Kayamandi Northern Extension Water Supply Pump Station, Pipelines and a Reservoir, Western Cape

Basic Assessment Process

Draft Environmental Management Programme for Public Review

Stellenbosch Municipality

Project reference: 16/3/3/1/B4/22/1070/20
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Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
00	2020/11/13	First Issue to Client – Draft for comment	Yes	Catherine Smith	Project Manager
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Distribution List

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-	1	Department of Environmental Affairs and Development Planning (Competent Authority)
-	1	Department of Water and Sanitation (Berg -Olifants Catchment Management Agency)
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-	1	CapeNature
-	1	Heritage Western Cape
-	1	Department of Agriculture, Land Use Management (Western Cape)
-	1	https://aecom.com/kayamandi-sa-10-20 Web address for public review of the Draft Basic Assessment Report

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List of Acronyms

Acronym	Description
BA	Basic Assessment
CA	Competent Authority
CAR	Corrective Action Request
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CLO	Community Liaison Officer
DNP	Defects Notification Period
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EMS	Environmental Management System
EO	Environmental Officer
ETB	Ethylbenzene
FPA	Fire Protection Association
GCC	General Conditions of Contract 2015
GNR	General Notice Regulations
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome
HWC	Heritage Western Cape
I&APs	Interested and Affected Party(s)
IMS	Integrated Management System
ISO	International Organization for Standardization
JIV	Joint Investigation Visit
LM	Local Municipality

Acronym	Description
MSDS	Material Safety Data Sheets
MW	Megawatt
NCR	Non-Conformance Report
NEM: BA	National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)
NEM: WA	National Environmental Management: Waste Act (No. 59 of 2008)
NEMA	National Environmental Management Act (Act No. 107 of 1998) as amended
NHRA	National Heritage Resources Act (No. 25 of 1999)
NWA	National Water Act (No. 36 of 1998)
OHSA	Occupational Health and Safety Act (Act No. 85 of 1993)
PPE	Personal Protective Equipment
QA/QC	Quality Assurance and Quality Control
QMS	Quality Management System
RAM	Responsibility Assignment Matrix
SAHRA	South African Heritage Resources Agency
SAICE	South African Institution of Civil Engineering
SANAS	South African National Accreditation System
SANS	South African National Standards
SAPS	South African Police Services
SHEQ	Safety, Health, Environment and Quality
SO	Social Officer
STP	Stored Pressure
TEM	Transport, Earthmoving and Materials Handling Equipment
WC: DEA&DP	Western Cape Provincial Department of Environmental Affairs and Development Planning

Glossary of Technical Terms

Term	Description
Clearing	Means the clearing and removal of vegetation, whether partially or in whole, including trees and shrubs, as specified.
Construction camp	Is the area designated for key construction infrastructure and services, including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management.
Contractor	The Contractor has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract, are in line with the Environmental Management Programme and that Method Statements are implemented as described.
Hazardous Substances	Is a substance governed by the Hazardous Substances Act, 1973 (Act No. 15 of 1973) as well as the Hazardous Chemical and Substances Regulations, 1995;
Heritage Remains	Heritage remains include: archaeological remains (including fossil bones and fossil shells); coins; indigenous and/or colonial ceramics; any articles of value or antiquity; marine shell heaps; stone artefacts and bone remains; structures and other built features; rock art and rock engravings; shipwrecks; and graves or unmarked human burials.
Method Statement	Means a written submission by the Contractor to the Project Manager in response to this EMPr or a request by the Project Manager and ECO. The Method Statement must set out the equipment, materials, labour and method(s) the Contractor proposes using to carry out an activity identified by the Project Manager when requesting the Method Statement. This must be done in such detail that the Project Manager and ECO is able to assess whether the Contractor's proposal is in accordance with this specification and/or will produce results in accordance with this specification. The Method Statement shall cover applicable details with regard to:

Term	Description
	i. Construction procedures; ii. Plant, materials and equipment to be used; iii. Transporting the equipment to and from site; iv. How the plant/ material/ equipment will be moved while on site; v. How and where the plant/ material/ equipment will be stored; vi. The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur; vii. Timing and location of activities; viii. Compliance/ non-compliance; and ix. Any other information deemed necessary by the Project Manager.
Slope	Means the inclination of a surface expressed as one unit of rise or fall for so many horizontal units.
Solid waste	Means all solid waste, including construction debris, hazardous waste, excess cement/ concrete, wrapping materials, timber, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).
Spoil	Means excavated material which is unsuitable for use as material in the construction works or is material which is surplus to the requirements of the construction works.
Topsoil	Means a varying depth (up to 300 mm) of the soil profile irrespective of the fertility, appearance, structure, agricultural potential, fertility and composition of the soil.
Works	Means the Works to be executed in terms of the Contract.

Content of the EMPr

Content as required by NEMA EIA Regulations GN No. 982 (as amended), Appendix 4	Chapter/Section number
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;	**Appendix A**
b) A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	**Section 3.7**
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;	**Figure 3-1**
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 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;	**Section 11.16**
e) A description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	**Section 11**
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;	**Section 11**
g) The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	**Section 7**
h) The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	**Section 7**
i) An indication of the persons who will be responsible for the implementation of the impact management actions;	**Section 11**
j) The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	**Section 11**
k) The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	**Section 7**
l) A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	**Section 7**
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; and (ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment; and	**Section 11.16.1**
n) Any specific information that may be required by the competent authority.	**N/A**

NOTE: Changes made to the original Draft EMPr that was made available for public review on 10 Dec 2020 have been indicated in grey highlight in this version (Draft EMPR Version 2) which is currently out for public review.

1. Introduction

An Environmental Management Programme (EMPr) is an environmental management tool used to prescribe management mechanisms or methods for the prevention of undue or reasonably avoidable adverse environmental impacts and for the enhancement of the positive environmental benefits of a development. The EMPr is based on the findings of the Basic Assessment (BA) process conducted in terms of the Environmental Impact Assessment (EIA) Regulations (2014), as amended. In terms of when the project was initiated, all works associated with the EIA process have been undertaken under the prevailing National Environmental Management Act (Act No. 107 of 1998) as amended (NEMA) and the EIA Regulations (Government Notice No. R. 982, 983, 984 and 985 of 04 December 2014, as amended), (the EIA Regulations).

An EMPr describes the measures that need to be taken to ensure the Duty of Care is bestowed upon those who cause, have caused or may in future cause pollution or degradation of the environment, as per Section 28(1) of NEMA. Non-compliance to Section 28 (Duty of Care) is a criminal offence and may lead to criminal prosecution. Furthermore, this EMPr is drafted in compliance with NEMA Section 24N (*Environmental Management Programme*) requirements and the scope is to set conditions for the implementation of the environmental management component for all personnel involved with the development. As such, the EMPr outlines how the development will be managed through its planning, design, pre-construction, construction, rehabilitation and decommissioning lifecycle and is designed to mitigate negative environmental impacts; whilst enhancing positive impacts.

The EMPr is used to guide and regulate environmental performance through all stages of development, including planning, design, construction, rehabilitation and maintenance, and eventual decommissioning (if applicable).

This EMPr (inclusive of Aquatic and Vegetation Rehabilitation Plans) must form part of the tender documentation to the Contractor(s) and becomes legally binding on the Contractor(s) and anyone acting on behalf of the Contractor(s) or the Applicant (Stellenbosch Local Municipality) during the development life-cycle process activities.

This EMPr was compiled as a stand-alone document and includes potential impacts associated with construction activities associated with the proposed project. The EMPr is designed to be as site-specific as possible. In addition, this EMPr is a dynamic and flexible document and may need to be updated on a regular basis, as directed by the Environmental Control Officer (ECO).

2. Background to the EMPr

2.1 Nature of the EMPr

The EMPr is a legally required and binding document in the same manner as a licence or Environmental Authorisation (EA) and is required prior to undertaking an activity. The document is site specific to ensure that it complies with the requirements of reasonable protection of the environment as imposed by Section 28 of NEMA in particular, which refers to duty of care. The EIA Regulations (2014), as amended, are used as a guideline for the content of the EMPr and in terms of Sec 24N of NEMA and an EMPr must include:

- information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24 (1A), including environmental objectives in respect of –
- planning and design;
- pre-construction and construction activities;
- the operation of undertaking of the activity in question;
- the rehabilitation of the environment; and
- details of -
  - the Environmental Assessment Practitioner (EAP) who prepared the EMPr; and
  - the expertise of that EAP to prepare an EMPr, including a curriculum vitae;
- a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;
- information identifying persons who will be responsible for the implementation of the measures contemplated in paragraph (2)
- information in respect of the mechanisms that proposed for monitoring compliance with the environmental management programme and for reporting on the compliance;
- as far as reasonably practicable, measures to rehabilitate the environmental affected by the undertaking of the any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and
- a description of the manner in which it intends to-
  - modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;
  - remedy the cause of pollution or degradation and migration of pollutants; and
  - comply with any prescribed environmental management standards or practices.

The mitigation measures required in terms of Section 28, subsection (1) include measures to:

- investigate, assess and evaluate the impact on the environment;
- inform and educate employees about the environmental risks of their work and the manner in which their tasks must be performed to avoid causing significant pollution or degradation of the environment;
- cease, modify or control any act, activity or process causing the pollution or degradation;
- contain or prevent the movement of pollutants or the cause of degradation;
- eliminate any source of the pollution or degradation; or
- remedy the effects of the pollution or degradation.

This EMPr, as a standalone document, shall be used to guide and regulate environmental performance of the project through the construction and rehabilitation stages of the scheme. It contains the following elements:

- goal setting and performance measurement;
- compliance management;
- an assessment and management system;
- community relations;
- roles, responsibilities and accountabilities;
- risk management;
- emergency preparedness and response;
- incident reporting and investigation; and
- Vegetation and Aquatic Rehabilitation Plans (Appendix I).

To achieve these environmental management requirements, a defined and implementable system must be in place. This system comprises the "what" and the "how".

- **The what:** The EMPr indicates to the Contractor what is required by setting objectives with measurable targets in place for the successful management of the scheme.
- **The how:** Stellenbosch Local Municipality is required to formulate procedures and/or guideline documents in compliance with its Quality Management System (QMS) requirements on how the objectives will be met.

2.2 Objectives of the EMPr

The main objective of the EMPr is to ensure the implementation of environmental practices that are aimed at the best form of environmental protection. The aim is to ensure that Stellenbosch Local Municipality takes reasonable measures to protect the environment and to remedy impacts to the environment, as required by the Duty of Care introduced by the NEMA, Section 28. The EMPr draws Stellenbosch Local Municipality's attention to the monitoring, auditing and corrective actions that may be needed during construction of the project. Therefore, the other objectives[1] of the EMPr are to:

- avoid, minimise or correct the disturbance of ecosystems and loss of biodiversity;
- avoid, minimise or correct pollution and degradation of the environment;
- avoid or minimise waste, to reuse or recycle waste where possible and to dispose of waste in a responsible manner;
- apply a risk-averse and cautious approach; and
- anticipate and prevent negative impacts on the environment and on people's environmental rights. Where impacts cannot be prevented, such impacts must be minimised and mitigated.

[1] As defined by the NEMA

2.3 Scope of the EMPr

The EMPr outlines the impacts and mitigation measures associated with the planning and design, pre-construction and construction, operation, rehabilitation and closure (or decommissioning) of the project. The roles, responsibilities and reporting procedures have been identified in the EMPr.

The EMPr also contains a series of environmental specifications designed to avoid, minimise and, ultimately, manage the potential environmental impacts associated with the construction of the project.

The EMPr is for the planning and design, pre-construction and construction, operation, rehabilitation and closure (or decommissioning) activities associated with the project.

2.4 Outcomes of the EMPr

This EMPr covers systems, strategies and procedures to ensure proposed developments associated with the proposed Project meet the environmental outcomes and targets as prescribed herein.

The below outcomes, targets and execution are to ensure the development is undertaken in an environmental responsible manner (please refer to Table 2-1).

Table 2-1: EMPr Outcomes

Outcomes	Targets	Execution
Compliance with legislative requirements	100% compliance with all requirements	Review of audit reports
Compliance with Competent Authority (CA) conditions	100% compliance with all requirements	Review of audit reports
Avoidance of environmental harm	Compliance with EMPr, environmental authorisation and best practicable environmental option	• Implementation of development based EMS • Implementation of monitoring environmental controls • Environmental reporting, auditing and recording • Awareness training
Conformance with best practicable environmental option	• Conduct environmental inductions (at development commencement and every six months thereafter) and provide for weekly environmental toolbox talks • Achieve performance indicators and targets • Undertake environmental inspections • Undertake environmental audits as per prescribed audit schedule • Report and record all environmental incidents and non-conformances • Assign and complete corrective actions within the prescribed timeframes	• Training of personnel in EMPr measures • Environmental monitoring and audits • Review of non-conformance register • Review of environmental reports
Maintain commitments to stakeholders and community	• Minimal grievances • Respond to all grievances • Within the prescribed timeframes	Review of Communications Register

2.5 Adaptive Management and Review of EMPr

As part of an adaptive management strategy, this EMPr is a "living" and / or dynamic document that shall be reviewed prior to each development phase to ensure appropriateness and applicability. This approach shall allow for:

- monitoring data gathered being used to evaluate impact management and mitigation;
- assumptions being tested and uncertainties reduced; and
- EMPr efficacy being determined and whether reviews are required.

Such review can provide for:

- revision of monitoring because of iterative learning;
- the determination of performance indicators and target success; and
- revision of performance targets and target actions.

Therefore, the EMPr may be revised due to:

- policy change;
- management review;
- audit recommendations;
- grievances or non-conformance reports; and
- legislative changes.

Please note the requirements associated with Regulations 29 and 31 of the EIA Regulations (2014), as amended, relating to the amendment processes:

- Part 1 Amendment (Regulation 29) shall be undertaken (the amendment shall require not formal submission of the EMPr to the CA; and no public participation). The amended EMPr shall however be submitted to the CA for record keeping when there is:
  - no change in scope of a valid environmental authorisation;
  - no increase in level or nature or assessed impact; and
  - a change of ownership or transfer of rights and obligations.
- Part 2 Amendment (Regulation 31) shall be undertaken when there is:
  - a change to the scope of a valid environmental authorisation;
  - an increase in level of or change in the nature of assessed impact; and
  - inclusion of an activity not considered within the initial application for environmental authorisation or the environmental authorisation itself.

A Part 2 Amendment shall be applicable when the length of the construction period exceeds the period specified in the environmental authorisation when no operational aspects are applicable (please refer to Regulation 26 (d) (ii) of the EIA Regulations (2014), as amended.

The amendment shall require a formal submission of the EMPr to the CA; together with a public participation process. A Part 2 Amendment process may negatively impact upon the Contractor's programme.

2.6 The Continuous Improvement Approach

The approach adopted for this EMPr is derived from the Deming Cycle (refer to Figure 2-1), a cycle of continuous improvement that entails the reiterative actions of plan, do, check and act.

2.6.1 Plan

The EMPr for the upgrade communicated the Environmental Policy and intended environmental governance of Stellenbosch Local Municipality to all parties. The project will be implemented under this policy, and all parties acting on behalf of Stellenbosch Local Municipality will adhere to this policy. The organisational relationships required have been illustrated and the roles and responsibilities of each "organisation" have been defined.

Project-specific planning for the replacement works involved listing activities associated with the works and the environmental aspects that may be impacted on. This provided a starting point from which aspect-specific environmental management objectives were established.

Environmental performance indicators were determined for these objectives and measurable targets were prescribed to monitor the environmental performance of the project.

Achieving the targets depends on compliance with this EMPr and the legislative requirements that underpin it.

2.6.2 Do

Throughout the proposed development, Stellenbosch Local Municipality will be required to develop and maintain a QMS that is designed to ensure that best management practices are implemented in day-to-day construction management. Such a QMS should include at least the following information:

- location and extent of associated infrastructure;
- associated activities, such as the transportation of people and equipment;
- resources and experience required (staffing);
- materials and equipment to be used;
- management actions;
- human resources used;
- construction-monitoring activities;
- emergency / disaster incident and reaction procedures; and
- rehabilitation procedures for the impacted environment.

Including these information topics in the Contractor's procedures and/or guideline documents will ensure that aspect-specific environmental management (based on this EMPr) forms an integral part of the construction works. It is, therefore, important for the Contractor to integrate the environmental management requirements into the construction activities by way of set procedures that are set out in its QMS.

The incorporation of the how and what will ensure that Stellenbosch Local Municipality understands what is required of it and that it allows systems to be put in place to ensure that the execution of the requirements

is monitored. Stellenbosch Local Municipality should also develop a programme for monitoring aspect-specific indicators in terms of the targets provided in the EMPr.

2.6.3 Check

A system of assessing monitoring results has been developed to check on the Contractor's environmental management performance. Continuous assessment facilitates proactive management of environmental issues. Mitigation measures can then be successfully implemented on an on-going basis to keep environmental indicators within their target thresholds. Moreover, the assessment system also enables the assessment of the efficacy of the EMPr.

Regular auditing of environmental performance is prescribed to prove and preserve accountability in a legislative context.

2.6.4 Act

The assessments and monitoring of the results and findings of the regular audits must be documented within a reporting. Precautionary mitigation measures and corrective actions will be prescribed, and instructions will be given in order to implement these in the field.

The findings of monitoring and auditing programmes can also be used to update the EMPr. Although the EMPr is a project-specific document, it is dynamic and should be updated regularly to address the changing circumstances of the scheme.

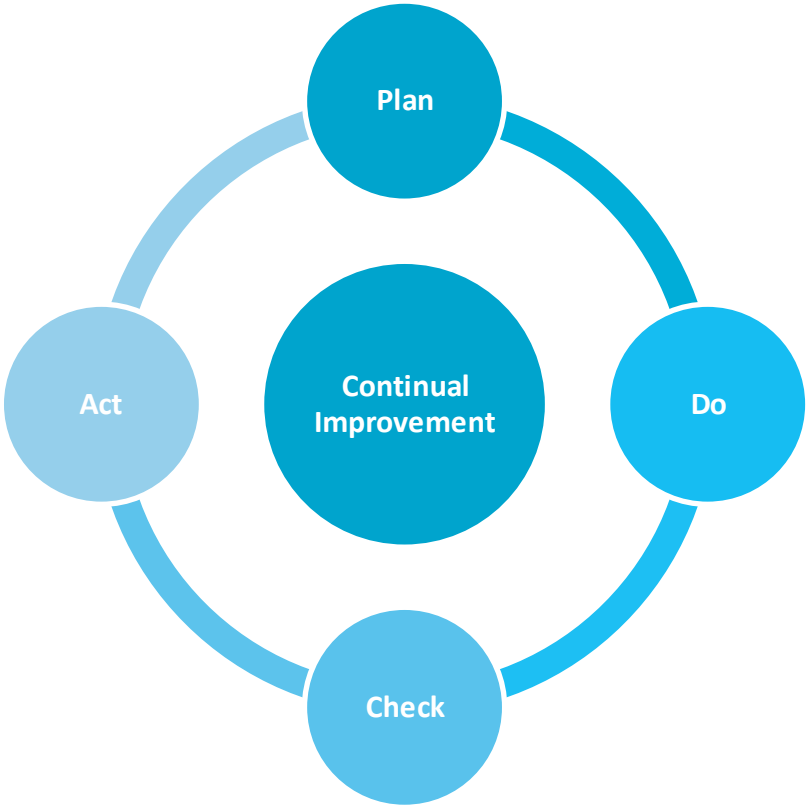

Figure 2-1: The Deming Cycle of Continuous Improvement

2.7 Stellenbosch's Environmental Management System

Stellenbosch has adopted ISO 14001 as a best-practice governance and corporate model for environmental management. Section 2.6 indicates Stellenbosch's adaptive environmental management strategy which is formed on the basis of ISO 14001. This EMPr forms an integral part of the cyclical structure (Deming Cycle) of the EMS.

2.8 Legal and Administrative Framework

The development shall be implemented within the framework of the NEMA and other relevant environmentally related legislation, including national acts, provincial ordinances, municipal by-laws and/or guideline documents as referenced in Appendix B.

3. Project Description

3.1 Background

Stellenbosch Local Municipality is undertaking planning and infrastructure provision for the establishment of the Kayamandi Bulk Water Supply Pipe and Reservoir (the Project). The proposed project is aligned to the Stellenbosch Local Municipality's Integrated Development Plan (IDP) and is in support of housing and development schemes over the next couple of years.

The Stellenbosch Local Municipality's IDP and Spatial Development Framework (SDF) have indicated the need for affordable housing opportunities for the Kayamandi area. Kayamandi is currently subjected to pressure for outward expansion, mainly from new residents moving to Stellenbosch from elsewhere. This migration of people causes increased pressure on municipal services such as water, sanitation and electricity supply. Stellenbosch currently receives two thirds of its water from the City of Cape Town (CoCT) sources, which includes the Theewaterskloof Dam, the Wemmershoek Dam and the Steenbras Dam.

Therefore, to supply Kayamandi, as well as the future housing and development schemes in and around Kayamandi with sufficient water, it is proposed that the municipality upgrade its bulk water supply network. The proposed Project is thus critical for development and continued security of water supply within the Stellenbosch area.

The proposed Project entails the construction of:

1. **75 to 154 litre per second (L/s) pump station**
   - located at the existing Papegaaiberg Reservoir and pump station site
   - with associated infrastructure associated infrastructure such as valve chambers and flow meters,
   - including two (2) back-up diesel generators, each with a generation capacity of 0.8 megawatt (MW), collectively generating approximately 1.6 MW,
   - installation of above-ground diesel storage of approximately 12 m^3 to fuel the back-up generators,
   - pump station footprint, including generators, diesel storage and associate infrastructure estimated at 3000 m^2
   - associated with the pump station will be a satellite construction camp of an estimated 400 m^2.

2. Rising main pipeline

- with associated scour chambers (5-7 small chambers, each estimated 10m^2),
- to take water from proposed new pump station at the existing Papegaaiberg Reservoir to the proposed new Kayamandi Northern Reservoir,
- approximately 3 200 m in length,
- internal diameter of estimated 450 mm,
- internal diameter of estimated 450 mm,
- footprint of the infrastructure is estimated at 3200 m x 1 m = 3 200 m^2
- footprint of construction (trench) will be 6-6.5 m wide (20 800 m^2)
- a proposed pipeline corridor of 50 m wide will be applied for along the length of the pipeline route, within which a 15-20 m construction corridor is required (64 000 m^2), except:
    - *Wetland crossing* – within the wetland buffer area (15 m on either side of the delineated wetland) no application corridor applies. A construction corridor of a maximum of 6.5 m is applied for;
    - *Azania/Watergang informal settlement* - pipeline passes between the newly established Watergang / Azania Township and the Kayamandi Township, where space is limited to the jeep track and walking path through this area – the pipeline will be placed in the available space (roughly a 6.5 m width), and
    - *Enkanini informal settlement (East of existing Kayamandi Reservoir)* – the pipeline route runs southwards and follows the gravel road past the eastern side of the existing Kayamandi Reservoir. In this section, a small informal settlement has established on both sides of this road and available space is <6m wide, constricting to 3-4m wide in places due to dwellings/structures encroaching on the road. A minimum construction corridor of 6.5m is required. The Stellenbosch Local Municipality Housing Department is in the process of engaging resident with regards to relocating identified structures in the area to make way for the proposed pipeline. A social impact assessment has been done to assess the potential impact of the pipeline on the structures and people that may need to be relocated.
- once complete a 6-6.5m pipeline servitude will need to be kept clear of development, however there will be no surface footprint, except for markers and scour chambers and a construction scar that will fade over time.

3. 560 m pipeline

- from the new Kayamandi Northern reservoir back along the rising main pipeline to Azania / Watergang (i.e. in parallel to the northern section, thus total length of the pipeline footprint is still 3200 m)
- internal diameter of estimated 450 mm or less
- footprint is included in that of the rising main.

4. Kayamandi Northern reservoir

- with associated infrastructure such as valve chambers, flow meters,
- that will be fed from the existing Papegaaiberg Reservoir via the proposed new rising main,
- with 10 mega litre (Mℓ) maximum capacity.

5. Additional Information

- Access will be via existing dust roads to reach the proposed reservoir and camp site(s) i.e. to the north of the project area via the R304 and to the south via Distillery Road.

3.2 Project Location

The study area falls within the Stellenbosch Local Municipality which is a Category B[2] municipality situated in the Western Cape province and forms part of the Winelands District Municipality. The proposed Project is located approximately 3 km north of Stellenbosch town western edge, Western Cape province (Figure 3-1). The Project is adjacent to the existing Papegaaiberg and Kayamandi reservoirs.

[2] A local municipality that shares municipal executive and legislative authority in its district area.

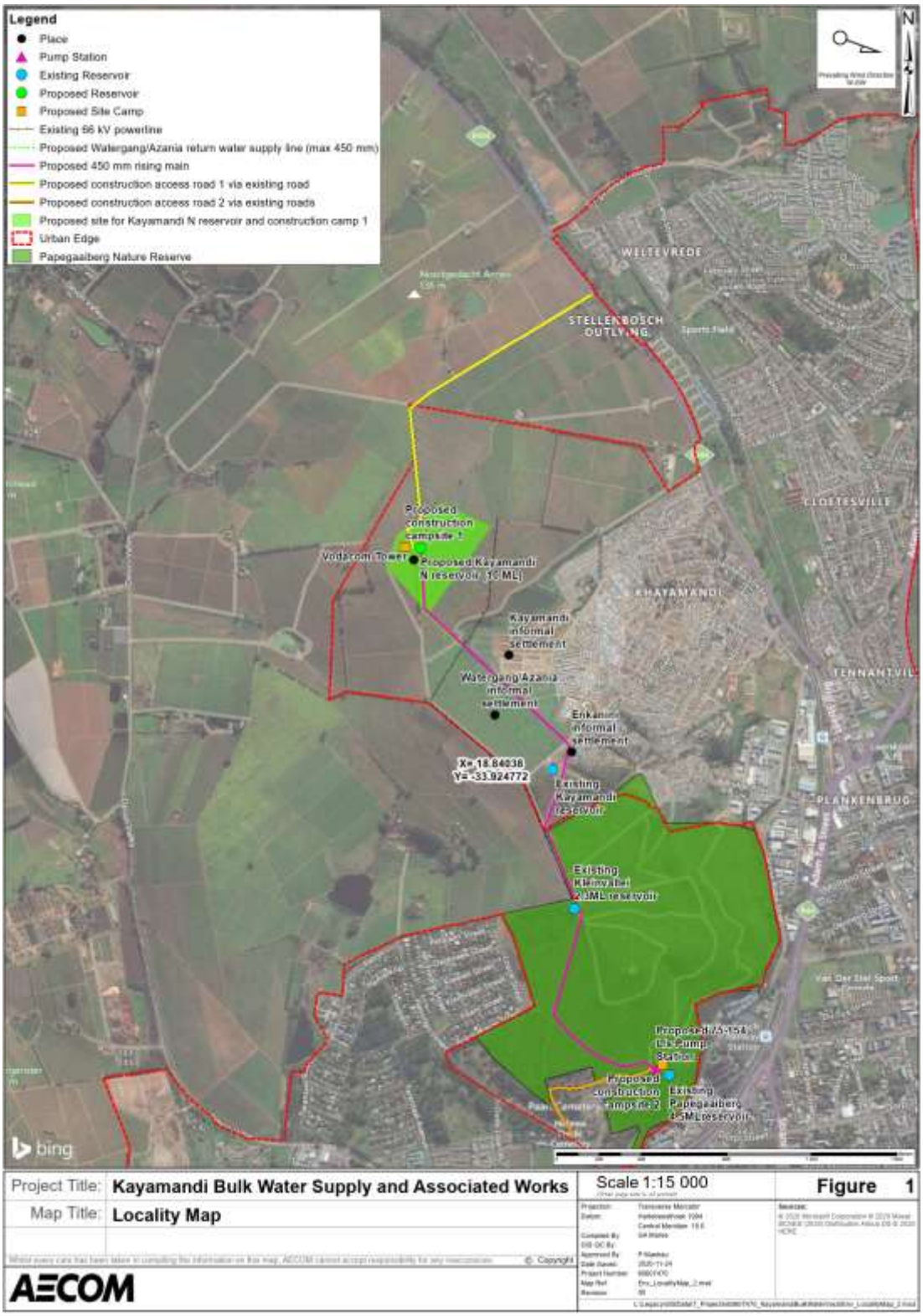

Figure 3-1: Map for the proposed Kayamandi Bulk Water Project

3.3 Servitudes

The construction servitude width required to accommodate the pipelines is 20 m (proposed rising main of 3.2km long). The pipeline servitude is required to ensure safe construction, maintenance and operation of the reservoir, pump station and pipeline.

There is existing fibre optic cable infrastructure adjacent to the proposed reservoir site and the proposed pump station site belonging to Vodacom and Dark Fibre Africa. These stakeholders must be informed of construction activities throughout the implementation phase.

There is also an overhead electrical cable that crosses the proposed pipeline route in the vicinity of the reiver crossing. Information on Requirements for Working Close to Distribution Powerlines is included in Appendix H.

3.4 Site Access

Access to the north of the project will be from Bird Street (R304) and via an existing gravel road. The currently proposed road is indicted in (Refer to Figure 3-1) however, the final access route will be determined by the Contractor just before construction, in consultation with the ECO and the relevant land owner. Therefore an 'area of access' is proposed for assessment and authorisation, within which an existing road will be utilised. The area of access is shown in Figure 3-2.

The properties in area demonstrated are owned by Stellenbosch Local Municipality, Cloetesdal Developments (Pty) Ltd (previously owned by Alberto Costa Trust, but currently in transfer to Cloetesdal Developments), and Johan de Villiers. All landowners are included in the I&AP database to afford them the opportunity to comment on the Basic Assessment.

Figure 3-2: Map for the proposed Kayamandi area of access

Access to the south of the project will be via Distillery Road and the existing gravel road that leads to the existing Papegaaiberg Reservoir. (Refer to Figure 3-1).

3.5 Site / route plan

Refer to Appendix E for maps indicative of the site or route plan for the proposed activity alignments.

3.6 Sensitive Sectors in the Pipeline Route

A section of the pipeline transverses the Papegaaiberg Nature Reserve (±1.4 km), which has a distribution of Swartland Granite Renosterveld (FRg2) and Swartland Shale Renosterveld (FRs9). According to the CapeNature Scientific Services Land Use Team (2017) these vegetation types fall amongst 21 critically endangered ecosystems and are of high conservation importance. The study area also transverses Ecological Support Area (ESA) 2 (Restore from other land use) for approximately 250 m of the alignment, approximately 200 m of a Critical Biodiversity Area (CBA) 1 (Terrestrial) and an estimated 1 500 m of CBA 2 (Terrestrial – Degraded) within the Papegaaiberg Nature Reserve. Refer to Appendix G for sensitivity map.

3.7 The Construction Process

3.7.1 Site Office and Laydown Area

The Contractor will require a site office and laydown rea for the duration of the contract period. There will be two (2) separate site offices and laydown areas, for the pump station (33°55'55.20"S; 18°50'16.32"E) and for the reservoir (33°54'54.66"S; 18°50'0.18"E).

3.7.2 Construction Camp

The Contractor will require a construction camp(s) for the duration of the contract period. Two (2) site camps will be erected, the main camp at the new Kayamandi Northern reservoir location and another satellite camp at the pump station location (existing Papegaaiberg reservoir site). The following conditions will be applicable to the camp sites:

- The site camp areas will be demarcated with a 1.8m high fence with lockable access gate;
- At the main camp temporary containers will be placed for the Engineers office, boardroom, Contractor office, storage containers and the site clerk's office, with covered car ports. The satellite camp will mainly house storage containers;
- Chemical toilets (ground secured) will be provided for the Contractor and Engineer. These will be serviced and cleaned once a week. On site chemical toilets will be used alongside activities as project progresses. Location of chemical toilets must be >100 m from the wetland identified in the BA Report and EMPr and >100 m;
- Waste bins will be kept in camp, waste will be disposed weekly at Devon Valley Landfill Site. Site camp areas will be kept clean at all times;
- Water basin and water point will be provided;
- Concrete discharge areas will be used to clean concrete trucks off site. These areas will be lined with HDPE sheeting. When disposed concrete has set, the concrete will be removed and disposed of at municipal waste depot;
- Wash bay area will be situated within the site camp;
- Security will be appointed fulltime at site camps after hours for duration of contract;
- Diesel storage tanks may be required for construction purposes. Total volume of diesel storage in tanks or bowser must be < 80 m^3 and must be located > 100 m from the wetland identified in the Aquatic Impact Assessment and from any other water course;
- All equipment in camp and on site will be in good working order. Drip trays will be used for equipment to prevent oil and diesel spills. Spill kit will also be on site to accommodate unnecessary spills;
- Materials will be stored on site and in site camps. Hazardous materials will be handled as per health and safety specifications;

- The main site camp will act as site assembly point and all visitors must report to site office before entering construction site. The satellite site camp will also have their own emergency assembly point;
- First aid kits and fire extinguishers will be available at site camps; and
- Any trees in the immediate area will be barricaded with danger tape. Trees will not be damaged during construction period.

3.7.3 Construction Access

Access routes will be used to access the project site namely:

- Access to the north of the project will be via Bird Street (R304) and an existing gravel road; and
- Access to the south of the project will be via Distillery Road and an existing gravel road.

3.7.4 Construction Activities

Construction planning and coordinating delivery of construction materials and equipment will be undertaken to reduce travel costs and fuel usage. The construction activities are anticipated to take a minimum of 18-24 months. The EMPr covers the following construction activities as mentioned below. The proposed Project entails the construction of:

- Maximum 10 mega litre (Mℓ) Kayamandi Northern Reservoir that will be fed from a new 77 to 154 litres per second (ℓ/s) pump station at the existing Papegaaiberg Reservoir;
- Rising main of approximately 3 200 m in length from a new pump station at the existing Papegaaiberg Reservoir to the new Kayamandi Northern Reservoir;
- 585 m pipeline from the new Kayamandi Northern reservoir to Azania / Watergang (back along the main pipeline),
- Associated infrastructure such as valve chambers and flow meters;
- Two (2) back-up diesel generators, each with a generation capacity of 0.8 megawatt (MW), collectively generating approximately 1.6 MW; and
- Installation of above-ground diesel storage of approximately 12 m^3 to fuel the back-up generators.

3.8 Waste and Effluent

The proposed project may result in the generation of solid construction waste. However, it is not envisaged that the waste volumes generated would trigger the thresholds as prescribed in terms of the National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA).

A limited amount of solid waste will be produced during the construction phase. Solid waste will be temporarily stored on site in waste bins between regular collection time by service providers (municipal waste collection and limited use of private contractors). Solid waste removal including will be transported to the Devon Valley Landfill Site (33° 56' 21.5628", 18° 49' 15.06") located approximately 7 km from the project site. The Devon Valley Landfill site accepts the following waste types:

- General/garden waste;
- Clean, uncontaminated rubble (free from Asbestos products, tiles, steel, iron, large concrete blocks); and
- Contaminated builder's rubble (Asbestos products, tiles, steel, iron large concrete blocks) (/1 ton).

No hazardous waste is allowed for disposal at Devon Valley Landfill Site. Should there be a need to dispose of any Special Hazardous Wastes (SHW) this will be transported to the Vissershok Landfill Site located at

the Cape Farms 33°46'27.44"S; 18°32'41.47"E approximately 55 km from the project site. The Vissershok Valley Landfill site accepts the following waste types:

- Builder's rubble;
- Motor oil;
- Garage waste;
- Clean garden waste;
- Paper and cardboard;
- Tetra pak;
- Cans and metal;
- Glass bottles;
- Plastic;
- Polystyrene; and
- Low to medium hazardous waste.

The following waste type is not accepted at the Vissershok Landfill Site:

- e-waste.

3.9 Water Requirements and Use

Construction-related activities which will impact upon water resources require the issue of General Authorisation for such activities in accordance to Section 21 of the NWA. The following water uses are being applied for:

- Section 21 (c): impeding or diverting the flow of water in a water course; and
- Section 21 (i): altering the bed, banks, course or characteristics of a water course.

A Section 21 (a) water use will not be applied for, and as such the Contractor will not be permitted to abstract water from any of the watercourse anywhere without a licence to do so. It is further understood that construction water will be sourced by the Contractor through legal means from municipal sources and in compliance to the NWA.

3.10 Energy Efficiency

Electricity is typically the highest input cost for water supply during operation. The design approach of the mechanical equipment and electrical supply is focussed on minimising energy usage by the specification of efficient equipment. Power will be sourced from nearby municipal electrical infrastructure in consultation with the municipality.

The contractor will be advised to avoid multiple trips when transporting equipment during construction. The transportation of materials can be done simultaneously with other activities or where possible transport all construction materials at the same time.

4. Roles and Responsibilities

During the construction and operation phases, or when maintenance is required, the Stellenbosch Local Municipality's responsibility to ensure that the Stellenbosch Local Municipality Project Manager and

Contractors involved in the construction of the Kayamandi Project receive a copy of the EMPr, inclusive of Vegetation and Aquatic Rehabilitation Plans and Maintenance Management Plan (MMP), and ensure compliance with these. The EMPr is to be included as part of all tender documents. The appointed Contractor will be required to comply with the construction, operational, and management regulations set out in this Draft EMPr. The Construction/Maintenance Manager will be responsible for ensuring that all construction/maintenance staff adheres to the Draft EMPr and MMP specifications. A copy of the EMPr (inclusive of Vegetation and Aquatic Rehabilitation Plans and Maintenance Management Plan (MMP)), EA from the Department of Environmental Affairs and Development Planning (DEA&DP) will be kept on site at the construction site office and made available to all Contractor's staff, regulatory authorities and I&APs upon request. The roles and responsibilities of all role players are indicated below. Hereafter, reference to the EMPr refers to the inclusion of the Vegetation and Aquatic Rehabilitation Plans and Maintenance Management Plan (MMP).

4.1 Leadership by Senior Management

Leadership by senior management is essential in developing a culture that values health, safety and environmental protection. Therefore, senior managers shall be required to demonstrate their commitment in their actions and decisions.

Stellenbosch Local Municipality aims to create and sustain a culture within both the development; and all role players, to drive the commitment of zero harm to all people, to protect the environment and enhance the local communities.

To achieve this aim, personnel in leadership roles shall be suitably qualified and competent to provide leadership in health, safety and environmental management and will be required to:

- know and understand the health, safety and environmental risks associated with their specific activities, how these risks are managed and the corrective actions to mitigate them;
- visibly demonstrate health, safety and environmental management leadership through measurable actions (e.g. communicating the Stellenbosch OHS Policy and Standards, undertaking health, safety and environmental worksite visits, engaging personnel and Contractors, and leading or participating in health, safety and environmental activities e.g. audits, investigations and campaigns;
- motivate, coach and develop personnel in effective health, safety and environmental management by acting as a role model for compliance and reporting of issues and incidents, and encourage personnel to do the same; provide constructive health, safety and environmental feedback and celebrate success including health, safety and environmental management behaviours and performance in staffing decisions; and develop the team's health, safety and environmental management competencies;
- ensure that all relevant personnel have undertaken induction training prior to working on site;
- hold individuals accountable for their health, safety and environmental management behaviours and performance by insisting on compliance with applicable laws, regulations and development commitments; and
- apply consistent consequence management to those who breach HSE Standards and procedures whilst rewarding correct health, safety and environmental behaviours

4.2 Stellenbosch Local Municipality's Roles and Responsibilities

Stellenbosch Local Municipality will be responsible for overall environmental control on the project site during the construction works, operation, maintenance, decommissioning and rehabilitation phases. It is

Stellenbosch Local Municipality's responsibility to ensure that the Project Manager and Contractors involved receive a copy of the EMPr and ensure compliance with it. Stellenbosch Local Municipality's responsibilities will include:

- Appointing the Contractor;
- Appointing an independent ECO for the duration of the Contract;
- Being fully familiar with the BA Report, EA conditions and the EMPr;
- Communicating the contact details of the ECO to the DEA&DP prior to the Contract commencing;
- Forwarding audit reports (prepared by the ECO) on request, to the DEA&DP;
- Notifying the DEA&DP within 30 days of change of ownership/Applicant;
- Notifying the DEA&DP of any change of address of the owner/developer;
- Notifying the DEA&DP of changes in the development that result in significant environmental impacts;
- The overall implementation of the EMPr;
- Ensuring compliance, by all parties, and the imposition of penalties for non-compliance through the Project Manager / Engineer and ECO;
- Implementing corrective and preventive actions, where required; and
- Preventing pollution and actions that will harm or may cause harm to the environment.
- Ensuring the activity does not commence within 30 days of the EA being issued;
- Notifying the DEA within 30 days that construction activity will commence;
- Notifying the DEA in writing within 24 hours if any condition in the EA cannot be or is not adhered to; and
- Notifying the DEA 14 days (or as stipulated in the EA) prior to commencement of the operational phase.

4.3 Project Manager / Engineer's Roles and Responsibilities

The Project Manager / Engineer will be responsible for the implementation of the EMPr throughout the construction phase and will report directly to Stellenbosch Local Municipality. The responsibilities of the Project Manager / Engineer will include:

- Being fully familiar with the BA Report, EA conditions and the EMPr;
- Ensuring that all Contractors and Sub-Contractors adhere to the EMPr;
- Taking the required action when noncompliance is detected;
- Maintaining a register of complaints and queries;
- Responding to any project-related complaints; and
- Maintaining an environmental incident book of all incidents occurring on site.

4.4 Contractor's Roles and Responsibilities

The Contractors is responsible for all work performed on site and is to ensure all work is undertaken in accordance with the relevant client specifications and requirements. The responsibilities of the Contractor will include:

- Being responsible for the rehabilitation activities for the duration of the contract (so will Sub-Contractors and contract workers);

- Being responsible for ensuring work conducted is done within the framework of the EMPr and applicable legislation;
- Ensure that all Sub-Contractors have a copy of and are fully conversant with the contents of the EMPr;
- Being required to compile and provide Method Statements setting out, in detail, how management actions contained in the EMPr will be implemented;
- Appoint suitable professional service providers to undertake environmental monitoring as per Section 4.6 below;
- Being required to monitor construction related impacts upon the surrounding environment as per the Environmental Monitoring Method Statement;
- Undertake a pre-construction Photographic Survey; and
- Appoint an Environmental Officer (EO) and Social Officer (SO) or Community Liaison Officer (CLO) for the duration of the contract (including the one-year Defects Notification Period (DNP)).

4.5 Environmental Control Officer's Roles and Responsibilities

The construction activities must be monitored by an ECO based on site for the duration of the construction phase. The ECO must be well versed in environmental matters and have a minimum of two years of relevant on-site construction experience. The ECO should have a relevant environmental degree or other relevant tertiary qualification. The ECO should be a mature, level-headed and firm person with above-average communication and negotiating skills and be able to handle and address conflict management.

The responsibilities of the ECO include:

- Monitoring compliance with the environmental requirements set in the EMPr;
- Reviewing a weekly environmental monitoring report that is submitted by the EO;
- Compiling a monthly audit report based on the weekly monitoring reports submitted by the EO;
- Advising Stellenbosch Local Municipality and Project Manager / Engineer about the interpretation, implementation and enforcement of the EMPr;
- Liaising with an archaeologist or heritage resources practitioner in the case of unearthing of artefacts and/or graves;
- Recommending rectification of non-compliances with the EMPr before significant impacts occur (e.g. debilitating injury or death or contamination) in consultation with the EO and the SO;
- Ensuring the Communications Register is maintained, and all such complaints are dealt with within 10 days;
- Reporting any significant environmental incidents to the relevant regulatory authorities as may be required;
- Ensuring an environmental incident book of all incidents occurring on site is maintained and that corrective measures have been undertaken;
- Reviewing and approving Environmental Method Statements compiled by the Contractor;
- Reviewing the pre-construction Photographic Survey;
- Inspecting and reporting on the efficiency of the method statements' management and mitigation programme; and
- Ensuring environmental awareness training is offered to all site personnel.

The ECO is responsible for providing an evaluation of compliance with the EMPr and not for enforcement of conditions of the EMPr. Stellenbosch Local Municipality is responsible for enforcement of the conditions of the EMPr.

The Contractor and the Environmental Officer (EO) (Section 4.6) are accountable to the independent external ECO for non-compliance with the EMPr. The ECO provides feedback to the Project Manager/Engineer who, in turn, reports to Stellenbosch Local Municipality and I&APs, as required. Issues of non-compliance raised by the ECO must be taken up by the Project Manager/Engineer and resolved with the Contractor as per the conditions of his/her contract.

The ECO will remain employed for the full duration of the contract until all snag items have been resolved, rehabilitation measures have been completed, and the site is handed over to Stellenbosch Local Municipality, thereby indicating the start of the operational phase.

4.6 Environmental Officer's Roles and Responsibilities

The EO must be appointed by the Contractor and is responsible for managing the day-to-day on-site implementation of the EMPr, and for the compilation of weekly environmental monitoring reports. In addition, the EO must act as liaison and advisor on all environmental and related issues, seek advice from the ECO when necessary, and ensure that any complaints received from I&APs (and communicated via the Project Manager/Engineer) are duly processed and addressed and that conflicts are resolved in an acceptable manner and within 10 days. The EO shall be full-time dedicated member of the Contractor's Team and must be approved by the Project Manager/Engineer.

The following qualifications, qualities and responsibilities are recommended for the individual appointed as the EO:

- A relevant environmental diploma or degree in natural sciences, as well as a minimum of three years' experience in construction-site monitoring, excluding health and safety;
- A level-headed and firm person with above-average communication and negotiating skills. The ability to handle and address conflict management situations will be an advantage; and
- Relevant experience in environmental site management and EMPr compliance monitoring.

The EO's responsibilities include:

- monitoring, on a daily basis, environmental specifications on site and compliance with the conditions of the EA, environmental legislation and EMPr;
- keeping a register of compliance / non-compliance with the environmental specifications;
- identifying and assessing previously unforeseen, actual or potential impacts on the environment;
- ensuring that a weekly environmental monitoring report is submitted to the ECO within 2 calendar days of the end of each week;
- conducting site inspections during the DNP, and bringing any environmental concerns to the attention of the ECO and Contractor;
- advising the Contractor on the rectification of any pollution, contamination or damage to the construction site, rights of way and adjacent land;
- attending site meetings (scheduled and *ad hoc*);

- presenting the environmental awareness training course to all staff, Contractors and Sub-Contractors and monitoring the environmental awareness training for all new personnel on-site, as undertaken by the Contractor;
- ensuring that a copy of the EA and the latest version of the EMPr are available on site at all times;
- ensuring that the Contractor is made aware of all applicable changes to the EMPr that are approved by the DEA;
- assisting the Contractor in drafting Environmental Method Statements and / or the Environmental Policy where such knowledge/expertise is lacking;
- maintaining a photographic record;
- maintaining a record of all waste manifests;
- undertaking daily environmental monitoring to ensure the Contractor's activities do not impact upon the receiving environment

Maintaining the following on site:

- weekly site diary;
- method statements;
- hazardous substances register;
- environmental monitoring reports;
- communications register;
- a non-conformance register, and
- a register of audits.

The EO will remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is handed over to Stellenbosch Local Municipality.

4.7 Social Officer's Roles and Responsibilities

The Social Officer(s) shall be employed by the Contractor and will be responsible for managing the day-to-day on-site implementation of the social aspects of the EMPr. The Social Officer(s) shall liaise with landowners and relevant I&APs regarding construction activities for the duration of construction and will ensure that any discussions and complaints received from the public are addressed and that conflicts are resolved in an acceptable manner within 10 days.

The Social Officer(s) shall be full-time dedicated member(s) of the Contractor's Team and must be approved by the Stellenbosch Local Municipality Project Manager. The Social Officer shall report to the Contracts Manager, seeking advice from the ECO when necessary.

The following qualifications, qualities and experience are recommended for the individual appointed as the Contractor's Social Officer:

- the Social Officer should preferably be selected form the local community;
- qualification in the relevant field;
- relevant experience in liaising between a Contractors or Developer with the community
- mature, level-headed and firm person with communication and negotiating skills;
- report writing skills;

The responsibilities and functions of the Social Officer will include:

- implement and manage the day-to-day social and communication aspects of the construction process according to the Specifications;
- liaise and maintain good relations with I&APs;
- monitor social aspects in terms of the specifications;
- implement mitigation and corrective measures;
- submit a monthly environmental report to the ECO;
- conduct site inspections during the DNP, and bring any social concerns to the attention of the ECO and Contractor;
- attend site meetings (scheduled and *ad hoc*);
- maintain a filing system meeting the project's Quality Management Plan;
- remain employed until the end of the DNP, not necessarily full time during the DNP;
- assist the contractor in the drafting of Social Method Statements where such knowledge/expertise is lacking;
- maintain the following on site:
- a weekly site diary;
- a public complaints and communications register; and
- a register of audits.

4.8 Institutional and Functional Arrangements

The institutional and functional arrangements indicate the role players and institutional linkages involved in the development. The arrangement is dictated by the contract with the Stellenbosch Local Municipality.

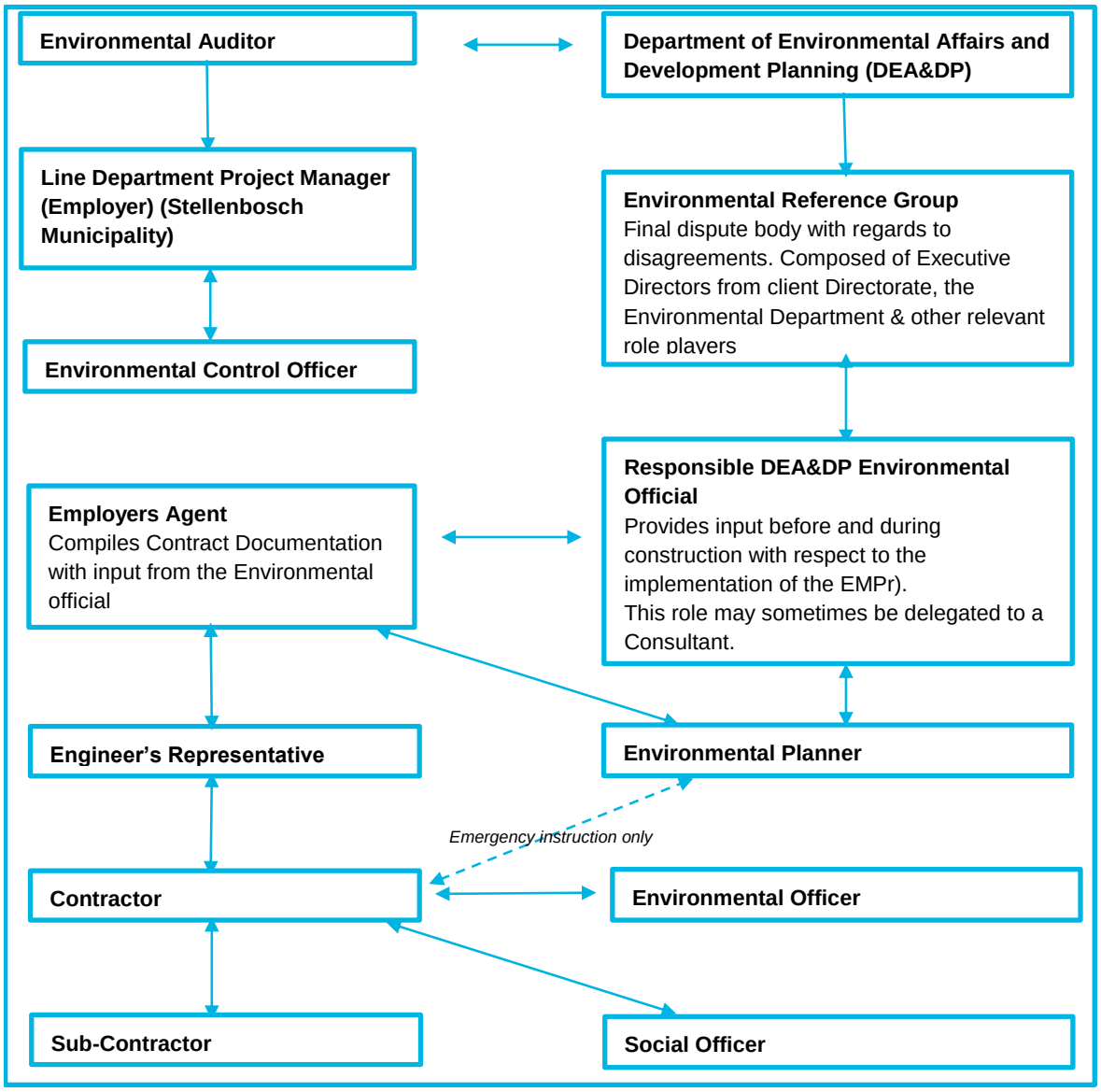

Figure 4-1: Typical Environmental Staffing Arrangement

5. Impacts Assessed

5.1 Identification of development Aspects, Impacts and Risk Assessment

This EMPr provides a system and set of procedures to ensure that Stellenbosch Local Municipality establishes and maintains sound and effective controls to manage potential environmental impacts throughout the development, and wherever practicable, realise opportunities for enhanced environmental outcomes.

Therefore, for environmental management to be effective, it needs to be proactive rather than reactive. Environmental risk(s) associated with large scale developments shall be identified and assessed during the environmental impact assessment process; whereas the Contractor shall identify environmental risk(s) as part of its health and safety assessment; and method statement compilation.

The assessment shall identify the significance of environmental risks and potential impacts using the following four-step approach:

i. identify each **element** with the potential to interact with the environment (e.g. characteristics and sensitivity of the environment);

ii. determine the potential **impacts** resulting from the activity including their duration, intensity and degree to which they can be **mitigated**;

iii. **rank risks** based on the likelihood of adverse impacts and the severity of the consequence, using the 'worst case scenario', as defined by the 'likelihood and consequence probability' risk matrix; and

iv. identify the level of mitigation required for each environmental aspect (e.g. the higher the potential severity of adverse environmental effects and the greater the consequence of those unmanaged effects the higher the degree of environmental management required).

Typical aspects include aesthetics, dust, earthworks, erosion, flora and fauna, fire, hazardous substances, heritage, land owner liaison, noise, rehabilitation, social, soil, sustainability, traffic, training, waste and water.

5.2 Summary of key impacts identified

The key impacts identified and assessed during the BA process are listed below.

5.2.1 Design and construction phase

Impacts that may occur during construction include:

- Direct loss of 35 000 m² of CR Swartland Granite Renosterveld vegetation;
- Encouragement and likely proliferation of Invasive Alien Plants and exotic grass and weed species within the development footprint and edges through soil disturbance;
- Loss of wetland functionality (Pipeline);
- Direct loss of wetland and wetland habitat (Pipeline);
- Loss of wetland functionality due to activities within 500m of wetlands;
- Change in the ambient noise quality;
- Emissions to air causing change to the ambient air quality;
- Increased traffic and reduced access due to road closures;
- General health, safety and security risk due to construction works;
- Employment during construction;
- Contamination, compaction and loss of topsoil;
- Change in the visual character;
- Loss of cultural and archaeological heritage;
- Physical displacement due to removal of informal dwellings in the pipeline corridor;
- Loss of assets due to removal of informal structures (other than dwellings) in the pipeline corridor;
- Temporary loss of livelihoods due to removal of market stalls in the pipeline corridor;
- Accidental damage to informal structures outside of pipeline corridor; and
- Increase in nuisance to residents adjacent to the pipeline route.

5.2.2 Operational Phase

Impacts during the operational phase of the proposed project are negligible and not significant, for the reason that the construction comprises the linking of already existing infrastructure or maintenance purposes. The following operational phase impacts were considered:

- Encouragement and likely proliferation of IAPs and exotic grass and weed species within the development footprint and edges through soil disturbance;
- Changes in the ambient noise quality;
- Change in the visual character; and
- Improved bulk water supply enabling expansion of low-cost housing in Kayamandi.

5.2.3 Decommissioning and Closure

Impacts associated with the project relate directly to the decommissioning and closure of the reservoir, pump station and pipelines. At this stage, decommissioning is not being considered.

5.3 Aspect and Activities Matrix

Environmental aspects identified during the site visit as well as aspects generally associated with construction-related activities have been identified and listed in Table 5-1.

Construction-related activities could have an impact on one or more of the aspects identified, as indicated by a tick mark in Table 5-1. Stellenbosch Local Municipality will be required to check which aspects may be affected by which construction-related activity and to put measures in place to mitigate or reduce the impacts on each aspect.

The Contractor will have to monitor, implement and demonstrate to its performance in environmental management and impact mitigation. Thus, aspect-specific performance measures (indicators and targets) have been provided in the implementation tables in Section 11.16 to which the Contractor must adhere.

Table 5-1: Aspects / Activities table – Construction Phase

Aspect	Project Activity												
	Access tracks and access roads	Basic environmental awareness training required	Pump Station Site and Works	Access road to Pump Station	Reservoir Site and Works	Access Road to Reservoir Site	Pipeline outside Pump Station and Reservoir Site	Site Office Establishment	Site Camp Establishment	Monitoring, auditing and incident reporting	Transportation of Material	Site Establishment	Site Disbandment
Direct loss of 35 000 m² of CR Swartland Granite Renosterveld vegetation		✓					✓		✓	✓	✓	✓	
Encouragement and likely proliferation of IAPs and exotic grass and weed species within the development footprint and edges through soil disturbance	✓	✓							✓			✓	
Loss of wetland functionality (pipeline)		✓					✓						
Direct loss of wetlands (pipeline)							✓						
Loss of wetland functionality and indirect loss of wetlands (pump station and reservoir							✓						
Ambient noise quality	✓	✓	✓		✓				✓	✓	✓		
Ambient air quality	✓	✓	✓		✓				✓	✓	✓		
Traffic impacts	✓			✓		✓					✓	✓	✓
Negative impacts to the general health and safety of the community and site personnel												✓	
Job creation				✓	✓	✓	✓	✓	✓				
Contamination, compaction and loss of soil			✓		✓		✓		✓	✓	✓		
Change in the visual character	✓		✓	✓	✓	✓	✓	✓	✓			✓	✓
Loss of cultural and archaeological heritage	✓		✓	✓	✓	✓	✓	✓	✓			✓	

Aspect	Access tracks and access roads	Basic environmental awareness training required	Pump Station Site and Works	Access road to Pump Station	Reservoir Site and Works	Access Road to Reservoir Site	Pipeline outside Pump Station and Reservoir Site	Site Office Establishment	Site Camp Establishment	Monitoring, auditing and incident reporting	Transportation of Material	Site Establishment	Site Disbandment
Physical displacement due to removal of informal dwellings in the pipeline corridor							✓						
Significance of loss of assets due to removal of informal structures (other than dwellings) in the pipeline corridor							✓						
Accidental damage to informal structures outside of pipeline corridor							✓						
Temporary loss of livelihoods due to removal of market stalls in the pipeline corridor							✓						
Increase in nuisance to residents adjacent to the pipeline route							✓						

Table 5-2: Aspects / Activities table – Operational Phase

	Access tracks and access roads	Basic environmental awareness training required	Pump Station Site and Works	Access road to Pump Station	Reservoir Site and Works	Access Road to Reservoir Site	Pipeline outside Pump Station and Reservoir Site	Site Office Establishment	Site Camp Establishment	Monitoring, auditing and incident reporting	Transportation of Material	Site Establishment	Site Disbandment
Encouragement and likely proliferation of IAPs and exotic grass and weed species within the development footprint and edges through soil disturbance			✓		✓								
Ambient noise quality			✓	✓	✓	✓	✓				✓		
Visual impact											✓		
Improved bulk water supply enabling expansion of low-cost housing in Kayamandi			✓		✓		✓			✓			

6. Environmental Management

The Contractor's EO shall record and report upon environmental management measures undertaken to mitigate assessed impacts upon the environment.

6.1 Documentation

The holder of the EA is responsible for the upkeep and management of the environmental file.

The following documentation listed below must be kept on the project site for the full duration of the contract. Although electronic documentation may be kept, a hard copy of all documentation must be filed. The filing system must be updated, and relevant documents added as required. The environmental file must be made available at all times by the relevant authority. The environmental file will form part of the monthly environmental audits conducted by the ECO.

- Full copy of the signed Environmental Authorisation from the DEA&DP;
- Approved EMPr, as well as any amendments that are approved by the DEA&DP;
- Vegetation and Aquatic Rehabilitation Plan;
- Maintenance Management Plan;
- Environmental policy of the contractor;
- Environmental method statements compiled by the contractor;
- Completed environmental checklist;
- Weekly environmental monitoring reports;
- Minutes and record of attendance of all environmental meetings;
- Environmental incident book;
- Communications register;
- Register of audits;
- Non-conformance reports;
- A copy of all site instructions issued;
- A copy of all corrective actions signed off (reference must be made to the non-conformance reports in this document);
- Waste manifests; and
- Relevant legislation referred to in Appendix B.

6.2 Responsibility Matrix and Organogram

The Contractor must have a Responsibility Matrix and Organogram, approved by the ECO and the Project Manager/Engineer, displayed in an appropriate location. This will identify responsible parties, their contact details, and highlight their roles and responsibilities. This document must be updated on a regular basis to ensure that information is correct.

6.3 Environmental Inspections and Audits

Monthly audits will be conducted to monitor compliance with the EMPr (including the Aquatic and Vegetation Rehabilitation Plans), MMP (where applicable for maintenance activities) and EA conditions. Photographic records of the site will support the visual assessment. The ECO will submit all audits to the Project Manager/Engineer, who in turn shall submit the audits to the DEA upon request. These findings will be kept on file at the project site.

External auditing may take place at unspecified times by the regulatory authorities. The regulatory authorities may, from time to time, also ask to view copies of audit reports drafted by the ECO.

Auditing will need to extend over the rehabilitation period, however once construction is complete, auditing of rehabilitation could be done by an independent and suitably qualified ecological/rehabilitation specialist.

The same audit requirements will also be applicable to maintenance, for the maintenance activities described in the MMP.

6.4 Weekly Environmental Monitoring Report

The EO will be required to provide the ECO with a weekly environmental monitoring report covering the events of the past week. This will highlight key performance areas and provide feedback on corrective and preventive actions taken. The EO will have the weekly reports signed off by the Contractor's Manager prior to submission to the ECO. Copies of all weekly reports must be kept in the environmental file.

6.5 Environmental Site Meetings

Environmental Site Meetings shall be held every second week or shall form part of the Project Progress Meeting. If the meetings are to be held separately, they shall be chaired by the Site Supervisor or Project Manager with the Contractor(s), EO(s) and Social Officer(s) in attendance. Minutes of the meetings must be kept in the environmental file and must include an attendance register.

6.6 Non-Conformance Report

A Non-Conformance Report (NCR) will be issued to the Contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. This will be requested by the ECO and issued via Project Manager/Engineer to the Contractor in writing. Preceding the issuing of the NCR, the Contractor will be presented with an opportunity to rectify the outstanding issue.

Preceding requirements to the submitting of the NCR will entail an issue that has been highlighted to the Contractor in the audits for corrective action. Should this issue not be corrected or completed to the satisfaction of the Project Manager/Engineer and ECO, the issue is escalated to an NCR.

Should the ECO assess an incident / issue and find it to be significant (e.g. non-repairable damage upon the environment), it will be reported to the DEA and immediately escalated to the level of an NCR. This will be done in consultation with the Project Manager/Engineer.

The following information should be recorded in the NCR:

- Details of non-conformance;
- Any plant or equipment involved;
- Any chemicals or hazardous substances involved;

- Work procedures not followed;
- Any other physical aspects; and
- Nature of the risk.

Actions agreed to by all parties following consultation that should adequately address the identified non-conformance. This may take the form of specific control measures and should take the hierarchy of controls into account. This must accompany the NCR for filing purposes;

- The agreed timeframe by which the contractor should have implemented the actions documented in the NCR; and
- The ECO should verify that the agreed actions have taken place on or soon after the agreed completion date. Where the actions are complete, the ECO and Contractor should sign the close-out portion of the non-conformance form and file it with the contract documentation.

6.7 Environmental Emergency Response

The Contractor's environmental emergency procedures must ensure that there will be an appropriate response to unexpected or accidental actions or incidents that could cause environmental impacts. Such incidents may include:

- Accidental discharges to water (i.e. into a water resource) and land;
- Accidental spillage of hazardous substances (typically oil, petrol, and diesel);
- Accidental toxic emissions into the air; and
- Specific environmental and ecosystem effects from accidental releases or incidents.

The Environmental Emergency Response Plan is separate to the Health and Safety Plan as it is aimed at responding to environmental incidents and must ensure and include the following:

- Construction employees shall be adequately trained in terms of incidents and emergency situations;
- Details of the organisation (manpower) and responsibilities, accountability and liability of personnel;
- A list of key personnel and contact numbers;
- Details of emergency services (e.g. The fire department, spill clean-up services) shall be listed;
- Internal and external communication plans, including prescribed reporting procedures;
- Actions to be taken in the event of different types of emergencies;
- Incident recording, progress reporting and remediation measures to be implemented; and
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.

The Contractor(s) will comply with the environmental emergency preparedness and incident and accident-reporting requirements, as required by the Occupational Health and Safety Act (Act No. 85 of 1993) (OHSA), the NEMA, the National Water Act (Act No. 36 of 1998), and/or any other relevant legislation listed in Appendix B.

6.7.1 Incident Reporting

Once the incident has been stabilised and initial notifications have been issued to the relevant parties, a full incident investigation shall be required with detailed corrective and preventative measures. A formal report shall be submitted within seven days to the Employers Agent, including all remediation measures undertaken to repair any damage caused and to prevent the incident from re-occurring. Information recorded for all incidents shall include:

- nature of incident;
- damages, injuries or fatalities sustained, and the parties involved;
- any risks such incident poses;
- toxicity of the substances involved;
- steps taken to avoid or minimise the effects of the incident and any future incidents / re-occurrence; and
- clean-up procedures, remedial actions and assessment of immediate and long-term effects.

6.7.2 Reportable Environmental Incidents

Reportable incidents are those:

- that cause substantial damage to the environment, or
- that have significant potential impact on the environment.

These can include:

- any spill to a watercourse, including drains as defined under relevant legislation;
- loss of hydrocarbons or chemicals greater than 20L in volume to land;
- spills or releases, including soil movement, which has moved offsite and has a negative impact;
- death or injury of livestock, wildlife or fauna of any kind caused by the construction activities;
- interference with any previously undetected sites of cultural significance without obtaining the appropriate approval;
- transfer of known alien invasive vegetation and diseases as a result of construction related activities;
- fires;
- traffic incident;
- damage to property outside the development footprint;
- unresolved landowner issues whereby agreement cannot be reached;
- an incident that is likely to cause regional or widespread negative publicity;
- serious environmental damage or imminent risk of serious environmental damage;
- significant environmental degradation, pollution or non-conformance of this EMPr or any other legislative requirement.
- Exceedances of prescribed dust fall standards where dust fall monitoring is required.

Key incident reporting numbers relevant to the project shall be provided as per Section 6.7.4 below.

6.7.3 Emergency Response Procedure

Appropriate risk management and the prevention of emergency situations is fundamental to all construction related activities and the implementation of the EMPr is aimed at anticipating, preventing and mitigating foreseeable risks associated with the development. Part of the risk management strategy is to ensure that in the event of an emergency situation, plans have been developed so that pre-planned response, notification and recovery activities can be initiated.

The Contractor's Emergency Preparedness and Incident Management Plan shall establish the structures of emergency teams, the communication processes and the resources, which may be required for managing the emergency. The Emergency Preparedness and Incident Management Plan shall therefore comprise the following:

- general responsibilities;
- incident management and notification structure;
- event classification and notification; and
- resources and training requirements.

The objectives of the Emergency Preparedness and Incident Management Plan shall be to:

- decrease the level of risk to life, property and the environment;
- describe how an emergency response is initiated and how the emergency teams are activated;
- specify command, control and communication arrangements between Stellenbosch Local Municipality, Employers Agent, Contractor, external response and government authorities;
- identify the roles and responsibilities of all personnel likely to be at the location of the emergency or involved in the response;
- identify emergency response equipment required;
- identify training requirements for response personnel; and
- provide the basis for training of all people who could be involved in an emergency.

6.7.4 Contact Information

The following key incident reporting numbers relevant to construction related activities shall be included within the Emergency Preparedness and Incident Management Plan:

- Stellenbosch Local Municipality Representative;
- Employers Agent;
- Engineers Representative;
- Construction Contractor;
- Construction Manager;
- Environment Control Officer;
- Health and Safety Manager;
- Environmental Officer;
- Community Liaison Officer;
- 24-hour Grievance Contact;

- Fire Department and local Fire Protection Association (FPA);
- Hospitals / clinics;
- South African Police Services;
- Air Quality Officer;
- Disaster Management;
- Director: Development Management (Region 2): Department of Environmental Affairs and Development Planning;
- Department of Water and Sanitation;
- Stellenbosch Local Municipality
- Heritage Western Cape (HWC)

6.8 Protected Species and Areas Management

The proposed Kayamandi Bulk Water Project transverses Ecological Support Area (ESA) 2 (Restore from other land use) for approximately 250 m of the alignment, approximately 200 m of Critical Biodiversity Area (CBA) 1 (Terrestrial) and an estimated 1 500 m of CBA 2 (Terrestrial – Degraded) within the Papegaaiberg Nature Reserve

The proposed project location is within the Swartland Granite Renosterveld (FRg2) and Swartland Shale Renosterveld (FRs9). According to the CapeNature Scientific Services Land Use Team (2017) these vegetation types fall amongst 21 of critically endangered ecosystems which have no official protection status and are of high conservation importance.

6.8.1 Responsibilities

The protection of these species during the construction and operational phases of the project should ideally be allocated as follows:

6.8.1.1 The Developer

This refers to the project proponent, Stellenbosch Local Municipality. They will be responsible for the following:

- Ensure that the requirements set out in this management plan are adhered to and implemented;
- Allocate the responsibilities assigned to the ECO to an independent suitably qualified individual prior to the start of construction activities on site; and
- Provide all principal contractors working on the project with a copy of this management plan as part of tender contract documentation to allow the contractors to cost for its requirements within their respective construction contracts.

6.8.1.2 The Engineer

The Engineer of the proposed development will be responsible for the overall implementation of the management plan during the construction phase of the project. To effectively implement the plant rescue plan, the engineer must be aware of the findings, mitigation measures and conclusions of the Final BA Report, the requirements of the EA, the EMPr, and this management plan.

6.8.1.3 The Environmental Control Officer and Environmental Officer

The ECO and EO are responsible for monitoring and verifying the implementation of the management plan during the construction phases of the project. To effectively implement the management plan, the ECO must be aware of the findings, mitigation measures and conclusions of the Final BA Report and relevant authorisations.

6.8.1.4 The Contractor

The contractor, being any directly appointed company or individual undertaking the implementation of works, will be responsible for complying with the management plan at all times during the construction phase.

6.8.2 Mitigation measures to prevent loss of vegetation and ecological processes

- Target, remove and control all invasive alien species.;
- Construction areas should be clearly marked out and surrounding areas should be observed as no-go areas;
- Areas of medium and high sensitivity should be avoided where possible; and
- Removal of indigenous vegetation shall be avoided unless absolutely necessary.

6.9 Incident Management

The Contractor is required to put in place an effective management system that will prevent or mitigate the occurrence of an incident. All the environmental incidents must be reported to the ECO and the Project Manager and management mechanisms are to be implemented to deal with the incident as quickly as possible.

A formal report must be submitted within 48 hours to the ECO and the Project Manager, including all remediation measures undertaken to repair any damage caused and to prevent the incident from re-occurring. Once the incident has been stabilised and initial notifications have been issued to the relevant parties, a full incident investigation is required complete with detailed corrective and preventative measures:

- Nature of incident;
- Damages, injuries or fatalities sustained, and the parties involved;
- Any risks such incident poses;
- Toxicity of the substances involved;
- Steps taken to avoid or minimise the effects of the incident and any future incidents; and
- Clean-up procedures, remedial actions and assessment of immediate and long-term effects.

6.10 Method Statements

It is a statutory requirement to ensure the wellbeing of employees and of the environment. Therefore, the Contractor must submit a Method Statement to the Project Manager/Engineer and the ECO for approval prior to the commencement of construction works. A Method Statement is a document detailing how a particular process will be carried out. It should detail the possible dangers/risks associated with the particular part of the project and the methods of control to be established and to show how the work will be managed in a safe and environmentally responsible manner.

The Contractor shall be required to undertake various tasks / activities in order to fulfil the conditions as stipulated in the contract. Therefore, in order for the Project Manager to be satisfied that the Contractor has a comprehensive understanding of the requirements of the task / activity, the Contractor shall submit method statements to the Project Manager for approval prior to the commencement of the activity. The method statement is a dynamic document integrating all facets of the activity, thereby ensuring the reader a comprehensive understanding of the actions associated with implementing the activity.

The method statement shall be submitted to the Project Manager for approval a minimum of 7 days prior to the commencement of the activity. During this period, the Project Manager shall consult with other members of the project management team to ascertain the Contractors knowledge and understanding of the requirements.

Should the Project Manager ascertain that the detail of the Method Statement is not sufficient; the method statement shall be returned to the Contractor for review and re-submission.

Upon acceptance of the method statement, both the Project Manager and the Contractor shall sign the method statement denoting mutual agreement that the contents thereof meet the minimum requirements to successfully complete the activity. By signing the method statement, the Contractor commits to working in accordance the agreed method.

Due to the method statement being a dynamic document, regular amendments may be required to ensure the implementation thereof corresponds with how the task / activity is actually being implemented; and in accordance to potentially changing requirements.

6.10.1 Purpose

The purpose of the method statement is to:

- Outline the safe manner in which the task / activity is to be undertaken;
- Provide induction material for all undertaking the task / activity to understand;
- Meet legal requirements – hazard identification and control;
- Provide a programme against work, material, time, staff and anticipated problems are to be managed; and
- Act as a tool in quality assurance.

6.10.2 Scope

A method statement describes the scope of the intended task / activity in an easy to understand step – by – step manner. This is particularly important to reduce potential confusion and ambiguity of the contents by those personnel required to implement it.

The method statement should clearly indicate:

- **What** – a brief concise description of the task / activity to be undertaken;
- **Who** – a brief concise description of the personnel involved with undertaking the task / activity;
- **When** - a brief concise description of the sequence of actions with due commencement and completion dates of the task / activity to be undertaken;
- **Where** - a brief concise description and map / drawing of the locality of the task / activity to be undertaken;
- **Why** - a brief concise description of the importance and requirement of the task / activity to be undertaken; and
- **How** - a brief concise description of the methods to be implemented, materials and equipment to be used for the task / activity to be undertaken.

6.10.3 Language Use

The method statement must be written in plain English so that they are understood by all. Therefore, a well thought through and well written method statement providing clear and concise specific work plans, can save much time and money and potentially prevent the occurrence of incidents and accidents.

The implementation therefore of the method statements shall be audited by the ECO. Consequently, the method statements must contain sufficient information and detail to satisfy the Project Manager and ECO that the works will be implemented correctly and that potential incidents / accidents shall mitigated and managed.

Please remember to:

- Consider the reader;
- Communicate a clear message;
- Use clear and concise language; and
- Consider how the information is portrayed.

6.10.4 Site Specific Requirements

The method statement must project specific. Method statements copying information contained within the EMPr, specifications or other documents shall not be considered as they do not indicate to the person responsible for approving the document, that the Contractor has a clear understanding of what is required.

6.10.5 Minimum Requirements

The method statement must contain as a minimum the following:

- Description
  - Provide a brief and concise description of the task at hand;
  - Personnel Qualifications and Experience;
  - List all the details of qualifications and experience required for the completion of the task; and
  - Experience may cover previous work done in the area that may not require certificates or licences.
- Personnel, Duties and Responsibilities
  - Give details of the duties and specific responsibilities of supervisors and other personnel. For example, describe such things as daily toolbox talks and guidance provided by the Environmental Officer;
  - Training Required to Complete Work; and
  - Make sure that all workers and their Supervisors are trained in the procedures needed to complete the job safely and in an environmentally responsible way, especially when undertaking task for the first time or where new or changed work methods are utilised.
- Programme
  - Provide a clear and concise programme indicating all phases and time frames associated with the task.
- Construction sequence and method
  - Indicate all steps associated with task at hand. This must be done in a manner which is easily understandable and leaves no uncertainties to staff that are required to implement the task in the field.
- Possible Hazards

  Include all possible hazards such as:
  - Hazardous substances, explosives, dust, etc.;
  - Hazards to others in area; and
  - Rubbish, electrical, fills.

- Resources/Plant/Equipment
  - List resources, plant and equipment that you will use on the job, e.g. ladders, scaffold etc.
- Health and Safety
  - List all safety controls such as Material Safety Data Sheets (MSDS);
  - Warning Signs;
  - Personal protective equipment;
  - Storage of materials and equipment;
  - Fellow workers/public safety provisions; and
  - Housekeeping
- Monitoring Systems
  - How will the execution of the task be monitored?
- Environmental
  - Indicate environmental management responsibilities;
  - Provide aspects and impacts associated with the activity;
  - Provide environmental guidelines; and
  - Specify employee training and involvement to i*ndicate the following:*
    - Material consumption;
    - Energy consumption;
    - Water consumption;
    - Waste management and reduction;
    - Buildings, machinery, soil;
    - Residual materials and waste;
    - Atmospheric emissions, noise and odour pollution;
    - Wastewater;
    - Accidents and accident prevention; and
    - Transport
- General
  - Explanation of important technical/environmental terms

The Contractor will be accountable for all actions taken in non-compliance of the accepted Method Statements. The Contractor shall keep all the method statements and subsequent revisions on file, copies of which must be distributed to all relevant personnel for implementation.

The Contractor will be required to submit, the method statements listed in Table 6-1 as identified in the contract, for approval by the Project Manager and the ECO prior to the start of construction activities.

The Contractor shall submit project and task specific method statements to the Project Manager within 7 days prior to the commencement of the activity. Activities shall only be allowed to commence once the method statements have been accepted by the Project Manager.

Refer to Appendix F for further details on Method Statements.

Table 6-1: List of Method Statements required prior to Construction Activities

Method Statement	Objective	Target	Criteria
Aesthetics	Reduce construction impacts upon the aesthetics of the surrounding environment.	No complaints from I&APs.	Reduce construction related impacts upon the aesthetics of the surrounding environment through the implementation of mitigation measures against dust generation, noise generation and visual impact.
Bunding	To contain and manage all hazardous substance releases into the environment.	• Zero spills. • No environmental pollution occurring. • Management according to agreed procedures.	Method of bunding and covering for static and mobile plant.
Construction Site and Office / Yard Establishment	To ensure site infrastructure, plant, materials and equipment are contained within a suitably secure locality that is adequately zoned and authorised in terms of regulatory requirements.	• No complaints from landowners • No damage to private property • Compliance to regulatory requirements. • No unplanned disturbance to construction related activities.	• Site office/yard layout and preparation. • Method of installing fences required for no-go areas, working areas and construction areas. • Preparation of the working area. • Removal of vegetation.
Cement Mixing / Concrete Batching / Bentonite Mixing	Provide measures to contain cementitious products impacting upon the surrounding environment.	• All cementitious mixing to occur within demarcated localities. • No indiscriminate spoiling of cementitious products in non-designated areas. • No impacts upon water resources.	Location, layout and preparation of cement / concrete batching facilities, including the methods employed for mixing concrete and the management of run-off water from such areas.
Contaminated Water	Ensure no contamination or pollution of water impacted upon by construction related activities.	All waste and contaminated water must be monitored and comply with regulatory requirements.	Contaminated water management, including the containment of run-off and polluted water.
Dust	Reduce construction related dust impacts on the surrounding environment. Prevent dust nuisance and health impacts on people and animals in the area.	• No complaints from I&APs. • Dust emissions must be monitored and comply with regulatory requirements.	Dust control and monitoring measures.
Contaminated Land	To circumvent any potential contamination or pollution of land that result from the storage of materials or products used, that contains hazardous elements and may impact negatively on the environment.	• Prevent the infiltration of rain water, run-off and monitoring of leakages of hazardous waste onto the soil and ground water. • Proper waste management.	The stored waste will be covered with an impermeable cover which will prevent rain water from entering waste and causing run-off. The liquid hazardous waste will be stored in sealed containers. The monitoring of the impermeable cover integrity and any potential leakages will be conducted. A provision of skips or bins for waste disposal.
Environmental Monitoring	Implement a programme whereby impacts upon the surrounding can be monitored and implement measures to mitigate such impacts.	• Compliance with regulatory requirements. • Ensure no incidents or accidents occur which negatively impact upon the surrounding environment.	Monitoring construction-related impacts upon the surrounding environment is kept within the environmental specifications and applicable legislation. The following variables are to be monitored: • Dust (e.g. by using reused water).

Method Statement	Objective	Target	Criteria
			• Noise (increase of 7dB above ambient is considered disturbing noise). • Contaminated water (through dewatering operations, etc.). • Waste: waste manifests for waste disposal including waste sent for recycling.
Erosion control	Prevent erosion and reduce potential impacts upon the surrounding environment.	• Slopes > 1:1 must have additional anti-erosion mechanisms. • No evidence of erosion. • No evidence of disturbance outside of project area.	Method(s) of erosion control, including erosion of spoil material.
Fire, Hazardous and Poisonous Substances	Impose a “no fire” rule on the entire project unless otherwise indicated in writing by the Project Manager/Engineer. Reduce potential impacts in the event of a fire incident. To manage, mitigate and control the potential occurrence of an incident / accident involving hazardous and poisonous substances.	• Zero (0) fires. • Proof of annual update and approval of the fire management Method Statement. • Proof of management review of fire preparedness and response before onset of the fire season. • Storage of hazardous/flammable materials and substances to comply with national, provincial and local regulatory requirements.	• Handling and storage of hazardous substances. • Emergency spillage procedures and compounds to be used. • Fire management plan and emergency procedures in case of fire. • Use of herbicides, pesticides and other poisonous substances. • Methods for the disposal of hazardous building materials. • Material Safety Data Sheets to be included where applicable.
Flora and Fauna	Preserve fauna and flora through control of construction activities, particularly in sensitive environments, and through search and rescue operations. Reduce the impact of the project on the surrounding vegetation during construction. Prevent infestation of alien species during construction.	• No evidence of disturbance outside of project area. All sensitive environments are to be demarcated as no-go areas unless otherwise indicated by the Project Manager/Engineer. • No construction related activities or facilities allowed within sensitive environments, unless prior approval is attained from the Project Manager/Engineer. • Proof of monthly removal of alien invasive species.	Implementation of measures to protect the flora and fauna identified within the project footprint.

Method Statement	Objective	Target	Criteria
Fuels and Fuel Spills	Manage and contain all refuelling activities to prevent and mitigate potential impacts.	• All refuelling to occur within designated areas. • All hydro carbons to be contained within approved bunded facilities. • Identified staff to undergo suitable spill clean-up training.	• Methods of refuelling vehicles. • Details of methods for fuel spills and clean-up operations.
Heritage	Limit and mitigate potential heritage impact on chance findings should they occur.	• No damage to heritage structures, unless proof of consultation with a heritage specialist and approval from the South African Heritage Resources Agency (SAHRA) / HWC is in place. • Records of chance finds must be kept. • Where chance finds are unearthed, proof of work being stopped immediately and proof of consultation with a heritage specialist / archaeologist (depending on the find) and SAHRA / HWC must be kept on site.	Measures to be implemented to identify, manage and protect "chance finds" and known items of historical or cultural value.
Noise	Reduce construction related noise affecting the surrounding environment.	• Noise levels shall be monitored to ensure they comply with regulatory requirements. Noise generating activities shall not increase by more than 7dB above ambient noise levels. • No complaints from I&APs.	Implement measures to reduce noise impacts generated through construction related.
Open Space	To ensure construction related activities do not impact upon the "sense of place". To provide for detailed sensitivity map indicating levels of access to areas of sensitivity. To provide for construction related activities which support the greater community? To provide for detailed overview of the construction related footprint.	Identify all areas of sensitivity and demarcate. All access routes and services to have least impact upon the environment and surrounding community.	Implement measures to lessen construction related activities impact upon the environment and the surrounding community.
Rehabilitation	To rehabilitate impacted areas to a suitable land capability class similar to that of the surrounding environment. Rehabilitation will take existing land uses into consideration. Rehabilitation should start immediately after work is completed. Additional Rehabilitation measures for activities at the wetland crossing and within the Papegaaiberg Nature Reserve (Appendix I) must also be adhered to.	• Reinstatement of areas affected through construction related activities. • Proof of monthly removal of alien invasive species re-establishing on cleared areas.	Rehabilitation of disturbed areas and re-vegetation after completion of construction related activities.
Solid and Liquid Waste Management	Implement measures to reduce, monitor and manage waste generation, whilst maximising recycling efficiency.	• Ensure all waste products are disposed of at a registered waste landfill site designed to cater for said waste product. • Proof of waste generated, reused, recycled and disposed of, including disposal certificates, must be kept on site.	• Solid and liquid waste control and removal of waste from site. • Methods for the disposal of vegetation, paper and plastics and/or building materials. • Methods for the recycling of oils etc.

Method Statement	Objective	Target	Criteria
		• Contain all waste with in approved designated areas and stored in marked containers. • Containers of hazardous waste and waste oils must be stored in a bunded, covered area. • No evidence of contamination by waste. • Bins provided at regular intervals. • No evidence of litter.	
Social	Maximise social benefits and minimise negative social impacts	• No complaints from affected landowners • No project delays due to landowner interference • All landowners signing release forms within 1 month of completion of the contract.	Methods for avoiding danger and causing the least possible inconvenience to the public (including pedestrians), traffic and vehicle traffic.
Sources of Materials	Source materials which have been legally mined or manufactured.	Provision of all MSDSs for all products used on site.	Details of materials imported to the site. MSDS are to be included.
Topsoil and Subsoil Management	Manage the removal and stockpiling of topsoil and subsoil during the contract for use during rehabilitation.	• Soil horizons (stockpile separately). Stockpiles should not be higher than 2 m. • Stockpiles will be kept free of alien invasive species. • No stockpiles shall be located within the 1:100 flood lines. • No stockpiles shall be located outside of areas indicated in the construction servitude diagrams.	• Removal of topsoil and subsoil. • Storage of topsoil and subsoil, including erosion prevention methods.
Traffic	Minimise the impacts and extent of construction related traffic on the surrounding road network and environment, whilst maximising road user safety.	• No accidents or incidents. • No complaints from the public. • Proof of notification of landowner for closure of access roads. • Alternative access roads always provided at partial road closures and other traffic disruptions. • Compliance with regulatory requirements.	To ensure construction related transport activities do not impact upon landowners and the surrounding environment. Activities associated with the transport of materials and staff is not negatively upon by construction related requirements.
Training	Foster construction related skills transfer, environmental awareness, health and safety awareness, and materials and equipment skills.	• Proof of training provided, including training materials that meet the requirements of the Project Manager/Engineer. • Proof of attendance of staff at training. • Records of training evaluation results. • Results must reflect that training has been effective.	Logistics for the environmental awareness course for all of the Contractor's employees and temporary labour, as well as for the Contractor's management staff.

Method Statement	Objective	Target	Criteria
Vegetation Clearing	To remove existing vegetation (trees and shrubs only).	No brush cut of indigenous vegetation (grass and forb species, including Fynbos species) in medium and high sensitivity areas.	To ensure effective and efficient re-growth of vegetation in medium and high sensitivity areas.
Wash Areas	To ensure plant and equipment used on site are kept clean whilst containing and preventing the release of potential contaminants into the receiving environment.	• No contamination of the receiving environment through the washing and cleaning of equipment and plant. • Compliance with regulatory requirements.	• Location, layout, preparation and operation of all wash areas, including vehicle washing, workshop washing, paint washing and clearing • Method for the treatment of wastewater prior to discharge.
Water	To provide for watercourse protection, together with storm water management; the maintenance or exceed of water quality standards; and the minimization of flooding.	• Maintain or exceed water quality standards. • No incidence of water contamination. • No threat of flooding. • Redirection of storm water from site to areas of low impact.	To ensure construction related activities do not negatively impact upon water resources and quality thereof. Method for storm water management and flood prevention.

6.11 Communications Register

All complaints or communications that are received from I&APs or any other stakeholder must be recorded in a Communications Register. These complaints and communications will be brought to the attention of the Project Manager/Engineer, where upon it will be investigated and a response to the Complainant, I&APs or stakeholder will be given within 10 days.

The Communications Register shall include the following information:

- Record the time and date of the complaint/communication;
- A detailed description of the complaint/communication;
- Action and resources used to correct the complaint;
- Photographic evidence of the complaint (where possible);
- A written response to the complainant indicating rectification of the complaint; and
- Information regarding the relevant authority that was contacted or notified in writing (person, time and date).

The relevant authorities include:

- Department of Water and Sanitation (e.g. for any incidents involving the contamination of water resources);
- Department of Agriculture, Forestry and Fisheries (e.g. uses of appropriate herbicides for eradication of alien invasive species, and permits for trees of special concern);
- Department of Health (e.g. for incidents such as contamination of water resources, accidental spill of hazardous substances);
- Department of Labour (e.g. for labour disputes or injuries on duty);
- DEA (e.g. for any significant incident of pollution of the soil and air);
- Department of Transport and Public Works (e.g. for the diversion of traffic due to construction activities);
- Stellenbosch Local Municipality: By-Law Relating to Stormwater Management;
- Stellenbosch Local Municipality: By-Law relating to Community Fire Safety;
- Stellenbosch Local Municipality: Integrated Waste Management By-Law; and
- Stellenbosch Local Municipality: By-Law relating to Electricity Supply.

6.11.1 Contractual Communication Protocol

The communication protocol shall be determined by contractual requirements. Such protocol shall be agreed to at the inception meeting where a responsibility assignment matrix (RAM) will be developed detailing the main communications or actions and the authorized staff responsibilities for initiation, preparation, review, approval and issue.

6.11.2 Local Government & Public Liaison

The Contractor shall direct all communication via Stellenbosch Local Municipality; or as directed by the Employers Agent.

6.12 Photographic Record

The EO will be required to compile a photographic record of all activities on site prior to construction related activities starting, during the construction process and on completion of construction related works. This will include photographs for:

The EO will be required to compile a photographic record of all activities on site prior to site activities and on completion of related works. This will include photographs for:

- Environmental audit reports;
- Progress of environmental works;
- Non-conformance reports; and
- Corrective action.

6.13 Waste Manifests

The Contractor shall ensure that all solid (including hazardous) waste should either be beneficiated on-site or removed from site is disposed of at a registered landfill site or nearby waste transfer station with capacity to accept the project generated waste. The nearest landfill site is located within Kayamandi e.g. Kayamandi Landfill site (Voortrekker Street, Kayamandi) approximately 750 m from the proposed site. The waste manifest shall be kept on record for auditing purposes. All waste management practices must be put in place and adhered to by staff, contractors and all other persons entering the site.

6.14 Good Housekeeping

The Contractor is to practice good housekeeping throughout the construction phase. This should eliminate disputes about responsibility, facilitate efficient and timeous running of the project. Over and above practising accepted construction methods in accordance with South African National Standards (SANS) 10120, this should include measures to preserve the environment inside the work area. Records of such actions taken to ensure the maintenance and management of housekeeping must be recorded.

6.15 Planning and Design

6.15.1 Planning

Planning is typically undertaken by Stellenbosch Local Municipality at development outset and sets out prescriptive measures to achieve desired results. These measures are typically conceptual at this stage and become more refined with time.

Stellenbosch Local Municipality typically calls for detailed (engineering) designs and appoints an EAP to undertake the EIA process. This process may contribute to the determination of feasibility but does not do so exclusively.

6.15.2 Design

As the design shall lay the groundwork for the future operation of the development, the environmental authorisation conditions and EIA specialist recommendations shall inform the design. Furthermore, due to the evolving nature of the development, it is incumbent upon Stellenbosch Local Municipality / Employers Agent that an Environmental Planner be appointed as part of Stellenbosch Local Municipality / Employer Agents' team to inter alia determine regulatory process requirements that inform the evolving designs.

6.16 Corrective and Preventive Measures (follow-up on monitoring and audits)

The Contractor shall initiate a process to correct and prevent future occurrences occurring.

Table 6-2: Correction Action

	Action	Timeframes	Responsibilities
Corrective action(s)	Initiate corrective and preventative measures	Immediate	Stellenbosch Local Municipality, Employers Agent / Engineer and Contractor
	Control source and or reduce impact upon the environment / community.	Within 1 day of occurrence being identified	
	Manage incident / accident / grievance in accordance to approved procedure.	Within 3 days of occurrence being identified	
	Monitor to verify no further occurrence takes place.	Within 5 days of occurrence being identified	
	Re-train all staff to prevent future re-occurrence.	Within 7 days of occurrence being identified	

6.17 Training

Environmental responsibility requirements for all role players are contained within the respective position description as outlined in Section 4. Consequently, all recruitment shall be undertaken with the aim of engaging personnel with the appropriate levels of competency and experience.

Furthermore, all personnel shall receive environmental training of the type and level appropriate to their role and responsibility. The Contractor's environmental awareness training programmes shall be targeted at the two levels of employment: management and labour.

The Contractor shall manage and implement all the requirements associated with presenting the training programme before the Commencement Date. The Contractor shall be required to initiate Environmental Awareness Training **within 7 days** of construction commencing. Staff shall be trained prior to commencement of working. Proof of training shall be submitted to the Employers Agent.

The Contractor may be requested to provide additional training (in the trainee's first language) on-site regarding environmental aspects that are unclear to the construction personnel. A translator may be required and requested to assist in this additional training. The cost for the translator will be borne by the Contractor. The Contractor shall implement the training programme at own cost.

All staff shall:

- be inducted prior to commencing work;
- receive task based / skills training;
- receive weekly environmental toolbox talks;
- undergo six monthly refresher (environmental) training; and
- be retrained as per corrective action outcome(s).

The Contractor shall keep records of personnel experience, qualifications and training undertaken, including inductions, in a training register. The training register shall include the following details:

- who was trained;
- when the training took place;
- name of the trainer;
- a general description of the content of the training; and
- effectiveness of training programmes.

All employees must receive general project related work skills training required to enable them to work safely and effectively, including:

- Health and safety;
- Emergency drills;
- Firefighting;
- Acceptable behaviour with regard to flora and fauna;
- Management and minimising of waste, including waste separation;
- Maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants, cement, mortar, and other chemicals;
- Spill and emergency management;
- Disaster management;
- Incident reporting; and
- General code of conduct towards I&APs (e.g. not to use I&AP toilets, water taps, bins, etc.).
- Handling of hazardous waste

Inductions which need to be conducted prior to any construction works occurring, will include but not be limited to information on:

- Information on applicable specifications, plans and method statements which are applicable to the project;
- Management and minimising of waste, including waste separation;
- Maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, lubricants, cement, mortar and other chemicals;
- Responsible handling, storage and transportation of hazardous materials;
- Environmental emergency procedures and incident reporting; and
- General code of conduct towards I&APs.

The EO may be requested to provide additional training (in a first language) on-site regarding environmental aspects that are unclear to the construction personnel. A translator may be required and requested to assist in this additional training. The cost for the translator will be borne by the Contractor. The Contractor shall implement the training programme at own cost.

6.18 Grievance procedure

A grievance procedure is a management tool used to prescribe management mechanisms or methods to address grievances arising from affected stakeholders on a development.

The Contractor shall adhere to the grievance management procedures as agreed with the Employers Agent.

6.19 Resource Allocations

Financial implications for items and activities prescribed in the EMPr shall be recognised by the Contractor (for the construction phase) and provision for these costs shall be made. Such costs can include (but may not be limited to) mitigation actions, environmental awareness training, monitoring and auditing requirements and measures for rectification and rehabilitation, management of archaeological / heritage findings unearthed during construction, including any equipment or specialists required for these items.

6.20 Final Environmental Compliance Report

A Final Environmental Compliance Report will be compiled by the ECO for submission to Stellenbosch Local Municipality at the end of the construction phase. The report will include details of:

- The completion of all environmental conditions and mitigation measures listed in the EMPr (inclusive of the Vegetation and Aquatic Rehabilitation Plans) and the EA, as well as with the MMP when specific maintenance activities as described in the MMP are conducted.
- All environmental incidents and completed corrective actions;
- The findings of the Environmental Audits;
- Conclusions as to whether environmental constraints, guidelines, norms and stipulations have been met and, if not, reasons why they have not been met;
- An indication of the outcomes of the environmental monitoring conducted;
- All Monthly Environmental Monitoring Reports (as an attachment);
- A copy of all Method Statements (as an attachment);
- A copy of the environmental Incident Book (as an attachment); and
- A copy of the Communications Register.

7. Monitoring

7.1 Monitoring Approach

Monitoring shall be carried out by the respective environmental representative from Stellenbosch Local Municipality, Employers Agent and Contractor.

7.2 Inspections

Site inspections shall be carried out on a daily basis by the Contractor's Environmental Officer to ensure measures implemented are effective in mitigating impacts.

The ECO shall undertake, as a minimum, fortnightly (or as prescribed in the conditions of authorisation) in order to provide an account of environmental compliance with the EMPr during construction.

The Contractors Environmental Officer / Community Liaison Officer shall undertake receptor monitoring to verify that construction related activities are not negatively impacting upon the environment; health of employees and members of the surrounding community; nor local economy (e.g. farming).

7.3 Compliance monitoring

The Contractors Environmental Officer or professional service provider shall undertake compliance monitoring to verify construction related activities are not exceeding prescribed thresh holds.

The Contractor shall submit environmental compliance monitoring data to the Employers Agent on a monthly basis.

7.4 Auditing (internal and external)

The ECO shall undertake monthly internal audits to verify the measures implemented by the Contractor to suitably mitigate identified risks / impacts.

The Environmental Auditor shall undertake external audits at the frequency prescribed by the relevant CA.

7.5 Time Programme

All monitoring shall be undertaken as per the monitoring programmes, where prescribed either by law or by the Employers Agent.

7.6 Quality control system (for monitoring)

Quality Assurance and Quality Control (QA/QC) addresses both the management of construction related activities and the "development" being constructed. QA includes the documented processes required to ensure that the development satisfies the needs for which it was undertaken; and will meet the development specifications and data quality outcomes. It also includes all activities of the overall management function that are required in meeting the outcomes of the development including planning, QC elements and any scope changes. The overall QA/QC program of the development shall be the foundation upon which Stellenbosch Local Municipality can assure itself that the work is being and has been adequately performed.

The Contractor shall consequently develop and maintain a Quality Assurance and Quality Control Integrated Management System (IMS) made up of both a QMS based on ISO 9001; and an environmental management system (EMS) based on ISO 14001.

All environmental / social monitoring shall follow accepted monitoring protocols / norms and standards; and shall be informed by the outcomes of any baseline studies.

All analysis of samples shall be done at a South African National Accreditation System (SANAS) 17025 accredited laboratory; unless specified in the Contractors method statement and approved by the Employers Agent.

8. Assurance

8.1 Reporting

Reporting is the process of measuring actual performance or how well the mitigation measures have been implemented, including the format, timing and responsibility for reporting.

8.1.1 General Reporting

Reporting by the various role players shall be undertaken in accordance to the table below.

Table 8-1: Periodic Reporting

Report	Timing	Prepared by	Reviewed by
Weekly	On the first day of the following week	Environmental Officer	Employers Agent with support of the ECO
Monthly	Within 7 days of completion of reporting period	Environmental Officer	Employers Agent with support of the ECO
Change Management	Whenever required	ECO / Environmental Auditor	Employers Agent / CA
Close-out Report	Within 30 days of completion of construction related activities	Environmental Officer	Employers Agent in support of the ECO

Audit Report - Internal	Within 7 days of completion of reporting period	ECO	Employers Agent
Audit Report - External	Within 7 days of completion of reporting period	Environmental Auditor	CA
Grievance	Within 7 days of grievance	Environmental Officer / Community Liaison Officer	Employers Agent with support of the ECO
Management Review	Within 7 days of management review	Contractors Senior Management	Employers Agent

8.1.2 Incident Reporting

The Contractor shall undertake incident reporting in accordance to the below table. Please note that NEMA Section 30 and 30A have prescriptive timeframes in which a CA is to be notified.

Table 8-2: Incident Reporting

Reporting	Action	Responsibility	Timeframe
	Report incident to Employers Agent / Engineer	Stellenbosch Local Municipality, Employers Agent / Engineer and Contractor	Immediate notification
	Incident report submitted to the Employers Agent / Engineer		Within 7 days of incident
	Contractor to select appropriate remedy to rectify non-conformance and provide revised method statement to the Employers Agent for approval.		Within 10 days of incident

8.2 Implementation (Contractor)

8.2.1.1 Weekly environmental and social monitoring reports;

The Contractor shall undertake daily site inspections, the outcomes of which shall be submitted in a weekly report to the Employers Agent. Such reports shall include:

- a summary of the results of the daily and weekly inspections;
- any non-conformances and corrective actions taken;
- work status and tasks to be completed;
- environmental activities undertaken;
- environmental incidents or grievances;
- environmental monitoring;
- consultation undertaken;
- progress of reinstatement; and
- results of any audits undertaken.

8.2.1.2 Monthly environmental and social audit reports;

The Contractor shall submit a consolidated and detailed monthly report to the Employers Agent.

8.3 Supervision (Engineer)

8.3.1 Corrective Action Requests

A Corrective Action Request (CAR) shall be issued to the Contractor instructing the initiation of corrective action. The Contractor shall initiate an investigative process to determine root cause, thereby preventing future recurrence, within the timeframe prescribed by the Employers Agent.

Follow up actions shall be assessed by the ECO to verify implementation of approved corrective actions, recommendations and their effectiveness in preventing re occurrence.

8.3.2 Action on Non-Conformance Report

Preceding the issuing of a NCR (Section 6.6 Non-Conformance Report), the Contractor shall be presented with an opportunity to rectify the outstanding issue (via a CAR). Should this issue not be corrected or completed to the satisfaction of the Employers Agent, the issue shall be escalated to an NCR.

An NCR shall be issued to the Contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. The Employers Agent shall issue the NCR to the Contractor in writing.

Should the ECO assess an incident / issue and find it to be significant (e.g. non-repairable damage upon the environment), it shall be reported to the authorities and immediately escalated to the level of an NCR. This shall be done in consultation with the Employers Agent.

The following information should be recorded in the NCR:

- details of non-conformance;
- any plant or equipment involved;
- any chemicals or hazardous substances involved;
- work procedures not followed;
- any other physical aspects; and
- nature of the risk.

Actions agreed by all parties following consultation shall adequately address the identified non-conformance. This shall take the form of specific control measures and take the hierarchy of controls into account. This shall accompany the NCR for filing purposes.

The agreed timeframe by which the Contractor shall have implemented the actions shall be documented in the NCR.

All NCR's shall be tracked and managed according to the development's quality control protocols.

The Employers Agent shall verify that the agreed actions have taken place on or soon after the agreed completion date. Where the actions are complete, the Employers Agent and Contractor shall sign the Close-Out portion of the Non-Conformance Form and file it with the contract documentation.

8.4 Audits (ECO and Environmental Auditor)

In addition to the prescribed monitoring undertaken by the Contractor, comprehensive audits shall be undertaken to determine the efficacy of the management measures implemented to manage and mitigate impacts.

8.4.1 Internal Audits

Detailed audit reports shall be drafted by the ECO indicating system deficiencies, non-conformances and adverse or potentially adverse environmental conditions arising from construction related activities.

The audit reports shall provide verifiable findings on the level of performance compliance; the ability to sufficiently provide for the avoidance, management and mitigation of environmental impacts; and levels of compliance with the EMPr and any other regulatory requirement. The audit reports shall be made available to the external Environmental Auditor.

All ECO audit reports shall be submitted to the Employers Agent monthly.

Audit reports for developments, where an EIA process has been undertaken, shall be submitted to the Employers Agent (Stellenbosch Local Municipality) for review prior to their submission to the relevant CA.

8.4.2 External Audits

External audits shall be undertaken by an independent Environmental Auditor,

- First audit three (3) months after commencement of the construction phase;
- Second audit a twelve (12) months into the construction phase;
- The last audit within six (6) months after completion of the construction period, and
- Auditing of rehabilitation activities should be annually for three years from the completion of construction.

These environmental audit reports shall comply with the requirements as prescribed in Regulation 34 of the EIA Regulations, 2014, as amended.

All environmental audit reports shall be submitted to Stellenbosch Local Municipality for review prior to their submission to the relevant CA.

8.5 Evaluation of Performance

8.5.1 Identify Trends

The Contractor shall analyse data obtained from monitoring programmes / audits to determine underlying patterns of performance in relation to time. Such outcomes shall aid the Contractor in implementing corrective actions, thereby pre-empting future possible environmental degradation or pollution.

8.5.2 Measure Progress

The Contractor shall monitor efficacy of mitigation measures implemented; and continually strive to improve the manner in which it protects the environment.

8.6 Review by Senior Management

The Contractor shall undertake periodic reviews by its senior management to evaluate efficacy of on-site EMS in delivering the desired environmental, health, safety and social protection.

These reviews shall be undertaken at intervals dictated by the current life-cycle stage; efficacy of EMPr implementation; level of compliance to internal and external audits and level of risk posed by upcoming activities.

A report containing management review recommendations shall be submitted to the Project Management. The Employers Agent shall track the implementation of the recommendations.

The Employers Agent shall reserve the right to issue a Corrective Action Request should the Contractor fail to adequately address issue at hand.

9. Suspension of Works

If the Contractor has not complied with one or more of the clauses of the EMPr the ECO may recommend the withholding of the payment certificate or the suspension of construction works to the Project Manager/Engineer and Stellenbosch Local Municipality. This may be conducted after having served the Contractor with an NCR and until the Contractor complies with the clauses of the EMPr. All delays resulting from such suspension shall be at the Contractor's expense.

10. Resource Allocations

Financial implications for items and activities mentioned in the EMPr must be recognised by the Contractor (for the construction phase) and provision for these costs must be made. Such costs can include (but may not be limited to) mitigation actions, environmental awareness training, monitoring and auditing requirements and measures for rectification and rehabilitation, management of archaeological / heritage findings unearthed during construction, including any equipment or specialists required for these items.

11. Implementation of the EMPr

The EMPr provides an integrated approach to environmental management. This approach is designed to guide the appropriate allocation of human resources, assign responsibilities, develop procedures and ensure project compliance with regulatory and best practice requirements.

Where conflict exists between this and any other document / specification, the following shall apply in descending order of applicability:

- a DEA authorised EMPr;
- this EMPr; and
- Contractual Specifications.

The Contractor is expected to implement all mitigations listed. It is the responsibility of Stellenbosch Local Municipality's Agent to monitor the contractor's compliance with the EMPr and to report to the client.

11.1 Aesthetics Management

Construction related activities have a short, yet visually negative impact upon the natural environment and the project footprint. The objectives are to reduce these impacts.

- Equipment and materials to be neatly stored in designated areas;
- All site offices are to be matt toned single storey buildings that emit no glare;
- No natural features may be defaced;
- Shade-cloth shall be placed on perimeter fencing to reduce visual impact of the camp site;
- Litter sweeps should be conducted regularly to ensure that the construction, office and site areas are clean;
- Lighting must face down, not into surrounding environment, to provide adequate lighting for Health and Safety requirements;
- Lights should not be mounted higher than 3m off ground level;
- Stockpiles must be regularly and neatly maintained; and
- Rehabilitation of all areas impacted upon through construction related activities must be achieved
- All construction general waste must be removed from the site and transported to the licensed landfill site

11.2 Contamination, Compaction and Loss of Soil

- The Contractor is to take appropriate measures to prevent and control soil and water contamination.
- Ensure that excavated material is removed from site regularly;
- Excavated soil should be stockpiled away from sensitive receptors such as watercourses;
- Excavated and graded bare areas should not be left for long period without been constructed.

- Soil should be placed on sheeting surrounded by a soil berm and covered with an additional sheet to prevent water entering;
- Identified hydrocarbon impacted soil must be disposed of in accordance with local by-laws and environmental legislation;
- Ensure that backfill material is not impacted before use by the contractor; and
- Identified hydrocarbon impacted groundwater must be disposed of in accordance with local by-laws and environmental legislation.
- Prevent uncontrolled access of vehicles through wetlands.
- A rehabilitation plan must be compiled for the scour and erosion in the watercourses located at the pipeline crossing.

11.3 Ambient Air Quality Management

- Dust emissions must be monitored and comply with regulatory requirements, including the AQMP for the Stellenbosch Local Municipality;
- Dust management impacts negatively on both the natural environment and the well-being of the local inhabitants. The objectives are to preserve air quality levels to an extent that public health; safety and environmental protection are assured.
- Stockpile heights can be reduced where dust entrainment has been noted to be high;
- Dust suppression (wetting or other) must be used, where applicable. Alternative sources of water must be considered for dust suppression purposes to ensure no wastage of water;
- Dust generating materials to be transported must be covered when transported;
- All vehicles must travel at speeds that will not generate dust -construction vehicles must keep to the speed limits of 25 km/h on the construction site;
- In the unlikely event of dust generation, the Contractor will be responsible to ensure monitoring is implemented to ensure dust levels do not exceed 600 mg/m^2/day – where the Contractor has applied successful mitigation measures, this monitoring will not be necessary; and
- Situations where vapours are encountered the need for vapour suppression should be assessed.
- Handling of soils is not to be conducted during high winds.

11.4 Earthworks Management

Earthworks may be required during site activities and are generally of low impact and short duration. The objectives are to minimise impacts on the receiving environment.

- Topsoil shall be stockpiled separately from subsoil. All stockpiles shall be stabilised, not be higher than 2 m;
- Stockpiles shall be protected from rain run-off and erosion;
- Spoil must be used as backfill to rehabilitate areas impacted upon by earthwork activities; and
- Excess spoil material disposed of at the nearest registered landfill site as identified by the Contractor and approved by the Project Manager and ECO.

11.5 Excavation Activities

- Following appointment by Stellenbosch Local Municipality, the Environmental Consultant will perform a site assessment of the soil excavated to determine hydrocarbon impact;
- Should groundwater be encountered, the Environmental Consultant may be appointed to include groundwater sampling in the site assessment;
- Regularly remove excavated material from site to manage the size of soil stockpiles;
- Stockpiles of material to be removed from site should be easily accessible by dump or skip trucks and away from potentially sensitive receptors;

- Excavated soil must be placed on sheeting surrounded by a soil berm and an additional covering sheet to prevent the entry of water; and
- Authorisation must be obtained from the CAM prior to the disposal of any water into the sewer system.

11.6 Flora and Fauna Management

The objective is to put into place measures to preserve fauna and flora through control of construction activities.

- No construction / demolition related activities to impact upon areas outside of the site footprint;
- There shall be no feeding of birds and animals on site;
- Open excavations must be adequately fenced to prevent access by wildlife or livestock and to encourage regeneration of native plants;
- No unauthorised clearing of vegetation will be permitted;
- Vegetation clearing prior and during construction must be limited to the footprint of the proposed development.
- The servitude area must be kept clear of alien vegetation.
- Any areas requiring rehabilitation shall be completed to a state similar to the surrounding landscape and re-vegetated with indigenous perennial shrubs and grasses from the local area;
- No unauthorised collection of fauna and flora in surrounding areas shall be permitted;
- Utilise the existing gravel road (best option) or road edge gutter within the assessed corridor for the trench with overburden soil to be placed in the road during construction;
- If any indigenous vegetation is to be cleared this should be brush cut, chipped and stored nearby on site (must not include any IAP or exotic species and be kept free of these) to be used as mulch spread lightly over the construction footprint once works are complete; and
- Topsoil must then be stripped, stored nearby and kept free for IAPs and weeds and once construction is complete this must be replaced where after the chipped mulch can be spread over the topsoil.
- The final route alignment in the Papegaaiberg Nature Reserve must be presented to Stellenbosch Local Municipality Environmental Department and CapeNature for approval prior to construction of the route in the reserve.

11.7 Fire Management

Construction related activities associated may pose a threat of damage to property, infrastructure and natural areas due to fire. The objective is to restrict the occurrence of fires and ensure all role players can respond efficiently and effectively, thereby reducing potential impact.

- Fire extinguishers must be available at all points of storage of flammable products;
- Stored pressure (STP) Dry Powder Fire Extinguishers must be used and at least one shall be provided per 50 m^2 floor surface area;
- The fire extinguishers must be checked on a monthly basis to ensure they have not been used/exceeded their yearly service intervals;
- Basic firefighting equipment shall be kept and maintained at all construction fronts at all times. Basic firefighting equipment shall not be restricted to fire extinguishers, but shall take cognisance of site-specific conditions and shall include fire beaters and water bowser, as and where required;
- Relevant staff are to undergo basic firefighting training;
- The Contractor shall assign the position of Fire Officer to one of its senior staff members who shall be competent and adequately trained to fulfil the position of Fire Officer;
- The Fire Officer shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedures to be followed. The Fire Officer will be responsible for contacting emergency services for assistance;

- Any fires that occur shall be reported to Stellenbosch Local Municipality immediately and reported in turn to the relevant authority (CAM, provincial government and national government);
- The site induction shall include information on fire prevention and firefighting and safety in the event of a fire;
- Ensure that the necessary materials and equipment for dealing with oil, fuel and hazardous substance spills and leaks are available on site and up to date at all times;
- No open fires shall be permitted on or off-site;
- No on-site burning of any waste materials, vegetation, litter or refuse shall be permitted; and
- Designated smoking areas, together with appropriate ash trays / bins shall be provided. The disposal of cigarette butts into the surrounding environment shall not be permitted.

11.8 Waste and Pollution Management

The storage, handling, use and disposal of hazardous substances shall be managed and monitored to ensure these substances do not impact upon the receiving environment.

- All hazardous substances to be kept under lock and key in a bunded impermeable weather and fire proof facility;
- Relevant staff to be trained in the safe handling and spill management of all substances used on site;
- All reactive hazardous substances to be labelled and stored separately;
- Suitable firefighting equipment must be stored in close proximity and all personnel must be made aware of the dangers of burning chemicals/smoke inhalation;
- Relevant staff are to be trained in the management of hazardous substances;
- All staff are to be provided with appropriate Personal Protective Equipment (PPE);
- Storage will comply with the manufacturers MSDS and local and national legislative requirements. MSDS's for all hazardous substances are to be kept on file;
- Ensure that the necessary materials and equipment for dealing with oil, fuel and hazardous substance spills, leaks and fires are available on site and up to date at all times;
- The following symbolic safety signs shall be depicted: "No Smoking", "No Naked Lights" and "Danger";
- These signs shall conform to the requirements of SANS 1186-1 and are to be prominently displayed in and around the storage area;
- It must be ensured that all hazardous contaminants are stored in designated areas that are sign-posted, lined with an appropriate barrier and bunded to 110% of the volumes of liquid being stored to prevent the bio-physical contamination of the environment (ground and surface water and soil contamination). Hazardous substance storage must not take place within 100 m of a wetland or within the 1:100-year flood line;
- The volume and contents of any hazardous material storage tanks shall be displayed using the emergency information system detailed in SANS 10232-1; and
- Signage containing clearly displayed emergency contact numbers must be provided.

11.9 Ambient Noise Management

- Noise sensitive receptors include the general public; the Contractor is to take care to ensure that all noise generating activities are managed appropriately.
- Surrounding residents and businesses must be informed about the site works and the expected length of time;
- Employees must be provided with adequate PPE;
- All construction related vehicles, plant and equipment must be properly maintained to avoid creation of unnecessary additional noise;

- Noisy operations should, wherever possible run concurrently in order to minimise the duration of high noise levels;
- Noise levels shall comply with SANS 10103:2008 and Occupational Health and Safety Act requirements;
- All works that deviate from normal construction related conditions shall be reported and actions initiated to mitigate against to prevent recurrence of the incident;
- Adhere to local authority by-laws relating to noise control;
- Construction activities must be limited to working hours (07h00-18h00) Monday to Saturday excluding public holidays (unless prior permission is provided by surrounding landowners); and
- Stellenbosch Local Municipality Noise Policy with regards to prohibitions relating to disturbing noise, machinery in residential areas, generator sets and construction noise will be adhered to, including the SANS codes for this zone.

11.10 Road and Traffic Management

It is expected that there will be a limited increase in project vehicle numbers due to site activities taking place.

- Minimise, as far as possible, the establishment of new access roads through watercourses or within buffers.
- Roads must be maintained in an acceptable condition for the safe travel of the public and project personnel;
- All vehicles must travel along designated routes;
- The travelling public shall have the right of way on public roads;
- Full closure of existing roads will not be allowed;
- Flagmen must be provided at partial road closures and other traffic disruptions to ensure the safety of the public;
- Any accidents or incidents must be recorded and Stellenbosch Local Municipality notified immediately. Investigation into the causes must be done;
- Construction vehicles are to keep to the speed limits (25 km/h on the construction site).
- Vehicles must obey prescribed speed limits; and
- Appropriate notification signs shall be erected at entrances to the construction site to warn visitors and pedestrians about the hazards around the construction site and the presence of heavy vehicles, where appropriate.

11.11 Site Closure and Rehabilitation Management

Rehabilitation and site closure activities are to take place as soon as activities have been completed on a site. Any required rehabilitation will return impacted areas to a suitable land capability class similar to that of the existing land use.

The Contractor shall prepare a suitable Site Closure and Rehabilitation Method Statement which includes for submission and approval by the Project Manager before contract completion. The method statement shall cover site closure and rehabilitation requirements of the specific site.

The method statement is to include the following:

- Details on the Contractors measures to be applied to the site in preparation for rehabilitation;
- Details of the rehabilitation methods to be applied including: monitoring strategy, monitoring frequency and presentation of results where required; and
- The format and means for recording and reporting on rehabilitation management and monitoring

11.12 Spill Management

In the event of a spill or accidental release of hazardous substances the Contractor is to undertake the following as a minimum:

- Stop the origin of the leak;
- Contain the spill by booms, dykes, or in pits;
- Joint Investigation Visit (JIV);
- Investigate the cause of the spill;
- Record damage from spill;
- Estimate spilled volume of oil & JIV Report;
- Recover the spilled volume where practical;
- Carry out site clean-up;
- Surface cleaning of the site; and
- Carry out root cause analysis.

Any significant spills on-site must be reported to the relevant Authority (e.g. Department of Water and Sanitation / Stellenbosch Local Municipality etc.) and must be remediated as per the EMPr. The conditions of Section 6.7 Environmental Emergency Response must be applied where applicable.

11.13 Site Demarcation and Management

Destruction or damage to existing infrastructure, services and servitudes is a risk during the project activities, the Contractor is to implement suitable mitigation measures.

- All underground services such as water, electricity, sewage, gas, compressed air, communication and close circuit television must be identified and marked prior to any excavation or drilling;
- Avoid infrastructure, services and servitudes during works; and
- Cordon off the site works area so that the construction crew are familiar with the area in which they are to work.

11.14 Waste Management

Waste management activities associated with the activities will be dependent on the hazard rating of the waste. Appropriate measures will be required for disposal for various forms of waste.

- Wherever possible, materials should be reused or recycled to reduce amounts of waste that needs to be disposed of at a landfill - disposal should be used as the last option;
- No illegal waste disposal may occur (without a waste license having been obtained);
- Builder's rubble must be kept clean by separating it from the other waste;
- General waste must be stored separately from hazardous waste. General waste must be stored in bins, skips or similar containers with lids only;
- Hazardous waste must be stored in a bunded roofed area. Water from cleaning the bund must be collected and disposed of at an appropriate landfill;
- Should asbestos be encountered underground during excavation on site, a registered asbestos company must prepare an asbestos management plan and attain approval from the relevant official at the Municipality/Province prior to any handling of uncovered asbestos;
- General waste that is not reused or recycled can only be disposed of at a registered landfill. Hazardous waste must be disposed of at a registered hazardous waste landfill;

- Disposal of hazardous waste to be conducted by a licensed contractor / professional service provider;
- Store and handle all hazardous materials and waste in accordance to their respective material safety data sheets;
- Record must be kept of all wastes generated and what proportions are being reused or recycled. Records of waste disposed at landfills must also be recorded. Disposal certificates must be obtained from landfill sites to document waste delivered to the landfill;
- No septic tanks (French drains) may be used. All sewage shall be removed to the municipal waste water treatment works;
- Portable sanitation facilities should be erected for construction personnel;
- Use of these facilities should be enforced (these facilities should be kept clean so that they are a desired alternative to the surrounding vegetation). These facilities should also be monitored and serviced regularly so as to prevent contamination of the water resources;
- The project foot print must be kept clean and waste removed to the waste storage facility daily;
- Anti-litter/ anti-dumping should be implemented on site and daily litter patrols must be conducted at the site camp and within the construction footprint; and
- Scavenger and weather proof bins must be provided.

11.15 Water Management

Water is a finite resource which requires sound management practices and conservation.

- Construction activities which will impact upon water resources will be undertaken as set out in the relevant license(s) to be issued by the Department of Water and Sanitation (DWS). Such licences should also made available to the Contractor;
- Storm water runoff must be prevented from coming into contact with waste or contaminants on the site. Discharge of effluents or polluted water into the water resources shall not be allowed;
- Water emanating from the mixing of cementitious products must be contained and prevented from entering the environment;
- The Contractor shall prevent the discharge of any substance into a water resource;
- Water released by the Contractor into the environment must comply with the standards imposed by the DWS; and
- Adequate water supply shall be provided to the workers on the site.

11.16 Implementation Tables

Table 11-1: Typical Aspects and Impacts associated with the Planning and Design Activities

Planning and Design Phase			
Activity/Issue		**Action required**	**Responsible Party**
1.	Appointments	• Appointment of an ECO.	Stellenbosch Local Municipality
2.	Aspects to be included in the design	• Existing services shall not be impacted upon.	Stellenbosch Local Municipality
3.	Employment creation	• The tender documentation should stipulate the use of local labourers or enterprises, where feasible. • The use of local labour should be maximised, where feasible. • It should be ensured that the Contractor uses local skills, or train semi-skilled people or re-skill appropriate candidates for employment purposes where possible. • On-site training should focus on the development of transferable skills (technical, marketing of their own skills and entrepreneurial skills) to ensure long term benefits to the individuals involved.	Project Manager/Engineer, Contractor, EO, ECO

11.16.1 Environmental Specifications – Construction Activities – Pre-Construction

Table 11-2: Typical Aspects and Impacts associated with the Pre-Construction Activities

Pre – Construction			
Activity/Issue		**Action required**	**Responsible Party**
1.	Timing of construction related activities	• The Contractor shall appoint the EO prior to the commencement of works and his/her name shall be provided to the Project Manager/Engineer 15 days prior to the commencement of construction related works. • The Contractor shall be required to provide training (by the EO) to all personnel regarding the potential impact of construction related activities upon sensitive environments.	Contractor, EO
2.	Defining works procedures	The Contractor shall compile method statements for all activities / tasks to be undertaken during the implementation of the required works.	Contractor
3.	Flora and Fauna	This shall form part of the Contractor's preconstruction survey.	Contractor, EO, ECO
4.	Pre-construction Photographic Survey, Botanical Walkdown, Rehabilitation planning	• The Pre-construction Photographic Survey and Botanical Walkdown must be conducted prior to the commencement of the construction works. It must be attended by the ECO and the Contractor. The following must be established, agreed and recorded. • Sensitive receptors immediately adjacent/close to the servitude / corridor. • Activities usually undertaken in the construction servitude area (e.g. Laydown and stockpile areas). • Impacted services and the protection of these services. • Fire protection and fighting measures. • Fencing requirements. • Areas where contamination has been found. • Information and agreements to be captured in a document for the affected land portions (copy of which is to be submitted to the Project Manager/Engineer. • Existing services, buildings and structures: Position, type, condition and other details of existing services (fencing, gates, roads, telephone lines, power lines etc.), buildings and structures within the construction site. This survey must include photographical records, documented per cadastral portion. • Access issues. • Areas where indigenous vegetation and/or protected plant species are found from site survey • Planning for rehabilitation should be done in the planning phase by a rehabilitation specialist and in line with the Aquatic and Vegetation Rehabilitation Plans. • The final route alignment in the Papegaaiberg Nature Reserve must be presented to Stellenbosch Local Municipality Environmental Department and CapeNature for approval prior to construction of the route in the reserve.	Contractor, EO, ECO
5.	Daily living and movement patterns	• Speed limits shall be adhered to when using local roads. • Access routes and access points for heavy construction vehicles should be indicated to warn motorists of the movement of these vehicles. • Limit the movement of construction vehicles to off-peak periods (where possible) and where sensitive receptors are situated e.g. nature reserves. • Machinery and vehicles should be in good working order to limit excessive noise pollution. • Construction activities must adhere to all relevant legislation.	Project Manager/Engineer, Contractor, EO, ECO

Pre – Construction			
Activity/Issue		**Action required**	**Responsible Party**
		• Construction activities should be limited to normal working hours (07h00-18h00) Monday to Saturday excluding public holidays (unless prior permission is provided by surrounding landowners). • Construction vehicles should keep to the speed limits. Speeding on gravel access roads should also be avoided to limit any excess dust pollution. • Construction camp sites should be fenced off prior to construction to limit unauthorised entry. • The construction approach should ensure that no existing infrastructure is damaged, and that the alignment does not negatively impact on possible future projects and/or infrastructure maintenance projects.	
6.	Local economic benefits	• Local sourcing of materials would assist in providing more economic and employment opportunities for the local people. • Local procurement could result in indirect economic spin-offs and benefits such as increased income, and expansion of other local economic sectors. • Maximise the use of local labour even if the number of locals that would be employed would be limited. There is opportunity for the Contractor to appoint local labour especially for the low-skilled tasks e.g. flag person for traffic calming measures. Prevent nepotism/ corruption in local recruitment structures. • Proportionally divide any potential local unskilled labour opportunities with the assistance of the Ward Councillors. These opportunities include the performance of general and basic construction activities (e.g. digging trenches, foundations and the erection of notices, etc.). Ward councillors and officials from Stellenbosch Local Municipality could assist in determining local subcontractors and/or labourers that should be considered for possible employment e.g. those subcontractors residing in the affected areas with the necessary skills. • Promote employment of women. • Monitor employment targets over the duration of construction.	Contractor
7.	Training and induction of employees	• The Contractor must ensure that all people involved (including Sub-Contractors, casual labour, etc.) are aware of and familiar with the environmental requirements. The Contractor's EO is responsible for providing at least one hour of environmental training to each member of the construction staff. If required, further training may be conducted by the ECO. • The Contractor's EO must monitor the performance of the construction staff to ensure that the training and induction have been understood and is being followed. • The Contractor should continue and extend HIV/AIDS awareness and support programmes amongst its staff and sub-contractors.	Contractor, EO, ECO

11.16.2 Environmental Specifications – Construction Activities – Site Office Establishment

Table 11-3: Typical Aspects and Impacts associated with the Site Office Establishment Activities

Construction Activities – Site office Establishment			
Activity/Issue		Action required	Responsible Party
1.	Construction site office/yard and site	The Contractor's site camps will be erected at separate locations from the development footprint. Two (2) site camps will be erected, the main camp at the new Kayamandi Northern reservoir location and another satellite camp at the pump station location (existing Papegaaiberg reservoir site). • All construction activities, materials, equipment and personnel will be restricted to within the area specified. • The location of the site office / yard selected will minimise nuisance impacts on neighbours (e.g. visual intrusion, lights at night, noise, dust, movement of people and vehicles, safety and security risks) Should temporary fencing be required the Contractor shall fence off the construction camp areas with high diamond mesh fence or similar. All temporary fencing must be removed on completion of the Works. • The camps may be used for the working hours activities of the Contractor's and the Employer's personnel and for all related facilities required by the Contractor and the Employer such as workshops, stores, testing laboratories, etc. The Contractor shall take all necessary steps required to comply fully with public legislation and regulation and all specification clauses governing the environment, health, transport, safety and public disturbance impacts. Accommodation of labour at camp sites will not be allowed. • Should at any stage of the Works Stellenbosch Local Municipality and/or the Project Manager/Engineer and/or the ECO be of the opinion that the camp sites of the Contractor are causing disturbance or inconvenience to nearby residents, then the authority granted by this clause for the Contractor may be withdrawn, either partially or entirely. • The Contractor shall at all times conform to all requirements contained in law or bylaws, as well as any other requirements set by the controlling land and local authorities. • The Contractor may not remove or damage any trees or shrubs on the site of the construction camps or laydown areas without the permission of the Project Manager/Engineer and where required it shall be done in accordance with the environmental requirements. • The Contractor shall water all new or dirt track access roads, as well as working areas used by vehicles inside camps, as required or as may be directed by the Project Manager/Engineer, to prevent dust being entrained by vehicles or wind. Alternative sources of water must be considered for dust suppression purposes to ensure no wastage of water. Existing tarred access roads should be used, where available. • At completion of construction work the Contractor must break and remove all concrete slabs etc. in construction camps and at batching plants, remove to approved spoil sites and hand over the sites in a clean and tidy condition. • No Taking-Over-Certificate shall be issued for the Works unless the site cleaning is done to the satisfaction of the Project Manager/Engineer and ECO. Rehabilitation of impacted areas shall be done in accordance with the specifications included in EMPr. • The Contractor shall submit a method statement for the establishment of the camp sites, including a drawing with the position, layout and type of facilities. Additionally, a Method Statement detailing the layout and method of establishment and operation of the batching plant shall be submitted by the Contractor. • Strict control of dust shall be undertaken, and due consideration must be given to the NEM:AQA, SANS 1929: Ambient air quality – limits for common pollutants, 2011 and the Stellenbosch Air Quality Guideline (June 2017). • Temporary containers should be placed in accordance to the site layout and within the development footprint (approved within the EA). • All waste generated on site must not be stored at the site camp at one point for more than 90 days and must be taken to the nearest registered waste disposal facility. • Sufficient water and sanitation facilities should be provided for the workers on site during the construction period. • All equipment should be maintained on a regular basis and should be in good working order. • A bunded and designated hazardous material storage area must be established	Contractor, EO, ECO

Construction Activities – Site office Establishment			
Activity/Issue		Action required	Responsible Party
		• Domestic solid waste bins should be placed at the site camp and separated into paper, plastics, metal, glass and food waste • A washout bay must be provided for washing of all equipment that has come into contact with concrete. <u>Accommodation of employees</u> • The Contractor shall make his own arrangements to house his employees and to transport them to site. • No informal housing or squatting will be allowed. The standard of the accommodation provided by the Contractor shall be subject to the approval of the Project Manager/Engineer. • Construction workers should be supervised at all times. • Social risks shall be communicated via training to the personnel living on site. <u>Power supply, water and other services</u> • The Contractor shall make his own arrangements regarding the supply of electrical power, water and all other services. No direct payment will be made for the provision of electricity, water and other services. The cost thereof shall be deemed to be included in the rates and amounts tendered for the various items of work for which these services are required, or in the Contractor's preliminary and general items. The Contractor will only obtain water from third parties if these parties are registered water users in terms of the NWA, and subject to a letter from the third parties allowing the Contractor to obtain this water. • The Contractor shall pay all consumption charges, and at his cost provide all connections, consumption meters, pipe work, storage tanks, transformers, cables, transport and other items associated with the supply of water and electricity for the Works. All connections to services of a Local Municipality (LM) (or its provider) shall be at points and to standards approved by the Project Manager/Engineer and the LM or designated provider. • During the construction of the pipeline and associated infrastructure, it is anticipated that satellite site offices may be required, which shall comprise a portable toilet, sheltered eating area and refuse bins. These should be no larger than 30 m² and shall be approved by the Project Manager/Engineer and ECO. The site office location shall have easy access and should preferably already be cleared or disturbed by previous human activity (e.g. previous construction camps, stockpile areas, parts of the existing road that forms part of the construction servitude or existing turning circles). All construction activities, materials, equipment and personnel will be restricted to within the area specified. <u>General</u> • The Contractor will not be permitted to paint / mark or deface natural features in an attempt to demarcate the site. Hazard tape may not be used to demarcate the external boundaries, as this easily breaks, littering the surrounding environment. • Pre-construction photographs will be taken by the ECO to determine the condition of the site before construction begins. This will provide a benchmark for rehabilitation as rehabilitated areas must match or better the pre-disturbance state. • The site office / yard and construction footprint will be kept clean, neat and tidy at all times, and all construction materials will be stored in a neat and organised manner. • Security guards are to be provided for after hours. • Residents close to the campsite office / yard shall be informed of the procedure for lodging complaints with regard to the Contractor's behaviour. • Local police services should be kept informed of the planned developments to ensure that they are able to adequately deal with any disruptive behaviour.	

Construction Activities – Site office Establishment			
Activity/Issue		Action required	Responsible Party
		• All construction activities should be stopped for the festive season in December. The construction camp should not be left vacant to avoid security risks and possible unauthorised entry.	
2.	Designated vehicle and plant cleaning and maintenance areas	• All vehicles and equipment requiring maintenance and servicing shall be taken off site and must be parked on an impermeable surface. Alternatively, drip trays must be placed below all vehicles / plant. Plastic sheets are not to be used as drip trays. • No servicing of vehicles on-site. • Maintenance of vehicles may be done at the construction site office / yard. Leaking equipment shall be repaired immediately or removed from the site. Spills from such leaks or breakages (e.g. hydraulic pipe bursts etc.) shall be reported to the Project Manager/Engineer and treated immediately. • Washing of vehicles may not be done at the construction site, and all vehicles requiring washing and servicing must be taken off site to a car wash / service station.	Contractor, EO, ECO

11.16.3 Environmental Specifications – Construction Activities – Site Management

Table 11-4: Typical Aspects and Impacts associated with the Site Management Activities

Construction Activities Site Management			
Activity/Issue		Action required	Responsible Party
1.	Aesthetics Management		
	Aesthetics	• The Contractor will ensure all components associated with site establishment are designed and positioned to limit the nuisance factor affecting surrounding land owners/users. All walls and roofs of buildings will be painted with a non-reflective matt paint of which the colour will be approved by the Project Manager/Engineer. Lighting will be of a downward facing spill off type to a maximum height of 3 m and should be so positioned to provide adequate lighting for Health and Safety requirements, without being a nuisance to adjacent neighbours. • No natural features may be defaced. Shade-cloth shall be placed on perimeter fencing to reduce visual impact of camp sites. Waste should be removed regularly to a registered landfill site. Daily litter patrols must be conducted, and record of these patrols kept. Bins must be provided at intervals agreed with the ECO within the camp and construction areas. • Litter caused by employees must not be tolerated. The ECO must monitor the sanitation of the work site. • All construction general waste must be removed from the site and transported to the licensed landfill site located close to the site – the Devon Valley Landfill Site (33° 56' 21.5628", 18° 49' 15.06") located approximately 7 km from the project site. Should there be a need to dispose of any SHW this will be transported to the Vissershok Landfill Site located at the Cape Farms 33°46'27.44"S; 18°32'41.47"E) located approximately 55 km from the project site. • The proposed construction must match the receiving environment as best as practicably possible.	Contractor, EO, ECO
	Visual intrusions	All portable toilets shall be screened from public view with a shade cloth enclosure.	Contractor, EO, ECO
2.	Dust Management		
	Air quality	• Vehicles and machinery will be maintained in good running condition. • Stockpiles (e.g. soil) should be maintained for as short a time as possible and should be enclosed by wind-break enclosures of a similar height to the stockpile. Stockpiles should be situated as close as possible to the construction footprint for re use in rehabilitation and away from the site boundary, water resources and nearby receptors, and should take the predominant wind direction into account.	Contractor, EO, ECO

Construction Activities Site Management			
Activity/Issue		Action required	Responsible Party
		• During the transfer of material to stockpiles, the drop heights should be minimised to control the dispersion of materials. • The Contractor will solely be responsible for the management and mitigation of dust generation. • The Contractor shall routinely spray all dust-generating surfaces with water, a dust suppressing agent or similar substance to prevent dust generation. Potable and contaminated water will not be used as a dust-suppressing agent and only recycled and/or rain water is to be used, when available. The source of water should be discussed with the EO and ECO as the extraction of water near or in a permanent drainage system may have implications in terms of the NWA, and therefore may well require the application of a Water Use Licence (WUL). Alternatively, the Contractor should use commercial dust suppressants. • Handling of soils is not to be conducted during winds in excess of 35 km/h. • No *ad hoc* cooking fires are allowed on site except in designated cooking areas. • Dust emissions must be monitored and comply with regulatory requirements, including the AQMP for the Stellenbosch Local Municipality. • Routinely spray all dust generating surfaces with water, a dust suppressant agent or similar to prevent dust generation. • The clearing of vegetation must be limited to where necessary. • Stockpiles (e.g. soil) must be maintained for as short a time as possible and should be enclosed by windbreak enclosures of a similar height to the stockpile. Stockpiles should be situated away from water resources and nearby receptors and should consider the predominant wind direction. • During the transfer of material to stockpiles, the drop heights must be minimised to control the dispersion of materials. • Handling of soils is not to be conducted during high winds. • The Contractor will be solely responsible for the management and mitigation of dust generation. • During periods of wind in excess of 35 km/h, soils should not be handled. • Provide safe points for vehicular crossings and traffic control managed by flag persons. • Erect appropriate notification signs at construction areas to warn the public about the hazards around the construction site. • Construction vehicles must keep to the speed limits (25 km/h on the construction site).	
3.	Earthworks Management		
	Transport, earthmoving and materials handling equipment (TEM)	• The Contractor shall ensure compliance with the Occupational Health and Safety Act (1993) and the relevant regulations for the operation and maintenance of TEM equipment. • The Contractor shall ensure all TEM, vehicles and equipment are maintained in good working condition to maximise efficiency and minimise pollution. All TEM and other equipment shall only be washed in designated washing areas to minimise water pollution and soil contamination. The designated washing areas are to be located at least 30m away from the watercourses and its buffer zones. • Soil / gravel material being transported to site by trucks will be covered to ensure that dust is not blown off the material. • The Contractor shall inform all suppliers that all materials are appropriately secured to ensure safe passage to and from site.	Contractor, EO, ECO
4.	Erosion Management		
	Erosion	• The Contractor shall be responsible for the prevention of erosion in areas impacted upon by their activities. All erosion repairs must be implemented at the first signs thereof. The Contractor must present the site in an erosion-free state before the issuing of the Taking-over Certificate.	Contractor, EO, ECO
	Stormwater	• For flat areas and areas located below road levels as well as areas generating high runoff such as parking areas, special precautions should be taken to protect buildings and surrounding structures from flooding.	Contractor, EO, ECO,

Construction Activities Site Management			
Activity/Issue		Action required	Responsible Party
		• Where stormwater runoff has the potential to be contaminated with environmentally harmful substances, for instance at wash bays, oil and grease traps will be provided to remove these substances from the generated runoff. • The substances will be separated from the runoff water in these oil and grease traps, removed and legally disposed of at frequent intervals and runoff returned to the natural drainage systems in order to minimize the environmental impact of this proposed development.	
5.	Fauna and Flora Management		
	Flora and fauna	• The ECO must be informed of all animals found on site in order to ensure proper capture, translocation and release. Trapping, collection, poisoning and/or shooting of any animals by construction personnel is forbidden. • The Contractor shall not keep domesticated animals on any of the camp sites. • No trees shall be damaged, pruned or removed. • A comprehensive alien vegetation eradication programme must be implemented, with the removal of all alien vegetation from within the development footprint (as legally required). This shall take place within one year of construction commencement. • Care must be taken during the alien vegetation removal process to ensure that no unnecessary fires are created through the stacking of biomass. • Imported materials must be free of alien vegetation species. • Maximise use of existing roads and access to areas outside the construction footprint must be strictly controlled. • Rehabilitation of areas disturbed during project activities (and other rehabilitation or replanting as may be specified) shall be undertaken to reinstate natural flora and prevent the expansion of weeds and invasive alien species. All material brought in must be from a reliable source and free of alien seeds or grass runners. • Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species. • The Contractor shall ensure all areas rehabilitated are kept weed free during the DNP. • All movable and low mobility fauna (such as reptiles and amphibians) must be translocated at the same time. • If any faunal species are recorded during construction, activities should temporarily cease, and an appropriate specialist should be consulted to identify the correct course of action. • No trapping, killing or poisoning of any wildlife is to be allowed on site. • Staff should be educated about the sensitivity of faunal species and measures should be put in place to deal with any species that are encountered during the construction process. The intentional killing of any animals including snakes, insects, lizards, birds or other animals should be strictly prohibited. • Topsoil must then be stripped, stored nearby and kept free for IAPs and weeds and once construction is complete this must be replaced where after the chipped mulch can be spread over the top.	Contractor, EO, ECO,
	Vermin	• The site must be kept clean and tidy at all times to ensure no vermin is attracted to it. • The use of pesticides is prohibited unless approved through the submission of a Method Statement to the Project Manager/Engineer and ECO.	Contractor, EO, ECO,
	Environmental Auditing	During construction, activities will be monitored and recorded by the EO and audited against the EMPr by the ECO. Monitoring and incident information will be communicated to the relevant authorities. Any complaint will be recorded and investigated. After construction, the site needs to be inspected and monitored to ensure that the rehabilitation activities have been successful by the Contractor and are maintained by Stellenbosch Local Municipality.	Contractor, EO, ECO, Stellenbosch Local Municipality

Construction Activities Site Management			
Activity/Issue		Action required	Responsible Party
	Ecologically sensitive areas	• All areas of medium - high sensitivity or natural vegetation outside the immediate construction footprints must be regarded as no-go areas. These areas may not be accessed by people or vehicles. • No ancillary activity, such as temporary housing, temporary ablution, storing of equipment or waste disposal may be permitted in the areas mapped or classified as ecologically sensitive. • If any indigenous vegetation is to be cleared this should be brush cut, chipped and stored nearby on site (must not include any IAP or exotic species and be kept free of these) to be used as mulch spread lightly over the construction footprint once works are complete	Contractor, EO, ECO
6.	Fire and Emergency Management		
	Safety and Security	• Construction property and equipment are to be clearly marked with identification tags. • Access to the construction site must be restricted and guarded. • Construction workers will wear clothing marked with the logo of the construction company and will carry identification cards. • The Contractor will maintain a consistent workforce that is familiar with the rules, practices and attitudes towards the misappropriation of property. • PPE and clothing shall be given to workers and the usage thereof shall be enforced to avoid construction-related accidents. • The Contractor shall implement measures to ensure the safety of pedestrians crossing the roads used by construction vehicles. • Potentially hazardous areas must be demarcated and clearly marked. • No unauthorised firearms or dangerous weapons are permitted on site. • Security (infrastructure and personnel) on-site should be implemented during the construction period.	Contractor, EO, ECO
	Health Risks	• A Health and Safety Officer is to be appointed for the duration of the construction period, and his/her contact details are to be made available to the ECO. • The Contractor should continue and extend HIV/AIDS awareness and support programmes amongst staff and sub-contractors. • Adequate water supply and sanitation-related facilities shall be provided to the workers at the construction sites, with due consideration of applicable water restrictions. This shall typically include 1 toilet to every 15 workers. The toilets shall be located no more than 100 m away from any work front. • Emergency response processes should be in place. All relevant communities and adjacent land owners should be notified of the correct procedures for dealing with serious emergencies. • Adequate water supply and sanitation related facilities should be provided to the workers at the construction sites. • Construction waste should be disposed of at registered landfill sites to prevent any surface and groundwater pollution. • Construction sites should be fenced off to avoid unauthorised entry by individuals.	Contractor, H&S Officer
	Environmental emergency response	• In the event of actions that may result in significant environmental damage, an environmental emergency response plan must be in place to limit the extent of environmental damage. Procedures and policies will be established to ensure that an incident does not recur. • Incidents will be reported immediately to the responsible person. All incidents will be documented in the environmental incident book. The relevant authority will be informed after an incident.	Contractor, EO, ECO
	Incident management	• The Contractor shall identify the types of environmental incidents that are likely to occur on site and ensure measures are put in place to prevent or mitigate the effects of such incidents.	Contractor, EO, ECO

Construction Activities Site Management			
Activity/Issue		Action required	Responsible Party
		• The Contractor is required to put in place an effective management system that will prevent or mitigate the occurrence of an incident. The method statement for this must be submitted to the Project Manager/Engineer for approval prior to the commencement of the works. This method statement must be reviewed and updated on a six monthly basis. • All SHE incidents must be reported by the Contractors employees to the Contractor. The Contractor shall immediately report the incident to the Project Manager/Engineer and put into place management mechanisms to deal with the incident as quickly as possible. • Once the incident has been stabilised and initial notifications have been issued to the relevant parties, a full incident investigation is required complete with detailed corrective and preventative measures. The Contractor is required to provide an incident report to the Project Manager/Engineer, which, as a minimum, must include the following: • Nature of incident. • Damages, injuries or fatalities sustained, and the parties involved. • Any risks such incident poses. • Toxicity of the substances involved. • Steps taken to avoid or minimise the effects of the incident and any future incidents. • Clean-up procedures, remedial actions and assessment of immediate and long term effects. • A formal report must be submitted within seven days to the Project Manager/Engineer, including all remediation measures undertaken to repair any damage caused and to prevent the incident from recurring.	
	Fire management	• The Contractor shall prepare and implement a Fire Management Method Statement to reduce fire-associated risk and thereby maintain a safe working environment and reduce negative impacts on the natural and social environment. The Contractor shall prepare the Fire Management Method Statement for approval by the Project Manager/Engineer within the first month of site establishment. • The method statement is to include the following as a minimum: • Measures to reduce the risk of fires starting and spreading. • Details on how the Contractor is to manage and control fires during construction. • Fire prevention equipment and where it will be located • The format and means for recording and reporting on fire mitigation, management and monitoring. • The Contractor will, ultimately, be responsible for fires that break out as a result of his activities during the implementation of the project, as well as the containment thereof. Stellenbosch Local Municipality's liability with regards to fire is transferred to the Contractor for the duration of the Contract. The Contractor shall take reasonable measures to reduce the risk of fires during construction. The Contractor shall limit the risk of fires through a combination of the methods below: • The Contractor shall assign the fire management duties to the EO. The EO shall be competent and adequately trained to fulfil the position. The EO shall be responsible for ensuring immediate and appropriate action in the event of a fire and shall ensure that employees are aware of the procedures to be followed. • All perimeter boundaries adjoining neighbouring properties must have fire breaks in place. The fire break width maintenance requirements and responsibilities will be determined by the Contractor in conjunction with the land owner. Fire breaks shall be monitored by a Professional Services Provider or by the local Fire Protection Association. The fire management method statement must include but not be limited to the following: • A list of the major workplace fire hazards • Proper handling and storage procedures,	Contractor, EO, ECO

Construction Activities Site Management			
Activity/Issue		Action required	Responsible Party
		• Potential ignition sources (such as welding and smoking), • Control procedures, and • Type of fire protection equipment or systems to be used for control. • The daily Fire Danger Index shall be displayed prominently on site at all times. • All staff shall receive training on fire hazards as a part of the site induction training by the Contractor before commencing work on the site. • Suitable firefighting resources must be placed at all fronts. • The Contractor shall ensure compliance with the Occupational Health and Safety Act (1993) and the relevant regulations regarding fire-fighting equipment. • In the event of a fire on site, the Contractor shall mobilise all nearby personnel and do everything possible to extinguish or contain the fire until the CAM Fire Brigade arrive. • Proof of construction workers training on fire hazards and firefighting is to be kept on file and shown to the ECO on request. • Any fires that occur shall be reported upon discovery to the Project Manager/Engineer and to the relevant authority. • No open fires shall be permitted on or off the site or for the preparation of meals within designated eating areas. • No on-site burning of waste materials, litter or refuse shall be permitted. • Smoking shall not be permitted on site, except in designated smoking areas. Designated smoking areas are not to include those areas where there is a fire hazard. Fire hazard areas include the workshop and fuel storage areas and any areas where the material supports the rapid spread of an initial flame. • The Contractor shall be required to monitor the following on an on-going basis: • Regular drills, at least twice per year, should be performed to ensure adequate response by all Contractors' staff. • Annual revision of Fire Management Method Statement.	
7.	Hazardous Substance Management		
	Cement / concrete mixing	• The Contractor will submit a Method Statement for the mixing of cementitious and related products, and this must include remedial actions for spillages of cement and concrete, the cleaning of concrete mixers / truck-mounted cement mixers, recycling of cementitious products and management and the disposal of waste / spoil. • Used cement bags shall be disposed of in weatherproof bins on site to prevent the generation of windblown cement dust and to prevent the bags from blowing away. • During construction, the Contractor(s) must ensure that concrete is mixed in appropriate structures to prevent the contamination of the surrounding environment. All visible remains are to be removed and disposed of as hazardous waste and all surplus material is to be removed. Plastic sheets and the bare ground are not to be used for mixing purposes. Batching plant and cement wash down area to established within a bunded areas and lined with high density polyethylene (HDPE) liner. The size of the bund needs to be scaled to accommodate the volume of cement of the batching plant at its maximum capacity. • Location of the batching plant should be on a flat area, not on a slope. • Inert concrete can be disposed of at a registered landfill site only after approval has been obtained from the Project Manager/Engineer. Waste manifests must be obtained by the Contractor for the disposal of inert concrete to a registered waste landfill site. • All visible remains of excess concrete shall be physically removed and disposed of on completion of construction.	Contractor, EO, ECO

Construction Activities Site Management			
Activity/Issue		Action required	Responsible Party
		• Where cement powder has been spilled onto the bare soil, the contaminated soil shall be removed, placed into an appropriate container and disposed of at a registered hazardous landfill site. • All cementitious mixing must occur within demarcated areas. • Temporary fencing shall be erected around batching plants to avoid unauthorised entry. • A washout bay must be provided for washing of all equipment that has come into contact with concrete. Water used for washing must be restricted. • Any hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licen ced disposal facility. • Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site in appropriate containers	
	Chemical spill control	• If a spill of any kind occurs, corrective action will be taken (notification of incident, isolation of contaminated material and safe disposal). • Spills shall be controlled with the following actions: • Method statements will be developed for potential hydrocarbon and chemical spill incidents. • Spillage control will be provided by impervious bunding or collecting spills to a sump for disposal or controlling by absorbent material on standby. • Capacity of impervious bund structures should be 110% of the capacity of the largest tank within the bund structure. • Spill containment facilities, such as impermeable or lined bunds (concrete is not impermeable) or drip trays will be provided in oil and chemical storage sites and vehicle maintenance areas. • Material from lined bunded areas will not be buried during rehabilitation. • Re-fuelling and handling of chemicals will occur only in a designated area. • Spill kits will be available on site and staff will be trained in their use. • The spill will immediately be cleaned up and disposed of at a registered hazardous waste landfill site. • All spills and actions will be reported in the site Environmental Incident Book. • Leakages must be repaired on mobile equipment and containment / drip trays must be placed underneath immobile equipment until the leakage has been repaired. The drip tray will have a small spill sock placed in it to capture small spills. • All generators will be permanently placed on drip trays to contain any spillages that may occur. • A spill response team should be brought onto the site to clean the affected area in the event of a spill greater than 100 litres. • If hydrocarbons are leaked or spilled, immediate rehabilitation with a product such as Drizit or Ecodynamics will be used and contaminated soils shall be removed for disposal off-site.	Project Manager/Engineer, Contractor, EO and ECO
	Chemical storage	• Hazardous materials may include diesel, petroleum, oil, cement, bitumen, Ethylbenzene (ETB), solvent-based paints, drilling fluids, pesticides, herbicides and Liquid Petroleum Gas (LPG). • All chemicals will be stored in specifically designed, lockable and lined storage areas where reactive substances are classed and segregated. • All hazardous substances must be stored in a lined bunded area and sufficient spill absorbent material must be provided for t he type of hazardous substance stored. The chemicals will not be stored within 30 m of watercourses.	Contractor, EO, ECO

Construction Activities Site Management			
Activity/Issue		Action required	Responsible Party
		• The chemicals will be labelled according to the chemical hazard rating and, as such, adequate signage must be displayed indicating the appropriate management measures to be implemented in the event of a spill / fire. Material Safety Data Sheets of chemicals used must be kept on file on site at all times. • The Contractor must use the least environmentally harmful chemical in undertaking specific duties / requirements. • Less than 30 m^3 of fuel/hazardous substance will be stored on site.	
8.	Heritage Management		
	Heritage resources / human remains	• The Contractor and workers should be notified that archaeological finds may be exposed during the construction work. • Should a find of heritage importance be unearthed, construction activities will stop immediately at the site of discovery. The area will be fenced off with a radius of 20m around the unearthed item, demarcated as a no-go area and access will be prohibited. Should there a risk of the find being violated, whether intentionally or inadvertently, the Contractor shall be required to appoint a guard to enforce the no-go area policy. The ECO and Project Manager/Engineer shall be notified immediately. • The ECO will advise Stellenbosch Local Municipality to contact an archaeologist to undertake further studies and determine the importance of such a find. All related activities will be undertaken by the archaeologist, or under his/her supervision, to ensure no unnecessary damage takes place on the site. • During this period, work will not take place in the demarcated area. Work will be continued further along the site at a distance which is clearly well out of the area that may be affected by the findings. Should the findings be clearly limited to a particular area the ECO and Project Manager/Engineer, in consultation with the archaeologist, will be free to determine what can reasonably be deemed a safe no-work distance, which will be kept clear of activities. • Work will only recommence on the written consent of the archaeologist and/or the SAHRA / HWC. • Finds containing human remains shall immediately be reported by the Project Manager/Engineer to the South African Police Services (SAPS). • All parties concerned shall respect the potentially sensitive and confidential nature of the heritage resource, particularly human remains. • Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on site. • The Contractor and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or paleontological artefacts, as set out in Section 51(1) of the National Heritage Resources Act (No. 25 of 1999) (NHRA). • Any extension to the project footprint shall require assessment by a qualified heritage practitioner prior to commencement of works.	Contractor, EO, ECO
9.	Infrastructure Management		
	Storage facilities	• The Contractor will provide storage facilities for equipment, plant and materials in such a way as to prevent damage to either the environment or to the stored item. • Such items stored will be in a damp and weatherproof, well ventilated and bunded facility that is raised sufficiently above ground level to prevent the ingress of storm water. • All chemicals, lubricants and fuels will be stored in secondary containment units that are capable of storing 110% of the contents stored. These secondary containment units will be impermeable, fire proof and constructed to approvals as obtained from the Project Manager/Engineer.	Contractor, EO, ECO
	Eating areas	• The Contractor shall provide staff with suitable eating areas that are weatherproof and away from construction related nuisance e.g. dust and noise. These designated eating areas must be for normal working hours only. The Contractor is to provide refuse bins and	Contractor, EO, ECO

Construction Activities Site Management			
Activity/Issue		Action required	Responsible Party
		lids which are cleaned on a daily basis. The Contractor must ensure staff does not leave food items lying around after breaks. The Contractor shall ensure a dedicated cleaning function at the eating areas after every meal. • Fires will not be allowed anywhere in construction and associated project areas.	
	Lay-down areas	• The Contractor shall set aside suitably sized areas for the storing of construction and associated materials. These areas must have a firm substratum and adequate drainage to ensure rapid drying out of the areas. The Contractor shall be responsible for keeping all areas of the site for which he is responsible in a neat, clean, sanitary and orderly condition in accordance with the specifications.	Contractor, EO, ECO
	Temporary site closure	• In the event of temporary site closure (e.g. during pay weekends and annual shutdown period), the Contractor shall check the site, ensure that the following conditions pertain and report on compliance with this clause: – Fuels / flammables / hazardous materials stores – Every effort should be made to ensure that fuel stores are as low in volume as practicable. – There are no leaks. – The outlet is secure and locked. – The bund is cleaned and empty. – Fire extinguishers are serviced and accessible. – The area is secure from accidental damage through vehicle collision and the like. – Emergency and contact numbers are available and displayed. – There is adequate ventilation in enclosed spaces. – There are no stores or containers within the 1:100 year flood line or at least within 30 m from the edge of the wetland areas. – Erosion prevention – Wind and dust mitigation measures such as brush packs, irrigation are in place. – Excavated and filled slopes and stockpiles are at a stable angle and capable of accommodating normal expected water flows. – There are sufficient detention ponds or channels in place. – Water contamination and pollution – Hazardous fuel stores are secure. – Cement and materials stores are secure. – Toilets are empty and secured. – Refuse bins are empty and secured. – Bunding is clean and treated with appropriate material that will absorb/ breakdown and where possible be designed to encapsulate minor hydrocarbon spillage. – Drip trays are empty and secure.	Contractor, EO, ECO
	Fencing at foundation sites	• The Contractor shall ensure all foundation excavations are adequately secured at the close of work each day. Fences capable of keeping livestock, domesticated animals and people out shall be used. These fences shall be clearly demarcated with safety mesh – no hazard tape or netting may be used. • The Contractor shall remove all temporary fencing upon completion of works.	Contractor, EO, ECO
	Sourcing of materials	• Commercial sources will be used. Permits received from suppliers must be kept at the construction site office.	Contractor, EO, ECO

10.	Land Use		
	I&APs relations and adjacent landowners	• The Contractor shall erect and maintain information boards in the position, quantity, design and dimensions specified by the Project Manager/Engineer. Such boards shall include general information of the activity and contact details for complaints by I&APs in accordance with details provided by the Project Manager/Engineer. The EO is to liaise with the community with regard to comments and queries by I&APs.	Project Manager/Engineer, Contractor, ECO
	Landowner interactions	• Interactions with landowners, local communities and other affected parties need to be done by the Contractor's EO. • All interactions with Landowners/Residents must be recorded in a Communications Register, which shall be made available to the Project Manager/Engineer on a monthly basis. • Occupiers of affected properties must be notified well in advance about proposed project and associated construction activities. Communication with the affected landowners/occupiers of land must be done at least 4 weeks prior to construction. • Alternative access roads always provided at partial road closures and other traffic disruptions. • Adequate road signage is to be provided to indicate alternative access to these premises during construction. • Interactions with landowners, local communities and other affected parties need to be done by the Contractor's EO. • The Contractor shall respect the property and rights of landowners and communities at all times and shall treat all such persons with courtesy. The Contractor shall keep records of all communication in a Property File for each property. • The Contractor shall ensure disruptions to Land owners/Residents and I&APs affected shall be minimised. • The Contractor shall ensure private property adjoining the site is not damaged due to construction related activities. Access to and from private property shall also not be affected by construction related activities. The Contractor shall absolve the Project Manager/Engineer of any and all risk and liability in this regard. • Prior to property access, the EO will arrange a meeting between the Contractor, Landowner/Resident and the ECO. This meeting will be held on the property affected and is aimed at determining Landowner/Resident, Contractor, Environmental and Social requirements. Aspects identified in the specifications for the pre-construction survey must be recorded. • In addition, the Fencing Act (Act 63 of 1963) regulates activities associated with fencing and gates. Therefore, in terms of this Act, it is critical for the Contractor and the Land owner to agree on fences and gates that need dismantling/erection. • Where existing fences have to be dismantled and re-erected, they shall be erected to the same design as the original and to the satisfaction of the landowner, but with such modifications as may be required by the Project Manager/Engineer. • All incidents occurring during the completion of the Contractors duties shall be reported to the Project Manager/Engineer in writing, by the Contractor. The Project Manager/Engineer will then assess the incident, concern or claim with the assistance of the ECO and determine the compensation/corrective action required by the Contractor. • The Contractor will take all actions required to ensure no re-occurrence of the incident/claim or concern occurs again. • The Contractor shall adhere to the timeframes for dealing with Land owner/I&AP concerns below: – Record concern in the Communications Register and verbally notify the ECO – immediate. – Respond to the concern – within 1 day of concern being raised. – Rectify/mitigate concern – within 3 days of concern being raised. – Respond in writing on "close out" of concern – within 5 days of concern being raised. – Submit to the Project Manager/Engineer a detailed report – within 7 days of concern being raised. • Pipeline installations within the Papegaaiberg Nature Reserve should be carefully planned to minimise any possible negative impacts on the land-use. • The pipeline alignment should avoid livestock enclosures within the project site. • I&APs that are directly affected by the construction phase must be notified prior to any nuisance activities and be notified of any temporary road closures at least seven (7) days in advance.	Project Manager/Engineer, Contractor, ECO

		• Provide safe points for vehicular crossings and traffic control managed by flag persons.	
	Communications Register	All complaints received will be investigated and a response given to the complainant within 10 days. Complaints and positive feedback received from I&APs must be recorded in the Communications Register. The complaint will be brought to the attention of the Project Manager/Engineer, who will respond accordingly.	Project Manager,/Engineer Contractor, EO,ECO
	Inflow of workers	• Maximise the use of local labour and contractors where possible by developing a strategy to involve local labour in the construction process. • The recruitment process and the use of contractors should be clearly communicated with the local communities, especially via the Ward Councillors. • The communication strategy should ensure that unrealistic employment expectations are not created. • Before construction commences, representatives from the Local Community and community leaders (e.g. Ward Councillors) and community-based organisations, should be informed of the details of the contractors, size of the workforce and construction schedules. • Should a large number of temporary workers not form part of the local community members, the contractor should make certain that the "outside" workforce carry identification tags or uniforms to be easily identifiable. It should furthermore be ensured that the inflow of workers and their presence in the high density settlements do not create conflict within these surrounding communities. • Local community organisations and policing forums / neighbourhood watches must be informed of the presence of an outside workforce (where relevant). • A transparent and all-inclusive communication and recruitment process should be implemented by the contractor. • Accommodation facilities should be adequate and should be able to deal with the requirements set by the contractor • Construction workers should be supervised at all times. • Security (infrastructure and personnel) on-site should be implemented during the construction period.	Project Manager/Engineer, Contractor, EO, SO, ECO
	Safety and security	• The movement of construction vehicles through the local communities should be limited to off-peak periods (if possible) to minimise adverse impacts on the movement of pedestrians (schoolchildren and individuals walking to and from work) and to a lesser extent on private vehicular traffic. • Signs must be erected at strategic locations throughout the area, warning residents and visitors about the hazards around the construction site and the presence of heavy vehicles. • Employing local community members could minimise the potential for criminal activity or perceived perception of an increase in criminal activity due to the presence of an outside workforce. • Screening of workers that apply for work could be useful to lessen perceived negative perceptions about the outside workforce. • The contractor should develop an emergency management plan to specifically deal with the increased risk of fires. • Construction areas and open excavations need to be fenced off to prevent access by the public in or near the working / construction areas. • Before the end of each day, water must be removed from the trenches. Where this is not possible, for example during extended rainfall events, a security official must regularly monitor the construction area and fencing to ensure that it is still intact, to prevent people falling into waterfilled trenches. • On site vehicles should be fitted with reversing horn or signal for safety reasons. • Staff on site shall always wear reflector PPE. • Open excavations will be marked and demarcated with danger tape. • Construction vehicle should travel within a recommended speed limit, maximum speed 30 km/h to avoid dust and collision. • Temporary roads must be maintained to benefit and accommodate commuters to and from work. • Dust management of the site to be manged according to Ambient Air Quality section above.	Project Manager/Engineer, Contractor, EO,ECO

	Resettlement		
	Displacement	• Stellenbosch Local Municipality should provide affected residents (identified in the SIA) and property owners with as much information as possible to enable them to anticipate the potential resettlement. • It would be desirable to address issues relating to resettlement as a matter of urgency and also to provide definitive timeframes linked to any possible resettlement. • A detailed Resettlement Action Plan (RAP) and Livelihoods Restoration plan should be prepared by a suitably qualified and experienced professional, which would include detailed discussions between Stellenbosch Local Municipality and the relevant councillors with regards to the number of dwellings and individuals to be affected, timeframes and the availability of a site where resettlement could occur.	Stellenbosch Local Municipality, Contractor, ECO, EO
11.	Noise Management		
	Noise	• Noise sources include construction machinery, power tools and compressors, vehicle movements, general construction activity and drilling. To limit noise levels, the following actions will be taken: • Vehicles and machinery will be kept in good working order and equipped with silencers. • Noisy activities will only be undertaken only during normal working hours (07h00-18h00) Monday to Saturday excluding public holidays (unless prior permission is provided by surrounding landowners). Work may not be conducted outside this period without the written authorisation of the Project Manager/Engineer. • The speed of delivery and construction vehicles in construction areas will be limited to 25km/h. • Any complaints will be investigated, and corrective action implemented and documented. • Noise levels should be monitored to ensure they comply with regulatory requirements. • Construction activities should be limited to working hours (07h00-18h00) Monday to Saturday excluding public holidays (unless prior permission is provided by surrounding landowners). • Vehicles and construction equipment should be kept in good working condition to limit excessive noise pollution. • Limit the movement of construction vehicles to off-peak periods (where possible) and where sensitive receptors are situated. • Stellenbosch Local Municipality Noise Policy with regards to prohibitions relating to disturbing noise, machinery in residential areas, generator sets, and construction noise will be adhered to, including the SANS codes for this zone.	Contractor, EO, ECO
12.	Rehabilitation Plan		
	Vegetation	See Environmental Specifications – Vegetation Activities, as well as the Aquatic and Vegetation Rehabilitation Plans.	
13.	Soil Management		
	Soil management	• Prevent uncontrolled access of vehicles through wetlands that can cause a significant adverse impact on the hydrology and soil structure of these areas through rutting (which can act as flow conduits) and through the compaction of soils. • All removed soil and material must not be stockpiled within the system. • Stockpiling should take place outside of the watercourse. • All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds. • A rehabilitation plan must be compiled for the scour and erosion in the wetland • Excavated and graded bare areas should not be left for long period without been constructed. • Graded bare soil and stockpiles should be protected and located away from storm water way and drainage lines to avoid siltation and sedimentation in watercourses.	Contractor, EO, ECO

		• Compaction by vehicles or poor storage methodology or careless handling of topsoil can cause erosion or contamination. • The objective is to prevent compaction and the loss of soil structure, the following soil handling techniques shall be employed: • Soil stockpiles should not be higher than 2 m with slopes of 1 m vertical to 2 m horizontal • Stockpile topsoil and subsoils separately. • The Contractor must not compact soil stockpiles and stockpiles must be removed from undisturbed area. Stockpiling must be done on cleared areas only. • Soil will not be handled during windy conditions (else it shall be dampened to reduce dust production) • • Repeated handling of soil will be avoided. • Overburden must be removed and stockpiled separately from topsoil stockpiles. • Overburden stockpiles may not be permitted to overflow and contaminate topsoil stockpiles. • All polluted soils shall be replaced by the Contractor(s) at his own cost. • Ensure there is no windblown dust in the servitude areas during construction by continual wetting of open sandy soils.	
	Spoil	Excess material obtained from the foundation footprint, shall be spoilt off site at the registered landfill site or reused.	Contractor, EO, ECO
14.	Traffic Management		
	Traffic management	• The Contractor shall provide safe points for vehicular crossing at designated points. These points will be manned by flag persons. • Appropriate notification signs shall be erected by the Contractor at entrances to the construction site to warn visitors and pedestrians about the hazards around the construction site and the presence of heavy vehicles, where appropriate. • Construction vehicles are to keep to the speed limits (25km/h on the construction site). • The Contractor shall provide safe points for vehicular crossing at designated points. These points must be manned by flag persons. • Appropriate notification signs shall be erected at entrances to the construction site to warn visitors and pedestrians about the hazards around the construction site and the presence of heavy vehicles, where appropriate. • Construction vehicles are to keep to the speed limits (25 km/h on the construction site).	Contractor, EO, ECO
15.	Training Programmes		
	Construction personnel information posters	The Contractor shall erect and maintain information posters for the information of his employees depicting actions to be taken to ensure compliance with aspects of the EMPr. Such posters shall be erected at the site access area, eating areas, and any other locations specified by the Project Manager/Engineer.	Contractor, EO, ECO
16.	Waste Management		
	Waste management	• A waste sorting facility will be established at the construction site office / yard. Solid waste will be separated into recyclable and non-recyclable waste. • Timber, metal, oil, paper, bricks, tyres, batteries and any other major recyclable wastes will be stored in safe, secure areas prior to disposal. Proof of disposal or removed for recycling must be kept on file and presented to the ECO on request. • General non-recyclable refuse will be collected in appropriate bins with secure lids to be disposed of at a registered waste landfill site or at the nearest transfer station with capacity to accept the waste generated by the project. Proof of disposal must be kept on file and presented to the ECO on request. • The Contractor will provide weather and vermin-proof bins, which shall be cleaned on a daily basis. Waste stockpiled temporarily must not exceed 5 days. The contractor must provide skips/waste collection bins for different waste types. The Contractor must ensure that staff do not leave food lying around after breaks. • Site inductions must include litter collection and litter must be collected continuously at working areas.	Contractor, EO, ECO

		• A separate oil container will be used to ensure that oil wastes are contained. • All chemical drums will be transported to a designated and lined bunded area when full, empty or when the contents of the drum are unusable or unknown. All drums will be appropriately disposed of at a registered hazardous waste landfill site. Proof of disposal must be kept on file and presented to the ECO on request. • No burning, burying or dumping of any solid waste materials will be permitted on site. This includes temporary dumping or storage outside the designated and fenced off development area. • Measures to control illegal dumping of construction waste must be in place as this may result in pollution to the surface water run-off. • Anti-litter/ anti-dumping mitigation measures should be implemented and included in the Integrated Waste Management Plan to be developed. • Staff must be well trained and continuously informed of mitigation measures included in the Integrated Waste Management Plan. • Continuous monitoring of potential litter and illegal dumping areas should take place • The Contractor will supply temporary ablution facilities (e.g. non-chemical or composting toilets) of an acceptable standard, with a minimum of one facility per 15 workers. The use of the surrounding areas for ablutions is strictly prohibited. The temporary ablution facilities will be monitored on a regular basis to ensure that the toilets are cleaned and emptied on a regular basis. The temporary ablution facilities will be secured to the ground to prevent them from being blown over in high winds. • Ablution facilities should be placed within 100 m of work areas. • Watercourses must be clearly indicated on site and construction impacts minimised in the watercourse areas. • Only necessary construction activities may take place in the watercourse areas. • Litter caused by employees must not be tolerated. The ECO must monitor the sanitation of the work site. • All construction general waste must be removed from the site and transported to the licensed landfill site located close to the site – the Devon Valley Landfill Site (33° 56' 21.5628", 18° 49' 15.06") located approximately 7 km from the project site. Should there be a need to dispose of any SHW this will be transported to the Vissershok Landfill Site located at the Cape Farms 33°46'27.44"S; 18°32'41.47"E) located approximately 55 km from the project site. • Records of solid waste removal must be kept, and records maintained to confirm safe disposal. • All waste generated on-site during construction must be adequately managed. Separation and recycling of different waste materials is supported. • Adequate scavenger-proof refuse disposal containers should be supplied to control solid waste on-site. • Ensure that environmental awareness training is offered to all site personnel - including topics on safe waste disposal, etc. • Provide waste receptacles to separate waste at the source, i.e. paper, glass, tin, food waste, etc., and provide all contractors and contractor's employs with training on the separation of waste. • Portable sanitation facilities should be erected for construction personnel. • Use of these facilities should be enforced (these facilities should be kept clean so that they are a desired alternative to the surrounding vegetation). These facilities should also be monitored and serviced regularly so as to prevent contamination of the water resources. • The construction site should be inspected for litter on a daily basis. Extra care should be taken on windy days. Precautions should be taken to avoid litter from entering watercourses. • Soil that is contaminated with, e.g. cement, petrochemicals or paint, should be disposed of at a registered waste disposal site and is not to be deposited into the any watercourses. • It must be ensured that all hazardous contaminants are stored in designated areas that are sign-posted, lined with an appropriate barrier and bunded to 110% of the volumes of liquid being stored to prevent the bio-physical contamination of the environment	

		(ground and surface water and soil contamination). Hazardous substance storage must not take place within 100 m of a wetland or within the 1:100-year flood line. • Any significant spills on-site must be reported to the relevant Authority (e.g. Department of Water and Sanitation / Stellenbosch Local Municipality etc.) and must be remediated as per the EMPr.	
17.	Water Management		
	Statutory	All the requirements of the NWA regarding water use and pollution management must be adhered to at all times.	Project Manager/Engineer, Contractor, EO,ECO
	Surface and groundwater	• Storm water runoff must be prevented from coming into contact with waste or contaminants on the site. Discharge of effluents or polluted water into the water resources shall not be allowed. • All TEM shall be refuelled off-site. • Water emanating from the mixing of cementitious products must be contained and prevented from entering the environment. • The Contractor shall prevent the discharge of any pollutants, such as bentonite, cements, concrete, lime, chemicals and fuels into any water resource. • Water released by the Contractor into the environment must comply with the DWS water standards (Refer to Section 11.15). • In order to avoid the accumulation of groundwater beneath the structures special attention should be given to allow water to drain out of the excavations though allowing the base of the excavation to be graded to a selected position at a minimum gradient of 1 % where water will either be pumped or gravitated out.	Contractor, EO, ECO
	Wetland	• Minimise, as far as possible, the establishment of new access roads through watercourses or within buffers. • All wetlands, river channels and riparian areas should be treated as "no-go" areas and appropriately demarcated as such. No vehicles, machinery, personnel, construction materials, cement, fuel, oil or waste should be allowed into these areas without the express permission of and supervision by the ECO. • Construction activities associated with the establishment access roads through wetlands, river channels or riparian areas (if unavoidable) should be restricted to a working area 10 m in width either side of the road, and these working areas should be clearly demarcated. No vehicles, machinery, personnel, construction material, cement, fuel, oil or waste should be allowed outside of the demarcated working areas. • There should be as little disturbance to surrounding vegetation as possible when construction activities are undertaken, as intact vegetation adjacent to construction areas will assist in the control of sediment dispersal from exposed areas. • Construction camps, toilets and temporary laydown areas should be located at least 30 m from the edge of any wetlands and rivers. The regulated area of a watercourse is defined as the outer edge of the 1:100-year flood line and/or the delineated riparian habitat (temporary wet zone of a watercourse), which is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam. • No fuel storage, refuelling, vehicle maintenance or vehicle depots should be allowed within 30 m of the edge of any wetlands or rivers. • Refuelling and fuel storage areas, and areas used for the servicing or parking of vehicles and machinery, should be located on impervious bases and should have bunds around them. Bunds should be sufficiently high to ensure that all the fuel kept in the area will be captured in the event of a major spillage. • Vehicles and machinery should not be washed within 30 m of the edge of any wetland or river. • No effluents or polluted water should be allowed to discharge into any rivers or wetland areas. • If construction areas are to be pumped of water (e.g. after rains), this water should be pumped into an appropriate settlement area, and not allowed to flow straight into any rivers or wetland areas. • No spoil material, including stripped topsoil, should be temporarily stockpiled within 30 m of the edge of any wetland or river.	Project Manager/Engineer, Contractor, EO,ECO

		• Freshwater ecosystems located in close proximity to construction areas (i.e. within ~30 m) should be inspected on a regular basis by the ECO for signs of disturbance from construction activities, and for signs of sedimentation or pollution. If signs of disturbance, sedimentation or pollution are noted, immediate action should be taken to remedy the situation and, if necessary, a freshwater ecologist should be consulted for advice on the most suitable remediation measures. • Workers should be made aware of the importance of not destroying or damaging the vegetation along rivers and in wetland areas, of not undertaking activities that could result in the pollution of rivers or wetlands, and of not killing or harming any animals that they encounter. • Ensure that the EMPr is rigorously implemented under the guidance and regular auditing of an experienced ECO. • All activities within the wetland that will be directly affected by the construction of the proposed pipeline must be carried out during the dry season; • Rehabilitation must be done in compliance with the Aquatic Rehabilitation Plan (Appendix I). • All plants within the proposed footprint area and within the wetland must be removed with the root system kept in place before any excavations. These plants must be stored outside of the wetland area in damp refuse bags in a shaded area. These plants must be carefully replanted as recommended in the Aquatic Rehabilitation Plan (Appendix I). • The footprint area associated with the pipeline construction must be minimised, avoiding the wetland areas where possible. Areas earmarked for the pipeline must be marked to ensure a controlled disturbance footprint area. • The recommended buffer zone has to be respected where possible. This buffer will not be applicable for activities required to access the wetland area, but must be applicable for all supporting activities such as laydown areas, site offices, ablutions etc. • The contractors used for the construction should have spill kits available prior to construction to ensure that any fuel, oil or hazardous substance spills are cleaned-up and discarded correctly. • It is also deemed important that the entire delineated wetland area be demarcated as sensitive areas, and no construction activity, laydown yards, camps or dumping of construction material are to be permitted within the sensitive zones, and buffer areas. • It is preferable that construction takes place during the dry season (as much as possible) to reduce the erosion potential of the exposed surfaces. • During construction activities, all rubble generated must be removed from the site and not dumped in the instream, within the wetland habitats. • No “non-essential” vehicles or activities, dumping or clearing is permitted within the delineated wetland.	
	Natural Drainage	• The Contractor shall ensure all works undertaken do not negatively impact upon drainage lines, either natural or man-made. Should the Contractor be required undertake works and impact upon a drainage line, the ECO shall be notified, and the requirement discussed with the affected landowner. The Contractor shall be required to make good on all damage upon completion of construction related works. • Plan for cut and fill slopes not exceeding a gradient of 1:2 (V:H) wherever possible. • The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly. • It is preferable that construction takes place during the dry season to reduce the erosion potential of the exposed surfaces. Make use of existing access routes, or where required, limit the number and extent of access routes for construction traffic across watercourses that may lead to the erosion of banks and disturbances of riparian vegetation. • Prevent uncontrolled access of vehicles through wetlands that can cause a significant adverse impact on the hydrology and soil structure of these areas through rutting (which can act as flow conduits) and through the compaction of soils.	Project Manager/Engineer, Contractor, EO,ECO
	Health and safety	Adequate water supply and sanitation related facilities should be provided to the workers at the construction sites.	Contractor

11.16.4 Environmental Specifications – Vegetation Activities

Table 11-5: Typical Aspects and Impacts associated with the Vegetation Activities

Rehabilitation Activities			
Activity /Issue		Action required	Responsible Party
1.	Vegetation	• The Contractor shall utilise the EMPr as the basis against which all the construction works shall comply. • Disturbed areas that will no longer be in use will be rehabilitated as indicated in the Vegetation Rehabilitation Plan (Appendix I) and by the ECO. If areas had topsoil removed and stockpiled prior to use, the surface will be ripped, and the topsoil will be replaced. All soils and topsoil material must be bought from a reliable source and must be free of alien seeds or grass runners. • The Contractor must limit the removal of trees and stockpile felled vegetation to the footprint of the proposed development. Trees to be removed must be clearly marked and the footprint area demarcated. Branches may be used to reduce surface run-off in exposed areas. • All vegetation cleared from the site should be taken to a composting or green waste facility. • Fences, barriers and demarcations associated with the various construction phases and activities must be removed. • The site will be cleared of all litter. • The Contractor must repair any damage that the construction works have caused to neighbouring properties. • All remaining construction materials must be removed from the site. • Once construction activities are completed, the area must be rehabilitated and all vegetation (i.e. trees and grass) must be restored as required in the Vegetation Rehabilitation Plan (Appendix I). • A meeting must be held on site between Stellenbosch Local Municipality or representative, the ECO, Rehabilitation Specialist and the Contractor to approve all rehabilitation activities and to ensure that the site has been restored to a condition that is acceptable and approved by Stellenbosch Local Municipality. • Rehabilitation will be conducted in a progressive manner (i.e. once construction in an area has been completed the area will be rehabilitated). • Construction works must remain within the demarcated areas. • Construction areas should be clearly marked out and surrounding areas should be observed as no-go areas. • Construction activities within the CBA areas of the Papegaaiberg Nature Reserve should be carefully planned to minimise any possible negative environmental impacts. • Stellenbosch Local Municipality (development division) should liaise with Stellenbosch Local Municipality (environment/conservation management division) with regards to the most preferred pipeline route within the Papegaaiberg of the Nature Reserve. • Utilise the existing gravel road (best option) or road edge gutter within the assessed corridor for the trench with overburden soil to be placed in the road during construction. • If any indigenous vegetation along the pipeline, but specifically in the Papegaaiberg Nature Reserve is to be cleared this should be brush cut, chipped and stored nearby on site (must not include any IAP or exotic species and be kept free of these) to be used as mulch spread lightly over the construction footprint once works are complete. • Topsoil must then be stripped, stored nearby and kept free for IAPs and weeds and once construction is complete this must be replaced where after the chipped mulch can be spread over the top. <u>Re-contouring:</u> Subsoil stockpiles should be used to re-contour construction affected areas. The Contractor shall restore the profile, soil condition and landform to as close as possible state to the pre-construction state.	Stellenbosch Local Municipality, Contractor, ECO, EO

Rehabilitation Activities			
Activity /Issue		Action required	Responsible Party
		Control of weeds and invader plants during vegetation: • Target, remove and control all invasive alien species through implementing an alien invasive plant management programme • Bush-cutting the vegetation causes woody invasive species to vigorously re-sprout, resulting in further problems. Felling and poisoning with herbicide is the best method for removing larger specimens. Seedlings should be hand-pulled, and herbicide should only be used on seedlings if their cover is over 80% of the total vegetation cover. • The Contractor shall maintain rehabilitated areas free of weeds and invader plants until the end of the DNP applicable to rehabilitation. Control of weeds and invader plants must be done in accordance with the specifications stipulated in the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) and the NEM:BA. • Practise early detection and rapid response for Invasive Alien Plant species and ruderal weeds that occur during construction of the pipeline and after completion for a minimum of one (1) year. • If any indigenous vegetation is to be cleared this should be brush cut, chipped and stored nearby on site (must not include any IAP or exotic species and be kept free of these) to be used as much spread lightly over the construction footprint once works are complete. • Topsoil must be stripped, stored nearby and kept free for IAPs and weeds and once construction is complete this must be replaced where after the chipped mulch can be spread over the top. • All works should be monitored by an ECO • Control of invasive species must also align with the requirements of the Vegetation Rehabilitation Plan.	
2.	Monitoring	• After construction, the site needs to be inspected by the ECO to ensure that the rehabilitation activities have been successful and to monitor alien vegetation re-growth. The ECO will report the condition of rehabilitation to Stellenbosch Local Municipality. • Stellenbosch Local Municipality is responsible for clearing alien vegetation within the rehabilitated areas.	ECO, Stellenbosch Local Municipality

11.16.5 Environmental Specifications – Operational Activities

The operational activities reflected in the table below highlight specific requirements which need to be implemented by the Stellenbosch Local Municipality during the operational phase of the development (where applicable).

Table 11-6: Typical Aspects and Impacts associated with the Operational Activities

Operational / Maintenance Activities			
Activity /Issue		Action required	Responsible Party
1.	Dust Management	Stellenbosch Local Municipality shall preserve air quality levels to an extent that public health; safety and environmental protection are assured. • Avoid maintenance activities during periods where the wind speed is 35 km/h or more, which is usually experienced in summer. • Provide safe points for vehicular crossings and traffic control managed by flag persons. • Erect appropriate notification signs at construction areas to warn the public about the hazards around the construction site.	Stellenbosch Local Municipality, Contractor, ECO, EO

Operational / Maintenance Activities			
Activity /Issue		Action required	Responsible Party
		• Maintenance vehicles must keep to the speed limits (25 km/h within the approved area and on access roads). • All works should be monitored by an ECO.	
2.	Earthworks Management	Stellenbosch Local Municipality shall minimise impacts on the receiving environment and disturbances to flora, fauna and affected landowners.	Stellenbosch Local Municipality, Contractor, ECO, EO
3.	Erosion Management	Stellenbosch Local Municipality shall implement measures to prevent erosion and reduce potential impacts upon the surrounding environment.	Stellenbosch Local Municipality, Contractor, ECO, EO
4.	Fauna and Flora Management	Stellenbosch Local Municipality shall preserve fauna and flora through control of operational and maintenance activities. Prevent infestation of alien species during operational and maintenance activities.	Stellenbosch Local Municipality, Contractor, ECO, EO
		Where maintenance is required in the Papegaaiberg Nature Reserve (CR vegetation type Swartland Granite Renosterveld (FRg2)) the MMP developed for the proposed project should be implemented in conjunction with the EMPr and Vegetation Rehabilitation Plan.	
		The CARA states that no person shall disperse any weed in the country (including an urban area) and a fine not exceeding R 5 000 and/or two years imprisonment can be imposed. Stellenbosch Local Municipality shall continue to monitor and implement, if required, the Rehabilitation Plan and Alien Invasive Species Control Plan on the site.	
		CARA requires that further spread of the species should be prevented. This control must be done on an annual basis by teams with experience of the Working for Water methods.	
		Felling and poisoning with herbicide is the best method for removing larger specimens. Seedlings should be hand-pulled, and herbicide should only be used on seedlings if their cover is over 80% of the total vegetation cover.	
		The presence of invasive alien trees within the project footprint should be monitored on a yearly basis.	
		Indigenous vegetation in the medium and high sensitivity areas should not be brush-cut unless absolutely necessary. The bush-cutting results in alien species becoming dominant and fynbos being damaged. The increase in alien vegetation increases biomass and fire-risk rather than decreasing it. Furthermore, if managed well, these areas could sustain indigenous species and ecological processes by providing connectivity between fragments of indigenous vegetation.	
		Target, remove and control all invasive alien species.	
5.	Fire and Emergency Management	Stellenbosch Local Municipality shall restrict the occurrence of fires and ensure all role players can respond efficiently and effectively, thereby reducing potential impact.	Stellenbosch Local Municipality, Contractor, ECO, EO
		Orange safety fencing must be used around any area that requires the digging of a trench for maintenance purposes.	
		The standard specifications for municipal civil engineering works must be followed for emergency maintenance purposes.	
6.		Stellenbosch Local Municipality shall minimise the impact of hazardous substance storage, handling and disposal on the receiving environment	Stellenbosch Local Municipality, Contractor, ECO, EO

Operational / Maintenance Activities			
Activity /Issue		Action required	Responsible Party
	Hazardous Substance Management	Accidental pollution incidents shall be reported to Stellenbosch Local Municipality immediately when they occur. Stellenbosch Local Municipality shall notify the relevant authorities as well as arrange appropriate improvement.	
		All potentially hazardous waste generated at the site including diesel, petroleum, oil and lubricants; pesticides; and effluent disinfectants shall be removed and disposed by an approved subcontractor to an approved disposal site. Potentially hazardous raw and waste materials shall be handled and stored on-site in accordance with the manufacturer's specification and in accordance with the Act.	
		Should pesticides be used for controlling weeds or vegetation at any place, the Fertilisers, Farms Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) apply. Should subcontractors apply pesticides, Stellenbosch Local Municipality shall ensure that their operators are registered according to the Act.	
7.	Heritage Management	Stellenbosch Local Municipality shall limit and mitigate potential heritage impacts and chance findings should they occur.	Stellenbosch Local Municipality, Contractor, ECO, EO
		Where chance finds are unearthed, proof of work being stopped immediately and proof of consultation with a heritage specialist / archaeologist (depending on the find) and SAHRA / HWC must be kept on site.	
8.	Infrastructure Management	Stellenbosch Local Municipality shall reduce impacts of the infrastructure on air quality, aesthetics, land access and the surrounding environment.	Stellenbosch Local Municipality, Contractor, ECO, EO
9.	Land Use	Stellenbosch Local Municipality shall minimise disturbances to landowners; land use rights and associated impacts upon commercial activities.	Stellenbosch Local Municipality, Contractor, ECO, EO
		Stellenbosch Local Municipality shall respond to queries and complaints from the public and documenting the details of such communications.	
		No soil erosion or invasion of declared weeds and/or invader plant(s) takes place, especially on rehabilitated areas. The Stellenbosch Local Municipality shall continue to monitor and implement, if required, the Rehabilitation Plan and Alien Invasive Species Control Plan on the site, especially the rehabilitated areas. The requirements of CARA and NEM:BA shall apply.	
		It is imperative that the construction of additional access roads be undertaken in full consultation with the property owners. Land to be used for future agricultural activities should not be negatively impacted on.	
		No encroachment of informal settlements occurs within the servitude areas due to the risks involved for those living in such a servitude.	
10.	Noise Management	Reduce operational and maintenance related noise affecting the surrounding environment.	Stellenbosch Local Municipality, Contractor, ECO, EO
		Noise emanating from operational activities shall not be disturbing noise. The sound level from the site measured at the nearest dwelling must not exceed the ambient noise level by more than 7dBA.	
		Stellenbosch Local Municipality Noise Policy with regards to prohibitions relating to disturbing noise, machinery in residential areas, generator sets, and construction noise will be adhered to, including the SANS codes for this zone.	

Operational / Maintenance Activities			
Activity /Issue		Action required	Responsible Party
11.	Rehabilitation Plan	To rehabilitate impacted areas to a suitable land capability class similar to that of the surrounding environment. Rehabilitation will take existing land uses into consideration. Rehabilitation should start immediately after work is completed.	Stellenbosch Local Municipality, Contractor, ECO, EO
12.	Soil Management	Stellenbosch Local Municipality shall manage the removal and stockpiling of topsoil and subsoil during the maintenance and operation phase of the scheme for use during rehabilitation.	Stellenbosch Local Municipality, Contractor, ECO, EO
13.	Training Programmes	Stellenbosch Local Municipality shall foster skills transfer, environmental awareness, health and safety awareness and materials and equipment skills.	Stellenbosch Local Municipality, Contractor, ECO, EO
14.	Waste Management	Stellenbosch Local Municipality shall implement measures to reduce, monitor and manage waste generation, whilst maximising recycling efficiency.	Stellenbosch Local Municipality, Contractor, ECO, EO
15.	Traffic Management	The Contractor shall provide safe points for vehicular crossing at designated points. These points must be manned by flag persons.	Contractor, ECO, EO
		Appropriate notification signs shall be erected at entrances to the construction site to warn visitors and pedestrians about the hazards around the construction site and the presence of heavy vehicles, where appropriate.	
		Construction vehicles are to keep to the speed limits (25 km/h on the construction site).	
	Water Management	Stellenbosch Local Municipality shall minimise the impact and maintain integrity of affected water resources.	Stellenbosch Local Municipality, Contractor, ECO, EO
		Precaution shall be taken that no surface or groundwater becomes polluted either through seepage or natural flow. Any deliberate or unplanned pollution of water is an offence according to the NWA and punishable with an undetermined fine, and/or five years imprisonment.	
		Operational and maintenance staff shall not be permitted to use watercourses for the purpose of bathing, washing of clothes, vehicles, operational and maintenance equipment nor disposal of any other waste.	
		Should an incident occur, which can cause water pollution, especially if it affects watercourses, the office of the DWS shall be contacted immediately (see requirements in the NWA). Cleaning up shall take place in consultation with the DWS.	
		No person shall discard or dump any litter within or adjacent to the servitude. At all times operation and maintenance staff should ensure that litter is discarded in appropriate containers.	
		Any solid waste derived during operation and maintenance shall be disposed at registered landfill site.	
		Employ a storm water management system that follows the principles of a sustainable urban drainage system, with input from a freshwater ecologist on the design.	

11.16.6 Environmental Specifications – Rehabilitation

The rehabilitation activities reflected in the table below highlight specific requirements which need to be implemented by Stellenbosch Local Municipality during the rehabilitation phase of the development.

Table 11-7: Typical Aspects and Impacts associated with the Rehabilitation Activities

Rehabilitation Activities			
Activity /Issue		Objective	Responsible Party
1.	Rehabilitation Plan	• Rehabilitation must comply with the Vegetation and Aquatic Rehabilitation Plans (Appendix I) as well as the measures below and described elsewhere in the EMPr. • To rehabilitate impacted areas to a suitable land capability class similar to that of the surrounding environment. Rehabilitation will take existing land uses into consideration. Rehabilitation should start immediately after decommissioning is completed. • For the wetland crossing, an aquatic ecology rehabilitation plan must be developed by a suitably qualified and experienced specialist, and must be implemented by the Contractor. • Backfill excavations and dongas • All excavations must be rehabilitated with soil and topsoil, which should not contain invasive plant species (in compliance with the CARA and NEM: BA, as amended), to the satisfaction of the ECO. • All building materials must be removed from the site. All compacted surfaces must be ripped and re-vegetated as per the re-vegetation specifications. • A meeting must be held on-site between Stellenbosch Local Municipality or representative, the ECO and the appointed Contractor to approve all rehabilitation activities and to ensure that the site has been restored to a condition that is acceptable and approved by Stellenbosch Local Municipality and the Western Cape Provincial Department of Environmental Affairs and Development Planning (WC: DEA&DP). • The most suitable seed mix for disturbed areas to be used in rehabilitation would include indigenous species. • Rehabilitation will be conducted in a progressive manner (i.e. once construction in an area has been completed the area will be rehabilitated). The rehabilitation of the area with indigenous vegetation must coincide with the rainfall events and all alien invasive vegetation shall be removed.	Contractor, ECO, EO
2.	Rehabilitation Measures	<u>Rehabilitation measures for the site are to include the following:</u> • All disturbed and cleared areas must be re-vegetated in line with the Vegetation Rehabilitation Plan (Appendix I). • Re-contouring: Subsoil stockpiles should be used to re-contour construction affected areas. The Contractor shall restore the profile, soil condition and landform to as close as possible state to the pre-construction state. • The Contractor shall maintain rehabilitated areas free of weeds and invader plants until the end of the DNP applicable to rehabilitation. Control of weeds and invader plants must be done in accordance with the specifications stipulated in the CARA and NEM:BA. <u>Erosion control:</u> • The Contractor shall be responsible for the prevention of erosion in areas impacted upon by their activities. All erosion repairs must be implemented at the first signs thereof and no erosion shall be allowed to develop on a large scale. The Contractor must present the site in an erosion free state before the issuing of the Performance Certificate. <u>Water course crossings:</u> • The wetland crossing must be rehabilitated in line with Aquatic Rehabilitation Plans (Appendix I) and the measures below. • All temporary infrastructures shall be removed, and the areas of disturbance reinstated. The banks and contours of the water course will be reshaped in accordance to the photographic and topographical survey to tie in with the surrounding landscape. The bed of the watercourse will be restored to contain the same bedding material as prior to construction activities taking place.	Contractor, ECO, EO

Rehabilitation Activities			
Activity /Issue		Objective	Responsible Party
		• At the time of decommissioning, the appointed Contractor or Stellenbosch Local Municipality must submit a method statement to the DWS and WC: DEA&DP to manage and rehabilitate the work in the watercourses in accordance with the specification. • The watercourses shall be rehabilitated immediately after the works have been completed as these are sensitive habitats and disturbance must be kept to a minimum. The beds of the watercourses shall be restored to a similar state, in terms of the soil profile, as well as physical and chemical properties as established in the pre-construction survey.	
3.	Soil Management	Stellenbosch Local Municipality shall manage the removal and stockpiling of topsoil and subsoil during the decommissioning phase of the scheme for use during rehabilitation.	Contractor, ECO, EO
4.	Stormwater	• Improved storm water networks to prevent erosion and scouring; • Curb headcut erosion and the collapse of embankments; and • Create energy dissipation at all discharge points.	Contractor, ECO, EO
5.	Traffic Management	Stellenbosch Local Municipality shall minimise the impacts and extent of related traffic on the surrounding road network and environment, whilst maximising road user safety.	Contractor, ECO, EO
6.	Visual Reintegration	Plant indigenous plants, preferably large trees as identified by the specialist. The landscaping should also be that of indigenous vegetation.	Stellenbosch Local Municipality, Contractor, ECO, EO

12. Guidelines

The Contractor is advised to include these Annexures within their on-site Environmental File. They are to be used to inform "how" the EMPr is to be implemented during construction related activities.

Appendix A: Provision of details of the author(s) and related expertise
Provision of details of the author(s) and related expertise, as per requirements contained within Annexure 16 EMPr Alignment with NEMA Sec 24N.

Appendix B – Legal and Administrative Framework
Provides Legislation, Permits, Standards and Guidelines against which the Contractor is to adhere during the development. This also includes potential authorisations / permits / licences required prior to construction commencement.

Appendix C – Environmental Authorisation / Water Use License
The Contractor is advised that developments which trigger an EIA / WUL may place further Conditions on the Contractor against which compliance is required. The Contractor is advised to be cognisant of these additional requirements and price accordingly.

Appendix D - Stellenbosch Local Municipality OHS Policy
Provides Stellenbosch Local Municipality's OHS Policy.

Appendix E – Site Plan
Provides further details relating to the Site Plan.

Appendix F - Method statement
This Annexure provides the Contractor with the minimum requirements to be included within the method statement.
It is incumbent upon the Contractor to provide a task or activity focussed method statement, providing the Employers Agent a holistic overview of all aspects associated with undertaking of the task / activity.
A method statement template has specifically not been provided to ensure that the method statement submitted by the Contractor aligns with Contractor QMS requirements.

Appendix G - Sensitivity Mapping
Provides for sensitivity mapping of "no-go" areas where the Contractor's activities are to be restricted.

Appendix H – Working near power lines
Provides requirements for working under the powerline that crosses the pipeline route near the wetland crossing.

Appendix A - Details of EAP and Expertise

Appendix B – Legal and Administrative Framework

Appendix C – Environmental Authorisation / Water Use License

To be inserted once awarded.

Appendix D - Stellenbosch Local Municipality OHS Policy

Appendix E – Site Plan

Appendix F - Method Statement

Appendix G - Sensitivity Mapping

Appendix H - Specific Requirements for Working Close to Distribution Powerlines

Appendix I – Aquatic and Vegetation Rehabilitation Plans

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