configuration and costs and to investigate all aspects of the proposed option(s) in sufficient depth to enable the decision-maker to make an informed and accountable decision. The overall Feasibility Study, which includes the EIA, makes a final recommendation on the preferred option which is submitted with motivation to management for approval and funding.

3.2 Background and Motivation

Adelaide (and surrounding towns) has suffered water shortages in the past. Investigations into the potential development of the water resource within the Koonap River Valley date back to the 1960's. In the 90's Foxwood Dam was re-considered to augment domestic supplies as well as for

some development of commercial irrigation. The scheme was not developed due to farmers not accepting the resultant cost of water.

The Nxuba Local Municipality (LM) raised the issue of water shortages at the 2009 EC Water Indaba. In response, DWS proposed a comprehensive Feasibility Study for Foxwood Dam alongside other options, which included:

- Improvement of water-use efficiency (Water Conservation and Demand Management);
- Enlargement of the off-channel storage scheme;
- Exploration and exploitation of groundwater resources; and
- Enlargement of the Fish River to Adelaide pipeline.

The motivation for the project stems from the strategic initiative to mobilize the water resources in the area as a stimulus for socio-economic development in this rural, economically depressed region. This initiative would support the objectives of the National Development Plan (NDP) and is consistent with the National Water Resource Strategy 2 (NWRS2).

Development of the Foxwood Dam would, in the first instance, provide additional, high assurance water supplies for domestic use; this would significantly improve the resilience of the limited supplies now available from the Koonap River without the benefit of storage, and would make water available to meet any increasing needs for domestic, municipal and industrial use.

The effective development of a major storage dam at the Foxwood site would regulate the variable runoff in the Koonap River to the extent that, after full provision is made for maintaining the Reserve to ensure the health and integrity of the resource itself, a significant quantity of water would be made available for irrigation development at an appropriate level of assurance. It is this resource that would be mobilized, together with land and human resources in the region, to provide a stimulus for socio-economic development. This vision is assessed in the context of agricultural development, land reform and rural development policies within the framework of the NDP.

3.3 Project Location

The project area is situated in central part of the EC, in the Amatole District Municipality (DM) and Nxuba LM (refer to maps contained in **Figures 2** and **3**). From a southern direction the proposed dam wall site (coordinates 32˚40’30”S, 26˚16’0”E) is accessed via the R344 (off the R63).

The town of Adelaide and the Bezuidenhoutville Township are located to the south-east of the dam. Adelaide lies 37 km west of Fort Beaufort, on the R63 between Bedford and Fort Beaufort, and is situated in the foothills of the Winterberg Mountain range. Adelaide serves as an administrative and decision-making centre in the region. It is predominantly a farming town, in a beef, mutton, wool and citrus farming district.

The project infrastructure is mostly located on privately-owned properties that are primarily used for agricultural practices, except for the land in the south-eastern part of the project footprint which is owned by the municipality.

The properties that are directly affected by the proposed development are shown in **Figure 4** and listed in **Table 2**.

Table 2: Directly affected properties

SG Code	Farm Name & No.	Erf / Ptn
C02500000000008700002	Olifants Drift 87	2
C02500000000008700000	Olifants Drift 87	
C02500010000000100000	Adelaide	1
C02500000000011100000	111	
C02500010000056900000	Adelaide	569
C01000000000012900000	Leeuw Hoek 129	
C01000000000008600000	Rooidam 86	
C01000000000012600002	Mancasana Drift (Petronella) 126	2
C01000000000012600000	Mancasana Drift (Petronella) 126	
C01000000000012600001	Mancasana Drift (Petronella) 126	1
C01000000000012600003	Mancasana Drift (Petronella) 126	3
C02500000000008600005	Elands Drift 86	5
C02500000000008600003	Elands Drift 86	3
C02500000000008600007	Elands Drift 86	7
C02500000000008600004	Elands Drift 86	4
C02500000000008600006	Elands Drift 86	6
C02500000000008600001	Elands Drift 86	1
C02500000000008600002	Elands Drift 86	2
C01000000000011600000	Fathers Poort 116	
C01000000000011500000	Doornkloof Mouth 115	

Figure 2: Regional Map (***Note – not all sub-components shown***)

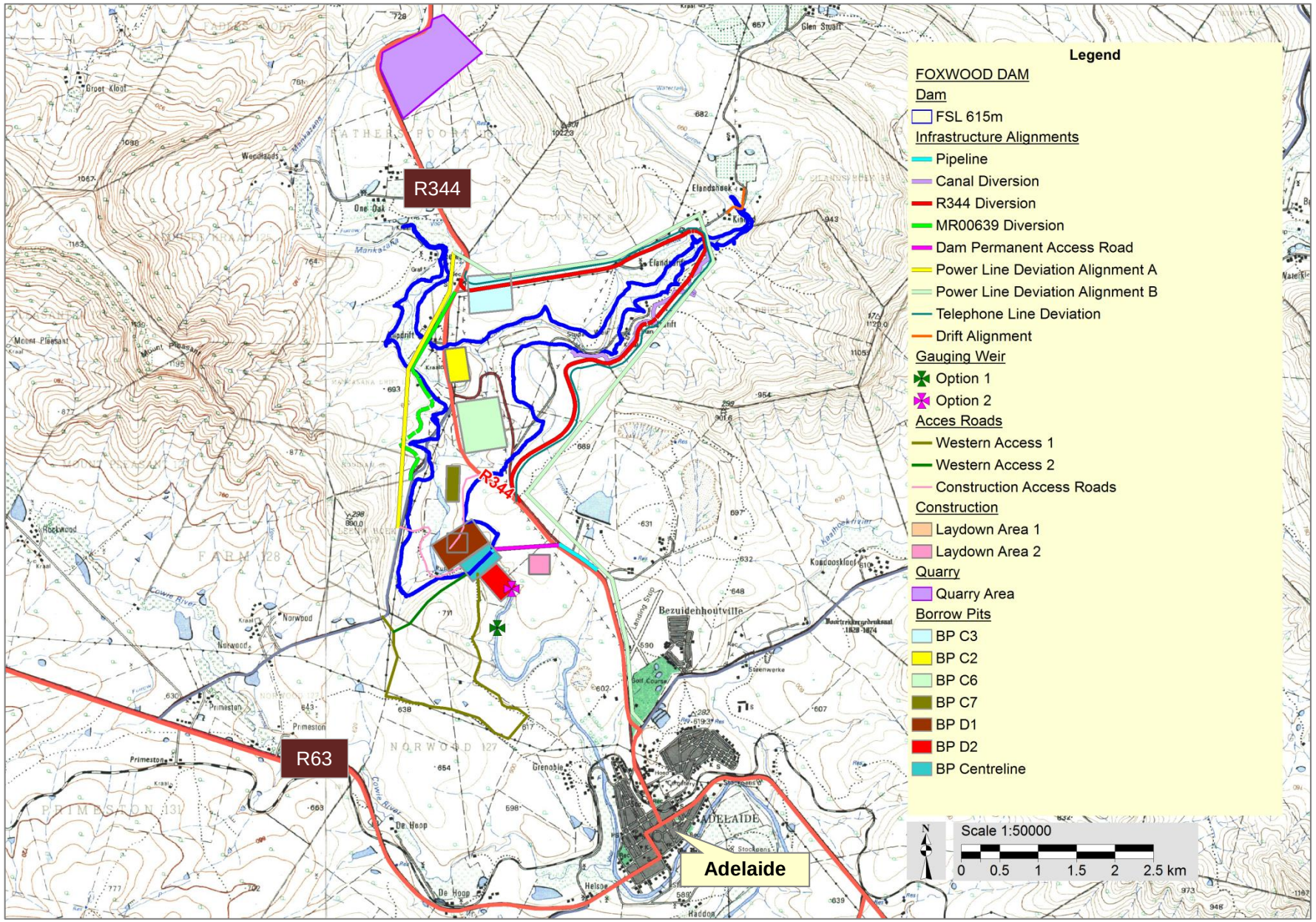

Figure 3: Locality and Topographical Map

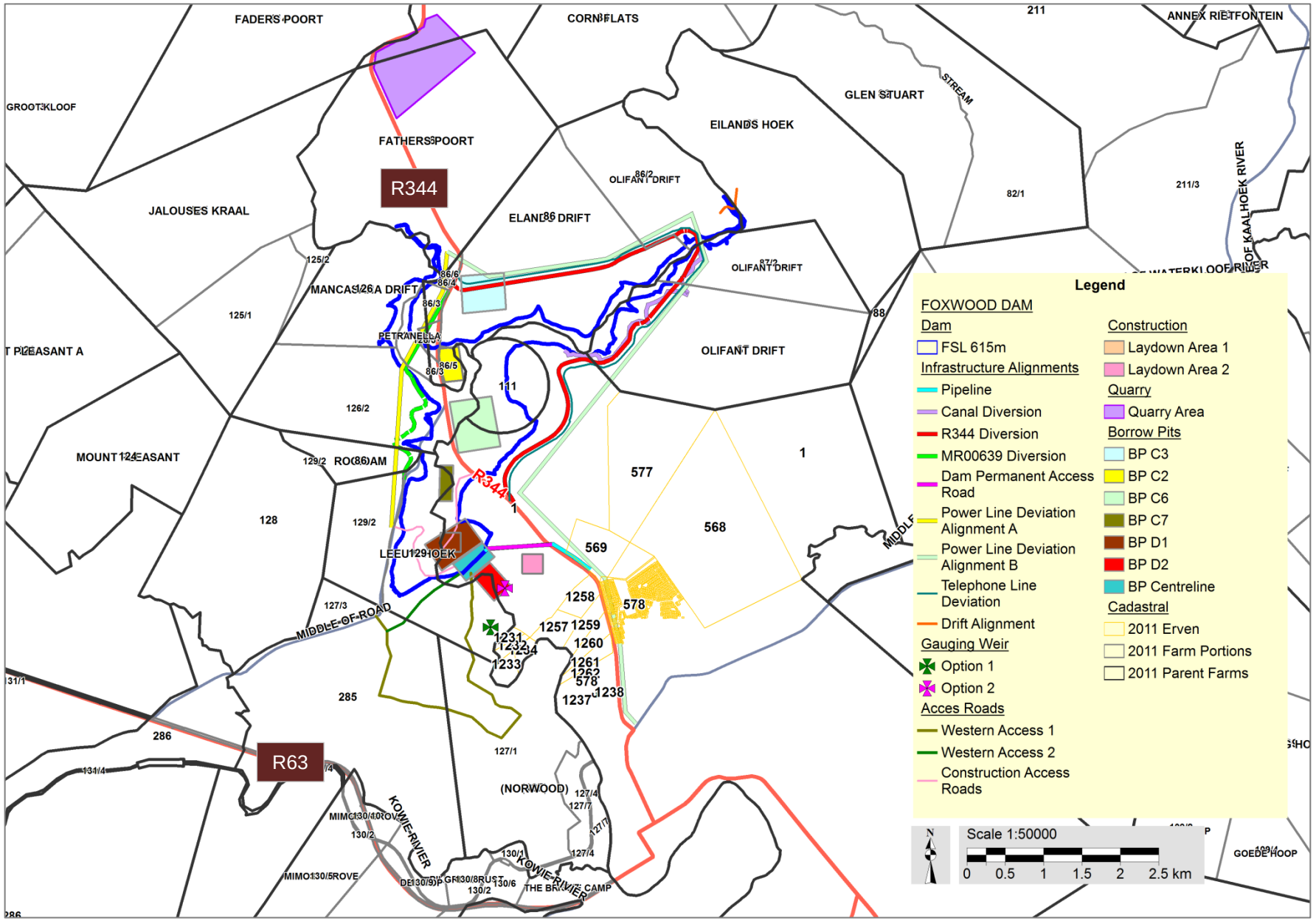

Figure 4: Cadastral Map

4 OVERVIEW OF PROJECT

The project components are listed in **Table 3** and shown in **Figures 3 - 4**.

Table 3: Project Components

Project Components	Associated Infrastructure
Major storage dam (Foxwood Dam)	1. Dam wall 2. Embankment 3. Dam outlet works (including dam intake tower, tunnel and outlet valve house) 4. Access roads (construction and operation) 5. Quarry and earthfill borrow areas 6. Electrical supply 7. Construction camp (temporary) 8. Operator's offices and accommodation (permanent)
Bulk water supply pipeline	1. Pump station 2. Pipeline and associated structures (chambers, Cathodic Protection measures, AC mitigation measures, pipeline markers)
Gauging Weir	1. Weir and associated instrumentation 2. Access roads (construction and operation) 3. Electrical supply 4. Satellite construction camp
Relocation of Infrastructure	1. Relocate water supply canal 2. Relocate R344 3. Relocate MR00639 4. Relocate Telkom telephone line 5. Relocate Eskom power line 6. Relocate drift (low level crossing)

5 EMPr FRAMEWORK

Due to the extent of the overall project, the following EMPrs were developed to deal with the various key components of the project:

1. Pre-Construction EMPr; and
2. Construction EMPr.

The following EMPrs will be developed as further information becomes available during the implementation of the project:

1- Search, Rescue and Relocation Management Plan;

2- Foxwood Dam Impoundment EMPr, which needs to make provision for the following (amongst others) –
   a. Dam safety management;
   b. Water quality management;
   c. Ecological Water Requirements releases;
   d. Managing impacts to land use and biodiversity in the dam basin ;

3- Rehabilitation Management Plan; and

4- Operational EMPr, which will complement the Operation and Maintenance Manual and needs to make provision for the following (amongst others) –
   a. Dam safety management;
   b. Operational Rules;
   c. Erosion management;
   d. Shoreline management;
   e. Access management;
   f. Ongoing engagement with I&APs;
   g. Control of alien invasive species;
   h. Firebreak management; and
   i. Biodiversity management.

The Pre-construction EMPr provides performance criteria required to address potential environmental impacts during the pre-construction phase of the Foxwood Dam project. This Report must be read in conjunction with the EIA Report.

The scope of the Pre-construction EMPr is as follows:

- Establish management objectives during the pre-construction phase in order to enhance benefits and minimise adverse environmental impacts;
- Provide targets for management objectives, in terms of desired performance;
- Describe actions required to achieve management objectives;

- Outline institutional structures and roles required to implement the Pre-construction EMPr; and
- Provide legislative framework.

6 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Nemai Consulting was appointed by DWS as the independent EAP to undertake the environmental assessment for the proposed development of Foxwood Dam.

Nemai Consulting is an independent, specialist environmental, social development and Occupational Health and Safety (OHS) consultancy, which was founded in December 1999. The company is directed by a team of experienced and capable environmental engineers, scientists, ecologists, sociologists, economists and analysts. The company has offices in Randburg (Gauteng), Durban (KZN) and Rustenburg (North West Province).

The core members of Nemai Consulting that were involved with compiling the EMPr for the project are captured in **Table 4** below, and their respective Curricula Vitae are contained in in the body of the EIA Report.

Table 4: EMPr Core Team Members

Name	Qualifications	Experience
Mr D. Henning	MSc (Aquatic Science)	15 years' experience. Prepared EMPs and acted as the Environmental Control Officer (ECO) on various projects, including: • 80km bulk water pipeline from Randfontein to Rustenburg; • Construction of the Spring Grove Dam, as part of the Mooi-Mgeni Transfer Scheme Phase 2; • Fish barrier on the Mooi River upstream of Spring Grove Dam; • Ncwabeni Off-Channel Storage and associated infrastructure; and • Mokolo Crocodile West Water Augmentation Project (water transfer scheme).
Mr C. Chidley	• B.Sc Eng (Civil); • BA (Economics, Philosophy) • MBA	22 years' experience. Prepared EMPs and acted as the ECO on various projects, including:: • Raising of Hazelmere Dam; • Upgrade of the Sunderland Ridge Waste Water Treatment Works and bulk sewer line situated on the Hennops River; • Empangeni Bulk Outfall Sewer, 40km pipeline.

7 ENVIRONMENTAL GOVERNANCE FRAMEWORK

7.1 Legal Framework

Construction will be undertaken according to recognised best industry practices and will include measures prescribed within this EMPr. This EMPr shall form part of the contract documents, and informs the Contractor about his duties in the fulfilment of the project objectives, with particular reference to the mitigation of environmental impacts that may potentially be caused by construction activities associated with the project. The Contractor will note that obligations imposed by the EMPr are legally binding in terms of environmental legislation.

All project activities must comply with all relevant South African legislation and regulations. All environmental statutory requirements should be included in the Contractors' conditions. Specific legislation that must be complied with includes, but is not necessarily limited to:

- Constitution of the Republic of South Africa, (No. 108 of 1996);
- National Environmental Management Act (No. 107 of 1998);
- National Water Act (No. 36 of 1998);
- Mineral and Petroleum Resources Development Act (No. 28 of 2002);
- National Environmental Management: Biodiversity Act (No. 10 of 2004);
- National Environmental Management: Waste Act (No. 59 of 2008);
- National Heritage Resources Act (No. 25 of 1999);
- National Veld and Forest Fire Act (No. 101 of 1998);
- National Environmental Management Protected Areas Act (No. 57 of 2003);
- Environmental Conservation Act (No. 73 of 1989);
- National Environmental Management Air Quality Act (Act No. 39 of 2004);
- Integrated Coastal Management Act (Act No. 24 of 2008);
- Animal Protection Act (No. 71 of 1962);
- Conservation of Agricultural Resources Act (No. 43 of 1983);
- Hazardous Substances Act (Act No. 15 of 1973);
- Occupational Health and Safety Act (No. 85 of 1993); and
- Explosives Act (No. 15 of 2003).

The various forms of authorisation that will be required for the project are listed in **Table 5**.

Table 5: Authorisations required for the implementation of the project

Description	Legal Reference	Regulatory Authority
Approval required for listed activities in terms of the EIA Regulations (4 December 2014) associated with the project. Scoping and EIA process conducted.	• National Environmental Management Act (No. 107 of 1998) • EIA Regulations (GN No. R. 982, R. 983, R. 984 and R. 985 of 4 December 2014)	DEA
The project entails the following activities that	• National Water Act (No. 36 of 1998)	DWS

Description	Legal Reference	Regulatory Authority
constitute water uses in terms of Section 21 of the National Water Act (NWA) (No. 36 of 1998): • Taking water from a water resource (water abstraction from Foxwood Dam to supply the town of Adelaide); • Storing water (Foxwood Dam); • Impeding or diverting the flow of water in a watercourse (instream works for Foxwood Dam, gauging weir, road realignment, access roads, etc.); and • Altering the bed, banks, course or characteristics of a watercourse (instream works for Foxwood Dam, gauging weir, road realignment, access roads, etc.).		
Permits to be obtained if protected trees are to be cut, disturbed, damaged, destroyed or removed.	• National Forests Act (No. 84 of 1998)	Department of Agriculture, Forestry and Fisheries (DAFF)
Permits to be obtained if heritage resources are to be impacted on and for the removal of graves.	• National Heritage Resources Act (No. 25 of 1999)	EC Provincial Heritage Resources Authority
Although exempted, DWS must still submit Environmental Management Programmes for all borrow areas and quarry situated outside of the Government Waterworks for approval.	• Minerals and Petroleum Resources Development Act (No. 28 of 2002)	Department of Mineral Resources (DMR)
Permit to be obtained for the removal and transportation of endangered fauna and flora.	• Nature and Environmental Conservation Ordinance (19 of 1974)	EC Department Economic Development, Environmental Affairs and Tourism (DEDEAT)
Permits required for blasting.	• Explosives Regulations (GN R109 of 17 January 2003)	SAPS Explosives

Additional legal requirements include the following:

- ❖ All waste (general and hazardous) generated during the construction may only be disposed of at appropriately licensed sites in terms of National Environmental Management: Waste Act (No. 59 of 2008);
- ❖ Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which include the Hazardous Substances Act (Act No. 15 of 1973), the Occupational Health and Safety Act (No. 85 of 1993), relevant associated Regulations, and applicable SANS and international standards;
- ❖ The storage of general or hazardous waste in a waste storage facility must comply with the norms and standards in GN No. R. 926 of 29 November 2013;
- ❖ Construction Regulations (2003) published under the Occupational Health and Safety Act (No. 85 of 1993) apply to construction activities including “the moving of earth, clearing of land, the making of an excavation, piling, or any similar type of work”. A “health and safety plan” which addresses hazards identified, and includes safe work procedures to mitigate, reduce or control the hazards identified, is required under this Act; and

- DWS will need to conform to all its legal obligations as part of the acquisition of land for the construction and operation of the project.

7.2 Project Specifications

The EMPr focuses more on performance criteria for environmental compliance, whereas the detail on how the project is to meet these performance criteria is provided in the project specification in the form of minimum standards and measures to be implemented by the Contractor. The Contractor shall provide detailed method statements on how the performance criteria will be met, through the application of the specification. These methods are to be reviewed and approved by the Project Manager to ensure that they are adequate.

The Method Statements must be project- and site specific and should explain in detail the following:

1. The manner in which the work is to be undertaken;
2. The estimated schedule for the works (timing);
3. The area where the works will be executed (location);
4. The materials and plant / equipment needed for the works;
5. The necessary mitigation measures that need to be implemented to adequately safeguard the environment, construction workers and the public (where applicable);
6. Training of employees;
7. Roles and responsibilities;
8. Monitoring and reporting requirements;

The list of method statements required to assist in the implementation of this EMPr includes at least the following (where applicable):

- Method Statement for site clearing;
- Method Statement for establishing the construction camp;
- Method Statement with regard to waste and wastewater management;
- Method Statement to show procedures for dealing with possible emergencies that can occur, such as fire and accidental leaks and spillage of carbon fuels and oils;
- Method Statement for dust control;
- Method Statement for the storage and handling of hazardous substances;
- Method Statement for management of concrete and batching plants;
- Method Statement for river diversions;
- Method Statement for borrow areas and quarry;
- Method Statement for controlling alien invasive species and noxious weeds;
- Method Statement for the decommissioning of the construction works area; and
- Method Statement for rehabilitation of construction footprint.

8 ROLES & RESPONSIBILITIES

A high-level outline of the institutional arrangements for the implementation of the EMPr during the pre-construction and construction phases of the project, as well as the conditions of the Environmental Authorisation, is provided in **Figure 5**.

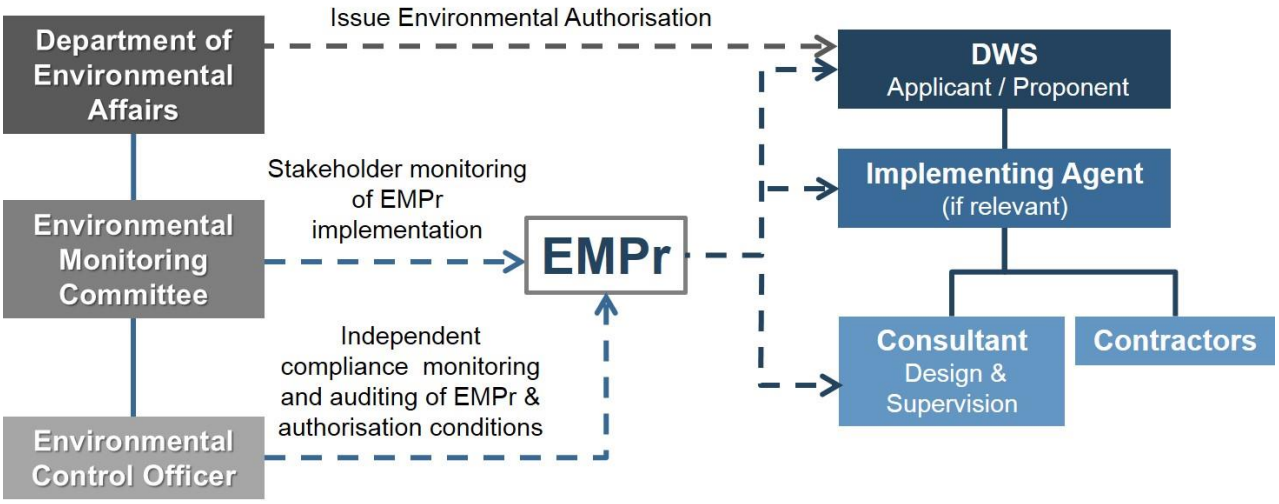

Figure 5: Institutional Arrangements: Roles & Responsibility

8.1 DEA

DEA is the mandated authority in terms of the National Environmental Management Act (No. 107 of 1998) that determines whether authorisation can be issued for the project, following a decision-making process conducted as part of the EIA. Conditions are included in the Environmental Authorisation, which need to be complied with by the project applicant.

DEA also fulfils a compliance and enforcement role with regards to the authorisation. The Department may perform random inspections to checks compliance. DEA will also serve as an active member of the Environmental Monitoring Committee (EMC) and will review the monitoring and auditing reports compiled by the ECO.

Amendments may be required to the EMPr or the Environmental Authorisation, based on adaptive management to the site conditions and the technical requirements of the project. These amendments will need to be approved by DEA.

8.2 DWS

DWS is the applicant in terms of National Environmental Management Act (No. 107 of 1998). DWS is also referred to as the project proponent and is ultimately responsible for the

development and implementation of the EMPr and ensuring that the conditions in the Environmental Authorisation are satisfied. The liability for non-compliance thus rests with DWS.

DWS may appoint an implementing agent for the project and arrangements for compliance need to be formalised between these parties.

8.3 Environmental Monitoring Committee

An EMC will be established before commencement of any construction activities, and will serve as an additional mechanism for monitoring the implementation of the EMPr and compliance with the Environmental Authorisation as well as for improving communication amongst key stakeholders. The committee will have an advisory, monitoring and "watch-dog" role for the duration of the construction phase of the project. This committee will report to the Director-General of DEA.

Appropriate Terms of Reference for the EMC will need to be prepared, which will include roles and responsibilities, membership and functionality (amongst others).

8.4 Project Manager

The Project Manager has over-all responsibility for managing the Contractors and for ensuring that the environmental management requirements are met. During the construction phase, the Project Manager will be the proponent's (or implementing agent's) construction manager. During the operations phase it is expected that this role will be fulfilled by the operations manager.

The Project Manager will be on site and the responsibilities of this party will include the following (amongst others):

- Overseeing of all environmental matters and compliance with all environmental requirements and authorisations; and
- Act as the interface between the ECO, EMC and the other project role players.

8.5 Environmental Control Officer

The Environmental Control Officer (ECO) is a competent (minimum of 3 years' experience) and independent representative, who acts as the EMC monitoring representative for the conducting of independent audits and performing a secretariat function for the EMC.

The ECO will undertake weekly inspections of the site and at least 6 monthly full compliance auditing against the EMPr and Environmental Authorisation. The aforementioned reports will be submitted to the Project Manager, EMC and DEA for their records.

The ECO will also check the following:

- The record of environmental incidents (spills, impacts, legal transgressions, etc.) as well as corrective and preventive actions taken;
- The public complaints register in which all complaints are recorded, as well as actions taken; and
- Results from the environmental monitoring programme (air, noise, water quality).

8.6 Contractor's Environmental Officer

The primary role of the competent Environmental Officer (minimum of 3 years' experience) is to coordinate the environmental management activities of the Contractor on site.

Specific responsibilities of the Environmental Officer, who will be on site, will include the following:

- Aiding the Contractor to comply with all the project's environmental management requirements;
- Assisting the Contractor in compiling Method Statements;
- Facilitating environmental activities and environmental awareness training of all persons on site;
- Exercise an internal compliance management system on behalf of the Contractor;
- Inspect the site as required to ensure adherence to the management actions of the EMPr and the Method Statements;
- Ensuring that environmental monitoring (air, noise, water quality) is being undertaken;
- Complete Site Inspection Forms on a regular basis;
- Provide inputs to the regular environment report to be prepared by the ECO (as required);
- Liaise with the construction team on issues related to implementation of, and compliance with, the EMPr;
- Maintain a record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; and
- Maintain a public complaints register in which all complaints are recorded, as well as actions taken.

9 MONITORING

Monitoring is required to ensure that the receiving environment at Foxwood Dam and the associated infrastructure is suitably safeguarded against the identified potential impacts, and to ensure that the environmental management requirements are adequately implemented and adhered to during the execution of the project.

9.1 Baseline Monitoring

Baseline monitoring aims to determine to the pre-construction state of the receiving environment, and serves as a reference to measure the residual impacts of the project by evaluating the deviation from the baseline conditions and the associated significance of the adverse effects.

The environmental parameters to be included in the baseline monitoring, which is to be undertaken by DWS, are shown in **Table 6**.

Table 6: Baseline Monitoring Requirements

Environmental Parameter	Monitoring Locations	Requirements
Water Quality	• All major watercourses to be affected by the project, including the Koonap and Mankazana Rivers. Sites to be located at suitable spots up- and downstream of the construction sites and in-stream works, to be determined in consultation with the ECO. • *In situ* water quality monitoring to be conducted.	• Comply with relevant standards - SANS 5667. • Water Quality variables to be tested include: ○ Chemical oxygen demand ○ Total ammonia ○ Copper ○ Iron ○ Lead ○ Nitrite/Nitrate ○ Orthophosphate ○ Zinc ○ Faecal coliform bacteria ○ Sodium (Na) ○ Soap, oil and grease ○ Manganese ○ Fluoride
Air Quality	• Dust fallout units to be located taking into consideration significant sources of air pollution, sensitive receptors, and dominant wind direction. Dust fallout to be measured at / around the following sites (as a minimum) – ○ Batching plant; ○ Aggregate stockpiles; ○ Crusher area; ○ Dam wall construction area; ○ Borrow areas and quarries; ○ Sensitive features (e.g. Presbyterian Church Adelaide Primary School, Bezuidenhoutville community, along the DR 02491, R344 and MR00639, etc.). • Particulate matter (PM_{10}) – strategic monitoring point(s) to be selected.	• Dust fallout – comply with ASTM D1739; SANS 1929, SANS 69. • Particulate matter (PM_{10}) – comply with the National Ambient Air Quality Standards.
Noise	Noise monitoring sampling sites to be	• Comply with SANS 10103:2008.

Environmental Parameter	Monitoring Locations	Requirements
	located taking into consideration significant sources of noise, sensitive receptors (e.g. Presbyterian Church Adelaide Primary School, Bezuidenhoutville community), and dominant wind direction. Sites to coincide with dust fallout sites (where relevant).	

9.2 Environmental Monitoring

Environmental monitoring entails checking, at pre-determined frequencies, whether thresholds and baseline values for certain environmental parameters are being exceeded. The parameters and sampling localities used during the baseline monitoring will form the basis of the environmental monitoring programme.

The following requirements need to be incorporated into the programme:

- Monitoring during normal operations, abnormal situations and emergency situations (e.g. unexpected spillage of hazardous substance);
- Measuring equipment must be accurately calibrated;
- Adequate quality control of the sampling must be ensured;
- Analysis is to be undertaken at a SANS 17025 certified laboratory;
- Certified methods of testing must be employed;
- Where legal specifications exist for testing and sampling methods, these must be taken into account; and
- Establish a process for identifying and implementing corrective measures.

Note that the specifications will include more detailed requirements in terms of environmental monitoring.

9.3 Compliance Monitoring and Auditing

Compliance monitoring will commence in the pre-construction phase, where those conditions in the Environmental Authorisation that need to be adhered to prior to project implementation will need to be checked and recorded, as well as to check compliance with the provisions in the Pre-Construction EMPr. Compliance monitoring will be completed at the end of the defects liability period to check the performance of rehabilitation measures and whether the related objectives have been met.

The ECO will undertake weekly inspections of the site and at least 6 monthly full compliance auditing against the EMPr and Environmental Authorisation. The aforementioned reports will be submitted to the Project Manager, EMC and DEA for their records.

Auditing of compliance with the Environmental Authorisation, EMPr and Closure Plan (separate document) must be conducted in accordance with Regulation 34 of GN No. R 982 (4 December 2014) in terms of the following:

1. The holder of an Environmental Authorisation must, for the period during which the Environmental Authorisation, EMPr and the Closure Plan, remain valid -
   a. Ensure that the compliance with the conditions of the Environmental Authorisation, EMPr and the Closure Plan is audited; and
   b. Submit an environmental audit report to DEA.
2. The environmental audit report must-
   a. Be prepared by an independent person with the relevant environmental auditing expertise;
   b. Provide verifiable findings, in a structured and systematic manner, on-
      i. The level of performance against and compliance of an organization or project with the provisions of the requisite Environmental Authorisation or EMPr and the Closure Plan; and
      ii. The ability of the measures contained in the EMPr and the Closure Plan, to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity;
   c. Contain the information set out in Appendix 7 of GN No. R 982 (4 December 2014); and
   d. Be conducted and submitted to DEA at intervals as indicated in the Environmental Authorisation.
3. The environmental audit report must determine-
   a. The ability of the EMPr and the Closure Plan to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity on an ongoing basis and to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the closure of the facility; and
   b. The level of compliance with the provisions of Environmental Authorisation, EMPr and the Closure Plan.

A document handling system must be established to ensure accurate updating of EMPr documents, and availability of all documents required for the effective functioning of the EMPr. Supplementary EMPr documentation could include:

- Method Statements;
- Site instructions;
- Emergency preparedness and response procedures;
- Record of environmental incidents;
- Non-conformance register
- Training records;
- Site inspection reports;
- Monitoring reports;
- Auditing reports; and
- Public complaints register (single register for maintained for overall site).

10 ENVIRONMENTAL TRAINING & AWARENESS CREATION

Training aims to create an understanding of environmental management obligations and prescriptive measures governing the execution of the project. It is generally geared towards project team members that require a higher-level of appreciation of the environmental management context and implementation framework for the project.

Awareness creation strives to foster a general attentiveness amongst the construction workforce to sensitive environmental features and an understanding of implementing environmental best practices. The various means of creating environmental awareness during the construction phase of the project may include:

- Induction course for all workers before commencing work on site;
- Refresher courses (as and when required);
- Daily toolbox talks, focusing on particular environmental issues (task- and area specific);
- Courses must be provided by suitably qualified persons and in a language and medium understood by the workers. It is noted that Xhosa is the dominant language in the area;
- Erect signage and barricading (where necessary) at appropriate points in the construction domain, highlighting sensitive environmental features (e.g. grave sites, protected trees); and
- Place posters containing environmental information at areas frequented by the construction workers (e.g. eating facilities).

Training and awareness creation will be tailored to the audience, based on their designated roles and responsibilities. Records will be kept of the type of training and awareness creation provided, as well as containing the details of the attendees.

11 EMPr REVIEW

Due to its dynamic nature, the EMPr for Foxwood Dam and its associated infrastructure will be reviewed and revised when necessary to ensure continued environmental improvement. Changes to the EMPr shall be required where the existing system:

- Does not make adequate provision for protecting the environment against the construction activities;
- Needs to be modified to meet conditions of statutory approval;
- It is not achieving acceptable environmental performance;
- Requires changes due to the outcome of a monitoring or auditing event or management review;
- Provides redundant, impracticable or ineffective management measures; and
- In terms of Regulation 34 of GN No. R 982 (4 December 2014).

The amendment of the EMPr will be undertaken in terms of Regulation 34 – 37 of GN No. R 982 (4 December 2014), as applicable.

12 ENVIRONMENTAL ACTIVITIES, ASPECTS AND IMPACTS

12.1 Environmental Activities

The main project activities as well as high-level environmental activities undertaken in the pre-construction phase are listed in **Table 7**.

Table 7: Activities associated with Pre-Construction Phase

Project Phase: Pre-construction
Project Activities
❖ Negotiations and agreements with the affected landowners, tenants, occupiers of land, stakeholders and authorities
❖ Initiate legal process required for land acquisition
❖ Detailed engineering design
❖ Detailed geotechnical investigations, including geophysical investigations
❖ Survey and mark construction servitude
❖ Survey and map topography for determination of post-construction landscape, rehabilitation and shaping (where necessary)
❖ Possible removal of trees within construction servitude
❖ Procurement process for Contractors
❖ Review Contractor's method statements (as relevant)
❖ Selective improvements of access roads to facilitate the delivery of construction plant and materials
❖ Arrangements for accommodation of construction workers (off site)
❖ The building of a site office and ablution facilities
❖ The harvesting of timber that will be inundated (if deemed necessary);
❖ Confirmation of arrangements with individual landowners / tenants / occupiers of land for managing and mitigating issues such as fencing and gate dimensions for traversing servitude, traversing patterns of livestock over servitude, access to livestock drinking points, security, opening and closing of gates and access to private property
❖ Confirmation of the location and condition of all buildings, assets and structures within the servitude
❖ Determining and documenting the road conditions for all identified haul roads
❖ Conduct detailed hydraulic analysis to determine the optimum positioning of the scour valves
High Level Environmental Activities
❖ Diligent compliance monitoring of the Pre-Construction EMPr, Environmental Authorisation and other relevant environmental legislation
❖ Resettlement of dwellings in dam basin and buffer zone
❖ Undertake Phase 2 Heritage Impact Assessment, Archaeological Impact Assessment and Palaeontological Impact Assessment
❖ Commence with Resource Management Plan (RMP) process
❖ Undertake a walk through survey of the project footprint by the relevant environmental specialists to identify sensitive environmental features
❖ Develop Search, Rescue and Relocation Management Plan, based on findings of walk through survey
❖ Search, rescue and relocation of red data, protected and endangered species, medicinal plants, heritage resources and graves (based on area of influence of the construction activities)
❖ Develop environmental monitoring programme (air quality, water quality, noise, traffic, social)
❖ Conduct further baseline environmental studies for environmental monitoring programme
❖ Barricading of sensitive environmental features (e.g. graves)

Project Phase: Pre-construction
❖ Permits if protected trees are to be cut, disturbed, damaged, destroyed or removed
❖ Permits if heritage resources are to be impacted on and for the relocation of graves
❖ Establish Environmental Monitoring Committee (EMC)
❖ On-going consultation with I&APs
❖ Other activities as per Pre-Construction EMPr

12.2 Environmental Aspects

Environmental aspects are regarded as *those components of an organisation's activities, products and services that are likely to interact with the environment and cause an impac*t. The following environmental aspects have been identified for the proposed development of Foxwood Dam and associated infrastructure during the pre-construction phase, which are linked to the project activities (note that only high level aspects are provided):

Table 8: Environmental Aspects associated with Pre-Construction Phase

Project Phase: Pre-construction
Environmental Aspects
❖ Inadequate consultation with landowners/ tenants / occupiers of land
❖ Inadequate environmental and compliance monitoring
❖ Poor construction site planning and layout
❖ Land occupancy by temporary buildings, provisional on-site facilities and storage areas
❖ Inaccurate pre-construction environmental walk through survey (including search and rescue)
❖ Absence of relevant permits (e.g. for protected trees, heritage resources)
❖ Lack of barricading of sensitive environmental features
❖ Poor waste management
❖ Absence of ablution facilities

12.3 Potential Significant Environmental Impacts

Environmental impacts are the change to the environment resulting from an environmental aspect, whether desirable or undesirable. Refer to **Table 9** for the potential significant impacts associated with the preceding activities and environmental aspects for the pre-construction phase.

Table 9: Potential Significant Environmental Impacts - Pre-Construction Phase

Environmental Factor	Potential Issues / Impacts
Land Use	❖ Loss of land used for agriculture and game farming ❖ Loss of natural areas due to land clearing ❖ Servitude restrictions
Topography	❖ Visual impact in river valleys ❖ Erosion of affected areas on steep slopes

Environmental Factor	Potential Issues / Impacts
Soil	❖ Soil erosion
Water Quality	❖ Sedimentation from land clearing
Aquatic Ecology	❖ Disruptions to aquatic biota community due to water contamination.
Riparian Habitat	❖ Loss of fuelwood, medicinal and herbal plants, building material and raw products for handicrafts within construction domain
Terrestrial Ecology	❖ Impacts to sensitive terrestrial ecological features ❖ Potential loss of significant flora and fauna species ❖ Damage / clearance of habitat of conservation importance ❖ Proliferation of exotic vegetation ❖ Loss of medicinal plants
Socio-economic Environment	❖ Loss of land within construction domain ❖ Risk to livestock ❖ Influx of people seeking employment and associated impacts (e.g. foreign workforce, cultural conflicts, squatting, demographic changes, anti-social behaviour, and incidence of HIV/AIDS) ❖ Land claims ❖ Safety and security ❖ Relocation of access roads ❖ Use of local road network ❖ Impact to visual quality and sense of place
Agriculture	❖ Loss of cultivated land within construction domain ❖ Loss of grazing land within construction domain ❖ Loss of stock watering points within construction domain ❖ Disruptions to farming operations as a result of construction-related use of existing access roads ❖ Loss of fertile soil through land clearance
Air Quality	❖ Excessive dust levels
Noise	❖ Localised increases in noise during construction
Historical and Cultural Features	❖ Destruction or damage of heritage resources through construction activities ❖ Relocation of graves
Transportation	❖ Increase in traffic on the local road networks ❖ Develop temporary access roads ❖ Risks to road users
Solid Waste	❖ Waste generated from site preparations (e.g. plant material) ❖ Domestic waste
Aesthetics	❖ Visual quality and sense of place to be adversely affected by construction activities
Tourism	❖ Influence to tourism potential

13 SENSITIVE ENVIRONMENTAL FEATURES

Cognisance must be taken of the following sensitive environmental features that should be afforded additional care and protection, as reflected in the Sensitivity Map contained in **Figure 6**:

- Steep slopes are encountered in the project area and measures to prevent erosion would need to be employed for construction activities in these areas. Steep areas include –
  - Left- and right flank at dam wall;
  - Western shoreline of proposed Full Supply Level (FSL);
  - North-eastern shoreline of proposed FSL, which includes a section of the relocated R344, canal, power line and telephone line; and
  - Quarry site.
- All watercourses, including the Koonap and Mankazana Rivers and their tributaries (including drainage lines), are regarded as sensitive and require suitable protection from the construction activities. All construction activities that affect these watercourses need to comply with the National Water Act (Act No. 36 of 1998).
- All existing infrastructure and structures are regarded as sensitive in the sense that they need to be safeguarded from construction activities until they have been relocated and the redundant sections removed (as relevant).
- Protected fauna and flora species occur in the area, which need to be protected against the project's potential adverse impacts. Construction activities in sensitive areas to comply with the National Environmental Management: Biodiversity Act (No. 10 of 2004), National Forests Act (No. 84 of 1998) and Nature and Environmental Conservation Ordinance (19 of 1974). Sensitive species to be identified as part of the pre-construction survey. If relocation is not required, then these species need to be adequately protected from construction activities.
- All traffic and pedestrians on the public roads are regarded as sensitive in the sense that measures need to be implemented to safeguard these road users from construction activities.
- The northern sections of the deviated R344 road, telephone line and power line follow the DR 02491 road route. The DR 02491 will need to be upgraded to meet the standards associated with a "R" route, as per the requirements of the EC Department of Roads and Public Works.
- A number of grave sites and structures older than 60 years were identified within the project area. The final locations of all heritage and cultural features will be confirmed as part of the Phase 2 Heritage Impact Assessment, Archaeological Impact Assessment and Paleontological Impact Assessment. These features may not be disturbed without following legal protocol.
- Prevent or limit as far as possible construction-related nuisance to the Presbyterian Church Adelaide Primary School, which is situated on Portion 4 of the Farm Elands Drift 86 along the R344.
- Existing communication channels need to be duly respected and adhered to when engaging with the community.

- Private land may not be accessed unless consent has been granted by the landowner, or until the land acquisition process has been concluded, or a construction servitude has been registered.
- The noise and air quality monitoring programme needs to take cognizance of sensitive receptors, such as dwellings on surrounding farms and Bezuidenhoutville township (located more than 1.5 km to the south-east of the dam wall).
- Livestock and unauthorised access to the construction domain needs to be prevented.
- Excavations to be adequately safeguarded.

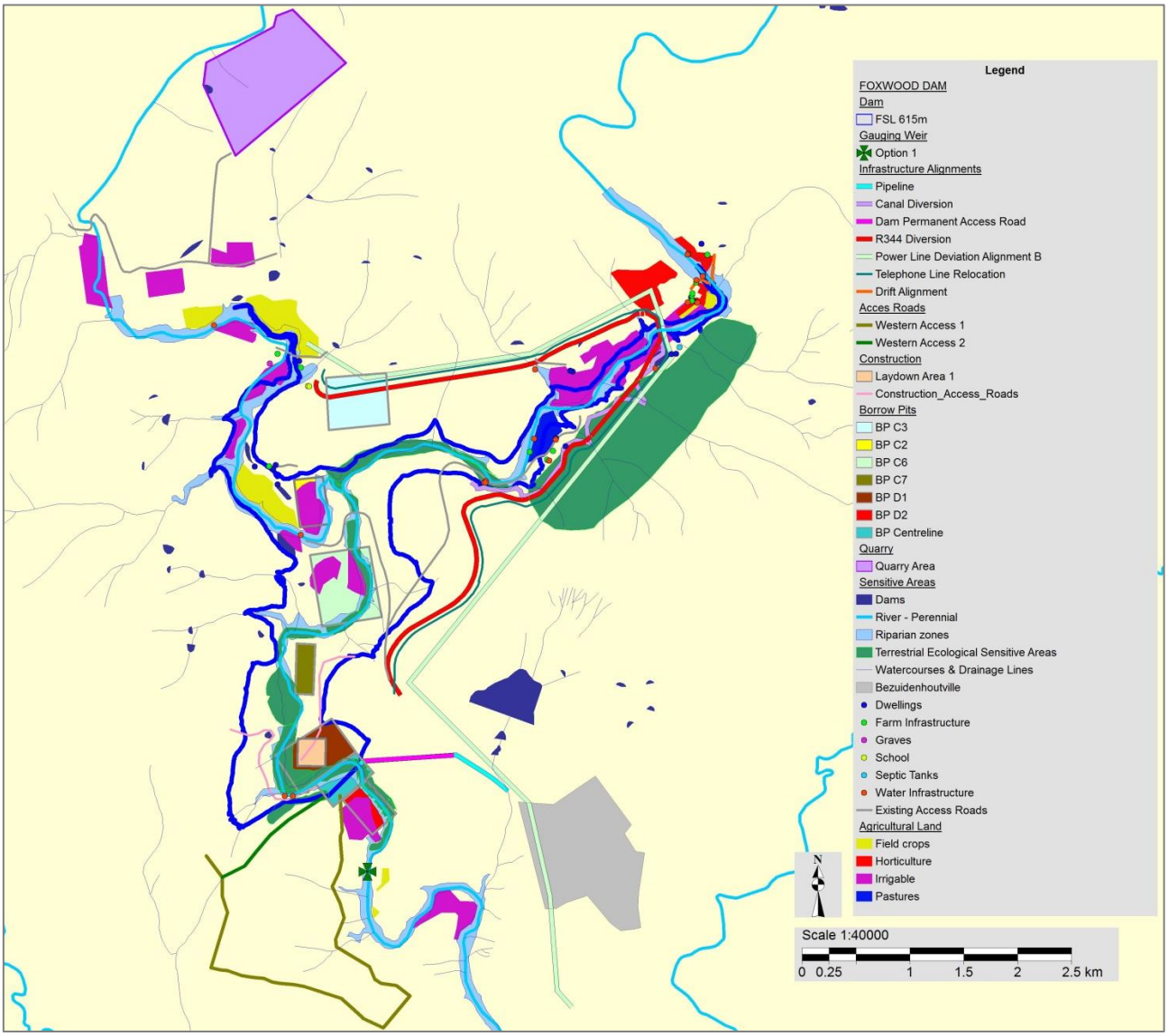

Figure 6: Sensitivity Map

The sensitivity map shown in **Figure 6** needs to be made available to the implementation team (including the Project Manager, ECO and Contractor) in GIS format to allow for further consideration and adequate interpretation at an appropriate scale.

14 IMPLEMENTATION PROGRAMME

The framework for the subsequent management measures consists of the following:

- **Management objectives** – i.e. desired outcome of management measures for mitigating negative impacts and enhancing the positive impacts related to project activities and aspects (i.e. risk sources);
- **Targets** – i.e. level of performance to accomplish management objectives;
- **Management actions** – i.e. practical actions aimed at achieving management objectives and targets;
- **Responsibilities**; and
- **Monitoring requirements**.

14.1 General Requirements

General requirements during the pre-construction phase include the following:

- Design to consider and incorporate environmental requirements;
- Define and communicate roles and responsibilities for the implementation of the EMPrs;
- Conduct appropriate environmental baseline studies;
- All test pits created as part of geotechnical investigations outside of the dam basin to be filled and rehabilitated;
- Undertake negotiations and confirm arrangements with landowners and/or land users regarding:
  - Use of the R344, MR0639 and DR 02491 and traffic arrangements;
  - Land occupancy (construction facilities);
  - Domestic animals;
  - Protocol for lodging complaints;
  - Possible loss of access;
  - Existing structures and infrastructure (including temporary and permanent water management structures and infrastructure);
  - Fencing and gate dimensions for traversing servitude;
  - Traversing patterns of game and/livestock;
  - Access to game and/livestock drinking points;
  - Security; and
  - Opening and closing of gates and access to private property.
- Ensure that all existing structures within the construction area are identified and recorded;

- ❖ Determine and document the road conditions of the R344, MR0639 and DR 02491, as well as all private access roads that will be affected by construction traffic (improvements to be made, where necessary after approval from the relevant authority); and
- ❖ Develop and implement an environmental awareness programme.
- ❖ Ensure uninterrupted water supply during relocation of canal that feeds Adelaide Dam, if this work cannot be done during a canal shutdown period.

14.2 Specialist Environmental Investigations

Management Objective:

Identify sensitive and protected environmental features in addition to those that have been identified as part of the EIA process.

Target:

1. All sensitive and protected environmental features to be identified in the construction domain (all the components of the project) and inundation area.
2. All relevant approvals to be obtained prior to relocation of red data, protected and endangered flora and fauna species, medicinal plants, heritage resources and graves.

Management Actions:

- Phase 2 Heritage Impact Assessment, Archaeological Impact Assessment and Paleontological Impact Assessment is to be conducted for the project area.
- Search, rescue and relocation plan is to be developed for sensitive (red data, threatened and endangered) flora and fauna species and graves within the construction domain and dam basin. The plan is to be implemented, taking cognisance of the project programme, to ensure that these sensitive environmental features are rescued prior to potential impact occurrence. EC DEDEAT, EC Provincial Heritage Resources Authority and DAFF are to be consulted to ensure that the plan incorporates all these authorities' requirements. For fauna and flora species, the following factors need to be considered (amongst others) as part of this plan:
  1. Detailed plan of action (including timeframes, methodology and costs);
  2. Site investigations to identify and record sensitive species;
  3. Consultation with authorities and stakeholders;
  4. Marking of species to be relocated;
  5. Seeking of permits;
  6. Identification of suitable areas for relocation;

7. Aftercare; and
8. Monitoring (including targets and indicators to measure success).

Responsibilities:

- DWS / implementing agent to appoint suitably qualified specialists.
- Specialists to execute the management actions.

Monitoring Requirements:

Approval by relevant environmental authorities.

14.3 Approvals, Permits and Licensing Requirements

Management Objective:

Compliance with applicable legislation to prevent unauthorised activities and negative impacts to protected environmental features.

Target:

Obtain requisite approvals for the relevant protected environmental features.

Management Actions:

- Seek permit from DAFF in terms of the National Forests Act (No. 84 of 1998) for protected trees that are to be cut, disturbed, damaged, destroyed or removed.
- Seek permit from EC DEDEAT in terms of the Nature and Environmental Conservation Ordinance (19 of 1974) for the removal and transportation of endangered fauna and flora (if relevant).
- Seek permit from EC Provincial Heritage Resources Authority in terms of the National Heritage Resources Act (No. 25 of 1999) if heritage resources are to be impacted on (relocated or destroyed), and for the removal of graves.
- Seek all other approvals, permits and licenses required for the project, in accordance with the protocols prescribed by the governing bodies.
- Approvals are to be in place prior to the potential impacts to the protected environmental features.

Responsibilities:

- DWS / implementing agent to appoint suitably qualified specialists.
- Specialists to seek and obtain relevant approvals.

Monitoring Requirements:

Approvals, permits and licences are to be in place with due consideration to the project programme.

14.4 Administrative Requirements

Management Objective:

- Ensure that all administrative measures and arrangements associated with the compliance with the Environmental Authorisation, EMPr and Closure Plan are in place.

Target:

- Administrative measures and arrangements are confirmed, checked and maintained.
- Document control procedure is in place, in accordance with the Environmental Management System to be employed on site.

Management Actions:

- Financial provision is made for the implementation of the conditions of the Environmental Authorisation and the mitigation measures contained in the EMPr and Closure Plan. Differentiate between those requirements that relate to the Proponent, Contractor, environmental team and other responsible parties.
- Document control procedure is to be provided and adhered to.
- Filing system is to be provided and maintained.

Responsibilities:

- Proponent – administrative provisions for compliance.
- Project Manager/Engineer and ECO - checking.
- Contractor – administrative provisions for compliance.

Monitoring Requirements:

- Document control procedure.
- Filing systems.
- Financial provisions (e.g. bill of quantities, budgets, etc.).

14.5 Construction Site Planning and Layout

Management Objective:

Proper planning and layout of the construction domain to ensure protection of sensitive environmental features. Refer to features highlighted in **Section 13**, Sensitivity Map (**Figure 6**), findings from pre-construction survey, further environmental studies, etc.

Target:

1. No negative impacts to sensitive environmental features as a result of poor construction site planning and layout.
2. A 100% of the construction footprint is to be included in the pre-construction survey.

Management Actions:

- Conduct a pre-construction survey of the area to be affected by the development of Foxwood Dam and the associated infrastructure. This must include site investigations with photographic records.
- Suitable specialist(s) are to identify sensitive environmental features (including fauna, flora and heritage sites) where special care needs to be taken, and implement the required suitable mitigation measures to safeguard these features (e.g. barricading, signage and awareness creation). Refer to the findings of the following EIA specialist studies in this regard:
  - Terrestrial Ecology Assessment (Nemai Consulting, 2015).
- A suitable specialist is to identify protected plants and trees. Any protected plants or trees in proximity to the construction domain that will remain, should be marked clearly (danger tape, fencing, etc.) and must not be disturbed, defaced, destroyed or removed, unless otherwise specified by the Project Manager. Acquire the necessary permits under the National Forests Act (No. 84 of 1998) if avoidance of protected trees is not possible.
- The Contractor is to produce a site plan for the approval of the Project Manager/Engineer prior to the establishment of the site, which aims to identify construction activities, facilities and structures in relation to sensitive environmental features. This plan will serve as a spatial tool that facilitates the execution of the construction phase with due consideration of sensitive environmental features. The plan must show the following (as relevant):
  - Buildings and structures;
  - Contractors' camp and lay down areas;
  - Site offices;

- Site laboratories;
- Batching plants;
- Crusher plants;
- Roads and access routes;
- Gates and fences;
- Essential services (permanent and temporary water, electricity and sewage);
- Rubble and waste rock storage and disposal sites;
- Solid waste storage and disposal sites;
- Site toilets and ablutions;
- Hazardous waste storage and disposal sites;
- Firebreaks;
- Borrow areas and quarry;
- Excavations and trenches;
- Cut and fill areas;
- Topsoil stockpiles;
- Spoil areas;
- Construction material stores;
- Vehicle and equipment stores;
- Workshops;
- Wash bays;
- Fuel stores;
- Hazardous substance stores;
- Sensitive environmental features; and
- Any other activities, facilities and structures deemed relevant.

Responsibilities:

- Project Manager/engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Photographic record as part of the pre-construction survey of areas to be affected by construction activities.
- Approved site plan.
- Barricading and signage.
- Records of awareness creation.

14.6 Managing Geotechnical Investigations

Management Objective:

Manage the possible negative environmental impacts associated with detailed geotechnical investigations.

Target:

1. No deviations from agreements made with the landowners.
2. No damage to sensitive environmental features (e.g. marked and barricaded heritage resources, protected trees, watercourses, structures and infrastructure).
3. Rehabilitation of test pits.

Management Actions:

- Suitable access arrangements are to be made in accordance with agreements prior to site investigations.
- Safe operation of plant and equipment required for geotechnical investigations.
- Adequate management of domestic and construction waste produced during investigations.
- Implement measures to mitigate soil erosion, loss of vegetation and pollution associated with the investigations.
- Prevent damage to sensitive environmental features.
- Landscape and rehabilitate test pits, if located outside of dam basin.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Geotechnical team to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Approval from DMR for borrow areas situated outside of the dam basin.

14.7 Environmental Awareness Creation

Management Objective:

Ensure that the Contractor, construction workers and site personnel are aware of the relevant provisions of the EMPr, sensitive environmental features and agreements made with the affected landowners and community members.

Target:

1. All construction workers and employees are to have completed appropriate environmental training before being allowed on the construction site.
2. A record of environmental training undertaken is to be kept on site.

Management Actions:

- The Contractor must arrange that all of his employees and those of his sub-contractors go through the project specific environmental awareness training courses before the commencement of construction and as and when new staff or sub-contractors are brought on site.
- The environmental training is compulsory for all employees and structured in accordance with their relevant rank, level and responsibility, as well as the Environmental Specification as they apply to the works and site.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Records of environmental training and awareness creation.

14.8 On-going Consultation with Community and Affected Parties

Management Objective:

- Establish and maintain a record of all complaints and claims against the project and ensure that these are timeously and effectively verified and responded to.
- Adhere to agreements made with individual landowners and community members regarding communication.

Target:

1. All complaints and claims are to be acknowledged within five (5) working days and are to be responded to within 10 working days of receipt, unless additional information and / or clarification are required.
2. No deviations from agreements made with individual landowners and community members.

Management Actions:

- Establish lines of communications with landowners and community members are established.
- Existing communication channels need to be duly respected and adhered to when engaging with the Bezuidenhoutville Township.
- Establish processes and procedures to effectively verify and address complaints and claims received.
- Complaints or liaison with landowners and community members with regard to environmental aspects, compensation or disturbance to activities or animals, must be recorded, reported to the correct person and a record of the response is to be entered in the complaints register.
- Provide the relevant contact details to landowners and community members for queries / raising of issues or complaints.
- Provide all information, especially technical findings, in a language that is understandable to the general public. The dominant local languages include English, Afrikaans and Xhosa.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.

14.9 Site Clearing

Management Objective:

- Manage environmental impacts associated with site and basin clearing.
- External to the dam basin, ensure that only areas that are specifically required for the construction purposes are cleared.

Target:

No damage is caused to sensitive environmental features outside of the demarcated construction areas, including marked and barricaded heritage resources, protected trees, watercourses, cultivated areas, structures and infrastructure.

Management Actions:

- Restrict site clearing activities to the construction area / domain and dam basin.
- Clearing of vegetation is to be conducted in a phased manner (where possible), with due consideration of the search and rescue activities. Vegetative cover for sensitive areas such as riparian zones is to remain for as long as possible.
- A Method Statement is to be developed, which will provide the details of how site clearing will be executed. Where possible, clearing by hand is recommended in order to create employment opportunities.
- Maintain barricading around sensitive environmental features.
- Avoid any disturbance to demarcated sensitive environmental features.
- Suitably experienced personnel (relevant to the potentially affected environmental features) are to monitor the clearing activities, with particular focus on heritage resources and graves, as well as protected fauna and flora species.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- No clearing outside of construction domain.
- Intact barricading.
- Public complaints register.
- Contractor's method statement.

14.10 Site Establishment

Management Objective:

Minimise negative environmental impacts associated with site establishment.

Target:

1. No deviations from agreements made with individual landowners and community members.
2. No damage to sensitive environmental features outside demarcated construction areas during site establishment.
3. No access or encroachment into no-go areas.
4. No justifiable complaints regarding general disturbance and nuisance received from the affected landowners and community members.

Management Actions:

- The Contractor is to produce a site plan for the approval by the Project Manager/Engineer prior to the establishment of the site, which aims to identify construction activities, facilities and structures in relation to sensitive environmental features. This plan will serve as a spatial tool that facilitates the execution of the construction phase with due consideration of sensitive environmental features.
- Locate construction and labour camps in areas where sensitive environmental features will not be impacted on.
- Facilities and structures shall be located with due cognisance of the terrain and geographical features of the project site.
- Positioning of the storage and lay-down areas should aim to minimise visual impacts.
- Maintain barricading around sensitive environmental features until the cessation of construction works.

- Control the movement of all vehicles and plant (including suppliers), such that they remain on designated routes and comply with relevant agreements.
- Ensure noise levels of construction activities and equipment are within their lawfully acceptable limits as per SANS 10103.
- Minimise public disturbance from lighting of the construction camp and site. For example, proper design of the placing (zones), height, type, direction (inward rather than outward) and intensity of floodlights, without compromising safety.
- Establish a local SMME recruitment preference policy.
- Land inside Foxwood Dam's purchase line as well as land required for appurtenant works must be acquired in accordance with statutory requirements.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Intact barricading.
- Public complaints register.
- Contractor's method statement.
- Relocation Action Plan.

14.11 Management of Access and Traffic

Management Objective:

- Ensure that all construction vehicles use only dedicated access routes to construction sites, as shown in the layout map in **Figure 3**.
- Ensure that the community have reasonable access to the land during construction.
- Ensure proper access control.
- Prevent unlawful access to the construction domain.
- Adhere to agreements made with individual landowners and community members regarding access.
- Ensure the safety of all road users by implementing proper signage and traffic control measures.
- Limit construction-related nuisance to service nodes.

Target:

1. No reports of construction vehicles using other unauthorised routes.
2. No complaints regarding blocking of access to farms.
3. No direct harm to livestock and wild animals due to inadequate access control.
4. No transporting of unsafe loads. Permits are to be obtained for abnormal loads.
5. No speeding.
6. No accidents.

Management Actions:

- Undertake negotiations and confirm arrangements with the private landowners regarding the use of the DR 02491 and other traffic arrangements.
- Determine and document the road conditions of the DR 02491 and R344, as relevant.
- Selective upgrade of the DR 02491, western access roads and other relevant access roads (see layout map) to ensure that they are capable of accommodating the type of vehicles and/or mechanical plant using these roads.
- Obtain the necessary approval for road upgrades and wayleave for road construction from the Provincial Department of Roads and Public Works, as applicable.
- Any clearing for access or haul roads outside the demarcated works area shall only be undertaken after approval from the Project Manager/ Engineer.
- Temporary access roads constructed outside of the dam basin are to be suitably rehabilitated.
- Ensure temporary accommodation of traffic where the DR 02491, R344 and MR00639 are affected by construction activities.
- Make provision for community members to access their properties safely.
- A speed limit of 40 km/h should be applied on public and other roads within the project area.
- Ensure appropriate traffic safety measures are implemented to make provision for blind rises and sharp bends on the DR 02491, R344 and MR00639 within the construction domain.
- Permission is required from the Project Manager/Engineer for the movement of any vehicles and/or personnel outside of designated working areas.
- Access roads are to be maintained in a suitable condition.
- Clearly mark pedestrian-safe access routes within the construction areas.
- Suitable erosion protective measures are to be implemented for access roads during the construction phase.
- Traffic safety measures (e.g. traffic warning signs, flagmen) are to be implemented where applicable.

- Clearly demarcate all construction access roads.
- Proper access control is to be maintained to prevent livestock from accessing construction areas.
- All fences erected for construction purposes (e.g. fences around camp sites, fencing around trenches, etc.) should be inspected on a daily basis to detect whether any damage has occurred. Damaged fences / barricading is to be repaired immediately.
- Consult with property owners, local authorities and communities to ensure that all affected parties are informed of the timing and extent of any disruptions.
- Ensure that service nodes, such as the Presbyterian Church Adelaide Primary School and the community facilities in Bezuidenhoutville Township, remain easily and safely accessible at all times. Limit the construction-related nuisance to these areas.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Signage displayed and maintained.
- Contractor's method statement.
- Maintenance of access control to construction sites.
- Maintenance of access roads.

14.12 Management of Labour Force

Management Objective:

- Ensure suitable management of the labour force to prevent security-related issues or disturbance to landowners and community members.
- Optimise the use of local labour.
- Provide a work environment that is conducive to effective labour relations.

Target:

1. No complaints from landowners and community members regarding trespassing or misconduct by construction workers.
2. All unskilled labour to be sourced from local communities.

Management Actions:

- Prohibit trespassing of construction workers on private property.
- Workers should be provided with identity cards and should wear identifiable clothing.
- Make suitable provision for accommodation of the workforce off-site.
- Creating nuisances and disturbances in or near communities shall be prohibited.
- Machine / vehicle operators shall receive clear instructions to remain within demarcated access routes and construction areas.
- Designated smoking areas should be provided, with special bins for discarding of cigarette butts.
- Establish a 'labour and employment desk' in consultation with local authorities, which is not to be situated at the site.
- Create opportunities for the employment of women.
- Where possible use labour-intensive methods of construction.
- Use local labour as far as possible, where necessary (e.g. unskilled labour).
- Develop a community labour agreement with targets for employment and for progression.
- Implement applicable training of labour to benefit individuals beyond completion of the project.
- Implement a STD and HIV/AIDS awareness and prevention programme amongst labourers. The contractor should provide an adequate supply of free condoms to all workers. Condoms should be located in the bathrooms and other communal areas on the construction site and at the construction camps. If viable, a voluntary counselling and testing programme should be introduced.

Responsibilities:

- Proponent – employment targets.
- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Labour-related targets.

14.13 Management of Ablution Facilities

Management Objective:

Minimise environmental impacts associated with ablution facilities.

Target:

1. No environmental contamination associated with ablution facilities.
2. Minimise visual impact associated with ablution facilities.

Management Actions:

- Provide sufficient ablution facilities (e.g. mobile / portable / VIP toilets) at the construction camp and along construction sites, which conform to all relevant health and safety standards and codes.
- No pit latrines, french drain systems or soak away systems shall be allowed. Install and maintain conservancy tanks for any residential labour camp and site offices. The location of conservancy tanks is to be approved by the Project Manager/Engineer.
- Toilets may not be situated within 100 meters of any water body or within the 1:100 year flood line.
- A sufficient number of toilets shall be provided to accommodate the number of personnel working in any given area. Toilets may not be further than 100 m from any working area. Toilet facilities supplied by the Contractor for the workers shall occur at a maximum ratio of 1 toilet per 15 workers.
- All temporary / portable / mobile toilets shall be secured to the ground to prevent them from toppling over due to wind or any other cause.
- Ensure the proper utilisation, maintenance and management of toilet, wash and waste facilities.
- The entrances to the toilets shalll be adequately screened from public view.
- These facilities will be maintained in a hygienic state and serviced regularly.
- Toilet paper shall be provided.

- The Contractor shall ensure that no spillage occurs when the toilets are cleaned or emptied and that a licensed service provider removes the contents from site. Disposal of such waste is only acceptable at a licensed waste disposal facility.
- Should shower facilities be provided for use by staff on site, the following controls must be imposed:
  - Proper positioning of the shower, and specifically its discharge point, shall be carried out to ensure that erosion and build-up of detergents does not occur.
  - All discharge from the shower and other washing facilities must be managed to prevent environmental contamination.
  - Use of the shower facilities must be limited to staff or authorised persons only.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Maintenance register for ablution facilities.
- Waste disposal certificates.
- Contractor's method statement.

14.14 Management of Topsoil

Management Objective:

Ensure suitable removal, storage, and transportation of topsoil for re-use during rehabilitation.

Target:

1. At least 95% of recovered topsoil from disturbed areas is to be stored for future use.
2. No visual evidence of erosion from topsoil stockpiles.
3. No visual evidence of erosion from areas where topsoil has been reinstated.

Management Actions:

- Determine the average depth of the topsoil prior to excavations.

- Identify suitable areas to store topsoil.
- Remove topsoil from areas to be affected by construction activities.
- Prevent mixing of topsoil with subsoil.
- Topsoil is to be adequately protected from contamination from construction activities and material.
- Protect stored topsoil from compaction.
- Wind and water erosion-control measures are to be implemented to prevent loss of topsoil.
- Following the construction phase, the topsoil should be placed as the final soil layer prior to seeding, on areas to be rehabilitated outside of the dam basin.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Condition of topsoil stockpiles.
- Dust monitoring.
- Rehabilitated areas.
- Contractor's method statement.

14.15 Management of Waste

Management Objective:

- Minimise negative environmental impacts associated with waste.
- Apply waste management principles to prevent, minimise, recycle or re-use material, with disposal as a last option.

Target:

- No littering on construction site.
- Maintain a clean and tidy construction site.
- A 100% record of all waste generated and disposed of at waste disposal facilities.
- Valid disposal certificates for all waste disposed.
- Provision of adequate waste containers that are easily accessible and maintained.

- Waste bins are to be removed and cleaned weekly.

Management Actions:

- Waste management activities must comply with the National Environmental Management: Waste Act (No. 59 of 2008).
- The storage of general or hazardous waste in a waste storage facility must comply with the norms and standards in GN No. R. 926 of 29 November 2013.
- Vermin / weatherproof bins shall be provided in sufficient numbers and capacity to store domestic waste. These bins must be kept closed to reduce odour build-up and emptied regularly to avoid overfilling and other associated nuisances.
- Where possible, waste must be separated at source (e.g. containers for glass, paper, metals, plastics, organic waste and hazardous wastes).
- Establish and monitor recycling targets.
- Provide waste skips at the construction areas. These skips should be sufficient in number, the skip storage area should be kept clean, and skips should be emptied and replaced before overflowing or spillage occurs.
- Ensure suitable housekeeping. .
- The Contractor shall ensure that no burying, dumping or burning of waste materials, vegetation, litter or refuse occurs. All waste will be disposed of at suitable licensed disposal sites, based on the waste type (general versus hazardous).
- Ensure that solid waste is transported so as to avoid waste spills en-route.

Responsibilities:

- Project Manager/Engineer and ECO - checking.
- Contractor to implement management actions.

Monitoring Requirements:

- Public complaints register.
- Waste register.
- Recycling targets.
- Disposal certificates.
- Contractor’s method statement.