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

Basic Assessment Process
Consultation Basic Assessment Report for Public Review

Stellenbosch Municipality

DEADP reference: 16/3/3/1/B4/22/1070/20
Project number: 60607470

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Quality information

Prepared by	Checked by	Verified by	Approved by
			
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Revision History

Revision	Revision date	Details	Authorized	Name	Position
01	2020-11-19	First Issue to Client – Draft for comment	Yes	Catherine Smith	Project Manager
02	2020 12 03	Draft BA Report published for Public Review	Yes	Catherine Smith	Project Manager
03	2021 04 26	Draft BA Report Version 2 reviewed and verified	Yes	Catherine Smith	Project Manager
04	2021 04 26	Final Draft BA Report Version 2, made available for public review	Yes	Catherine Smith	Project Manager

Distribution List

# Hard Copies	Soft Copy (electronic transfer)	Association / Company Name
-	1	Department of Environmental Affairs and Development Planning (Competent Authority)
-	1	Department of Water and Sanitation (Berg-Olifants Catchment Management Agency)
-	1	Stellenbosch Municipality: Division Spatial Planning and Environment
-	1	Stellenbosch Municipality: Housing Department
-	1	Office of the Speaker – including Ward Councillors
-	1	Winelands District Municipality
-	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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BASIC ASSESSMENT REPORT

IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT NO. 107 OF 1998) AND ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014 (AS AMENDED)

PROJECT TITLE

Basic Assessment Process for the Proposed Kayamandi Northern Extension Project: Water Supply Pump Stations, Pipelines and a 10 Mℓ Reservoir, Western Cape

NOTE: UPDATES TO THE ORINGAL DRAFT BASIC ASSESSMENT REPORT ARE CAPTURED IN THIS REPORT (DRAFT BASIC ASSESSMENT REPORT VERSION 2) IN GREY HIGHLIGHT

REPORT TYPE CATEGORY	REPORT REFERENCE NUMBER	DATE OF REPORT
Pre-Application Basic Assessment Report (if applicable)[1]	N/A	N/A
Draft Basic Assessment Report[2]	16/3/3/1/B4/22/1070/20	10/12/2020 – 01/02/2021
Draft Basic Assessment Report Version 2[2]	16/3/3/1/B4/22/1070/20	28/04/2021 – 27/05/2021
Final Basic Assessment Report[3] or, if applicable Revised Basic Assessment Report[4] (strikethrough what is not applicable)	N/A	N/A

Notes:

1. In terms of Regulation 40(3) potential or registered interested and affected parties, including the Competent Authority, may be provided with an opportunity to comment on the Basic Assessment Report prior to submission of the application but must again be provided an opportunity to comment on such reports once an application has been submitted to the Competent Authority. The Basic Assessment Report released for comment prior to submission of the application is referred to as the "Pre-Application Basic Assessment Report". The Basic Assessment Report made available for comment after submission of the application is referred to as the "Draft Basic Assessment Report". The Basic Assessment Report together with all the comments received on the report which is submitted to the Competent Authority for decision-making is referred to as the "Final Basic Assessment Report".

2. In terms of Regulation 19(1)(b) if significant changes have been made or significant new information has been added to the Draft Basic Assessment Report , which changes or information was not contained in the Draft Basic Assessment Report consulted on during the initial public participation process, then a Final Basic Assessment Report will not be submitted, but rather a "Revised Basic Assessment Report", which must be subjected to another public participation process of at least 30 days, must be submitted to the Competent Authority together with all the comments received.

DEPARTMENTAL REFERENCE NUMBER(S)

Pre-application reference number:	N/A
File reference number (EIA):	16/3/3/1/B4/22/1070/20
NEAS reference number (EIA):	N/A
~~File reference number (Waste):~~	N/A
~~NEAS reference number (Waste):~~	N/A
~~File reference number (Air Quality):~~	N/A
~~NEAS reference number (Air Quality):~~	N/A
~~File reference number (Other):~~	N/A
~~NEAS reference number (Other):~~	N/A

CONTENT AND GENERAL REQUIREMENTS

Note that:

1. The content of the Department's Circular EADP 0028/2014 (dated 9 December 2014) on the "One Environmental Management System" and the Environmental Impact Assessment ("EIA") Regulations, 2014 (as amended), any subsequent Circulars, and guidelines must be taken into account when completing this Basic Assessment Report Form.
2. This Basic Assessment Report is the standard report format which, in terms of Regulation 16(3) of the EIA Regulations, 2014 (as amended) must be used in all instances when preparing a Basic Assessment Report for Basic Assessment applications for an environmental authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA")and the EIA Regulations, 2014 (as amended) and/or a waste management licence in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) ("NEM:WA"), and/or an atmospheric emission licence in terms of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004) ("NEM:AQA") when the Western Cape Government: Environmental Affairs and Development Planning ("DEA&DP") is the Competent Authority/Licensing Authority.
3. This report form is current as of October 2017. It is the responsibility of the Applicant/ Environmental Assessment Practitioner ("EAP") to ascertain whether subsequent versions of the report form have been released by the Department. Visit the Department's website at **http://www.westerncape.gov.za/eadp** to check for the latest version of this checklist.
4. The required information must be typed within the spaces provided in the form. The size of the spaces provided is not necessarily indicative of the amount of information to be provided. The tables may be expanded where necessary.
5. The use of "not applicable" in the report must be done with circumspection. All applicable sections of this report form must be completed. Where "not applicable" is used, this may result in the refusal of the application.
6. While the different sections of the report form only provide space for provision of information related to one alternative, if more than one feasible and reasonable alternative is considered, the relevant section must be copied and completed for each alternative.
7. Unless protected by law, all information contained in, and attached to this report, will become public information on receipt by the competent authority. If information is not submitted with this report due to such information being protected by law, the applicant and/or EAP must declare such non-disclosure and provide the reasons for believing that the information is protected.
8. Unless otherwise indicated by the Department, one hard copy and one electronic copy of this report must be submitted to the Department at the postal address given below or by delivery thereof to the Registry Office of the Department. Reasonable access to copies of this report must be provided to the relevant Organs of State for consultation purposes, which may, if so indicated by the Department, include providing a printed copy to a specific Organ of State.
9. This Report must be submitted to the Department and the contact details for doing so are provided below.
10. Where this Department is also identified as the Licencing Authority to decide applications under NEM:WA or NEM:AQA, the submission of the Report must also be made as follows, for-

    - Waste management licence applications, this report must also (*i.e.*, another hard copy and electronic copy) be submitted for the attention of the Department's Waste Management Directorate (tel: 021-483-2756 and fax: 021-483-4425) at the same postal address as the Cape Town Office.
    - Atmospheric emissions licence applications, this report must also be (*i.e.*, another hard copy and electronic copy) submitted for the attention of the Licensing Authority or this Department's Air Quality Management Directorate (tel: 021 483 2798 and fax: 021 483 3254) at the same postal address as the Cape Town Office.

DEPARTMENTAL DETAILS

CAPE TOWN OFFICE		GEORGE REGIONAL OFFICE
REGION 1 **(City of Cape Town & West Coast District)** Department of Environmental Affairs and Development Planning Attention: Directorate: Development Management (Region 1) Private Bag X 9086 Cape Town, 8000 Registry Office 1st Floor Utilitas Building 1 Dorp Street, Cape Town Queries should be directed to the Directorate: Development Management (Region 1) at: Tel.: (021) 483-5829 Fax: (021) 483-4372	**REGION 2** **(Cape Winelands District & Overberg District)** Department of Environmental Affairs and Development Planning Attention: Directorate: Development Management (Region 2) Private Bag X 9086 Cape Town, 8000 Registry Office 1st Floor Utilitas Building 1 Dorp Street, Cape Town Queries should be directed to the Directorate: Development Management (Region 2) at: Tel.: (021) 483-5842 Fax: (021) 483-3633	**REGION 3** **(Central Karoo District & Eden District)** Department of Environmental Affairs and Development Planning Attention: Directorate: Development Management (Region 3) Private Bag X 6509 George, 6530 Registry Office 4th Floor, York Park Building 93 York Street George Queries should be directed to the Directorate: Development Management (Region 3) at: Tel.: (044) 805-8600 Fax: (044) 805 8650

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ACRONYMS USED IN THIS BASIC ASSESSMENT REPORT:

Acronym	Description
AQMP	Air Quality Management Plan
BA	Basic Assessment
BAR	Basic Assessment Report
BID	Background Information Document
CARA	Conservation of Agricultural Resources Act (No. 43 of 1983)
CBA	Critical Biodiversity Area
CR	Critically Endangered
CLO	Community Liaison Officer
CREW	Custodians of Rare and Endangered Wildflowers
CRR	Comments & Response Report
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
EHA	Ecological Health Assessment
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIS	Ecological Importance and Sensitivity
EN	Endangered
ESA	Ecological Support Area
eWULAAS	Water Use Licence Application and Authorisation System
GA	General Authorisation
GIS	Geographic Information Systems
GN R	General Notice Regulation
ha	Hectare
HDPE	High density polyethylene
HGM	Hydrogeomorphic
HWC	Heritage Western Cape
IAP	Invasive Alien Vegetation
IDP	Integrated Development Plan
IEC	International Electrotechnical Commission
ISO	International Organisation for Standardization

Acronym	Description
ISSP	Informal Settlement Support Programme
km	Kilometre
ℓ	Litre
LRP	Livelihoods Restoration Plan
m	Metre
m^2	Square metre
m^3	Cubic metres
Mℓ	Mega litre
MSA	Middle Stone Age
MVA	Mega Volt Amp
NEM:AQA	National Environmental Management: Air Quality Act (No. 39 of 2004)
NEM:BA	National Environmental Management: Biodiversity Act (No. 10 of 2004)
NEM:ICMA	National Environmental Management: Integrated Coastal Management Act (No. 24 of 2008)
NEM:PAA	National Environmental Management: Protected Areas Act (No. 57 of 2003)
NEM:WA	National Environmental Management: Waste Act (No. 59 of 2008)
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act (No 25 of 1999)
NPSH	Net Positive Suction Head
NWA	National Water Act (No, 36 of 1998)
ONA	Other Natural Areas
PAPs	Project Affected People
PES	Present Ecological State
PPE	Personal Protective Equipment
PPE	Personal Protective Equipment
PPP	Public Participation Process
PSDF	Provincial Spatial Development Framework
RAP	Resettlement Action Plan
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SANS	South African national Standards
SDF	Spatial Development Framework
SHW	Special Hazardous Waste
SIA	Social Impact Assessment
V	Vulnerable
WCBSP	Western Cape Biodiversity Spatial Plan

Acronym	Description
WMA	Water Management Area

DETAILS OF THE APPLICANT

Applicant / Organisation / Organ of State:	Stellenbosch Local Municipality		
Contact person:	1. Deon Louw/ 2. Adriaan Kurtz / 3. Esias de Jager		
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DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER ("EAP")

Name of the EAP organisation:	AECOM SA (Pty) Ltd		
Person who compiled this Report:	Catherine Smith		
EAP Reg. No.:	South African Council for Natural Scientific Professions (SACNASP) 400415/13		
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EAP Qualifications:	M.Sc Zoology		

Please provide details of the lead EAP, including details on the expertise of the lead EAP responsible for the Basic Assessment (BA) process. Also attach his/her Curriculum Vitae to this BAR.

Catherine has 13 years' experience in environmental management and has worked in various sectors including energy and renewables, waste, transport and agriculture. She has gathered skills in project management, risk and impact assessment, project feasibility, integrated environmental management including enviro-legal, cultural and heritage, social and sustainability aspects. Catherine has 10 years project management experience and is registered with SACNASP as a Professional Natural Scientist (Pri.Nat.Sci).

EXECUTIVE SUMMARY OF THE BASIC ASSESSMENT REPORT:

Background to the project

The Stellenbosch 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 Municipality's Integrated Development Plan (IDP) (Stellenbosch Local Municipality, 2019) and is in support of housing and development schemes over the next couple of years.

The proposed Project entails the construction of:

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.

Rising main pipeline

- with associated scour chambers (5-7 small chambers, each estimated 10 m^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 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.

560 m pipeline

- from the proposed 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.

Kayamandi Northern reservoir

- with associated infrastructure such as valve chambers and flow meters,
- that will be fed from the existing Papegaaiberg Reservoir via the proposed new rising main,
- with 10 mega litre (Mℓ) maximum capacity,
- with a 1600 m^2 footprint
- including a construction camp with laydown area of a maximum of 4000 m^2 footprint,
- the proposed reservoir and campsite will be located within the surveyed area for the proposed reservoir site, as indicated in the Locality Map (Appendix A)

Total footprint of the development is 30 000 m^2 (pump station) + 20 800 m^2 (pipeline) + 1600 m^2 (reservoir) = 25 400 m^2 (2.5 ha)

Access will be via existing tar and dust roads.

The pipeline will cross a water course, for which a General Authorisation will be required in terms of the National Water Act (Act 36 of 1998). Thus, all public documentation used in the PP Process will also provide notification that a General Authorisation will be applied for from the Department of Water and Sanitation (DWS).

[Note the original reservoir size was 11 Mℓ but was reduced to 10 Mℓ. Additionally, the original proposal included an 8 ℓ/s pump station with associated pipework to serve area S82 (also known as Azania or Watergang), with approximate pumping head of 45 m, which has since been removed from the proposed project currently being applied for. The specialist studies still refer to the 10 Mℓ volume and the 8 ℓ/s pump station however these changes do not represent material/substantive changes to the project impact nor the specialist assessments, which are still valid for the updated project description**]**;

Study area

The study area falls within the Stellenbosch Local 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.

Description of the Receiving Environment

The proposed reservoir site is currently used for agriculture and services (Vodacom cell phone mast). The pipeline crosses agricultural land, open degraded land, informal residential areas (Watergang / Azania) and a section that traverses the Papegaaiberg Nature Reserve.

The section that transverses the Papegaaiberg Nature Reserve (±1.4 km) 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 (CR) ecosystems. 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.

This project area falls in the G22F quaternary catchment, within the Berg Water Management Area (WMA) 19. The wetland area within the proposed site was delineated by a Wetland & Aquatic Ecologist and a total of three (3) hydrogeomorphic (HGM) units were identified, however the proposed project will only transverse a single HGM unit. The average ecosystem services score for this HGM unit was determined to be "Intermediate" and the integrity (or health) of the unit is "Seriously Modified".

Public Participation

Key stakeholders were identified as follows:

- Occupiers of Land (directly affected);
- Adjacent Landowners (indirectly affected);

- Provincial and Local Government;
- Ward councillors, community leaders and ratepayer's association; and
- Non-Government Organisations (NGOs).

A database of interested and affected parties (I&APs) has been compiled, inclusive of individuals, organisations, institutions, communities and the structures that represent them. The focus is on those stakeholders who may be impacted by or influence decisions regarding the project as not all stakeholders are necessarily in the project's direct sphere of influence. As additional stakeholders are identified throughout the Basic Assessment (BA) process, the database will be updated accordingly.

Notice to all I&APs relevant to the application was conducted as follows:

- Site notices were erected at six (6) locations during the announcement phase on 7 November 2019. Description of the site notices is given in Table 1-1 below.

Table 1-1: Site Notice Locations

Site Notice	Location	Latitude	Longitude
1.	Positioned on a boundary fence along the proposed access road (existing dirt road) to the Kayamandi reservoir site.	33°54'45.17"S	18°50'0.40"E
2.	Papegaaiberg Nature Reserve temporary access gate	33°55'50.55"S	18°50'16.09"E
3.	Papegaaiberg Reservoir boundary fence at the southern-most point of the pipeline route and the location of Site Camp 1	33°56'14.11"S	18°50'45.68"E
4.	Kayamandi Local Library notice board	33°56'12.27"S	18°51'43.31"E
5.	Stellenbosch Local Library notice board	33°56'25.33"S	18°50'29.48"E
6.	Stellenbosch Municipal Offices, ground floor reception	33°56'13.39"S	18°51'45.12"E
7.	Kayamandi Economic and Tourism Corridor (cashiers Office)	33°55'9.50"S	18°51'7.21"E

- **New updated site notices** were erected at the start of the original public review period for the Basic Assessment. These were place on 10 December 2020 at the following lcoations.

Table 1-2: Site Notice Locations

Site Notice	Location	Latitude	Longitude
1.	Stellenbosch Local Library notice board	33°56'25.33"S	18°50'29.48"E
2.	Stellenbosch/ Kayamandi Economic and Tourism Corridor Fence	33°55'11.60"S	18°51'9.11"E
3.	Kayamandi Local Library notice board	33°56'12.27"S	18°51'43.31"E
4.	Fence along pipeline at Enkanini and Azania/Watergang	33°55'24.79"S	18°50'27.44"E
5.	Fence at Vodacom tower at reservoir site	33°54'57.56"S	18°49'60.00"E
6.	Kayamandi Clinic	33°55'10.24"S	18°50'47.72"E

7.	Positioned on a boundary fence at access road on the R304	33°54'16.43"S	18°50'32.51"E

Proof of site notices are included in the Final Basic Assessment once public participation has been concluded.

Refer to Appendix F3 for an example of the site notices.

- A pre-application letter accompanied by the Background Information Document (BID) to notify key I&APs (e.g. Ward Councillors) of the BA process as well as to invite them to participate in the process. This letter was distributed via e-mail on 06 November 2019. The letter and BID provided:
  - A description of the project;
  - An outline of the BA process and public participation process (PPP) to be followed;
  - And indication of how, when and where stakeholders and I&APs can participate in the PPP; and
  - Contact details of the EAP representative.

Refer to Appendix F2 for a copy of the pre-application letter.

- BIDs were placed at the Stellenbosch Local Municipality's Office of the Speaker on 06 November 2019. The purpose of the BIDs was to provide I&APs with access to more detailed information regarding the proposed project. Ward Councillors were also provided with BID copies to distribute to the affected community members.

Refer to Appendix F4 for an example of the BID.

- Advertisements were placed in the main body of the Eikestad Nuus newspapers during the announcement phase on 07 November 2019. The newspaper advertisements were placed in English and isiXhosa.
- Updated Advertisements were placed in the main body of the Eikestad Nuus newspapers to announce the availability of the Basic Assessment Report and EMPR for review on 10 December 2020. The newspaper advertisements were placed in English and isiXhosa.

Refer to Appendix F1 for an example of the newspaper adverts as well as a copy of the newspaper advert placed.

- A pre-application public meeting was held on 30 September 2019 with the Competent Authority (CA), DEA&DP, BIDs were also distributed to I&APs present at the meeting.

- A 30-day pre-application notification period was undertaken with the aim of informing I&APs of the proposed project affording I&APs an early opportunity to raise critical issues that need to be considered in the planning phase of the project.

- The Draft BA Report (this report) and Environmental Management Programme (EMPr) was made available to the public and State Departments for their comment. All registered I&APs were notified of the availability of this Basic Assessment Report. The reports were made available in the public domain for 30-calendar days from 10 Dec 2020 to 1 Feb 2021, as per the EIA Regulations (2014), as amended.

- Based on comment on the Draft BA Report received from DEADP and Cape Nature, the BA report was updated to this report – the Draft BA Report Version 2, which will be made available to registered I&APs for a 30-revew and commenting period.

All issues and comments raised by the I&APs will be addressed and incorporated in the Comments and Responses Report that will accompany the Final (Revied) BA Report that will be submitted to DEADP.

Details of All the Alternatives Considered

An alternative site was not considered as the proposed reservoir will be fed from the existing Papegaaiberg reservoir. The

reservoir will be built on the highest point above the Kayamandi township, to provide the maximum possible head (pressure) to the downstream area. Different locations for the pump station were considered in terms of electricity availability, risk to future vandalism, and integration with the existing water distribution network. The proposed new pump station will be located at the Papegaaiberg Reservoir. The rising main linking the pump station and reservoir will follow the alignment of existing water mains up to the Kayamandi Reservoir, from where it will mainly follow existing dirt roads to the proposed new Kayamandi North Reservoir.

Environmental Changes Associated with the Alternatives

A summary of the environmental aspects associated with the proposed project are as follows:

Vegetation:

Vegetation will be cleared for the construction of the reservoir and installation of the pipeline.

Aquatic Habitat:

The proposed pipelines will impede into the delineated wetland and the assigned buffer zone.

Heritage, cultural and archaeological:

Based on a specialist assessment there are no significant archaeological or other heritage resources that might be impacted by the construction of the reservoir and installation of the pipeline were identified in the desktop review or walkover survey.

Adjacent land use:

The adjacent land use includes a settlement and agricultural activities. Additionally, there is Fibre Optic Cable Infrastructure at the proposed reservoir site and at the proposed pump station site, for which a wayleave from Vodacom/Dark Fibre Africa will be needed. Any comments received from these two organisations will be included in the Final Basic Assessment. The project could cause temporary increase in traffic, dust generation, noise generation the other general health and safety aspects associated with typical construction projects.

Social Impacts:

The key potential socio-economic impacts associated with the proposed project include physical displacement of five households (11 structures) in the pipeline corridor, loss of assets due to removal of other informal structures and a medicinal and food garden in the pipeline corridor and loss of livelihoods due to removal of market stalls in the pipeline corridor.

Impact Summary and Statement

The BA process for the proposed Kayamandi Bulk Water Supply Pump station, Pipeline and Reservoir has described the status quo of the receiving environment and assessed the expected environmental and social impacts associated with the proposed project. The impacts were identified with input from key specialist studies. This process has enabled an all-inclusive integrated assessment of the impacts to the surrounding natural and social environment during the projected construction and operational phases of the project. The BA process, the associated assessment of impacts and the identification of residual risks allows for concluding the following:

- Alternatives considered as part of the application relate to the position of the reservoir. The preferred position is:
  - the pump station located at the Papegaaiberg Reservoir;
  - the rising main linking the pump station and reservoir following the alignment of existing water mains up to the Kayamandi Reservoir, from where it will mainly follow existing dirt roads; and
  - construction of the reservoir at the proposed site, uphill of Kayamandi.
- The construction of pump station and pipeline will result in the direct loss of Swartland Granite Renosterveld vegetation through the removal of vegetation within the Papegaaiberg Nature Reserve. The vegetation removal will however be limited and with the implementation of mitigation measures and active rehabilitation measures (guided by the Vegetation Rehabilitation Plan) the significance of the change to the receiving environment can be reduced to a medium impact;
- The construction of the pipeline infrastructure may result in the loss of wetland functionality and wetland habitat through impeding into the delineated wetland and the assigned buffer zone of HGM 3. The specialist report concluded that *despite the unavoidable*

risk posed by the project, the post-mitigation risks posed by the project are expected to be Low for all phases of the project. This is based on the assumption that the prescribed mitigation measures and recommendations will be implemented for the project. A recommendation is made that a rehabilitation plan be compiled for the placement of the pipeline across the wetland. An Aquatic Rehabilitation Plan was developed for the proposed wetland crossing.

- The construction of the pipeline will require the relocation and resettlement of community members. At the time of assessment at least eleven (11) structures in the western portion of Enkanini that encroach on the gravel road / pipeline corridor from the elevated western side will need to be removed, to provide allowance of a minimum 6.5 m wide corridor. The servitude must remain accessible in future, therefore the structures in this corridor must be permanently removed. A Relocation Action Plan and Livelihoods Restoration Plan will need to be prepared to guide resettlement activities before construction in this area can begin.
- Although the project will not create significant new job opportunities the impact is still positive.
- No impact was identified in terms of the visual aspects of the site or the occurrence of heritage resources.
- During the operational phase care must be taken during maintenance activities in areas where Swartland Granite Grassland vegetation is prevalent, and the Vegetation Rehabilitation Plan must be followed. Furthermore, the likely proliferation of Invasive Alien Plants and exotic grass and weed species within the development footprint and edges through soil disturbance must be managed as per the mitigation measures included in this report and the attached EMPr (Appendix H).
- The implementation of the no-go alternative will result in the impacts related to the proposed development not being realised. The no-go alternative would however also result in the identified need for bulk water infrastructure development and bulk water supply not being met.

In conclusion, no environmental fatal flaws were identified that should prevent the proposed reservoir development, installation of the pipelines as well as all associated activities. The proposed development is considered to be the best practicable environmental option to meet the need for bulk water augmentation in the area.

Thus, no consequences that cannot be mitigated to an acceptable level or fatal flaws were identified. Whilst some aspects of the project will result in a change in the receiving environment of high to medium negative significance during the construction and operational phases prior to the implementation of any control measures again, with the implementation of the recommended mitigation measures the risk is acceptable and the changes to the receiving environment is reduced to impacts of a low negative significance except one where the change is reduced to an impact of negative medium significance. This is still acceptable and not considered to be a fatal flaw.

Impacts resulting in a positive change to the receiving environment were also identified which include employment opportunities during the construction period and improved bulk water supply enabling expansion of low-cost housing in Kayamandi during the operational phase.

Summary of Impact Assessment (Construction Phase)

No.	Impact Description	Significance rating	
		Without Mitigation	With Mitigation
1.	Direct loss of 35 000 m² of CR Swartland Granite Renosterveld vegetation	High negative	Medium negative
2.	Encouragement and likely proliferation of Invasive Alien Plants and exotic grass and weed species within the development footprint and edges through soil disturbance	Medium negative	Low negative
3.	Loss of wetland functionality (Pipeline)	High negative	Low negative
4.	Direct loss of wetland and wetland habitat (Pipeline)	Medium negative	Low negative
5.	Loss of wetland functionality due to activities within 500m of wetlands (pump station and reservoir)	Low negative	Low negative
6.	Change in the ambient noise quality	Medium negative	Low negative
7.	Emissions to air causing change to the ambient air quality	Low negative	Low negative

8.	Increased traffic and reduced access due to road closures	Medium negative	Low negative
9.	General health, safety and security risk due to construction works	Medium negative	No impact
10.	Employment during construction	Low positive	Medium positive
11.	Contamination, compaction and loss of topsoil	Low negative	Low negative
12.	Change in the visual character	Low negative	No impact
13.	Loss of cultural and archaeological heritage	Low impact	No impact
14.	Physical displacement due to removal of informal dwellings in the pipeline corridor	High negative	Low negative
15.	Loss of assets due to removal of informal structures (other than dwellings) in the pipeline corridor	Medium Negative	No Impact
16.	Temporary loss of livelihoods due to removal of market stalls in the pipeline corridor	High negative	No Impact
17.	Accidental damage to informal structures outside of pipeline corridor	Low negative	No Impact
18.	Increase in nuisance to residents adjacent to the pipeline route	Medium negative	Low negative

Summary of Impact Assessment (Operation Phase)

No.	Impact Description	Significance rating	
		Without Mitigation	With Mitigation
1.	Encouragement and likely proliferation of Invasive Alien Plants and exotic grass and weed species within the development footprint and edges through soil disturbance	High negative	Low negative
2.	Changes in the ambient noise quality	Low negative	Low negative
3.	Change in the visual character	Low negative	Low negative
4.	Improved bulk water supply enabling expansion of low-cost housing in Kayamandi	High positive	High positive

In conclusion no environmental fatal flaws were identified which would prevent the proposed reservoir development, installation of the pipelines as well as all associated activities. The proposed development is considered to be the best practicable environmental option to meet the need for bulk water augmentation in the area.

Conditions and Recommendations

- The construction of the pipeline will require the relocation and resettlement of community members. At the time of assessment at least eleven (11) structures in the western portion of Enkanini that encroach on the gravel road / pipeline corridor from the elevated western side will need to be removed, to provide allowance of a minimum 6.5 m wide corridor (33°55'26.79"S;18°50'27.93"). The servitude must remain accessible in future, therefore the structures in this corridor must be permanently removed. Compilation and implementation of a RAP and an LRP is required to facilitate the relocation of identified structures and people in a manner that minimises the impacts identified in the Social Impact Assessment. Relocation should be complete before work on the section of the project in Enkanini can begin.

- A 15 m buffer zone should be implemented from all wetlands and water courses for associated infrastructure and activities apart from crossing point infrastructure and construction (i.e. rising main.) as per the specialist recommendation;
- All other recommendations of the Wetland Baseline Study and Aquatic Rehabilitation Plan must be adhered to;
- The recommendations and mitigation measures provided in the Botanical Assessment and Vegetation Rehabilitation Plan should be adhered to. The topsoil and vegetation that is cleared would need to be removed, kept free of weeds and once the trenches are closed the topsoil replaced along with the vegetation in the form of mulch;
- The recommendations and mitigation measures in the EMPr should be adhered to;
- A suitably qualified Environmental Control Officer (ECO) and Community Liaison Officer (CLO) must be appointed to monitor the construction activities;
- Method statements indicated in the EMPr must be compiled prior to construction, clearly outlining how the contractor will minimize environmental impacts for applicable construction activities;
- No tools, equipment or any other materials should be stored in any of the watercourses;
- No-go areas must be identified, and related buffers be implemented and observed, particularly within the Papegaaiberg Nature Reserve and only the area required for construction purposes should be accessed;
- Monitoring inspections must be undertaken by a specialist during construction and rehabilitation for signs of erosion and any Invasive Alien Plants (IAPs) due to the critically endangered vegetation type present (regardless of the condition of this vegetation);
- Pre-construction photo survey shall be undertaken by the ECO.

1 SECTION A: PROJECT INFORMATION

1.1 ACTIVITY LOCATION

Location of all proposed sites:	Kayamandi, Stellenbosch
Farm / Erf name(s) and number(s) (including Portions thereof) for each proposed site:	Refer to Appendix K.
Property size(s) in m^2 for each proposed site:	Refer to Appendix K.
Development footprint size(s) in m^2:	2.5 ha
Surveyor General (SG) 21 digit code for each proposed site:	Refer to Appendix K.

1.2 PROJECT DESCRIPTION

(a) Is the project a new development? If "NO", explain:	YES
N/A	

(b) Provide a detailed description of the scope of the proposed development (project).

Background

The Stellenbosch 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 Municipality's Integrated Development Plan (IDP) and is in support of housing and development schemes over the next couple of years.

Motivation

The Stellenbosch Municipality's IDP and Spatial Development Framework (SDF) have identified the need for housing 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 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.

Project Location

The study area falls within the Stellenbosch Municipality which is a Category B[1] municipality situated in the Western Cape Province and forms part of the Winelands District Municipality (Please refer to Figure 1-1). The proposed Project is located approximately 3 km north of the western edge of the town of Stellenbosch town, Western Cape province (Locality Map, Appendix 3 and Layout - Appendix 4). The Project is adjacent to the existing Papegaaiberg, Kleinvallei and Kayamandi reservoirs.

Project Details

The proposed Project entails the construction of:

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,

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

- **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.

Rising main pipeline

- with associated scour chambers (5-7 small chambers, each estimated 10 m^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 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.

560 m pipeline

- from the proposed 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.

Kayamandi Northern reservoir

- with associated infrastructure such as valve chambers and flow meters,
- that will be fed from the existing Papegaaiberg Reservoir via the proposed new rising main,
- with 10 mega litre (Mℓ) maximum capacity,
- **with a 1600 m^2 footprint**
- including a construction camp with laydown area of a maximum of 4000 m^2 footprint,
- the proposed reservoir and campsite will be located within the surveyed area for the proposed reservoir site, as indicated in the Locality Map (Appendix A)

Total footprint of the development (once completed) is 30 000 m^2 (pump station) + 20 800 m^2 (pipeline) + 1600 m^2 (reservoir) = 25 400 m^2 (2.5 ha).

Access will be via existing tar and dust roads.

The pipeline will cross a water course, for which a General Authorisation will be required in terms of the he National Water Act (Act 36 of 1998). Thus, all public documentation using in the PP Process will also provide notification that a General Authorisation will be applied for from the Department of Water and Sanitation (DWS).

The proposed pipeline route is considered the most feasible route to the proposed reservoir site, and the proposed reservoir site is the most feasibly based on the elevation of the site, which typically needs to be the highest point above which the reservoir is supposed to serve; however, it will affect a number of dwellings and informal market structures. At the time of assessment at least eleven (11) structures in the western portion of Enkanini that have over the years encroached onto the gravel road / pipeline corridor from the elevated western side were identified that will need to be removed, to provide allowance of a minimum 6.5 m wide corridor. The servitude must remain accessible in future, therefore the structures in this corridor must be permanently removed.

Infrastructure Details

The following activities are considered for the proposed Project:

i. **Pump Station Design**: The selection of the pumps is based on different factors including the type of foundation required, the soil type and the ground water conditions found at the area. The pump station was sized to allow for all the pipe work, valves and fittings to be installed while making enough allowance for working space. The depth of the pump station will be finalised based on the static height available on site and the Net Positive Suction Head (NPSH) requirements of the pumps.

ii. **Energy Saving**: Electricity required for pumping is typically the highest input cost for water supply infrastructure. The design approach of the mechanical equipment and electrical supply is focussed on minimising energy usage by the specification of efficient equipment;

iii. **Back-Up Generator and Diesel Storage**: The design of the fuel storage has taken into account the industry standards for safe storage of fuel. Storage units will be constructed of weatherproof materials to prevent weathering and bunding to 110% of the volume of the storage tank to contain sudden leakage will be applied and provided with a 1:100 slope towards a catch-pit to capture major leaks. The wall and floor within which the diesel tank is contained will be sealed 0.5 m high with diesel-resistant paint inside.

iv. **Bulk Pipeline Design**: The pipeline alignment was selected in terms of its hydraulic characteristics and client requirements. Field inspections were undertaken by the engineering team to assess the pipe routing and to identify any physical constraints to be taken into consideration.

v. **Reservoir Design**: The optimal shape and sizing of the reservoir was determined with due consideration of the acceptable top water level and low water level, the optimal height versus plan area ratio as well as the shape of the reservoir. Typically, this is influenced by the land available and the size of the reservoir. For the size of this reservoir it is assumed that a circular reservoir would be most optimal.

vi. **Cement Batching:** Concrete is required for the construction of the reservoir, as well as for the pump stations and valve chambers along the pipeline route.

    Contractors often get their concrete in ready-mix form, which is brought to site as an when needed. In this case, no batching would occur, however an area for washing concrete off construction vehicles before leaving site will still be needed to prevent spread of concrete outside of the construction footprint.

Alternatively, the contractor may consider putting up a batch plant due the large volumes of concrete required. However, there is no water available at the reservoir site, thus water would also need to be brought in should on-site batching be selected. Water for this purpose will be acquired from a potable source with permission from the registered user of that source, and not without permission. Water for this purpose cannot be sourced from a natural water resource without a permit for abstraction from the DWS is applied for (note: abstraction of water from a water resource is NOT proposed in this BA).

The need/motivation for a batching plant on site will however only be determined after appointment of the construction contractor. Should onsite batching be needed it will need to adhere to the following (which will be included in the recommended conditions of Environmental Authorisation):

1. A Method Statement detailing the layout and method of establishment and operation of the batching plant shall be submitted by the Contractor and included in the EMPr;
2. Location of the batching plant should be on a flat area, not on a slope. The location of the batching plant or any batching related activities must also not occur within sensitive areas identified during this Application for Environmental Authorisation and all cementitious mixing must therefore occur strictly within demarcated areas as identified in consultation with the ECO;
3. 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);
4. Temporary fencing shall be erected around batching plants to avoid unauthorised entry;
5. Impacts to receiving water resources must be prevented at all costs;
6. 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;
7. 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;
8. Any hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility; and
9. Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site in appropriate containers. Satellite Construction Camp.

Construction access and construction camps:

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). Both areas will also be used for temporary storage and stockpiling of materials for the duration of contract. The site camps will be demarcated with 1.8 m high fence with access gate. The Main Construction Camp will entail:

- Temporary containers will be used for the engineering office, boardroom, contractor office, storage containers and the site clerk's office, with covered car ports;
- Dustbins with lids will be located at the site camps (220 litre steel drums barricaded to prevent winds from blowing waste into surrounding environment. Dustbins will be emptied weekly at the nearest waste facility (Devon Valley Landfill Site). (Refer to Section 1.2 (e) for more on waste management);
- Chemical toilets will be required at both site camps for the duration of the construction phase; and
- Storage of between 1 000 ℓ and 2 000 ℓ of fuel will be required on site for the duration of the construction phase.

Site photos of the proposed camp sites are included in Appendix C.

Please note: This description must relate to the listed and specified activities in paragraph (d) below.

(c) Please indicate the following periods that are recommended for inclusion in the environmental authorisation:

(i)	the period within which commencement must occur,	**July/Aug 2021**
(ii)	the period for which the environmental authorisation should be granted and the date by which the activity must have been concluded, where the environmental authorisation does not include operational aspects;	**5 years**
(iii)	the period that should be granted for the non-operational aspects of the environmental authorisation; and	**5 years**
(iv)	the period that should be granted for the operational aspects of the environmental authorisation.	**Lifetime on project**

Please note: The Department must specify the abovementioned periods, where applicable, in an environmental authorisation. In terms of the period within which commencement must occur, the period must not exceed 10 years and must not be extended beyond such 10 year period, unless the process to amend the environmental authorisation contemplated in regulation 32 is followed.

(d) List all the listed activities triggered and being applied for.

Please note: The onus is on the applicant to ensure that all the applicable listed activities are applied for and assessed as part of the EIA process. Please refer to paragraph (b) above.

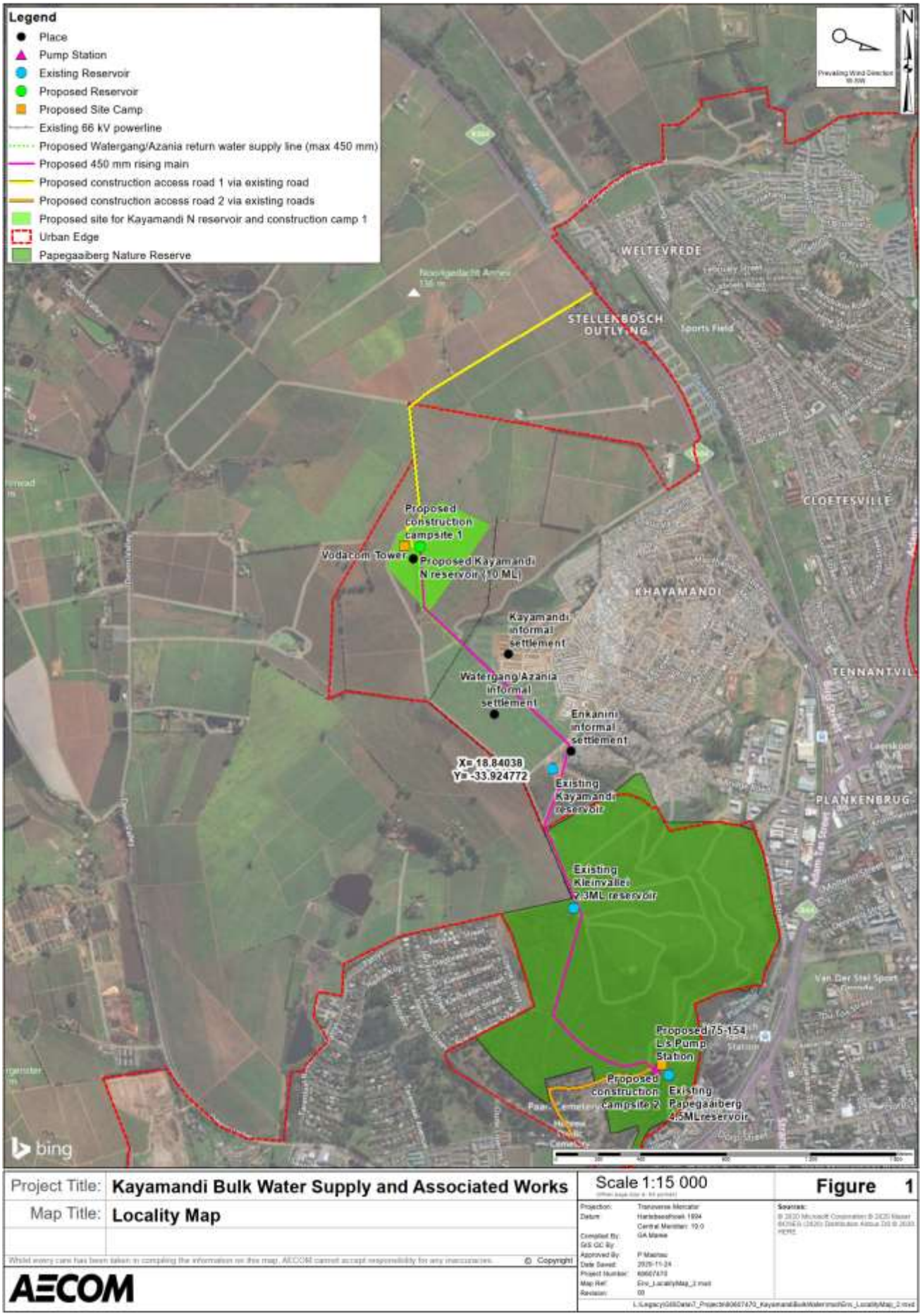

Figure 1-1: Map for the proposed Kayamandi Bulk Water Project

EIA Regulations Listing Notices 1 and 3 of 2014 (as amended):

Listed Activity No(s):	Describe the relevant Basic Assessment Activity(ies) in writing as per **Listing Notice 1** (GN No. R. 983)	Describe the portion of the development that relates to the applicable listed activity as per the project description.	Identify if the activity is development / development and operational / decommissioning / expansion / expansion and operational.
9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— - with an internal diameter of 0,36 metres or more; or • with a peak throughput of 120 litres per second or more; excluding where— 1. such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or 2. where such development will occur within an urban area.	The proposed pipeline is 3 200 m in length, with internal diameter of 450 mm and flow rate of approximately 77 to 154 L/s. The southern half of the route (1 400 m length) is outside of the urban edge (Figure 1-1). This activity is thus applicable due to the length and diameter of the pipeline that is located outside of the urban edge. **Note: this activity was not included in the NOI but was subsequently identified as applicable and is thus applied for.**	Development
12	The development of— ii. infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse	The proposed pipeline route crosses a wetland. The length of the crossing over the wetland is approximately 50 m. Construction width (trench width) may be up to 6.5 m wide. Thus, the footprint of the impact at this wetland crossing will be approximately 325 m^2.	Development
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	The proposed pipeline route will cross a wetland. The construction footprint will be 325 m^2 and the depth of construction will be approximately 2 m deep (thus 650 m^3) Thus, more than 10 m^3 of soil/sand will be removed from the watercourse during construction, most of which will then be replaced after placement of the pipeline to fill the excavation.	Development

Listed Activity No(s):	Describe the relevant Basic Assessment Activity(ies) in writing as per **Listing Notice 3** (GN No. R. 985)	Describe the portion of the development that relates to the applicable listed activity as per the project description.	Identify if the activity is development / development and operational / decommissioning / expansion / expansion and operational.
12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. **i. Western Cape** 1. Within any CR or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as CR in the National Spatial Biodiversity Assessment 2004; 2. Within critical biodiversity areas identified in bioregional plans.	Clearance of an area of more than 300 m^2 indigenous vegetation will be required for the proposed Kayamandi Bulk Water Project. Indigenous vegetation is present in the Papegaaiberg Nature Reserve. There are two (2) vegetation types within the Papegaaiberg Nature Reserve and have been classified as follows: • CR – Swartland Granite Renosterveld (FRg2) (Government Gazette, 2011)1. • CR – Swartland Shale Renosterveld (FRs9) (Government Gazette, 2011). Project components within the reserve include: • Pump station site 3000 m^2. • Pipeline section in the reserve – approximately 1400 km long x 6.5 m wide will be cleared for trenching (9100 m^2). • The botanical assessment indicated that 85% of this area is natural vegetation. • Thus, 10 285 m^2 is considered natural or near natural.	Development

Waste management activities in terms of the NEM: WA (GN No. 921):

Category A Listed Activity No(s):	Describe the relevant Category A waste management activity in writing as per GN No. 921	Describe the portion of the development that relates to the applicable listed activity as per the project description
	N/A	

Note: If any waste management activities are applicable, the **Listed Waste Management Activities Additional Information Annexure** must be completed and attached to this Basic Assessment Report (BAR) as **Appendix I.**

[1] Government Gazette. (2011). *National list of ecosystems that are threatened and in need of protection.* Pretoria: Department of Environmental Affairs.

Atmospheric emission activities in terms of the NEM: AQA (GN No. 893):

Listed Activity No(s):	Describe the relevant atmospheric emission activity in writing as per GN No. 893	Describe the portion of the development that relates to the applicable listed activity as per the project description.
	N/A	

(e) Provide details of all components (including associated structures and infrastructure) of the proposed development and attach diagrams (*e.g.,* architectural drawings or perspectives, engineering drawings, process flowcharts, *etc*.).

Buildings Provide brief description below:		NO
N/A		
Infrastructure (*e.g.,* roads, power and water supply/ storage) Provide brief description below:		NO
The proposed infrastructure will be constructed mainly to provide the future housing and development schemes in Kayamandi with sufficient water. Main infrastructure details: • Pumps station at Papegaaiberg Nature reserve, • Maximum 10 Mℓ Kayamandi Northern Reservoir; • Rising main of approximate length 3 200 m; • 585 m pipeline from the new Kayamandi Northern reservoir; and • 75 to 154 litre per second (ℓ/s) pump station • Associated infrastructure such as valve chambers, flow meters. Additionally, • Existing access roads will be used for the duration of the development and operational phases; • Storage of between 1 000 ℓ and 2 000 ℓ of fuel will be required on site for the duration of the construction phase; • Power will be sourced from Eskom. Connection points at the existing Papegaaiberg Reservoir (for the pump station) and at the Vodacom tower (for the reservoir); and • Water required for the construction phase will be provided by the municipality.		
Processing activities (*e.g.,* manufacturing, storage, distribution) Provide brief description below:		NO
N/A		
Storage facilities for raw materials and products (*e.g.,* volume and substances to be stored) Provide brief description below:	YES	
Temporary storage of building materials will be required at the construction camps during the construction phase. Such facilities will not be located within 100 m of a watercourse.		
Storage and treatment facilities for effluent, wastewater or sewage: Provide brief description below:		NO
N/A		
Storage and treatment of solid waste. Provide brief description below:	YES	
A limited amount of solid construction waste will be produced during the construction phase. Excavated material will be stockpiled as per the requirements in the EMPr for re-use in filling excavation trenches. It is unlikely that excavation spoil will be generated. Should any spoil material have to be discarded off site, it will be minimal and will be taken to the Devon Valley Landfill. • Minimal amounts of other construction waste could include construction rubble/concrete waste. Which will also be taken to Devon Valley Landfill;		

- Domestic Solid waste generated during construction will include general construction waste (e.g. concrete waste, plastics, metals, materials contaminated with hydrocarbons or food waste);
- Domestic Solid waste will be separated into specific bins as follows; paper, plastics, metal, glass and food waste; and
- Bins will be taken weekly to Devon Valley Landfill.

The Devon Valley Landfill Site is owned and run by Stellenbosch Municipality (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 tonne).

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) it 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 Vissershok Valley Landfill site accepts the following waste types (hazardous and general):

- 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.

Facilities associated with the release of emissions or pollution. Provide brief description below:		NO
N/A		
Other activities (*e.g.,* water abstraction activities, crop planting activities) – Provide brief description below:		NO
N/A		

1.3 PHYSICAL SIZE OF THE PROPOSED DEVELOPMENT

(a) Property size(s): Indicate the size of all the properties (cadastral units) on which the development proposal is to be undertaken		
• Farm 183, Portion 0, 2 913 892 m^2 (291.3892 ha) • Watergang 182, Portion 0, 729 860 m^2 (72.986 ha) • Farm 181, Portion 0, size 507 800 m^2 (50.78 ha)	5 065 565	m^2

• Watergang 182, Portion 1, 138 560 m^2 (13.856 ha) • Farm 183, Portion 60, 300 m^2 (0.03 ha) • Farm 183, Portion 5, 508 432 m^2 (50.8432 ha) • Farm 183, Portion 36, 28 272 m^2 (2.8272 ha) • Farm 183, Portion 23, 238 449 m^2 (23.8449 ha)		
(b) Size of the facility: Indicate the size of the facility where the development proposal is to be undertaken	20 540	m^2
(c) Development footprint: Indicate the area that will be physically altered as a result of undertaking any development proposal (*i.e.,* the physical size of the development together with all its associated structures and infrastructure)	20 540	m^2
(d) Size of the activity: Indicate the physical size (footprint) of the development proposal	73 000	m^2
(e) For linear development proposals: Indicate the length (L) and width (W) of the development proposal	3 200 m (L)	m
	1 m (W)	m
(f) For storage facilities: Indicate the volume of the storage facility	10 000 m^3 potable water storage reservoir 12 m^3 fuel storage	m^3
(g) For sewage/effluent treatment facilities: Indicate the volume of the facility (Note: the maximum design capacity must be indicated	N/A	m^3

1.4 SITE ACCESS

(a) Is there an existing access road?	YES	
(b) If no, what is the distance in (m) over which a new access road will be built?	N/A	

(c) Describe the type of access road planned:

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 1-1) 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 1-2.

The properties in area demonstrated are owned by Stellenbosch 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.

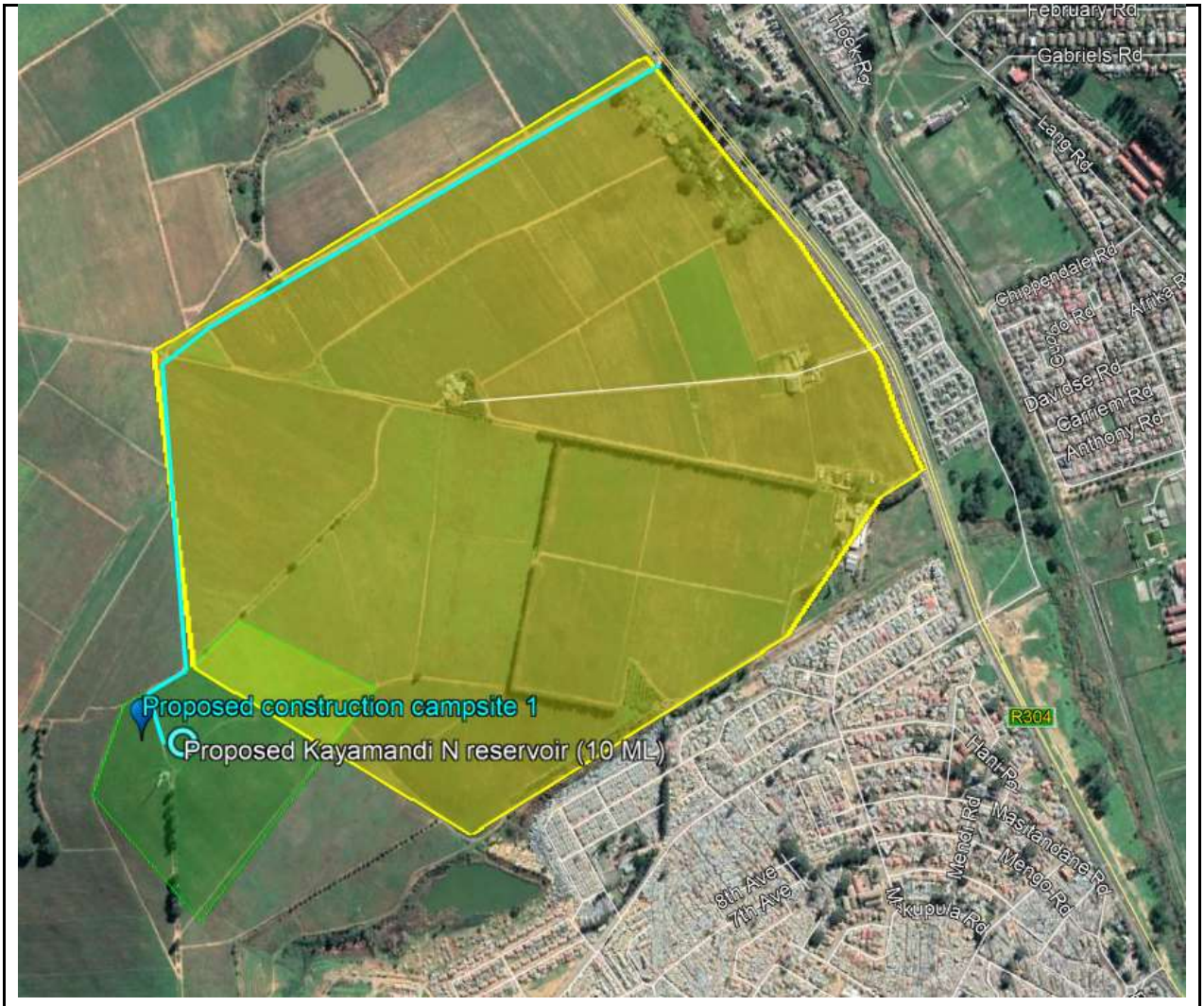

Figure 1-2: Map for the proposed Kayamandi area of access

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 1-1)

Please note: The position of the proposed access road(s) are indicated on the site plan.

1.5 DESCRIPTION OF THE PROPERTY (IES) ON WHICH THE LISTED ACTIVITY(IES) ARE TO BE UNDERTAKEN AND THE LOCATION OF THE LISTED ACTIVITY(IES) ON THE PROPERTY

5.1 Provide a description of the property on which the listed activity(ies) is/are to be undertaken and the location of the listed activity(ies) on the property, as well as of all alternative properties and locations (duplicate section below as required).

No.	Reservoir (R) or Pipeline and pump station (P)	Associated Listed Activity	Farm	Farm / Erf Number	Portion	Property Size (ha)	Farm Name
	R	GNR 983, Activity 12	Farm 183	183	0	291.3892	Grootvlei

No.	Reservoir (R) or Pipeline and pump station (P)	Associated Listed Activity	Farm	Farm / Erf Number	Portion	Property Size (ha)	Farm Name
	P	GNR 983, Activity 9; GNR 985 Activity 19	Watergang	182	0	72.986	Watergang
	P	GNR 983, Activity 9 and 19, GNR 985 Activity 12	Farm 181	181	0	50.87	Farm 181
	P	GNR 983, Activity 9 and 19, GNR 985 Activity 12	Watergang	182	1	13.856	Watergang
	R	GNR 983, Activity 12	Farm 183	183	60	0.03	Grootvlei
	R, P	GNR 983, Activity 9 and 12	Farm 183	1514	5	50.8432	Watergang
	R	GNR 983, Activity 12	Farm 183	183	36	2.8272	Grootvlei
	R	GNR 983, Activity 12	Farm 183	183	23	23.8449	Grootvlei

	Farm	Latitude (S): (deg.; min.; sec)			Longitude (E): (deg.; min.; sec.)		
Coordinates of all the proposed activities on the property or properties (sites):	1.	33	56	7.22	18	49	26.96
	2.	33	55	5.03	18	50	15.24
	3.	33	55	45.16	18	50	46.20
	4.	33	55	45.16	18	50	46.20
	5.	33	54	57.34	18	49	59.90
	6.	33	54	59.73	18	50	9.93
	7.	33	54	57.36	18	50	4.19
	8.	33	54	48.89	18	49	59.36
	9.	33	54	27.28	18	50	26.71

Note: For land where the property has not been defined, the coordinates of the area within which the development is proposed must be provided in an addendum to this report.

5.2 Provide a description of the area where the aquatic or ocean-based activity(ies) is/are to be undertaken and the location of the activity(ies) and alternative sites (if applicable).

N/A

	~~**Latitude (S):** (deg.; min.; sec)~~	~~**Longitude (E):** (deg.; min.; sec)~~

~~Coordinates of the boundary /perimeter of all proposed aquatic or ocean-based activities (sites) (if applicable):~~						

5.3 For a linear development proposal, please provide a description and coordinates of the corridor in which the proposed development will be undertaken (if applicable).

1. From the proposed new reservoir site, the pipeline corridor runs south for approximately 280 m along/adjacent to a gravel road with agriculture (vineyards) on both sides of the road.
2. The corridor then turns and runs south-east for approximately 270 m crossing vineyards and a wetland.
3. The pipeline continues in a south-east direction on a gravel road for approximately 670 m where it passes between Azania / Watergang on the west, and Kayamandi on the east. A heavy-duty fence exists between Kayamandi and the gravel road.
4. The pipeline then turns south-south-west for 410 m, first passing through a small informal housing area, known as Enkanini (as described above) and then along the gravel road over open veld.
5. The corridor then enters the Papegaaiberg Nature reserve turns south-east and for approximately 400 m along or adjacent to the gravel road.
6. The pipeline then runs south-west close to the Kleinvallei Reservoir for 400 m. In this area the pipeline will be located outside of the road, on the western side of the gravel road, in order to run as close to existing pipelines through that area.
7. The pipeline then follows the road in a south-west direction for 600 m ending at the existing Papegaaiberg Reservoir.

The proposed installation of the pipeline route in the Enkanini area (iv. above) intersects on five (5) dwellings and two (2) informal market structures. The potential impacts of relocation of the structures and / or people and informal businesses (livelihoods) has been assessed and the results are presented in Appendix G. There is currently no formal plan for the relocating of the affected community members, Stellenbosch Municipality will adhere to the 6.0 m servitude requirement for maintenance purposes during the operational phase. Consultation with the affected community members is currently underway by the Stellenbosch Municipality, with the desired outcome of identifying suitable relocation areas. Compilation and implementation of a Resettlement Action Plan (RAP) and Livelihoods Restoration Plan (LRP) is recommended as a condition of environmental authorisation to guide the relocation process,

For linear activities:	**Latitude (S):** deg.; min.; sec)			**Longitude (E):** (deg.; min.; sec)		
• Starting point of the activity	33	54	52.95	18	50	0.83
• Middle point of the activity	33	32	91.00	18	50	26.02
• End point of the activity	33	56	15.86	18	50	45.85

Note: For linear development proposals longer than 1000m, please provide an addendum with co-ordinates taken every 250m along the route. All important waypoints must be indicated and the GIS shape file provided digitally.

Kindly note that a KMZ file indicating all important waypoints with co-ordinates taken every 250m along the route is included in Appendix K3.

5.4 Provide a location map (see below) as **Appendix A** to this report that shows the location of the proposed development and associated structures and infrastructure on the property; as well as a detailed site development plan / site map (see below) as **Appendix B** to this report; and if applicable, all alternative properties and locations.

The GIS shape files (.shp) for maps / site development plans must be included in the electronic copy of the report submitted to the competent authority.

Locality Map:	The scale of the locality map must be at least 1:50 000. For linear development proposals of more than 25 kilometres, a smaller scale *e.g.*, 1:250 000 can be used. The scale must be indicated on the map. The map must indicate the following: • an accurate indication of the project site position as well as the positions of the alternative sites, if any; • road names or numbers of all the major roads as well as the roads that provide access to the site(s) • a north arrow; • a legend; • a linear scale; • the prevailing wind direction (during November to April and during May to October); and • GPS co-ordinates (to indicate the position of the activity using the latitude and longitude of the centre point of the site for each alternative site. The co-ordinates should be in degrees and decimal minutes. The minutes should have at least three decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection). For an ocean-based or aquatic activity, the coordinates must be provided within which the activity is to be undertaken and a map at an appropriate scale clearly indicating the area within which the activity is to be undertaken. Coordinates must be provided in degrees, minutes and seconds using the Hartebeesthoek94; WGS84 co-ordinate system.
Site Plan:	Detailed site development plan(s) must be prepared for each alternative site or alternative activity. The site plans must contain or conform to the following: • The detailed site plan must preferably be at a scale of 1:500 or at an appropriate scale. The scale must be indicated on the plan, preferably together with a linear scale. • The property boundaries and numbers of all the properties within 50m of the site must be indicated on the site plan. • The current land use (not zoning) as well as the land use zoning of each of the adjoining properties must be indicated on the site plan. • The position of each element of the application as well as any other structures on the site must be indicated on the site plan. • Services, including electricity supply cables (indicate aboveground or underground), water supply pipelines, boreholes, sewage pipelines, storm water infrastructure and access roads that will form part of the development must be indicated on the site plan. • Servitudes and an indication of the purpose of each servitude must be indicated on the site plan. • Sensitive environmental elements within 100m of the site must be included on the site plan, including (but not limited to):

	○ Watercourses / Rivers / Wetlands - including the 32 meter set back line from the edge of the bank of a river/stream/wetland; ○ Flood lines (*i.e.,* 1:100 year, 1:50 year and 1:10 year where applicable; ○ Ridges; ○ Cultural and historical features; ○ Areas with indigenous vegetation (even if degraded or infested with alien species). • Whenever the slope of the site exceeds 1:10, a contour map of the site must be submitted. • North arrow A map/site plan must also be provided at an appropriate scale, which superimposes the proposed development and its associated structures and infrastructure on the environmental sensitivities of the preferred and alternative sites indicating any areas that should be avoided, including buffer areas. The GIS shape file for the site development plan(s) must be submitted digitally.

1.6 SITE PHOTOGRAPHS

Colour photographs of the site and its surroundings (taken on the site and taken from outside the site) with a description of each photograph. The vantage points from which the photographs were taken must be indicated on the site plan, or locality plan as applicable. If available, please also provide a recent aerial photograph. Photographs must be attached as **Appendix C** to this report. The aerial photograph(s) should be supplemented with additional photographs of relevant features on the site. Date of photographs must be included. Please note that the above requirements must be duplicated for all alternative sites.

2 SECTION B: DESCRIPTION OF THE RECEIVING ENVIRONMENT

Site/Area Description

For linear development proposals (pipelines, *etc*.) as well as development proposals that cover very large sites, it may be necessary to complete copies of this section for each part of the site that has a significantly different environment. In such cases please complete copies of Section B and indicate the area that is covered by each copy on the Site Plan.

2.1 GRADIENT OF THE SITE

Indicate the general gradient of the sites (highlight the appropriate box).

Flatter than 1:10	1:10 – 1:4	

2.2 LOCATION IN LANDSCAPE

(a) Indicate the landform(s) that best describes the site (highlight the appropriate box(es).

	Side slope of hill / mountain				Undulating plain/low hills	

(b) Provide a description of the location in the landscape. -

The proposed Project is located approximately 3 km north of Stellenbosch town's western edge, Western Cape Province. The site is surrounded by agricultural land and residential areas.

The landscape is represented by land type valleys supporting low to moderately tall *leptophylous* shrublands with varying canopy cover as well as open shrublands dominated by renosterbos. Hills commonly occur throughout this landscape which results in the formation of "Hummockveld" near Pitberg. These hills are associated with stunted trees and thicket (Mucina & Rutherford, 2006).

The proposed site is further located within the Berg River Water Management Area (WMA). The Berg River forms the only major river within this WMA.

2.3 GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

(a) Is the site(s) located on or near any of the following (highlight the appropriate boxes)?

Shallow water table (less than 1.5m deep)		NO
Seasonally wet soils (often close to water bodies)		NO
Unstable rocky slopes or steep slopes with loose soil		NO
Dispersive soils (soils that dissolve in water)		NO
Soils with high clay content	YES	
Any other unstable soil or geological feature		NO
An area sensitive to erosion		NO
An area adjacent to or above an aquifer.		NO
An area within 100m of a source of surface water		NO
An area within 500m of a wetland	YES	

An area within the 1:50 year flood zone	[redacted]	NO	[redacted]
A water source subject to tidal influence	[redacted]	NO	[redacted]

(b) If any of the answers to the above is "YES" or "UNSURE", specialist input may be requested by the Department. (Information in respect of the above will often be available at the planning sections of local authorities. The 1:50 000 scale Regional Geotechnical Maps prepared by Geological Survey may also be used).

(c) Indicate the type of geological formation underlying the site.

[redacted]	[redacted]	Other (describe)

Provide a description.

The underlying geology of the site is linked to the Tygerberg Formation. The general physical characteristics of the formation indicate a lithology of phyllite, metagreywacke, quartzite and minor volcanic rocks (Figure 2-1) (CapeFarmMapper, 2020).

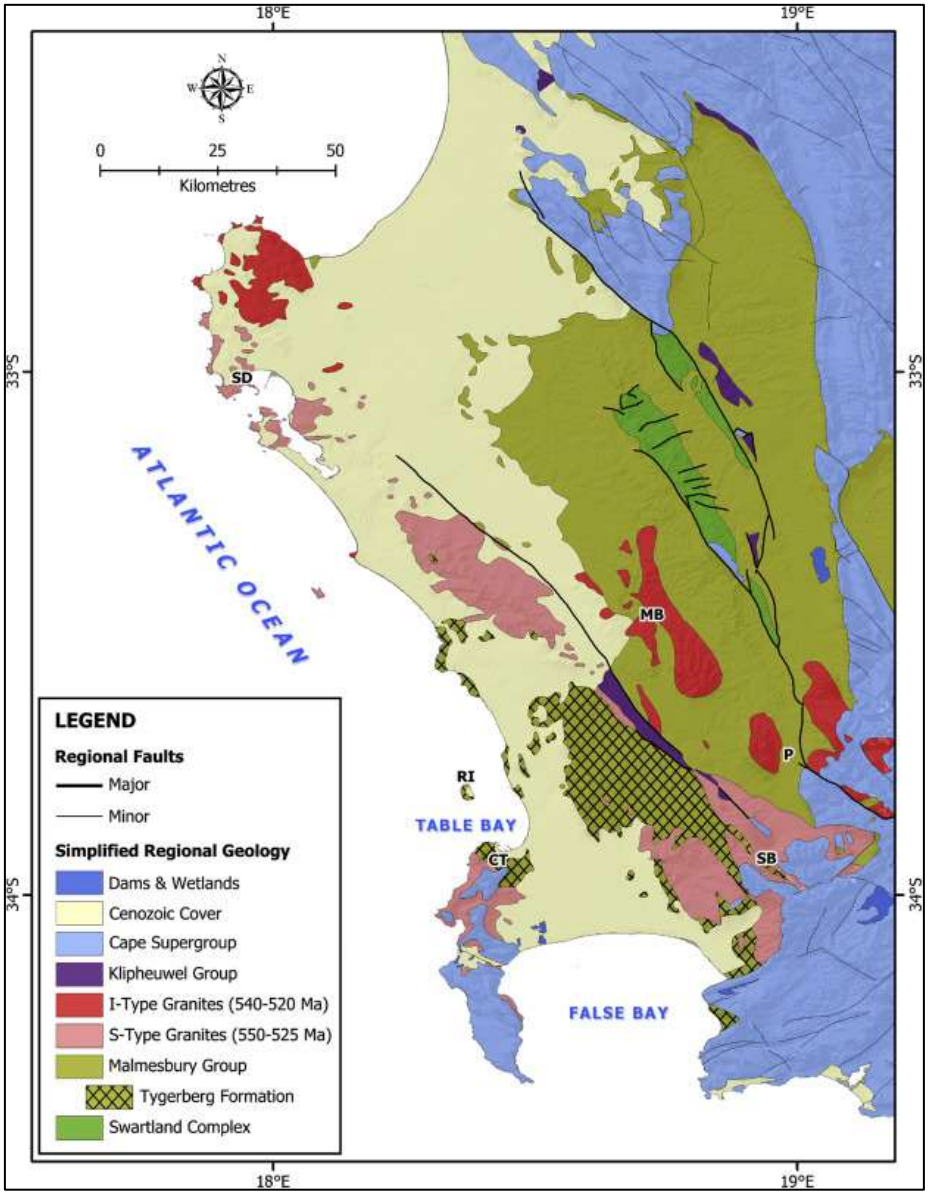

Figure 2-1: Geological map of the formations in a section of the Western Cape

Source: MacHutchon, de Beer, van Zyl and Cawthra (2020)

According to the land type database (Land Type Survey Staff, 1972 - 2006), the project area is characterised by the Ba 47 land type, which is characterised by plinthic catena with upland duplex and margalitic soils being rare. Dystrophic and mesotrophic red soils are widespread.

This region is characterised by clayey soils, specifically from the Moorreesburg Formation in the West and the Porterville Formation in the North and east. These soils contain pedocutanic and prismacutanic diagnostic horizons. Glenrosa and Mispah is dominant within this region. Land types commonly associated with the geology includes Db[2], Da[3] and Fb[4] land types.

2.4 SURFACE WATER

(a) Indicate the surface water present on and or adjacent to the site and alternative sites (highlight the appropriate boxes)?

Perennial River		NO	UNSURE
Non-Perennial River	YES		UNSURE
Permanent Wetland	YES		UNSURE
Seasonal Wetland		NO	UNSURE
Artificial Wetland		NO	UNSURE
Estuarine / Lagoon		NO	UNSURE

(b) Provide a description.

Two (2) National Freshwater Ecosystem Priority Areas (NFEPA) wetland systems have been identified within the 500 m regulated area, namely a channelled valley bottom wetland as well as a wetland flat. It is worth noting that the wetland flat has been identified as an artificial system, which potentially could be associated with the existing reservoir.

2.5 THE SEAFRONT / SEA

(a) Is the site(s) located within any of the following areas? (highlight the appropriate boxes).
If the site or alternative site is closer than 100m to such an area, please provide the approximate distance in (m).

AREA	**YES**	**NO**	**UNSURE**	**If "YES": Distance to nearest area (m)**
An area within 100m of the high water mark of the sea		NO		N/A
An area within 100m of the high water mark of an estuary/lagoon		NO		N/A
An area within the littoral active zone		NO		N/A
An area in the coastal public property		NO		N/A

[2] Db - refers to land where duplex soils with non-red B horizons comprise more than half of the area covered by duplex soils (Carstens, 2016)
[3] Da - refers to land where duplex soils with red B horizons comprise more than half of the area covered by duplex soils (Carstens, 2016)
[4] Fb - indicates land where lime occurs regularly (there need not be much of it) in one or more valley bottom soils (Carstens, 2016)

Major anthropogenic structures		NO		N/A
An area within a Coastal Protection Zone		NO		N/A
An area seaward of the coastal management line		NO		N/A
An area within the high risk zone (20 years)		NO		N/A
An area within the medium risk zone (50 years)		NO		N/A
An area within the low risk zone (100 years)		NO		N/A
An area below the 5m contour		NO		N/A
An area within 1km from the high water mark of the sea		NO		N/A
A rocky beach		NO		N/A
A sandy beach		NO		N/A

(b) If any of the answers to the above is "YES" or "UNSURE", specialist input may be requested by the Department. (The 1:50 000 scale Regional Geotechnical Maps prepared by Geological Survey may also be used).

2.6 BIODIVERSITY

Note: The Department may request specialist input/studies depending on the nature of the biodiversity occurring on the site and potential impact(s) of the proposed development. To assist with the identification of the biodiversity occurring on site and the ecosystem status, consult http://bgis.sanbi.org or BGIShelp@sanbi.org . Information is also available on compact disc ("cd") from the Biodiversity-GIS Unit, Tel.: (021) 799 8698. This information may be updated from time to time and it is the applicant/ EAP's responsibility to ensure that the latest version is used. A map of the relevant biodiversity information (including an indication of the habitat conditions as per (b) below) must be provided as an overlay map on the property/site plan as **Appendix D** to this report.

(a) Highlight the applicable biodiversity planning categories of all areas on preferred and alternative sites and indicate the reason(s) provided in the biodiversity plan for the selection of the specific area as part of the specific category. Also describe the prevailing level of protection of the Critical Biodiversity Area ("CBA") and Ecological Support Area ("ESA") (how many hectares / what percentages are formally protected).

Systematic Biodiversity Planning Category	CBA		
If CBA or ESA, indicate the reason(s) for its selection in biodiversity plan and the conservation management objectives	The proposed Kayamandi Bulk Water Project is located close to ESA 2 (Restore from other land use) and traverses approximately 180 m of a CBA 1 (Terrestrial) and an estimated 45 m of CBA 2 (Terrestrial – Degraded) within the Papegaaiberg Nature Reserve. Kindy refer to Figure 2-2 below.		

	NEMBA GNR 1477 (2009) identifies eight (8) criterions that categorise threatened terrestrial ecosystems based on certain values. These include the following: ii. A1: Irreversible loss of natural habitat. iii. A2: Ecosystem degradation and loss of integrity. iv. B: Rate of loss of natural habitat. v. C: Limited extent and imminent threat. vi. D1: Threatened plant species associates. vii. D2: Threatened animal species associations. viii. E: Fragmentation. ix. Priority areas meeting explicit biodiversity targets as defined in a systematic biodiversity plan. The Swartland Granite Renosterveld (FRg2) vegetation type which occurs within the proposed reservoir site and pipeline alignment has been categorised EN under the criterion A1 and D1.
Describe the site's CBA/ESA quantitative values (hectares/percentage) in relation to the prevailing level of protection of CBA and ESA (how many hectares / what percentages are formally protected locally and in the province)	The sites extent for each is: CBA 1: 352.60 m^2 CBA 2: 88.74 m^2 Refer Figure 2-3 below.

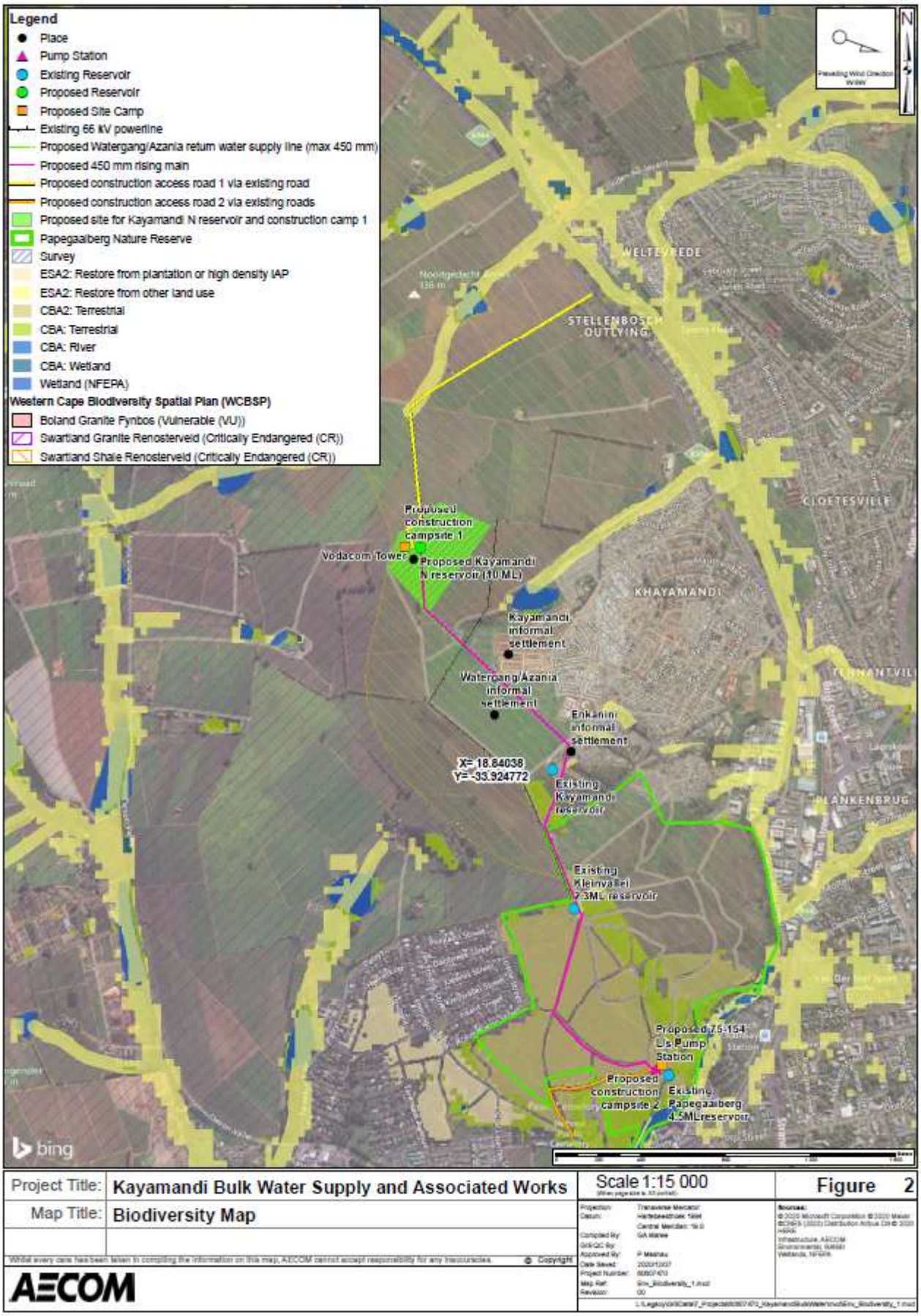

Figure 2-2: Biodiversity overlay map

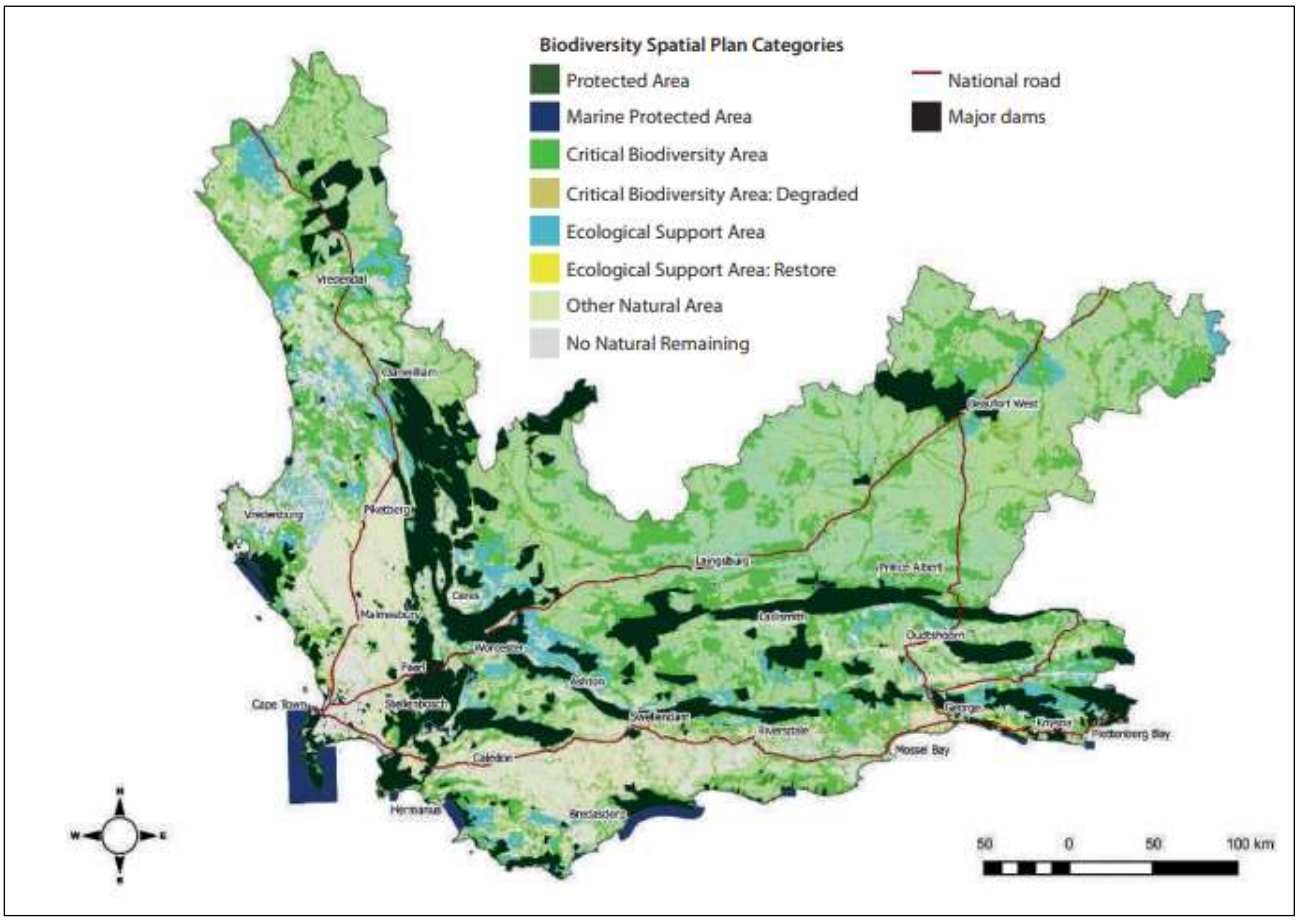

Figure 2-3:Biodiversity Spatial Plan Map of the Western Cape

Source: Pool-Stanvliet, Duffell-Canham, Pence, & Smart (2017)

(b) Highlight and describe the habitat condition on site.

Habitat Condition	Percentage of habitat condition class (adding up to 100%) and area of each in square metre (m^2)		Description and additional comments and observations (including additional insight into condition, *e.g.* poor land management practises, presence of quarries, grazing/harvesting regimes, *etc.*)
Natural	**36%**	**9075 m^2**	The pipeline route (1400 m) and the pump station site (3000 m^2) within Papegaaiberg Nature Reserve, covers 12 100 m^2. The botanical assessment indicated that 75% of the project footprint is in natural vegetation (thus 9075 m^2 or 0.97 ha)
Near Natural (includes areas with low to moderate level of alien invasive plants)	**12%**	**3025 m^2**	The pipeline route (1400 m) and the pump station site (3000 m^2) within Papegaaiberg Nature Reserve, covers 12 100 m^2. The botanical assessment indicated that 75% of the project footprint is in natural vegetation (thus 9075 m^2 or 0.97 ha)
Degraded (includes areas heavily invaded by alien plants)	**15%**	**3 900.00 m^2**	Pipeline route from edge of Papegaaiberg Nature Reserve, running northwards across open veld and between Enkanini settlement.
Transformed (includes cultivation, dams, urban, plantation, roads, *etc.*)	**37%**	**9 400 m^2**	Agricultural land from proposed reservoir site to the edge of Watergang/Azania. Informal settlement/residential through Watergang/ Azania.

(c) Complete the table to indicate:

(i) the type of vegetation present on the site, including its ecosystem status; and

(ii) whether an aquatic ecosystem is present on/or adjacent to the site.

Terrestrial Ecosystems		Description of Ecosystem, Vegetation Type, Original Extent, Threshold (ha, %), Ecosystem Status
Ecosystem threat status as per the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)	Critically	• The remaining natural habitat is less than the biodiversity target as indicated by SANBI (2012). • 60% of the ecosystem is significantly degraded. • There are less than 80 threatened Red List plant species • There is a very high replicability and high threat to the probability of the area meeting explicit biodiversity targets is defined by the systematic biodiversity plan.
	[redacted]	N/A
		N/A
		N/A
		N/A

Aquatic Ecosystems	
	[redacted]

Wetland (including rivers, depressions, channelled and unchanneled wetlands, flats, seeps pans, and artificial wetlands)						
YES	NO	UNSURE	YES	NO	YES	NO

(d) Provide a description of the vegetation type and/or aquatic ecosystem present on the site, including any important biodiversity features/information identified on the site (e.g. threatened species and special habitats). Clearly describe the biodiversity targets and management objectives in this regard.

NOTE: THE SUB-SECTIONS SET OUT IN THE SECTION BELOW SHOULD BE READ IN CONJUNCTION WITH THE SPECIALIST REPORTS ENCLOSED HEREWITH AS APPENDIX G.

Botanical Baseline

The proposed site is largly modified and is currently used for agriculture and services (Vodacom cell phone mast), while the pipeline crosses agricultural land, open degraded land, informal residential areas (Watergang / Azania) . The propsed project also includes a section that traverses the Papegaaiberg Nature Reserve for approximately 1.6 km (Figure 2-4). The required footprint for the construction of this pipeline will be approximately 20 m wide.

The area that crosses the nature reserve comprises Indigenous 5 vegetation. The vegetation types found within the reserve are listed as Swartland Granite Renosterveld to the west and Swartland Shale Renosterveld (FRs9) covering a section to the east of the reserve. The potential pipeline corridor falls only within the mapped-out portion of Swartland Granite Renosterveld FRg2 (Mucina and Rutherford, 2012). This is described as, 'Moderate foot slopes and undulating plains supporting a mosaic of grasslands/herblands and medium dense, microphyllous shrublands dominated by renosterbos. Groups of small trees and tall shrubs are associated with heuweltjies and rock outcrops (Mucina and Rutherford, 2012).

The Swartland Shale Renosterveld (FRs 9) vegetation type is distributed throughout the Western Cape in the Western Coast lowlands from Boland and Swartland, Het Kruis in the north and southwards between the Olifantsrivierberge and Piketberg. This vegetation type widens between Gouda and Hopefield at Moorreesburg and encompasses Klipheuwel, Riebeek-Kasteel, Durbanville, Philadelphia and Sir Lowry's Pass Village near Gordon's Bay (Mucina & Rutherford, 2006).

Landscape features within this vegetation type includes valleys supporting low to moderately tall *leptophylous* shrublands with varying canopy cover as well as open shrublands dominated by renosterbos. Hills commonly occur throughout this landscape which results in the formation of "Hummockveld" near Pitberg. These hills are associated with stunted trees and thicket (Mucina & Rutherford, 2006).

This vegetation type is CR with a conservation target of 26% with very few nature reserves conserving this vegetation type. Approximately 90% of this vegetation type has been transformed into agricultural and built-up land uses, (Mucina & Rutherford, 2006) (extracted fromThe Biodiversity Company (2019)).

The Swartland Granite Renosterveld is distributed entirely within the Western Cape Province, 'Discrete areas in the Swartland and Boland: largest patch centred on Darling from Ratelberg in the north to Dassenberg near Mamre and Pella; several centred on Malmesbury from Darmstadt in the north to the lower slopes of the Perdeberg (and small patches to the west towards Atlantis); east of Wellington from Micha to Valencia, lower surrounds of Paarl Mountain; Joostenberg, Muldersvlei, Bottelaryberg, Papegaaiberg (Stellenbosch West), to Firgrove and northern Somerset West. Altitude 50–350 m (Mucina and Rutherford, 2012).

Figure 2-4: Proposed pipeline traverses the Papegaaiberg Nature Reserve.

Furthermore, the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEMBA) provides for listing of threatened or protected ecosystems in one of the following categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The vegetation type found within this section, Swartland Granite Renosterveld (FRg2) and Swartland Shale Renosterveld (FRs9) are listed as CR. CR defines ecosystems that have undergone severe degradation of ecological structure, function or composition as a result of human intervention and are subject to an extremely high risk of irreversible transformation (Government Gazette, 2011).

The area also falls with the Cape Winelands and Stellenbosch zone within Western Cape Biodiversity Spatial Plan (WCBSP) and the section of pipeline traverses an area listed as CBA 2 (Terrestrial – Degraded) (refer to Figure 2-2). The WCBSP is the product of a systematic biodiversity planning assessment that delineates CBAs, ESAs and Other Natural Areas (ONA) which require safeguarding to ensure the continued existence and functioning of species and ecosystems, including the delivery of ecosystem services, across terrestrial and freshwater realms.

These spatial priorities are used to inform sustainable development in the Western Cape Province. This product replaces all previous systematic biodiversity planning products and sector plans with updated layers and features. According to the definition for CBA 2 areas these are, 'Areas in degraded or secondary conditions that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure'. As such the management objective is listed as, 'maintain in a natural or near-natural state, with no further loss of habitat. Degraded areas should be rehabilitated. Only low-impact, biodiversity-sensitive land-uses are appropriate' (extracted from NCC Environmental Services (Pty) Ltd, 2019)).

Lastly, Custodians of Rare and Endangered Wildflowers (CREW) collect specific monitoring information when surveying South Africa's plants of conservation concern. According to CREW the species of conservation concern within the vicinity of the proposed Project area are indicated in Table 2-1.

Table 2-1: List of species of conservation concern within the vicinity of the proposed Project area

Species	Common Name	Status
Phylica strigulosa	Heath Phylica, Ericoid Phylica, hardebos	VU
Xiphotheca lanceolata	Swartland Silverpea	VU
Moraea versicolor	Midday Clockflower	VU
Aristea lugens	Black-lug Capeblue	EN
Muraltia macropetala	Bigflower Purplegorse	VU
Lotononis prostrata	Unknown	NT
Aspalathus muraltioides	Unknown	EN

Invasive Alien Vegetation (IAV) found primarily comprises a dense infestation of young *Acacia saligna saplings* (Category 1b[5] NEM:BA), on the lower section and non-listed annual exotic grass species such as *Bromus diandrus*, *Avena fatua*, *Euphorbia helioscopa* and *Briza maxima*.

Wetland Baseline

The wetland areas were delineated by a Wetland & Aquatic Ecologist in accordance with the Department of Water Affairs and Forestry (DWAF) (now named the Department of Water and Sanitation (DWS)) (2005) guidelines (see Figure 2-5). During the field survey, one (1) wetland type, an unchannelled valley bottom wetland, was identified for the assessment.

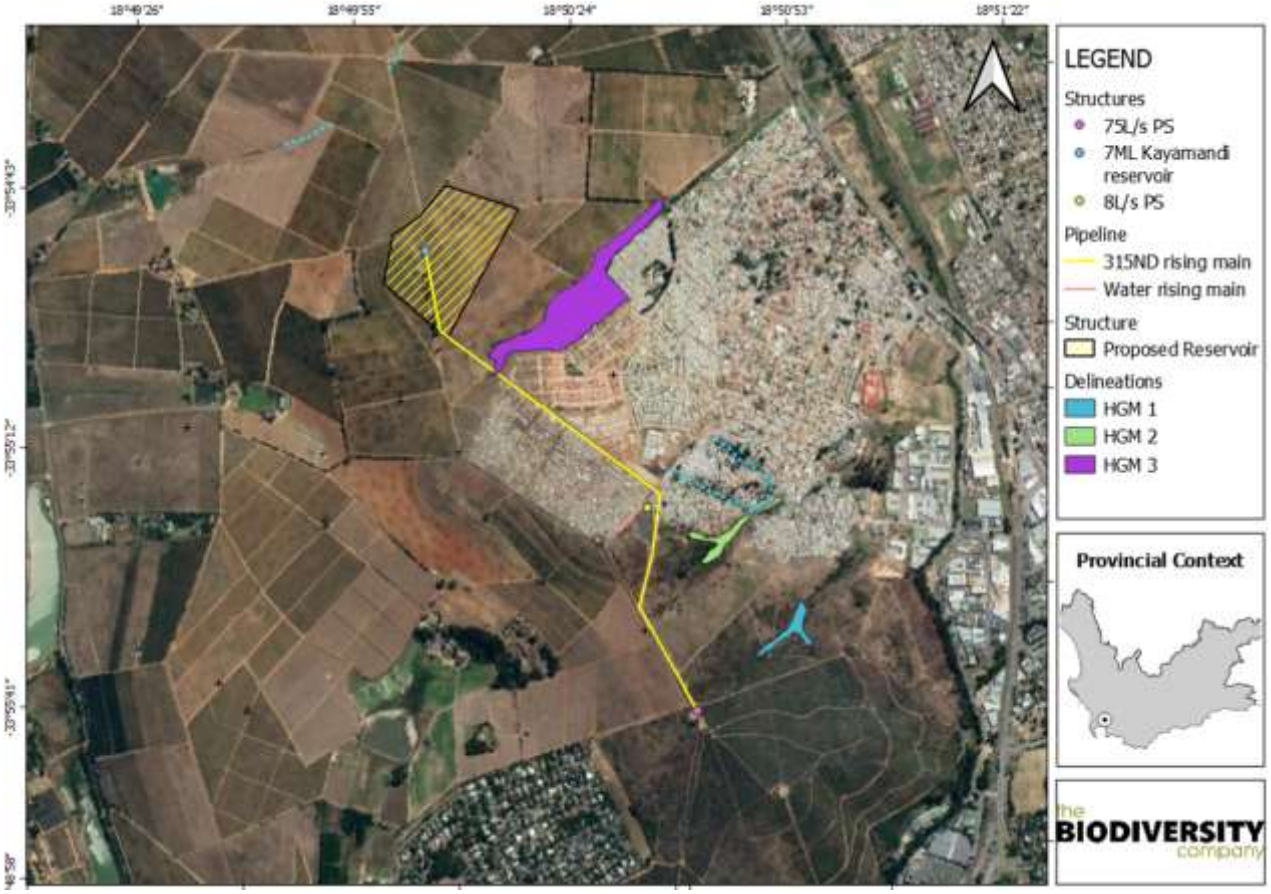

Figure 2-5: Delineation of wetlands within Kayamandi Bulk Water Project area

5 Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.

A total of three (3) hydrogeomorphic (HGM) units were also identified, delineated and assessed for the project (refer to Figure 2-5). A series of drainage lines were also identified and delineated for this assessment. The proposed pipeline will however traverse only a single HGM unit, namely HGM 3. The remaining two (2) HGM units will not be traversed and are at a lower risk due to the distance of these systems from the proposed infrastructure (> 100 m).

The general ecosystem function and ecological services provided by HGM 3 is indicated in Table 2-2. The average ecosystem services score was determined to be "Intermediate" for HGM 3. The lowest ecosystem service score for HGM 3 was *provisioning of cultivated foods* at a score of 0.2 and the highest score was determined to be Water Quality Enhancement benefits in the role of *Phosphate assimilation* and *Nitrate assimilation* at a score of 2.2 for both. The ecosystem services provided by the wetlands identified on site were assessed and rated using the WET-EcoServices method (Kotze, Marneweck, Batchelor, Lindley, & Collins, 2008).

Table 2-2: The ecosystem services being provided by HGM 3

Wetland Unit					HGM 3
Ecosystem Services Supplied by Wetlands	Indirect Benefits	Regulating and supporting benefits	Flood attenuation		2.1
			Streamflow regulation		1.8
			Water Quality enhancement benefits	Sediment trapping	2.1
				Phosphate assimilation	2.2
				Nitrate assimilation	2.2
				Toxicant assimilation	2.1
				Erosion control	2.1
			Carbon storage		1.7
	Direct Benefits	Biodiversity maintenance			1.4
		Provision benefits	Provisioning of water for human use		1.1
			Provisioning of harvestable resources		0.8
			Provisioning of cultivated foods		0.2
		Cultural benefits	Cultural heritage		0.5
			Tourism and recreation		0.6
			Education and research		0.6
Average Eco Services Score					1.4

The Ecological Importance and Sensitivity (EIS) for HGM 3 was determined based on the presence of the CR Swartland Shale Renosterveld (FRs 9) vegetation type and the two (2) National Freshwater Ecosystem Priority Areas (NFEPA) wetland systems (artificial) within the unit (Table 2-3).

Table 2-3: The EIS results for the delineated HGM 3 unit

Wetland Importance & Sensitivity	HGM 3 Importance
Ecological importance and sensitivity	1.8
Hydrological/functional importance	2.0
Direct human benefits	0.6

The Ecological Health Assessment (EHA) was assessed using the WET-Health methodology in order to determine the Present Ecological State (PES). The PES for HGM 3 has a rating of E which describes that a change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable. Refer to Table 2-4 for HGM 3's PES results.

Table 2-4: Summary of the scores for the HGM 3 PES

Component	PES Rating	Description
Hydrology	E	Seriously Modified: Aspects which have altered the hydrology include: Urban development and development of the larger catchment, Stormwater inputs, The creation of impoundments within the system, Erosion and incision of the watercourse.
Geomorphology	D	Largely Modified: The system has been encroached upon by agricultural activities and the adjacent settlement, this has caused a narrowing of the channelled reaches. The channel adjacent to the settlement is also relatively straight, with limited meandering potential. The dam has resulted in an inundated area, causing an expanse of the system.
Vegetation	D	Largely Modified: Alien vegetation and impacts attributed to human activities and the clearing of vegetation was noted to have further impacted on the ecological condition/function of the vegetation composition.
Overall	E	The change in ecosystem processes and loss of natural habitat and biota is great, but some remaining natural habitat features are still recognizable.

It should be noted that subsequent to the site visit, the pipeline route was extended from Kayamandi reservoir to Papegaaiberg Reservoir. The specialist updated their study by considering desktop information on water resources within 500m of the new additional route section. Only a perennial river (surface water resource) was identified > 100m to the south of the proposed project activity and no wetlands identified. It is recommended that prior to construction an aquatic specialist does a site walk over prior to construction to verify the desktop information.

Conclusion

From a botanical perspective the project area (i.e. the minimum pipeline (trench) corridor of 6.5 m wide and construction footprint of 20m wide) transecting the Papegaaiberg Nature reserve is invaluable due to the critically endangered vegetation type present (regardless of the condition of this vegetation). Although no species of conservation concern were found it is still a high likelihood that these may be present within the corridor. Any development within this vegetation type will thus have a high impact and thus should be avoided as much as possible. In the areas where clearance of vegetation cannot be avoided then it is recommended that the area is restored and rehabilitated once construction is complete. Clearance of vegetation outside of the construction footprint (i.e. the movement of vehicles alongside the trench) must be minimised and clearance of this vegetation should be avoided). This is in line with its biodiversity spatial planning status and listing (NCC Environmental Services (Pty) Ltd, 2019).

From a wetland perspective the proposed pipeline will traverse a single HGM unit, namely HGM 3 The average ecosystem services score was determined to be “Intermediate” for HGM 3. The integrity (or health) of the unit is “Seriously Modified”. The ecological importance and sensitivity of the three systems was determined to be Moderate. Taking into consideration the proposed development and the associated threats, a buffer width of 15 m was determined to be suitable for the three wetland areas (The Biodiversity Company , 2019).

2.7 LAND USE OF THE SITE

Note: The Department may request specialist input/studies depending on the nature of the land use character of the area and potential impact(s) of the proposed development.

Untransformed area	Low density residential	Medium density residential	High density residential	Informal residential
Retail	Commercial & warehousing	Light industrial	Medium industrial	Heavy industrial
Power station	Office/consulting room	Military or police base/station/compound	Casino/entertainment complex	Tourism and Hospitality facility
Open cast mine	Underground mine	Spoil heap or slimes dam	Quarry, sand or borrow pit	Dam or reservoir
Hospital/medical centre	School	Tertiary education facility	Church	Old age home
Sewage treatment plant	Train station or shunting yard	Railway line	Major road (4 lanes and more)	Airport
Harbour	Sport facilities	Golf course	Polo fields	Filling station
Landfill or waste treatment site	Plantation	Agriculture	River, stream or wetland	Nature conservation area
Mountain, koppie or ridge	Museum	Historical building	Graveyard	Archaeological site
Other land uses (describe):	Cell phone mast (Vodacom)			

(a) Provide a description.

The proposed site is currently used for agriculture and services (Vodacom/Black Fibre cell phone mast and cables), while the pipeline crosses agricultural land, open degraded land, informal residential areas (Watergang / Azania) and a section that traverses the Papegaaiberg Nature Reserve.

2.8 LAND USE CHARACTER OF THE SURROUNDING AREA

(a) Highlight the current land uses and/or prominent features that occur within +/- 500m radius of the site and neighbouring properties if these are located beyond 500m of the site.

Note: The Department may request specialist input/studies depending on the nature of the land use character of the area and potential impact(s) of the proposed development.

Untransformed area	Low density residential	Medium density residential	High density residential	Informal residential
Retail	Commercial & warehousing	Light industrial	Medium industrial	Heavy industrial
Power station	Office/consulting room	Military or police base/station/compound	Casino/entertainment complex	Tourism and Hospitality facility
Open cast mine	Underground mine	Spoil heap or slimes dam	Quarry, sand or borrow pit	Dam or reservoir

Hospital/medical centre	School	Tertiary education facility	Church	Old age home
Sewage treatment plant	Train station or shunting yard	Railway line	Major road (4 lanes and more)	Airport
Harbour	Sport facilities	Golf course	Polo fields	Filling station
Landfill or waste treatment site	Plantation	Agriculture	River, stream or wetland	Nature conservation area
Mountain, koppie or ridge	Museum	Historical building	Graveyard	Archaeological site
Other land uses (describe):	N/A			

(b) Provide a description, including the distance and direction to the nearest residential area, industrial area, agri-industrial area.

The proposed Project is located approximately 3 km north of Stellenbosch town western edge. The proposed pipeline is immediately surrounded the informal residential areas (Watergang / Azania) on either side. The southernmost side of the proposed pipeline and reservoir site is surrounded by the Papegaaiberg Reserve.

2.9 SOCIO-ECONOMIC ASPECTS

a) Describe the existing social and economic characteristics of the community in the vicinity of the proposed site, in order to provide baseline information (for example, population characteristics/demographics, level of education, the level of employment and unemployment in the area, available work force, seasonal migration patterns, major economic activities in the local municipality, gender aspects that might be of relevance to this project, *etc*.).

The baseline profile of the receiving socio-economic environment is presented in this section. The first two sections focus on the socio-economic characteristics of the regional and local study areas, while the third section describes the site-specific study area. These study areas were defined in Section 1. Where necessary, the socio-economic trends in the respective study areas are compared against trends in larger administrative areas; this provides additional context for interpretation. The final section presents a summary of pertinent socio-economic attributes of the study area. This summary also highlights the relevance of these pertinent attributes for this study and for the proposed Project.

2.9.1 GOVERNANCE AND ADMINISTRATIVE CONTEXT

The Stellenbosch Local Municipality has an Executive Mayor supported by a Municipal Manager who is appointed by the Stellenbosch Council. The Municipality's administrative structure also consists of proportionally elected councillors and ward councillors who are responsible for representing the needs of the people. The population within each ward is represented by the ward councillor and a ward committee.

2.9.2 DEMOGRAPHIC CHARACTERISTICS AND POPULATION DISTRIBUTION

The Stellenbosch Municipality had a population of approximately 155 700 people in 2016, of which approximately 25 000 lived in Kayamandi and approximately 8 000 in Ward 12 (StatsSA, 2016). The population particularly in Ward 12 has increased further since then. The Coloured population group makes up more than half of the Stellenbosch Municipality's population, but Kayamandi is almost exclusively inhabited by Black Africans (Table 2-5).

Table 2-5: Population groups in Stellenbosch Municipality and Kayamandi

Population group	Stellenbosch Municipality	Kayamandi			
		Ward 12	Ward 13	Ward 14	Ward 15
Black African	28.3%	97.%%	92.3%	96.5%	93.4%
Coloured	52.7%	2.7%	7.5%	3.3%	6.2%
Indian / Asian	0.4%	0.1%	0.0%	0.0%	0.1%
White	18.6%	0.0%	0.2%	0.2%	0.3%
***Source:* StastSA (2016)**					

This population comprise of approximately 43 420 households, with each household comprising 3.3 household members on average (StatsSA, 2011). In terms of distribution, the population is scattered across different settlement types with the highest density of people in urban areas, such as Cloetesville, Plankenberg and Kayamandi. Farm settlement types make us 23.4 % of the distribution in Stellenbosch. The population distribution is indicated by density, which is also indicative of the potential pressure that human occupation might exert on often limited municipal services and resources. Human settlement within the local study area is characterised by two contrasting settlement patterns. Most of the land is largely populated with an average occupation rate of 187 person per km^2 (Table 2-6).

Table 2-6: Settlement types for the Stellenbosch Local Municipality

Area	Percentage
Urban	76,6%
Tribal/Traditional	0%
Farm	23,4%
***Source:* StatsSA (2011)**	

The age profile of the regional population shows that almost 72.3% of the population were aged between 15-64 years in 2011, followed by those aged between 0-14 years at 22.8% and then by the elderly (65+) with a percentage of 4.9% ((StatsSA, 2011)) (Figure 2-6).

The gender distribution shows an almost equal split between males and females recorded at 48.9% and 51.1 % respectively. Racially the population comprises mostly Coloured (52.2%) followed by Black African (28.1%) individuals, refer to Figure 2-7. Prominent languages spoken in the study area include Afrikaans and English (StatsSA, 2011).

The level of education among the regional population is relatively low, with 17.1% having completed Grade 12 and 2.4% having no formal education (StatsSA, 2011).

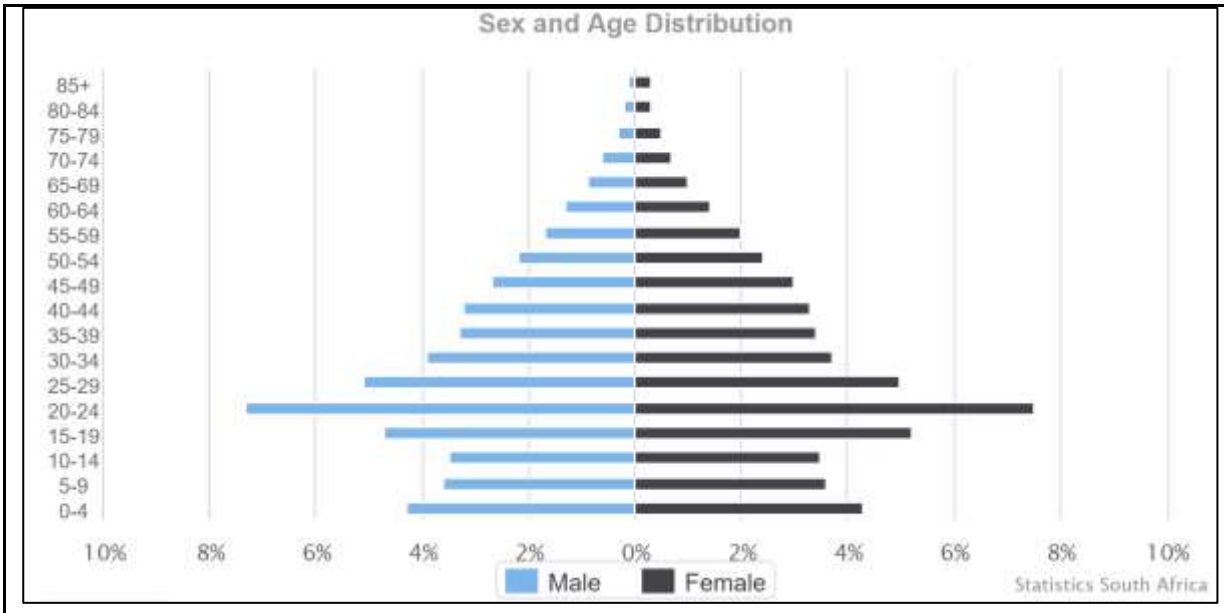

Figure 2-6: Sex and Age Distribution at the Stellenbosch Local Municipality

Source: StatsSA (2011)

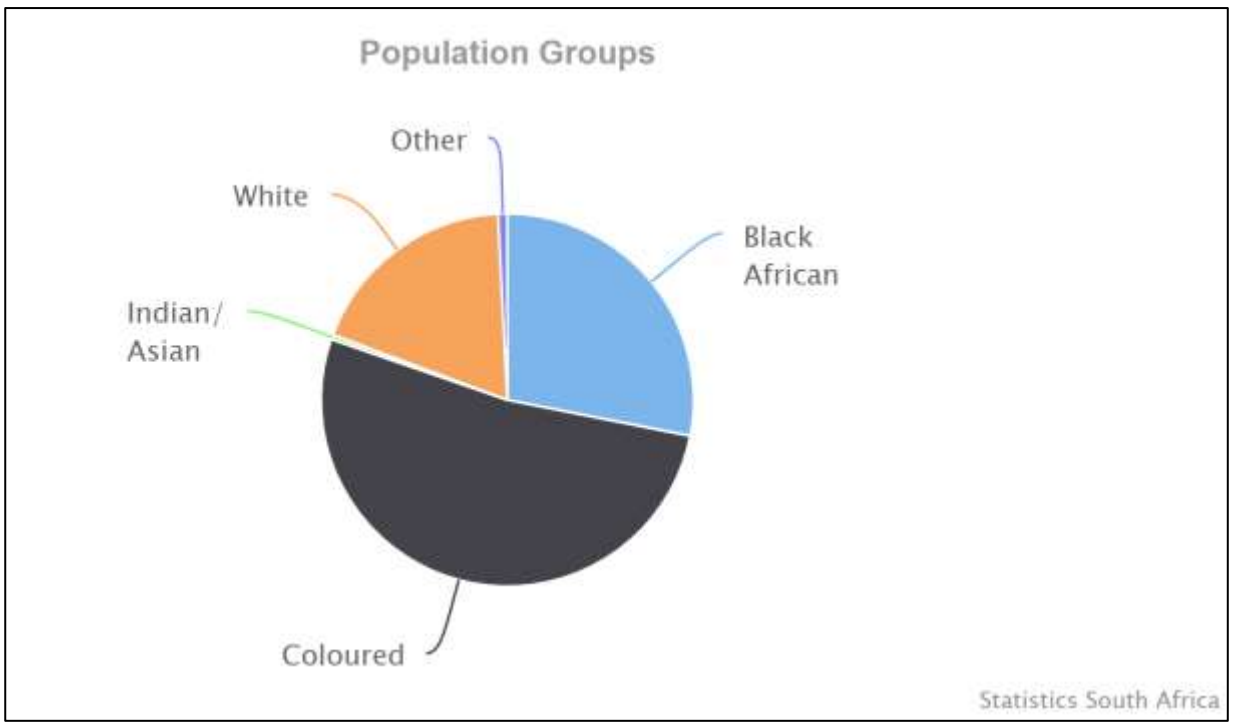

Figure 2-7: Population Group Distribution for Stellenbosch Local Municipality

Source: StatsSA (2011)

2.9.3 OVERVIEW OF THE ECONOMY AND EMPLOYMENT

Of the economically active portion of the population within the Stellenbosch Local Municipality (those aged between 15 and 64 years), only 21.5% are employed, while 15.2% unemployed (Figure 2-8). People in the latter category are typically students or homemakers. The unemployment rate is 15.2%, while the youth unemployment rate is 21.5%.

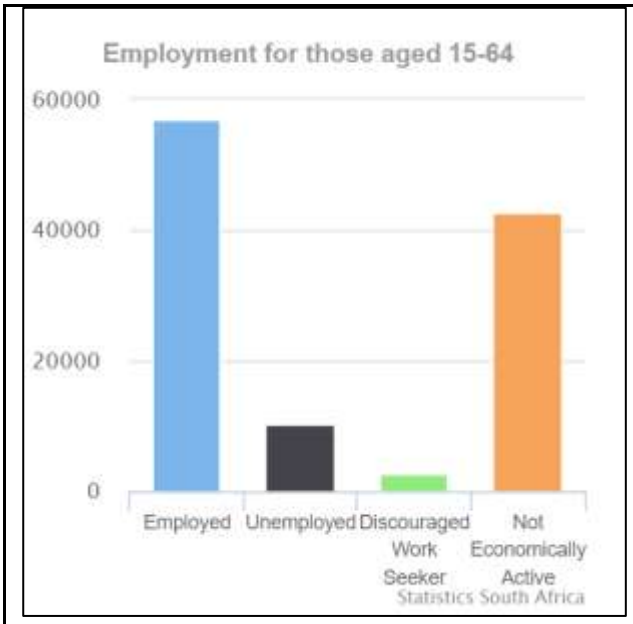

Figure 2-8: Employment data for the economically active portion of the population within the Stellenbosch Local Municipality

Source: StatsSA (2011)

The study area boasts a relatively diverse and growing economy, which has increased by 2.8% between 2005 and 2015 (Stellenbosch Local Municiplaity, 2017). In 2015, the Stellenbosch Local Municipality's Gross Domestic Product (GDP) was recorded at R 13.5 billion. There are five (5) main economic contributors in the Stellenbosch Local Municipality instrumental to the employment pattern of the area, namely (1) Finance, insurance, real estate and business services, (2) Wholesale and retail trade, catering and accommodation, (3) Manufacturing, (4) Transport, storage and communication, and (5) General government .Table 2-7 illustrates the contribution of each these sectors. The Stellenbosch Local Municipality's GDP for the region growth was recorded to be 3.2 in 2011, 2.5 in 2013 and 1.6 in 2015. The greatest contributor to employment is the Wholesale and retail trade, catering and accommodation sector which provided approximately 20 030 jobs in 2015, followed by Finance, insurance, real estate and business services sector which contributed 11 504 jobs in 2015 (Stellenbosch Local Municiplaity, 2017).

Table 2-7: Contribution to GDP from the four main economic sectors

No.	Economic Sector	Contribution to employment	Number of jobs in 2015	Contribution to reginal GDP (million)
1.	Finance, insurance, real estate and business services	15.3%	11 504	R 2 925.4
2.	Wholesale and retail trade, catering and accommodation	26.6%	20 030	R 2 736.0 4
3.	Manufacturing	10.4%	7 854	R 2 303.3
4.	Transport, storage and communication	5.7%	4 281	R 1 497.1
5.	General government	10.0%	7 564	R 1 441.1
Source: Stellenbosch Local Municipality (2017)				

2.9.4 SERVICE DELIVERY

According to the Stellenbosch Local Municipality IDP (2019) for 2017-2022 and SDF (2018) there are considerable infrastructure backlogs equating to a funding requirement of R 1 billion that is preventing the development of current and future housing projects. Furthermore, there is a backlog in the maintenance of infrastructure with 38.6% of the water supply infrastructure and 43.8% of the sanitation infrastructure in a poor condition. These backlogs are mostly limited to middle- and upper-income households, including Kayamandi. The Stellenbosch Local Municipality IDP (2019) for 2017-2022 lists several strategies to address these backlogs, which includes an integrated human settlement plan and a water services development plan.

2.9.5 ACCESS TO WATER, SANITATION AND ENERGY

Most domestic water supply within the regional study area is provided by regional water schemes. Most households (80.5 %) have access to piped water; and 72.4 % have access to water inside their dwellings (StatsSA, 2011). This is slightly lower than the national average of 88.8%. Access to sanitation is relatively good, with almost 87.1% of households having access to flush facilities, with the remainder relying mostly on flush toilet (with septic tank), chemical toilet and even bucket toilets (StatsSA, 2011).

Table 2-8: Toilet facility types within the Stellenbosch Local Municipality

	Toilet Facility	Percentage
1.	Pit toilet without ventilation	0.4%
2.	Pit toilet with ventilation	0.5%
3.	Chemical toilet	0.7%
4.	Other	2.1%
5.	None	2.4%
6.	Bucket toilet	2.6%
7.	Flush toilet (with septic tank)	3.9%
8.	Flush toilet (connected to sewerage system)	87.1%
Source: StatsSA, 2011		

In 2016, most households indicated that they have access to electricity, with 98.1% indicating that they use electricity for lighting purposes (Stellenbosch Local Municipality, 2019) as indicated in Table 2-9. Many households especially those in economically depressed/rural areas, however, still rely on alternate energy sources (for example gas and paraffin) for heating and cooking purposes (StatsSA, 2011).

Table 2-9: Energy or fuel for cooking, heating and lighting

Energy Source	Cooking	Heating	Lighting
Electricity	87.5%	67.5%	92.9%
Gas	6.3%	2.1%	0.4%
Paraffin	4.2%	9.6%	4.1%
Solar	0.1%	0.3%	0.1%
Candles	0%	0%	2.1%
Wood	1.2%	6.5%	0%
Coal	0%	0.1%	0%
Animal Dung	0%	0%	0%
Other	0.3%	0%	0%%
None	0.1%	13.9%	0.4
Source: StatsSA, 2011			

2.9.6 HOUSING AND TENURE

The majority of households (75.1%) within the regional study area reside in formal dwellings (StatsSA, 2011). The remaining households mostly reside in informal dwellings, which is also an indicator of population influx and shortage of affordable housing. In terms of ownership, just more than 25.6% have full ownership on their dwellings and property, while another third is still paying off their dwellings or reside in rented dwellings (StatsSA, 2011) (Figure 2-9).

The Regional study area is experiencing a considerable housing shortage, especially when the apparent recent double growth in population sizes in Kayamandi is considered. Recent data indicates that the municipality requires more than R 1+-billion to eradicate the current housing backlog. Strategies are in place to address this backlog (Stellenbosch Local Municipality, 2018).

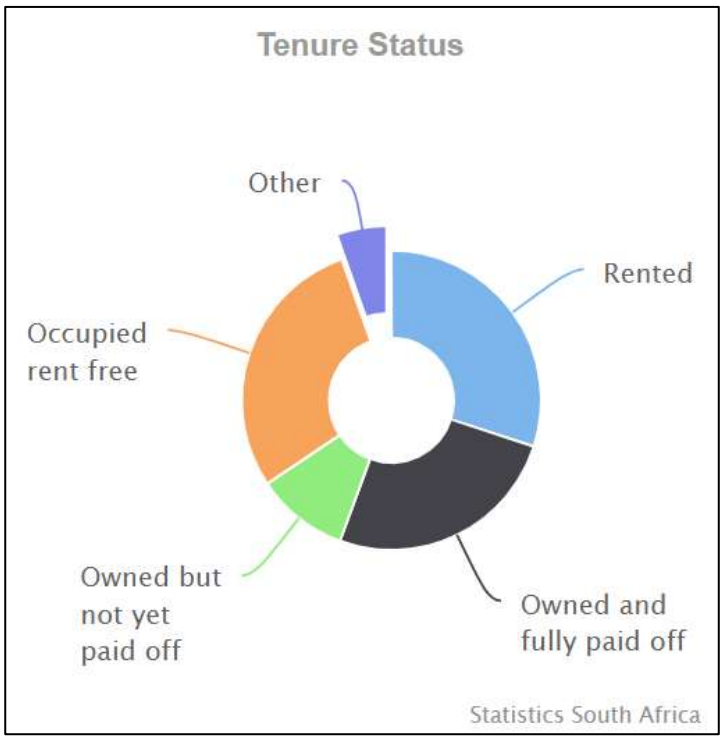

Figure 2-9: Tenure status at the Stellenbosch Local Municipality

Source: StatsSA (2011)

2.9.7 SPATIAL DEVELOPMENT

The Stellenbosch Municipality SDF was adopted by the Council on 28 May 2018. The purpose of a spatial framework for the city is to be a tool to integrate all aspects of spatial planning such as land use planning; planning of a pedestrian, vehicular and other movement patters; planning regarding buildings and built-up areas; planning of open space systems; planning of roads and other service infrastructure; as well as to guide all decision-making processes regarding spatial development.

The SDF is guided and informed by the Provincial Spatial Development Framework (PSDF), which proposes future spatial structure for the Province with regard to the location and nature of the physical development in the province. Three (5) spatial agendas are identified in the PSDF:

- Growing the Western Cape economy in partnership with the private sector, non-governmental and community-based organisations.
- Using infrastructure investment as primary lever to bring about the required urban and rural spatial transitions.
- Improving oversight of the sustainable use of the western cape's spatial assets.

2.9.8 COMMUNITY NEEDS AND SOCIAL DEVELOPMENT

The following Capital Budget Project have been identified by the affected ward representatives for the year 2018/2020, these projects are not limited to the below list and are not presented in any particular order (Table 2-10).

Table 2-10: Capital Budget Projects for the four (4) affected wards

Wards	Capital Budget Projects
Ward 11	Relocation of powerline that currently falls within the landfill site.
	Rebuild of the Kleine Libertas Complex
	Stellenbosch Main – 10 Mega Volt Amp (MVA) Transmission line upgrade at Jan Marais
Source: Stellenbosch Local Municipality, 2018	
Ward 12	Kayamandi: Watergang and Zone O housing development project
	Establishment of Informal Trading Sites in Kayamandi
	Development of a New Reservoir for the Kayamandi Northern Extension
Source: Stellenbosch Local Municipality, 2018	
Ward 13	Kayamandi: Watergang and Zone O housing development project
	Northern Extension: Feasibility Study for Kayamandi
	Stormwater Drainage Project – Kayamandi and Enkanini
Source: Stellenbosch Local Municipality, 2018	
Ward 15	Kayamandi Pedestrian Crossing (R304, River and Railway Line)
	Development of a Taxi Rank - Kayamandi
	Informal Settlement Support Programme (ISSP) Kayamandi Enkanini (1300 sites)
Source: Stellenbosch Local Municipality, 2018	

2.10 HISTORICAL AND CULTURAL ASPECTS

(a) Please be advised that if section 38 of the NHRA is applicable to your proposed development, you are requested to furnish this Department with written comment from Heritage Western Cape as part of your public participation process. Heritage Western Cape must be given an opportunity, together with the rest of the I&APs, to comment on any Pre-application BAR, a Draft BAR, and Revised BAR.

Section 38 of the NHRA states the following:

"*38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-*

(a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;

(b) the construction of a bridge or similar structure exceeding 50m in length;

(c) any development or other activity which will change the character of a site-

(i) exceeding 5 000m^2 in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources

authority;

(d) the re-zoning of a site exceeding 10 000m^2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority,

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development".

(b) The impact on any national estate referred to in section 3(2), excluding the national estate contemplated in section 3(2)(i)(vi) and (vii), of the NHRA, must also be investigated, assessed and evaluated. Section 3(2) states the following:

"*3(2) Without limiting the generality of subsection (1), the national estate may include—*

(a) places, buildings, structures and equipment of cultural significance;

(b) places to which oral traditions are attached or which are associated with living heritage;

(c) historical settlements and townscapes;

(d) landscapes and natural features of cultural significance;

(e) geological sites of scientific or cultural importance;

(f) archaeological and palaeontological sites;

(g) graves and burial grounds, including—

(i) ancestral graves;

(ii) royal graves and graves of traditional leaders;

(iii) graves of victims of conflict;

(iv) graves of individuals designated by the Minister by notice in the Gazette;

(v) historical graves and cemeteries; and

(vi) other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);

(h) sites of significance relating to the history of slavery in South Africa;

(i) movable objects, including—

(i) objects recovered from the soil or waters of South Africa, including archaeological and paleontological objects and material, meteorites and rare geological specimens;

(ii) objects to which oral traditions are attached or which are associated with living heritage;

(iii) ethnographic art and objects;

(iv) military objects;

(v) objects of decorative or fine art;

(vi) objects of scientific or technological interest; and

(vii) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996)".

Is Section 38 of the NHRA applicable to the proposed development?	YES	[redacted]
If YES or UNCERTAIN, explain:	"*38. (1) Subject to the provisions of subsections (7), (8) and (9), any person who intends to undertake a development categorised as-* *(a) the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;* *(c) any development or other activity which will change the character of a site-*	

Will the development impact on any national estate referred to in Section 3(2) of the NHRA?			NO	
If YES or UNCERTAIN, explain:	N/A			
Will any building or structure older than 60 years be affected in any way?			NO	
If YES or UNCERTAIN, explain:	N/A			
Are there any signs of culturally or historically significant elements, as defined in section 2 of the NHRA, including Archaeological or paleontological sites, on or close (within 20m) to the site?			NO	
If YES or UNCERTAIN, explain:	N/A			

Note: If uncertain, the Department may request that specialist input be provided **and** Heritage Western Cape (HWC) must provide comment on this aspect of the proposal. (Please note that a copy of the comments obtained from the Heritage Resources Authority must be appended to this report as Appendix E1).

2.11 APPLICABLE LEGISLATION, POLICIES, CIRCULARS AND/OR GUIDELINES

(a) Identify all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to the development proposal and associated listed activity(ies) being applied for and that have been considered in the preparation of the BAR.

LEGISLATION, POLICIES, PLANS, GUIDELINES, SPATIAL TOOLS, MUNICIPAL DEVELOPMENT PLANNING FRAMEWORKS, AND INSTRUMENTS	**ADMINISTERING AUTHORITY and how it is relevant to this application**	**TYPE Permit/license/authorisation/comment / relevant consideration** (*e.g.* rezoning or consent use, building plan approval, Water Use License and/or General Authorisation, License in terms of the SAHRA and CARA, coastal discharge permit, *etc.*)	**DATE** (if already obtained)**:**
National Environmental Management Act (No. 107 of 1998), as amended	Western Cape Department of Environmental Affairs and Development Planning. • Prior to the construction of the proposed infrastructure associated with the Project, Environmental Authorisation in compliance with The EIA Regulations (2014) published under GNR No. 982 and 984 is required.	Environmental Authorisation (this application)	Pending
National Water Act (No, 36 of 1998)	Department of Water and Sanitation. • The proposed site traverses a watercourse, which requires that a General Authorisation registration be submitted for the following water uses: – Section 21 c) impeding of diverting the flow of water in a watercourse; and – Section 21 i) altering the bed, banks, course or characteristics of a watercourse.	General Authorisation	Application has been started on eWULAAs and will be completed in May/June 2021
National Heritage Resources Act (No. 25 of 1999)	Heritage Western Cape. • The NHRA stipulates that a Heritage Impact Assessment (HIA) is required for	Notice of Intent to Develop	20 November 2019

LEGISLATION, POLICIES, PLANS, GUIDELINES, SPATIAL TOOLS, MUNICIPAL DEVELOPMENT PLANNING FRAMEWORKS, AND INSTRUMENTS	ADMINISTERING AUTHORITY and how it is relevant to this application	TYPE Permit/license/authorisation/comment / relevant consideration (*e.g.* rezoning or consent use, building plan approval, Water Use License and/or General Authorisation, License in terms of the SAHRA and CARA, coastal discharge permit, *etc.*)	DATE (if already obtained):
	undertaking any development or other activity which will change the character of a site: – exceeding 5 000 m^2 in extent; or – involving three or more existing erven or subdivisions thereof; or – involving three or more erven or divisions thereof which have been consolidated within the past five years.		

(b) Describe how the proposed development **complies with and responds** to the legislation and policy context, plans, guidelines, spatial tools, municipal development planning frameworks and instruments.

LEGISLATION, POLICIES, PLANS, GUIDELINES, SPATIAL TOOLS, MUNICIPAL DEVELOPMENT PLANNING FRAMEWORKS, AND INSTRUMENTS	Describe how the proposed development complies with and responds:	
The Constitution	Chapter	Bill of Rights
	Section 24	Environmental rights
	Section 25	Rights in property
	Section 32	This section provides that every person has the constitutional right of access to information held by the state, including for example a state department such as the Department of Environmental Affairs (DEA), and any information held by another person in so far as that information is required for the exercise or protection of any of their rights, including their environmental right.
	Section 33	The Constitution entitles everyone to administrative action that is lawful, reasonable and procedurally fair and if one's rights have been adversely affected by

LEGISLATION, POLICIES, PLANS, GUIDELINES, SPATIAL TOOLS, MUNICIPAL DEVELOPMENT PLANNING FRAMEWORKS, AND INSTRUMENTS	Describe how the proposed development complies with and responds:	
		administrative action one has the right to be given written reasons for the decision.
NEMA –EIA Regulations (2014) as amended in 2017	GN R 982, 983, and 985	The purpose of these Regulations is to standardise the environmental process and criteria as contemplated in Chapter 5 of NEMA relating to the preparation, assessment, submission, processing and consideration of, and decision on, applications for an Environmental Authorisation (EA) for the commencement of activities, subjected to environmental assessment. This Application for Environmental Authorisation is conducted in response to the provisions of the EIA Regulations.
National Water Act (No, 36 of 1998) (NWA) - General Authorisation (GA) in terms of Section 39 (Notice 509 of 2016)	This GA applies to the use of water in terms of section 21(c) or (i) of the NWA within the regulated area of a watercourse as defined in this GA. The proposed project entails concrete surface repairs, replacement of the bridge joints as well as repairs on two culverts.	
National Environmental Management: Waste Act (No. 59 of 2008)	Section 16	General duty in terms of waste management. Prescribed 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 is included in the draft EMPr (Appendix H).
	Section 17	Reduction, re-use, recycling and recovery of waste. Prescribed 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 is included in the draft EMPr (Appendix H).
	Section 20	No person may commence, undertake or conduct a waste management activity, except in accordance with: • the requirements or standards prescribed by said Act and Regulations; and • a waste management licence issued in respect of that activity, if a licence is required.
	Section 26	Prohibition of unauthorised disposal of waste. Prescribed 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 is included in the draft EMPr (Appendix H).

LEGISLATION, POLICIES, PLANS, GUIDELINES, SPATIAL TOOLS, MUNICIPAL DEVELOPMENT PLANNING FRAMEWORKS, AND INSTRUMENTS	Describe how the proposed development complies with and responds:	
	Section 27	Prohibition of littering. Prescribed 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 is included in the draft EMPr (Appendix H).
Occupational Health and Safety Act (No. 85 of 1993) and Regulations	General Administration Regulations GN R929 of June 2003	Material Safety Data Sheets must be made available at the request of any interested or affected party.
	Section 8	General duties of employers to their employees. Prescribed 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 is included in the draft EMPr (Appendix H).
	Section 9	General duties of employers and self-employed persons to persons other than their employees. Prescribed 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 is included in the draft EMPr (Appendix H).
National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)	The provisions of this Act would only be applicable during the construction phase of the project	
	Section 32	Measures for the control of dust. Prescribed 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 is included in the draft EMPr (Appendix H).
	Section 34	Measures for the control of noise. Prescribed 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 is included in the draft EMPr (Appendix H).
	Section 35	Measures for the control of offensive odours. Prescribed management mechanisms or methods for the prevention of undue or reasonably avoidable adverse environmental

LEGISLATION, POLICIES, PLANS, GUIDELINES, SPATIAL TOOLS, MUNICIPAL DEVELOPMENT PLANNING FRAMEWORKS, AND INSTRUMENTS	Describe how the proposed development complies with and responds:	
		impacts and for the enhancement of the positive environmental benefits of a development is included in the draft EMPr (Appendix H).
	Chapter 5	Licensing of listed activities. Prescribed 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 is included in the draft EMPr (Appendix H).
	Schedule 2	Ambient air quality standards. Prescribed 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 is included in the draft EMPr (Appendix H).
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)	Sections 65-69	These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species. Prescribed 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 is included in the draft EMPr (Appendix H).
	Sections 71 and 73	These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species. Prescribed 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 is included in the draft EMPr (Appendix H).
	Alien and Invasive Species Regulations in terms of section 97 (1).	
	Chapter 2	Categories of listed invasive species.
National Environmental Management: Protected Areas Act (No. 57 of 2003) (NEM:PAA)	The NEM:PAA was signed into law on 18 February 2004 and came into operation on 01 November 2004.The aim of the Act is to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes and seascapes. The Act operates in conjunction with the NEM:BA. Protected Areas have been identified and included in this draft Basic Assessment Report. These areas have informed	

LEGISLATION, POLICIES, PLANS, GUIDELINES, SPATIAL TOOLS, MUNICIPAL DEVELOPMENT PLANNING FRAMEWORKS, AND INSTRUMENTS	Describe how the proposed development complies with and responds:	
	the layout options for the proposed development, mitigation measures proposed and the recommendations by the EAP.	
Environment Conservation Act (No. 73 of 1989) and Regulations	Although the Environment Conservation Act has been substantially repealed by the NEMA and the NEM:WA, certain Regulations promulgated under the Act remain in effect. Of importance are the National Noise Control Regulations	
Hazardous Substances Act (No. 15 of 1973)	Provides for the definition, classification, use, operation, modification, disposal or dumping of hazardous substances. Prescribed 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 is included in the draft EMPr (Appendix H).	
Spatial Planning and Land Use Management Act (No. 16 of 2013)	• Framework Act for all spatial planning and land use management legislation. • Provide for a uniform, effective and comprehensive system of spatial planning and land use management for the Republic. • Ensure that the system of spatial planning and land use management promotes social and economic inclusion. • Provide for development principles and norms and standards. • Provide for the sustainable and efficient use of land. • Provide for cooperative government and intergovernmental relations amongst the national, provincial and local spheres of government. • Redress the imbalances of the past and to ensure that there is equity in the application of spatial development planning and land use management systems. The proposed project is aligned to the Stellenbosch Municipality's Integrated Development Plan (IDP) (Stellenbosch Local Municipality, 2019) and is in support of housing and development schemes over the next couple of years.	
National Road Traffic Act (No. 93 of 1996) and Regulations	Section 54	Transportation of dangerous goods.
South African National Standards (SANS) 1929: Ambient air quality – limits for common pollutants, 2011	This standard indicates limit values for common air pollutants. The air particles in this project will be typical of a road upgrade.	
SANS 10103: The measurement and rating of environmental noise with respect to land use, health, annoyance and to speech communication, 2008	This standard covers methods and gives guidelines to assess working and living environments with respect to possible annoyance by noise. The noise generated for this project will be typical of a road upgrade.	
DEA&DP - Guideline Document: Guideline on Public Participation, 2013	The public participation requirements contained in Chapter 6 of the NEMA EIA Regulations were interpreted in conjunction with the recommendations contained in this guideline during the design of the Public Participation approach to the project.	
Guideline on Environmental Management Plans (June 2005)	The Environmental Management Plan/ Programme (EMPr) Guideline was consulted to ensure that the EMPr has been adequately compiled (please refer to Appendix H for EMPr).	

LEGISLATION, POLICIES, PLANS, GUIDELINES, SPATIAL TOOLS, MUNICIPAL DEVELOPMENT PLANNING FRAMEWORKS, AND INSTRUMENTS	Describe how the proposed development complies with and responds:	
Guideline on Specialist Studies (October 2005)	The specialist study conducted for the purpose of this report was reviewed and summarized by the EAP with the help of this guideline.	
IDP for the Stellenbosch Municipality 2017-2022 (May 2017)	The BA process considered the planning policies that govern the study area to ensure that the scale, density and nature of activities/developments are harmonious and in keeping with the sense of place and character of the area.	
Stellenbosch Municipality SDF (May 2018)		
Stellenbosch Municipality Environmental Management Framework (EMF) (September 2018)		
Stellenbosch Municipality Zoning Scheme By-Law (2018)	The municipality is aiming to facilitate the development of ±4 000 to 6 000 residential opportunities as well as providing the required social and amnesties and public services required to support the development. This by-law indicates that rezoning of properties from "Agricultural" to the required and suitable zoning as prescribed.	
Stellenbosch Municipality Air Quality By-Law (June 2017)	This by-law is to ensure that air pollution is avoided, or where it cannot be altogether avoided, minimized and remedied within the municipality.	
Stellenbosch Municipality By-Law Relating to Plantations, Parks, Gardens, Recreation Facilities and Nature Reserves	Section 3	This section provides general prohibition for any person who is in contact with nature reserves that are vested in or under the control of the council
	Section 4	Powers of the Council
	Section 6	Liability of the council
	Section 7	This section sets out penalties that can be imposed to any person who contravenes any provision of this by-law.
Stellenbosch Municipality Noise Control Policy (July 2018)	Section 3	**Complaints** This section sets out the procedure that is undertaken to deal with noise related complaints.
	Section 4	**Disturbing Noise Procedure** Should residual noise level differ by 10 dBA from the rating level then a disturbing noise procedure will be executed. SANS 10103 is used in the case of low frequency noise that exceeds the level specified.
	Section 5	**Noise Nuisance Procedure**
	Section 6	**Machinery in Residential Areas** An investigating officer is appointed to measure noise levels, should the noise levels exceed 50 dBA a written instruction will be issued to the responsible person to mitigate the noise.

LEGISLATION, POLICIES, PLANS, GUIDELINES, SPATIAL TOOLS, MUNICIPAL DEVELOPMENT PLANNING FRAMEWORKS, AND INSTRUMENTS	Describe how the proposed development complies with and responds:	
	Section 10	This section sets out the procedure for lodging an application for the installation of synchronised generator units to the Noise Control officer for comment.
	Section 11	**Construction noise** When dealing with building construction noise complaints, should the noise be within the permitted National Building Control Regulation hours,
Stellenbosch Municipality Alien Invasive Plants Management Plan	The purpose of this document is to: • Ensure that the municipality has a strategy to manage and conserve biological diversity. • To assist the municipality in responding to the obligation of invasive alien plant (IAP) management and to coordinate its approach in this regard.	
Air Quality Management Plan (AQMP) for the Stellenbosch Municipality (August 2013)	The Stellenbosch AQMP has been developed in terms of the NEM: AQA with the fooling goals: • Air quality governance meets requirements to effectively implement the AQMP • Reduce atmospheric emissions of harmful pollutants. • Systems and tools are established to effectively implement the AQMP. • The AQMP sets out ambient air quality standards according to national criteria.	
Cape Winelands District Municipality- Personal Protective Equipment (PPE) policy for road Maintenance and Mechanical Workshop Employees, 2015	The purpose if this policy is to: • Standardize PPE issued to all Provincial Road Maintenance employees, and • Assist in the safe management of risks in the working environment.	

Note: Copies of any comments, permit(s) or licences received from any other Organ of State must be attached to this report as **Appendix E**.

3 SECTION C: PUBLIC PARTICIPATION

The PPP must fulfil the requirements outlined in the NEMA, the EIA Regulations, 2014 (as amended) and if applicable, the NEM: WA and/or the NEM: AQA. This Department's Circular DEADP 0028/2014 (dated 9 December 2014) on the "One Environmental Management System" and the EIA Regulations, any subsequent Circulars, and guidelines must also be taken into account.

1. Please highlight the appropriate box to indicate whether the specific requirement was undertaken or whether there was an exemption applied for.

In terms of Regulation 41 of the EIA Regulations, 2014 (as amended) -			
(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of -			
(i) the site where the activity to which the application relates, is or is to be undertaken; and	YES		
(ii) any alternative site Please note that there is only one site for the proposed development.			N/A
(b) giving written notice, in any manner provided for in Section 47D of the NEMA, to –			
(i) the occupiers of the site and, if the applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;	YES		
(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;	YES		
(iii) the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;	YES		
(iv) the municipality (Local and District Municipality) which has jurisdiction in the area;	YES		
(v) any organ of state having jurisdiction in respect of any aspect of the activity; and	YES		
(vi) any other party as required by the Department;	YES		
(c) placing an advertisement in -			
(i) one local newspaper; or	YES		
(ii) any official *Gazette* that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;			N/A
(d) placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken			N/A
(e) using reasonable alternative methods, as agreed to by the Department, in those instances where a person is desirous of but unable to participate in the process due to—	YES		

(i) illiteracy; (ii) disability; or (iii) any other disadvantage.		[redacted]	[redacted]
If you have indicated that "EXEMPTION" is applicable to any of the above, proof of the exemption decision must be appended to this report.			
Please note that for the NEM: WA and NEM: AQA, a notice must be placed in at least two newspapers circulating in the area where the activity applied for is proposed. **NOT APPLICABLE**			
If applicable, has/will an advertisement be placed in at least two newspapers?	[redacted]	NO, not applicable	
If "NO", then proof of the exemption decision must be appended to this report.			

2. Provide a list of all the State Departments and Organs of State that were consulted:

State Department / Organ of State	**Date request was sent:**	**Date comment received:**	**Support / not in support**
Stellenbosch Local Municipality	Background Information sent 07 November 2019; Draft BA Report provided for review 10 Dec 2020. Draft BA Report Version 2 will be provided for 30-day commenting period.	Awaiting comment on Draft BA Report Version 2	Supports
Western Cape Department of Economic Development and Tourism	Background Information sent 07 November 2019; Draft BA Report provided for review 10 Dec 2020. Draft BA Report Version 2 will be provided for 30-day commenting period.	Awaiting comment on Draft BA Report Version 2	To be confirmed
Western Cape Department of Water and Sanitation	Pre-application meeting was held on 30 September 2019. Background Information sent 07 November 2019 Draft BA Report provided for review 10 Dec 2020. Draft BA Report Version 2 will be provided for 30-day commenting period	5 Feb 2020 Awaiting comment on Draft BA Report Version 2	In support. Indication that an application can be lodged for registration of water uses(s) authorized in terms of General Authorization was provided.
Western Cape Department of Agriculture	Background Information sent 07 November 2019; Draft BA Report provided for review 10 Dec 2020. Draft BA Report Version 2 will be provided for 30-day commenting period.	Awaiting comment on Draft BA Report Version 2	To be confirmed.
South African Heritage Resources Agency	Background Information sent 07 November 2019; Draft BA Report provided for review 10 Dec 2020. Draft BA Report Version 2 will be provided for 30-day commenting period.	Awaiting comment on Draft BA Report Version 2	To be confirmed.
Heritage Western Cape	Background Information sent 07 November 2019 NID submitted on 20 November 2019. Draft BA Report provided for review 10 Dec 2020. Draft BA Report Version 2 will be provided for 30-day commenting period	09 December 2019. Awaiting comment on Draft BA Report Version 2	In support. Response to NID application indicated that the proposed project will not impact on heritage resources.

State Department / Organ of State	Date request was sent:	Date comment received:	Support / not in support
Cape Nature	Background Information sent 07 November 2019 Draft BA Report provided for review 10 Dec 2020. Draft BA Report Version 2 will be provided for 30-day commenting period	Initial comments received on 15 October 2019 indicated a request for a botanical study to be conducted for the section of pipeline through the Papegaaiberg Nature Reserve. (Done) Comment on the Draft BA Report included the request for the rehabilitation plans to be done upfront as part of the application. (Done) Awaiting comment on Draft BA Report Version 2	Cape Nature advised that Papegaaiberg Nature Reserve has been proclaimed under NEM:PAA and is owned and managed by Stellenbosch Municipality.

3. Provide a summary of the issues raised by I&APs and an indication of the manner in which the issues were incorporated, or the reasons for not including them.
   (The detailed outcomes of this process, including copies of the supporting documents and inputs must be included in a Comments and Response Report to be attached to the BAR (see note below) as **Appendix F**).

The comments made by the I&APs in the notification period was an enquiry in relation to the proposed construction camp sites. In the BID there was a camp site proposed at the entrance (33°55'52.05"S; 18°50'15.45"E) to the Papegaaiberg Nature reserve in the suburb of Onder Papegaaiberg. This campsite location is however no longer proposed and has been removed from the application.

The Draft BA Report was made available to all registered I&APs for a 30-day review period (10 Dec 2020 to 1 Feb 2021) and all comments, issues and concerns indicated by I&APs during this time, were captured in the Comments & Response Report (CRR), included as Appendix F5. Key comments received during this time included:

- DEADP – recommended preparation of a Maintenance Management Plan for future maintenance activities at the wetland crossing.
- DEADP – requested progress on finding suitable locations for the people that would need to be relocated if the proposed development is approved.
- Cape Nature – requested that a Vegetation and Aquatic Rehabilitation plans be prepared as part of the application (as apposed to after environmental authorisation.

Further comments received from I&APs during the 30-day review period of the Draft BA Report Version 2 will be submitted to DEADP with the Final (Revised) BA Report.

The Draft BA Report will be made available in the following link: https://aecom.com/kayamandi-sa-10-20.

4. Provide a summary of any conditional aspects identified / highlighted by any Organs of State, which have jurisdiction in respect of any aspect of the relevant activity.

No conditional aspects identified to date. Awaiting comments on the draft BA report.

Note:
Even if pre-application public participation is undertaken as allowed for by Regulation 40(3), it must be undertaken in accordance with the requirements set out in Regulations 3(3), 3(4), 3(8), 7(2), 7(5), 19, 40, 41, 42, 43 and 44.

If the "exemption" option is selected above and no proof of the exemption decision is attached to this BAR, the application will be refused.

A list of all the potential I&APs, including the Organs of State, notified and a list of all the registered I&APs must be submitted with the BAR. The list of registered I&APs must be opened, maintained and made available to any person requesting access to the register in writing.

The BAR must be submitted to the Department when being made available to I&APs, including the relevant Organs of State and State Departments which have jurisdiction with regard to any aspect of the activity, for a commenting period of at least 30 days. Unless agreement to the contrary has been reached between the Competent Authority and the EAP, the EAP will be responsible for the consultation with the relevant State Departments in terms of Section 24O and Regulation 7(2) – which consultation must happen simultaneously with the consultation with the I&APs and other Organs of State.

All the comments received from I&APs on the BAR must be recorded, responded to and included in the Comments and Responses Report included as **Appendix F** of the BAR. If necessary, any amendments made in response to comments received must be affected in the BAR itself. The Comments and Responses Report must also include a description of the PPP followed.

The minutes of any meetings held by the EAP with I&APs and other role players wherein the views of the participants are recorded, must also be submitted as part of the public participation information to be attached to the final BAR as **Appendix F.**

Proof of all the notices given as indicated, as well as notice to I&APs of the availability of the Pre-Application BAR (if applicable), Draft BAR, and Revised BAR (if applicable) must be submitted as part of the public participation information to be attached to the BAR as **Appendix F**. In terms of the required "proof" the following must be submitted to the Department:

- a site map showing where the site notice was displayed, a dated photographs showing the notice displayed on site and a copy of the text displayed on the notice;
- in terms of the written notices given, a copy of the written notice sent, as well as:
    - if registered mail was sent, a list of the registered mail sent (showing the registered mail number, the name of the person the mail was sent to, the address of the person and the date the registered mail was sent);
    - if normal mail was sent, a list of the mail sent (showing the name of the person the mail was sent to, the address of the person, the date the mail was sent, and the signature of the post office worker or the post office stamp indicating that the letter was sent);
    - if a facsimile was sent, a copy of the facsimile report;

- if an electronic mail was sent, a copy of the electronic mail sent; and
- if a "mail drop" was done, a signed register of "mail drops" received (showing the name of the person the notice was handed to, the address of the person, the date, and the signature of the person); and

- a copy of the newspaper advertisement ("newspaper clipping") that was placed, indicating the name of the newspaper and date of publication (of such quality that the wording in the advertisement is legible).

4 SECTION D: NEED AND DESIRABILITY

Note: Before completing this section, first consult this Department's Circular EADP 0028/2014 (dated 9 December 2014) on the "One Environmental Management System" and the EIA Regulations, 2014 (as amended), any subsequent Circulars, and guidelines available on the Department's website: **http://www.westerncape.gov.za/eadp**). In this regard, it must be noted that the *Guideline on Need and Desirability in terms of the Environmental Impact Assessment (EIA) Regulations, 2010* published by the national Department of Environmental Affairs on 20 October 2014 (GN No. 891 on Government Gazette No. 38108 refers) (available at: http://www.gov.za/sites/www.gov.za/files/38108_891.pdf) also applied to EIAs in terms of the EIA Regulations, 2014 (as amended).

1. Is the development permitted in terms of the property's existing land use rights?	YES		Please explain
The current zoning of the land is categorised as Industrial, Agricultural and Rural. Required servitudes will be registered with Stellenbosch Municipality.			
2. Will the development be in line with the following?			
(a) Provincial Spatial Development Framework ("PSDF").	YES		Please explain
In terms of section 3.2.2.3 of the PSDF – Provincial Spatial Policies (Policy E1) indicates that regional infrastructure investment should align and synchronise bulk infrastructure, transport and housing investment programmes. The proposed Project is in support of a housing scheme in Kayamandi to ensure sufficient water supply for future housing developments in the Kayamandi area (page 63).			
(b) Urban edge / edge of built environment for the area.	YES		Please explain
The Stellenbosch SDF dated November 2019 indicates that the proposed area is part of the Stellenbosch urban edge expansion plan (page 43).			
Integrated Development Plan and Spatial Development Framework of the Local Municipality (*e.g.*, would the approval of this application compromise the integrity of the existing approved and credible municipal IDP and SDF?).	YES		Please explain
The IDP mentions that Kayamandi has been earmarked for water related development to address the poor condition of the water infrastructure and to confirm future development (page 79). The capital budget for 2017/2020 provides a list of projects which form part of the strategic objectives of the municipality. Project number 104 is listed as the "Bulk water supply pipe and Reservoir: Kayamandi" (page 154).			
(d) An EMF adopted by this Department. (*e.g.,* Would the approval of this application compromise the integrity of the existing environmental management priorities for the area and if so, can it be justified in terms of sustainability considerations?)	YES		Please explain

In page 99 of the EMF it is indicated that proposed surface infrastructure and building projects include the development of reservoirs. Furthermore, in page 101 it is mentioned that the Municipality is planning to undertake infrastructure projects to ensure a reliable supply of water from bulk water resources infrastructure within acceptable risk parameters to meet the sustainable demand for the Municipality.			
Any other Plans (*e.g.,* Integrated Waste Management Plan (for waste management activities), *etc*.)).		NO	Please explain
N/A			
3. Is the land use (associated with the project being applied for) considered within the timeframe intended by the existing approved SDF agreed to by the relevant environmental authority (in other words, is the proposed development in line with the projects and programmes identified as priorities within the credible IDP)?	YES		Please explain
The current SDF was drafted for the period 2010 – 2020.			
4. Should development, or if applicable, expansion of the town/area concerned in terms of this land use (associated with the activity being applied for) occur on the proposed site at this point in time?	YES		Please explain
The Stellenbosch SDF dated February 2019 indicates that the proposed area is part of the Stellenbosch urban edge expansion plan (page 43).			
5. Does the community/area need the project and the associated land use concerned (is it a societal priority)? (This refers to the strategic as well as local level (*e.g.,* development is a National Priority, but within a specific local context it could be inappropriate.)	YES		Please explain
The Stellenbosch Municipality's IDP and SDF have indicated the need for low cost 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 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 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.			
6. Are the necessary services available together with adequate unallocated municipal capacity (at the time of application), or must additional capacity be created to cater for the project? (Confirmation by the relevant municipality in this regard must be attached to the BAR as Appendix E.)	YES		Please explain
The project will connect to existing municipal water and electrical services at Papegaaiberg Reservoir, and near the Vodacom tower at the proposed Kayamandi North reservoir site. The project applicant is the municipality providing services and thus no services letters are required.			
7. Is this project provided for in the infrastructure planning of the municipality and if not, what will the implication be on the infrastructure planning of the municipality (priority and	YES		Please explain

placement of services and opportunity costs)? (Comment by the relevant municipality in this regard must be attached to the BAR as Appendix E.)			
This project is provided for in the Stellenbosch Municipality's SDF and IDP.			
8. Is this project part of a national programme to address an issue of national concern or importance?		NO	Please explain
The project is aligned with provincial and regional plans.			
9. Do location factors favour this land use (associated with the development proposal and associated listed activity(ies) applied for) at this place? (This relates to the contextualisation of the proposed land use on the proposed site within its broader context.)	YES		Please explain
The current zoning of the land is categorised as Industrial, Agricultural and Rural. Required servitudes will be registered with Stellenbosch Municipality.			
10. Will the development proposal or the land use associated with the development proposal applied for, impact on sensitive natural and cultural areas (built and rural/natural environment)?	YES		Please explain
The proposed project entails the development of access roads wider than 4 m within the boundaries of a protected area (Papegaaiberg Nature Reserve). There are two (2) vegetation types within the proposed area and pipeline alignment and have been classified as follows: • Critically endangered – Swartland Granite Renosterveld (FRg2) (Government Gazette, 2011). • Critically Endangered – Swartland Shale Renosterveld (FRs9) (Government Gazette, 2011). • 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.			
11. Will the development impact on people's health and well-being (*e.g.,* in terms of noise, odours, visual character and 'sense of place', *etc.*)?	YES		Please explain
Noise and air emission will be typical of a construction project. Sense of place will be slight alerted as there is existing infrastructure related to the proposed activity.			
12. Will the proposed development or the land use associated with the proposed development applied for, result in unacceptable opportunity costs?	YES		Please explain
The proposed project is based on Stellenbosch Municipality's SDF and IDF.			
13. What will the cumulative impacts (positive and negative) of the proposed land use associated with the development proposal and associated listed activity(ies) applied for, be?			
In the case of vegetation, the cumulative impact considers the effect of the project on the vegetation type (Swartland Granite Renosterveld (FRg2) and Swartland Shale Renosterveld (FRs9)) as whole and considers how multiple small projects can cumulatively add up and create a larger impact of a more regional scale. The development of this site would result in the initial loss of vegetation on the pipeline route and pump station site (10 285 m^2) of this vegetation however the vegetation on the pipeline route will re-establish over time (if done according to the botanical study and the EMPr). The area that will be permanently transformed will be the pumpstation site of 3000 m^3. While this area is relatively small, other developments have already, and will continue to, reduce this vegetation type.			

With regards to the wetland, the cumulative impact would be the loss of wetlands in the area as a result of continued human activities. The cumulative impact could also include changes in the water regime which will have a direct impact on the vegetation at the site. Mitigation measures required for this project will be to develop and implement a rehabilitation plan for the river crossing, which should facilitated the re-establishment of ecosystem functioning associated with this wetland.

14. Is the development the best practicable environmental option for this land/site?	YES		Please explain

The current zoning of the land is categorised as Industrial, Agricultural and Rural. Required servitudes will be registered with the Stellenbosch Municipality. The only site constraints include the existing overhead powerline and electricity pylons and telecoms cables. Relevant stakeholders for these services have been engaged in the process and final comment will be sought from them as part of the review of the Basic Assessment.

The area has experienced high in-migration and has expanded significantly over the last 10-15 years through construction of additional formal low-cost housing to the west. In addition, many informal backyard dwellings have been built. These, and the settlement of the Watergang / Azania area in 2018, point to an ongoing need for additional affordable housing in the area. As a result, Stellenbosch Municipality is planning further development of low-cost housing north of Kayamandi. The proposed project is thus strategically located in order to provide water for the current and planned development of the area.

The pipeline route selection was further based on the best site possible elevation while accommodating the slope of the terrain.

15. What will the benefits be to society in general and to the local communities?	Please explain

The surrounding community would gain a marginal benefit from the development in terms of a few temporary employment opportunities during the construction, as well as possible permanent positions (e.g. maintenance and security) once the reservoir are developed. The community would benefit in the provision of water supply for their households.

16. Any other need and desirability considerations related to the proposed development?	Please explain

There are no further need and desirability considerations for this project above what has been mentioned.

17. Describe how the general objectives of Integrated Environmental Management as set out in Section 23 of the NEMA have been taken into account:

The general objectives of Integrated Environmental Management (IEM) are listed below and a summary of how they have been taken into account is provided:

<u>Promote the integration of the principles of environmental management set out in Section 2 into the making of all decisions which may have a significant effect on the environment –</u>

This BA process takes into account all the potential impacts (negative and positive) associated with the proposed project. The social, economic, cultural and biophysical impacts have been considered and evaluated and specialist input was obtained to inform mitigation measures. Furthermore, in order to avoid potentially significant impacts, Wetland Baseline and Botanical Survey were undertaken (please refer to Appendix G for the Specialist Studies and Section G for the detailed Impact Assessment). The impacts will be mitigated and managed according to the detailed EMPr, attached as Appendix H.

Identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits and promoting compliance with the principles of environmental management set out in Section 2 –

Impacts associated with the proposed Kayamandi Northern Extension Project: have been identified, assessed and included as mitigation measures in the EMPr, these are detailed in Section F of this BA Report

Ensure that the effects of activities on the environment receive adequate consideration before actions are taken in connection with them –

This Application is being undertaken in accordance with the NEMA EIA Regulations (2014), as amended, the provisions of which align with the objectives of IEM. The intention is that the proposed activity be socially, environmentally and economically sustainable through the consideration of the surrounding environment, the surrounding land use and implementation of control measures as prescribed.

Ensure that adequate and appropriate opportunity for public participation in decisions that may affect the environment –

This Application has been undertaken in accordance with the Public Participation Requirements set out in the NEMA EIA Regulations 2014, as amended. The public and Organs of State were given an opportunity to participate during a pre-application process, furthermore another opportunity will be available to comment on the proposed project and to participate in the BA Process. Please refer to Appendix F for the PPP).

Ensure the consideration of environmental attributes in management and decision-making which may have a significant effect on the environment –

This BA process takes into account all the general objectives of IEM. The social, economic, cultural and biophysical impacts have been considered. The impacts will be mitigated and managed according to the detailed EMPr attached as Appendix H.

Identify and employ the modes of environmental management best suited to ensuring that a particular activity is pursued in accordance with the principles of environmental management set out in Section 2 –

This BA process takes into account all the general objectives of IEM. The social, economic, cultural and biophysical impacts have been considered to inform mitigation measures. The impacts will be mitigated and managed according to the detailed EMPr, attached as Appendix H.

18 Describe how the principles of environmental management as set out in Section 2 of the NEMA have been taken into account:

The National Environmental Management Principles were considered in the following manner:

- All relevant environmental, social and economic aspects of the proposed activity have been identified, described, assessed and mitigation measures have been prescribed where required.
- The proposed activity will be socially, environmentally and economically sustainable through the consideration of the surrounding biophysical and socio-economic environment and the surrounding land uses.
- Suitable specialist and engineering input has been obtained in order to ensure that the proposed activity has minimal impact on the environment.

- The PPP process will be undertaken in terms the requirements as outlined in Regulation 41 of the EIA Regulations (2014), as amended. Furthermore, all reports compiled as part of this process will be made available to the public.

The proposed activity will improve service delivery in terms of water supply. The aim of the project is to supply Kayamandi, as well as the future housing and development schemes in 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; therefore, the community will benefit from this project.

5 SECTION E: DETAILS OF ALL THE ALTERNATIVES CONSIDERED

Note: Before completing this section, first consult this Department's Circular EADP 0028/2014 (dated 9 December 2014) on the "One Environmental Management System" and the EIA Regulations, 2014 (as amended), any subsequent Circulars, and guidelines available on the Department's website **http://www.westerncape.gov.za/eadp.**

The EIA Regulations, 2014 (as amended) defines "*alternatives*" as " *in relation to a proposed activity, means different means of fulfilling the general purpose and requirements of the activity, which may include alternatives to the—*
(a) property on which or location where the activity is proposed to be undertaken;
(b) type of activity to be undertaken;
(c) design or layout of the activity;
(d) technology to be used in the activity; or
(e) operational aspects of the activity;
(f) and includes the option of not implementing the activity;"

The NEMA (section 24(4)(a) and (b) of the NEMA, refers) prescribes that the procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment must, *inter alia*, with respect to every application for environmental authorisation –

- ensure that the general objectives of integrated environmental management laid down in the NEMA and the National Environmental Management Principles set out in the NEMA are taken into account; and
- include an investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity.

The general objective of integrated environmental management (section 23 of NEMA, refers) is, *inter alia*, to "*identify, predict and evaluate the actual and potential impact on the environment, socio-economic conditions and cultural heritage, the risks and consequences and alternatives and options for mitigation of activities, with a view to minimising negative impacts, maximising benefits, and promoting compliance with the principles of environmental management*" set out in the NEMA.

The identification, evaluation, consideration and comparative assessment of alternatives directly relate to the management of impacts. Related to every identified impact, alternatives, modifications or changes to the activity must be identified, evaluated, considered and comparatively considered to:

- in terms of negative impacts, firstly avoid a negative impact altogether, or if avoidance is not possible alternatives to better mitigate, manage and remediate a negative impact and to compensate for/offset any impacts that remain after mitigation and remediation; and
- in terms of positive impacts, maximise impacts.

5.1 DETAILS OF THE IDENTIFIED AND CONSIDERED ALTERNATIVES AND INDICATE THOSE ALTERNATIVES THAT WERE FOUND TO BE FEASIBLE AND REASONABLE

Note: A full description of the investigation of alternatives must be provided and motivation if no reasonable or feasible alternatives exists.

(a) Property and **location/site** alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts, or detailed motivation if no reasonable or feasible alternatives exist:

An alternative site/ location was not considered as the proposed activity entails connecting the existing Kleinvallei and Papegaaiberg Reservoirs as well as to the Papegaaiberg Pump Station.

The start and end points of this linear development and the associated route that the infrastructure will follow has been optimised. The reservoir will be built on the highest point above the Kayamandi township, to provide the maximum possible head (pressure) to the downstream area. Different locations for the pump station were considered in terms of electricity availability, risk to future vandalism, and integration with the existing water distribution network. The pump station will now be located at the Papegaaiberg Reservoir. The rising main linking the pump station and reservoir will follow the alignment of existing water mains up to the Kayamandi Reservoir, from where it will mainly follow existing dirt roads.

(b) Activity alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts, or detailed motivation if no reasonable or feasible alternatives exist:

The activity is for the development of the reservoir, installation of the pipelines as well as the installation of the back-up diesel generators. The consideration for an activity alternative such as:

- Drilling a borehole – would not be feasible as the purpose of the reservoir is to provide the future water supply network to supply Kayamandi, as well as the future housing and development schemes in Kayamandi, therefore the abstraction rate and expected yield would be unsustainable in relation to aquifer recharge prospects (Seward, Xu, & Turton, 2015); and
- Alternative back-up power (not diesel generators) – alternatives such as solar or wind energy sources are not feasible from an economic, environmental or technical perspective with large installations, battery storage and a guaranteed availability of power being required.

(c) Design or layout alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts, or detailed motivation if no reasonable or feasible alternatives exist:

The proposed reservoir site is currently open land and no settlements exists in that area. The design options favour this location also due to future security and safety risks. However, the pipeline runs between Kayamandi and the Watergang/Azania informal settlement and through the western portion of the Enkanini informal settlement south of Kayamandi, and the southern portion of the project lies within the Papegaaiberg Nature Reserve. Eleven structures in the western portion of Enkanini, which encroach on the gravel road / proposed pipeline corridor, must be permanently removed prior to construction. An alternative alignment to the south-west of Watergang / Azania was investigated but is not feasible due to the topography being steep and extremely rocky.

(d) Technology alternatives (*e.g.,* to reduce resource demand and increase resource use efficiency) to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts, or detailed motivation if no reasonable or feasible alternatives exist:

Electricity is typically the highest input cost for water supply. The design approach of the mechanical equipment and electrical supply is focussed on minimising energy usage by the specification of efficient equipment.

(e) Operational alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts, or detailed motivation if no reasonable or feasible alternatives exist:

No additional operational alternatives exist. The most energy efficient technical options will be used in the pump station designs.

(f) The option of not implementing the activity (the '*No-Go*' Option):

The *status quo* implies that the proposed activity is not undertaken. The potential benefits and / or positive impacts associated with undertaking the project would not be realised. Therefore, the future water supply network to supply Kayamandi, as well as the future housing and development schemes in Kayamandi would not be realised. The proposed Project is thus critical for development and continued security of water supply within the Stellenbosch area. Not undertaking the proposed activity would also mean a lost opportunity on the positive social impacts as a few temporary employment opportunities will be available for the local community.

(g) Other alternatives to avoid negative impacts, mitigate unavoidable negative impacts and maximise positive impacts, or detailed motivation if no reasonable or feasible alternatives exist:

No other alternatives, in addition to those outlined above were considered at this stage.

(h) Provide a summary of all alternatives investigated and the outcome of each investigation:

Property and location/site alternatives

An alternative site /location was not considered as the proposed project is an expansion of existing infrastructure to support the future housing and development schemes in Kayamandi.

Activity alternatives

The activity is for the development of the reservoir, installation of the pipelines as well as the installation of the back-up diesel generators. Activity alternatives such as borehole supply or the use of solar or wind as back-up as opposed to diesel were not feasible alternatives.

Design or layout alternatives

The current layout and design is optimised and considered to be the most suitable for the site based on the steep and extremely rocky topography on site.

Technology alternatives

Technological alternatives to reduce electricity use included the design approach and mechanical equipment being focussed on reducing electrical supply.

Operational alternatives

Refer to technology alternatives.

No-Go Alternative

The no-go alternative would result in a lack of water supply Kayamandi, current, as well as for the future housing and development schemes in Kayamandi. This alternative would also result in no negative impacts on the environment that would be associated with the construction and operation of the activities.

Other

No other alternatives, in addition to those outlined above, were investigated during this BA process.

(i) Provide a detailed motivation for not further considering the alternatives that were found not feasible and reasonable, including a description and proof of the investigation of those alternatives:

The reservoir had to be placed as high as possible, to maximize head available for future delivery by gravity. The pump station had to be placed next to the Papegaaiberg Reservoir, as it will be extracting its water from this reservoir. Topography dictated the alignment of the pipeline between the new Kayamandi Northern Reservoir and the existing Kayamandi Reservoir.

Only the preferred alternative was investigated for this BA. Site sensitivities of the preferred alternative were investigated through specialist studies undertaken for this process (Wetland Baseline and Impact Assessment, Botanical Impact Assessment and Heritage Baseline Study).

The specialist inputs / studies, findings and recommendations are provided in Section 7.3 and the specialist studies are included in Appendix G.

5.2 PREFERRED ALTERNATIVE

(a) Provide a concluding statement indicating the preferred alternative(s), including preferred location, site, activity and technology for the development.

The preferred alternative is:

- the pump station located at the Papegaaiberg Reservoir; and
- the rising main linking the pump station and reservoir following the alignment of existing water mains up to the Kayamandi Reservoir, from where it will mainly follow existing dirt roads.

The preferred design is the reservoir will be built on the highest point above the Kayamandi township with the pipeline alignment bordering the north-eastern border on Watergang / Azania. The preferred back-up power source for this alternative is a diesel generator.

6 SECTION F: ENVIRONMENTAL ASPECTS ASSOCIATED WITH THE ALTERNATIVES

Note: The information in this section must be DUPLICATED for all the feasible and reasonable ALTERNATIVES.

6.1 DESCRIBE THE ENVIRONMENTAL ASPECTS ASSOCIATED WITH THE PROPOSED DEVELOPMENT AND ITS ALTERNATIVES, FOCUSING ON THE FOLLOWING:

(a) Geographical, geological and physical aspects:

Vegetation:

Vegetation clearance is required as part of the project. From a botanical perspective the corridor is invaluable due to the critically endangered vegetation type present (regardless of the condition of this vegetation). Although no species of conservation concern were found it is still a high likelihood that these may be present within the corridor. Any development within this vegetation type will thus have a high impact and thus should be avoided as much as possible. This is in line with its biodiversity spatial planning status and listing. Refer to Figure 6-1.

Figure 6-1: Vegetation groupings within the lower portion of the site. Yellow polygons are the most sensitive

Aquatic Habitat:

This project area falls in the G22F quaternary catchment, within the Berg WMA 19. From a wetland perspective the proposed pipeline will traverse a single HGM unit, namely HGM 3. The average ecosystem services score was determined to be "Intermediate" for HGM 3. The integrity (or health) of the unit is "Seriously Modified". The ecological importance and sensitivity of the three systems was determined to be Moderate. Taking into consideration the proposed development and the associated threats, a buffer width of 15 m was determined to be suitable for the three wetland areas. Refer to Figure 6-2

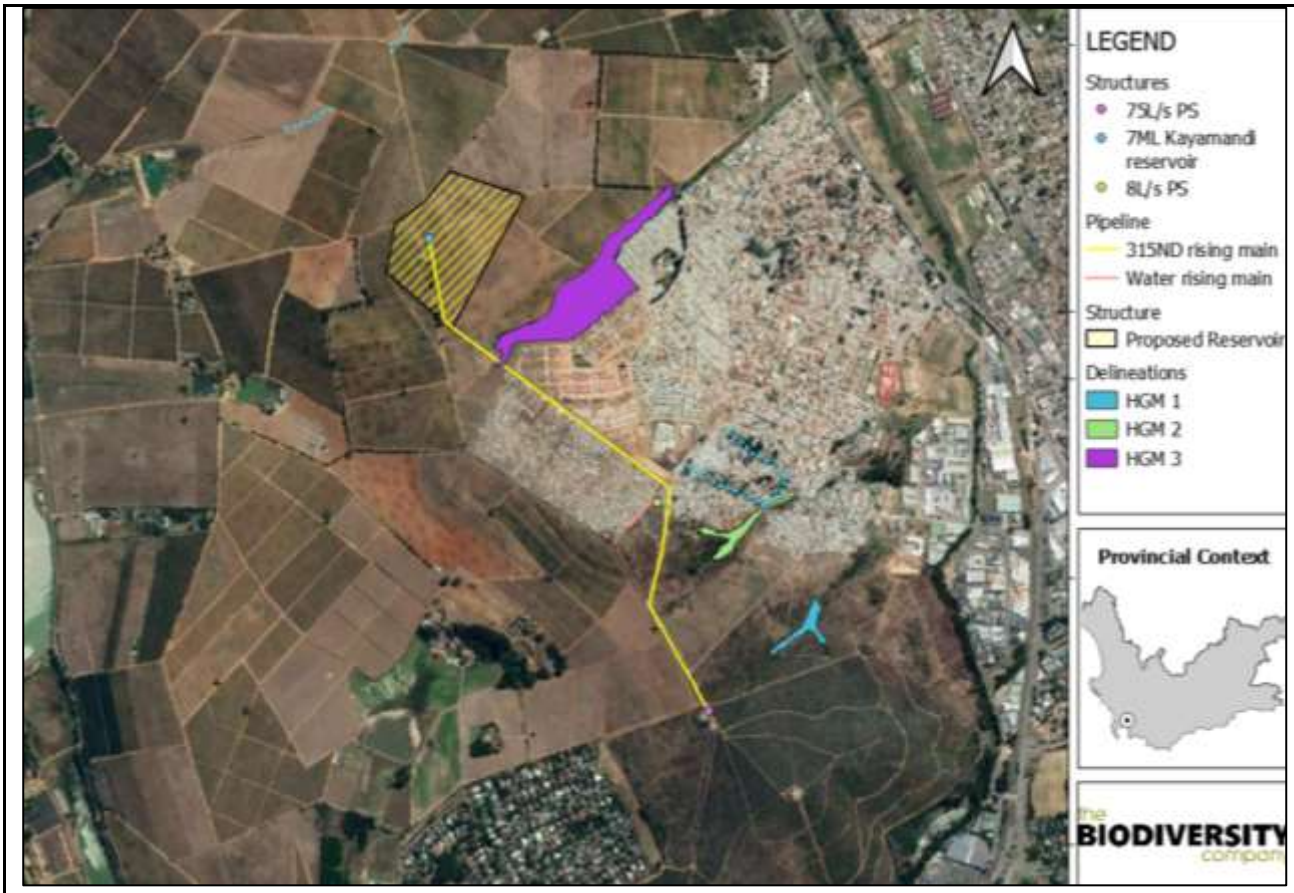

Figure 6-2: Delineation of wetlands within Kayamandi Bulk Water Project area

Adjacent land use:

The proposed Project is located approximately 3 km north of Stellenbosch town western edge. The proposed pipeline is surrounded the informal residential areas (Watergang / Azania) on either side. The southernmost side of the proposed pipeline and reservoir site is surrounded by agricultural land. Refer to Figure 1-1.

Land use/ location:

The proposed site is currently being used for agriculture and services (Vodacom cell phone mast), while the pipeline crosses agricultural land, open degraded land, the informal residential areas (Watergang / Azania) and a section that traverses the Papegaaiberg Nature Reserve. Refer to Figure 1-1.

(b) Ecological aspects:

Will the proposed development and its alternatives have an impact on CBAs or ESAs? If yes, please explain: Also include a description of how the proposed development will influence the quantitative values (hectares/percentage) of the categories on the CBA/ESA map.	YES	NO

The proposed Kayamandi Bulk Water Project transverses ESA 2 (Restore from other land use) for approximately 250 m of the alignment, approximately 200 m of CBA 1 (Terrestrial) and an estimated 1 500 m of CBA 2 (Terrestrial – Degraded) within the Papegaaiberg Nature Reserve (Figure 2-4).

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 critically endangered ecosystems which have no official protection status.

Will the proposed development and its alternatives have an impact on terrestrial vegetation, or aquatic ecosystems (wetlands, estuaries or the coastline)? If yes, please explain:	YES	

The possible impacts on terrestrial vegetation is listed below:

- Direct loss of vegetation (1.4 km pipeline, 6.5 m trench footprint, 20 m wide construction footprint), CR Swartland Granite Renosterveld in residual to modified state (Good) through clearing for construction.
- Encroachment and likely proliferation of IAP and exotic grass and weed species within the development footprint and edges through soil disturbance (stimulates germination of IAPs and weeds) which will reduce the quality of adjacent vegetation and that recovering on the construction footprint.

The proposed activity could have an impact on aquatic ecosystems. The potential risk posed by the proposed activity is described in Table 6-1:

Table 6-1: Aspects and impacts relevant to the proposed activity

Pipelines		
Activity	Aspect	Impact
Construction of pipelines	Removal of vegetation	• Impeding on stream flow; • Siltation of wetlands; • Erosion of channels and wetlands; • Loss of vegetation; • Direct loss of wetland areas; • Decrease in functionality; • Additional water quality impairment; • Compaction; • Altering hydromorphic soils; • Drainage patterns change; and • Altering overland flow characteristics.
	Excavations	
	Traffic	
	Ablution facilities	
	Storage of chemicals, mixes and fuel	
	Domestic and industrial waste	
Operation of pipelines	Operation of Pipeline	
	Maintenance of pipelines	
Reservoir and pumps		
Activity	Aspect	Impact
Construction of reservoir and pumps	Removal of vegetation	• Impeding on stream flow; • Siltation of wetlands; • Erosion of channels and wetlands; • Loss of vegetation; • Direct loss of wetland areas; • Decrease in functionality; • Additional water quality impairment; • Compaction; • Altering hydromorphic soils; • Drainage patterns change; and • Altering overland flow characteristics.
	Excavations	
	Traffic	
	Ablution facilities	
	Storage of chemicals, mixes and fuel	
	Domestic and industrial waste	
Operation of reservoir and pumps	Operation of facilities	
	Maintenance of facilities	

Source: The Biodiversity Company (2019)

Will the proposed development and its alternatives have an impact on any populations of threatened plant or animal species, and/or on any habitat that may contain a unique signature of plant or animal species? If yes, please explain:	YES

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.

Describe the manner in which any other biological aspects will be impacted:

No other biological aspects are expected to be impacted upon.

Will the proposed development also trigger section 63 of the NEM: ICMA?	NO

If yes, describe the following: (i) the extent to which the applicant has in the past complied with similar authorisations; (ii) whether coastal public property, the coastal protection zone or coastal access land will be affected, and if so, the extent to which the proposed development proposal or listed activity is consistent with the purpose for establishing and protecting those areas; (iii) the estuarine management plans, coastal management programmes, coastal management lines and coastal management objectives applicable in the area; (iv) the likely socio-economic impact if the listed activity is authorised or is not authorised; (v) the likely impact of coastal environmental processes on the proposed development; (vi) whether the development proposal or listed activity— (a) is situated within coastal public property and is inconsistent with the objective of conserving and enhancing coastal public property for the benefit of current and future generations; (b) is situated within the coastal protection zone and is inconsistent with the purpose for which a coastal protection zone is established as set out in section 17 of NEM: ICMA; (c) is situated within coastal access land and is inconsistent with the purpose for which coastal access land is designated as set out in section 18 of NEM: ICMA; (d) is likely to cause irreversible or long-lasting adverse effects to any aspect of the coastal environment that cannot satisfactorily be mitigated; (e) is likely to be significantly damaged or prejudiced by dynamic coastal processes; (f) would substantially prejudice the achievement of any coastal management objective; or (g) would be contrary to the interests of the whole community; (vii) whether the very nature of the proposed activity or development requires it to be located within coastal public property, the coastal protection zone or coastal access land; (viii) whether the proposed development will provide important services to the public when using coastal public property, the coastal protection zone, coastal access land or a coastal protected area; and (ix) the objects of NEM: ICMA, where applicable.
N/A

(c) Social and Economic aspects:

What is the expected capital value of the project on completion?	R ±30 million
What is the expected yearly income or contribution to the economy that will be generated by or as a result of the project?	Unknown at this stage
Will the project contribute to service infrastructure?	YES
Is the project a public amenity?	YES
How many new employment opportunities will be created during the development phase?	±40
What is the expected value of the employment opportunities during the development phase?	Unknown at this stage
What percentage of this will accrue to previously disadvantaged individuals?	100%
How will this be ensured and monitored (please explain):	

The reservoir location is adjacent to the Kayamandi township. Water supplied to this reservoir will be distributed to the adjacent area.

During construction, the applicant will track the operational entity's employment statistics and enforce applicable Human Resource policies relating to previously disadvantaged individuals, as appropriate. Furthermore, the following mitigation measures are included in the EMPr:

- 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.).
- Promote employment of women.
- Monitor employment targets over the duration of construction.

How many permanent new employment opportunities will be created during the operational phase of the project?	None foreseen at this stage
What is the expected current value of the employment opportunities during the first 10 years?	0
What percentage of this will accrue to previously disadvantaged individuals?	0
How will this be ensured and monitored (please explain):	
N/A	
Any other information related to the manner in which the socio-economic aspects will be impacted:	
N/A	

(d) Heritage and Cultural aspects:

Archaeology: Stone Age artefacts, particularly dating from to the Earlier Stone Age, are common in the Stellenbosch area and surrounds (Goodwin & Van Riet Lowe 1929). The important Earlier Stone Age site of Bosman's Crossing was discovered by Louis Peringuey in 1899 (Peringuey 1911; Seddon 1966; Halkett 2012) and is memorialised in an archaeological reserve located 1.2 km south of the existing Kleinvallei Reservoir, which is the southerly terminus of the proposed new pipeline. Earlier Stone Age artefacts have also been located in the Veldwagtersrivier catchment (H. Deacon cited in Kaplan 1998), and many Earlier Stone Age artefacts were also found by Kaplan (1998) on the eastern side of Onder Papegaaiberg. More recent Middle and Later Stone Age archaeological material is relatively infrequently encountered in this area. Orton (2014:12) in a Heritage Impact Assessment (HIA) for the rehabilitation of the Stellenbosch Landfill site in Devon Valley, to the east of the development site, found no archaeological resources.

The walkover survey conducted by ACO on 07 October 2019 for this project found two isolated Middle Stone Age (MSA) quartzite flakes (Figure 6-3 and Figure 6-4) on the hilltop where the Kayamandi Northern reservoir is proposed. These flakes are likely to have been introduced to the area as the local rock is a form of Ecca shale rather than quartzite, and no other archaeological material was noted in the area.

Figure 6-3: MSA quartzite flake

Figure 6-4: Worn MSA quartzite flake

Palaeontology: According to the SAHRIS palaeosensitivity map (https://sahris.sahra.org.za/map/palaeo), the proposed development area lies in an area of low palaeontological sensitivity. No palaeontological studies are required for development proposals in such areas, although the implementation during construction of a protocol for reporting palaeontological finds is required.

Historical Built Environment: As the second oldest town in South Africa, Stellenbosch is well-known for its deep historical layering. Fransen (2006) notes that the establishment of a second settlement at the Cape was a clear sign that the Dutch were here to stay; the days of the Cape being merely a refreshment station were over. Although the Stellenbosch District was founded in 1679 by Commander Simon van der Stel, it was only in 1685 that, on the instruction of the visiting commissioner Van Reede, that the land was surveyed, and a village actually laid out.

Many Cape Dutch houses and outbuildings are preserved both within Stellenbosch and in the surrounding area (Fransen 2004, Todeschini 2018). Many are declared Provincial Heritage Sites (Grade II) while a number of others are Grade IIIa, b and c. The locations and grading of structures within 2 km of the project are shown in Figure 6-5 and the features and their grading are further described in Appendix G.

The Grade II heritage resources within the 2 km buffer are:

- Weltevreden farm, with its H-shaped house dating from c.1812 and unique trapezoidal werf, which stands 1.8 km from the northern limit of the reservoir area of interest;
- Le Jardin Villa or Petershof, a Cape Dutch Revival house on Devon Valley Road, approximately 1.5 km north-west of the reservoir area of interest;
- Troughend (Klein Vredenburg) and Libertas, both approximately 2.1 km south of the Kleinvallei reservoir;
- Doornbosch, approximately 3.1 km south of the Kleinvallei reservoir;
- Kromme Rivier werf, 1.3 km east of the Kleinvallei reservoir, within the Stellenbosch town centre; and
- Two historical streetscapes within Stellenbosch: portions of Ryneveld Street and Banghoek Road, both located approximately 1.7 and 1.9 km from the Kleinvallei and Onder Papegaaiberg reservoirs, respectively.

Several historical structures and features, roads and scenic routes (Devon Valley Road – see Winter and Oberholzer 2014), occur around the proposed development area. However, these are generally locally screened by topography, vegetation and/or intervening development from the proposed development area and the proposed works are sufficiently low key and distant for a significant impact on the surrounding heritage resources or cultural landscape to be unlikely.
No significant archaeological or other heritage resources that might be impacted by the construction of the reservoir and installation of the pipeline were identified in the desktop review or walkover survey.

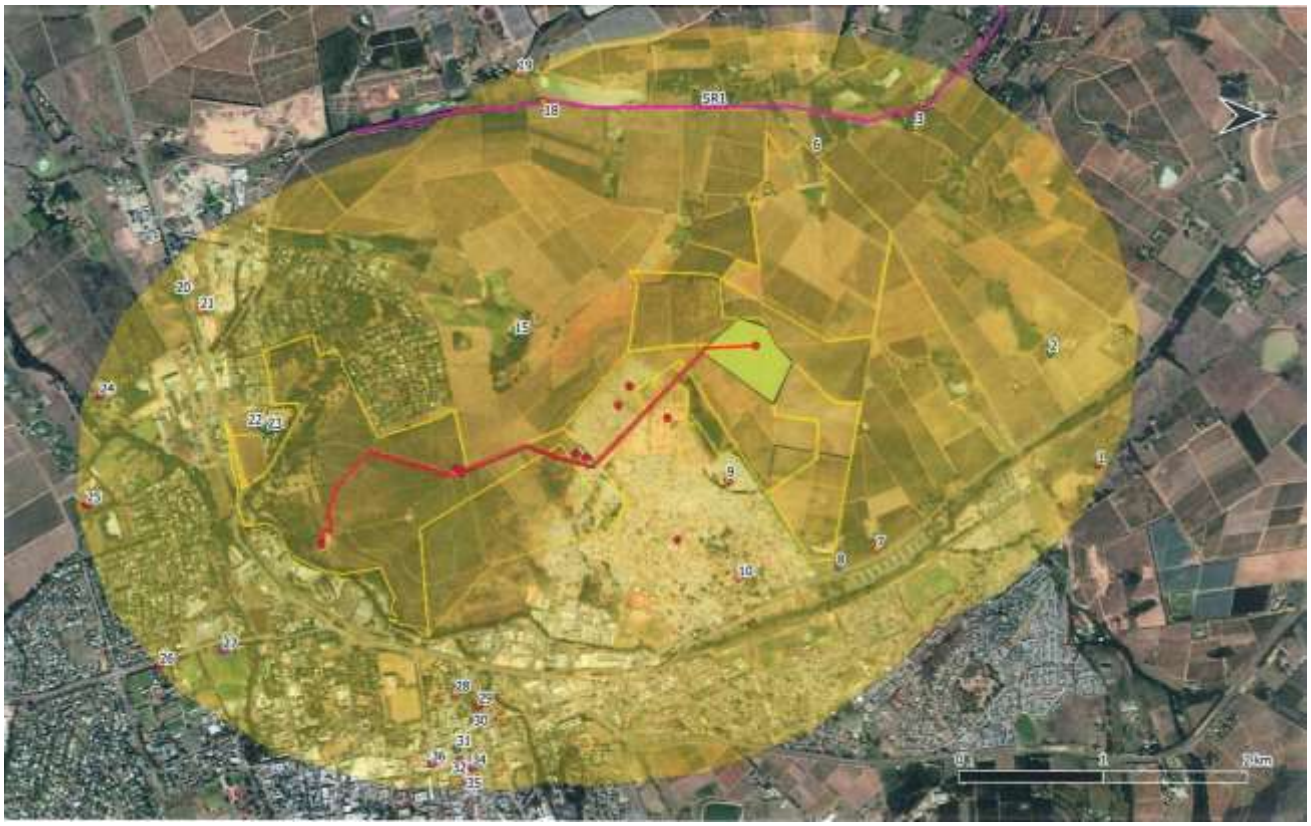

Figure 6-5: Historical built environment and scenic routes within 2 km of the proposed project area

6.2 WASTE AND EMISSIONS

(a) Waste (including effluent) management

Will the development proposal produce waste (including rubble) during the development phase?	YES	
If yes, indicate the types of waste (actual type of waste, *e.g.* oil, and whether hazardous or not) and estimated quantity per type?	Minimal, Uncertain	
Excavation spoil		

Will the development proposal produce waste during its operational phase?		NO
If yes, indicate the types of waste (actual type of waste, *e.g.* oil, and whether hazardous or not) and estimated quantity per type?	~~m~~^{3}	
N/A	N/A	

Will the development proposal require waste to be treated / disposed of onsite?		NO
If yes, indicate the types of waste (actual type of waste, *e.g.* oil, and whether hazardous or not) and estimated quantity per type per phase of the proposed development to be treated/disposed of?	~~m~~^{3}	
N/A	N/A	
If no, where and how will the waste be treated / disposed of? Please explain. Indicate the types of waste (actual type of waste, *e.g.* oil, and whether hazardous or not) and estimated quantity per type per phase of the proposed development to be treated/disposed of?		
All excess spoil will be levelled out on site along the pipeline route. A limited amount of solid waste will be produced during the construction phase (e.g. concrete waste.). 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). Should any material have to be discarded off site, it will be minimal and will be taken to the municipal landfill site, which is close to the site. Solid waste removal excluding hazardous 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. Should there be a need to dispose of any hazardous waste, 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.		
Has the municipality or relevant authority confirmed that sufficient capacity exists for treating / disposing of the waste to be generated by the development proposal? If yes, provide written confirmation from the municipality or relevant authority.	YES	
Will the development proposal produce waste that will be treated and/or disposed of at another facility other than into a municipal waste stream?		NO
If yes, has this facility confirmed that sufficient capacity exists for treating / disposing of the waste to be generated by the development proposal? Provide written confirmation from the facility.		
Does the facility have an operating license? (If yes, please attach a copy of the licence.)		
N/A		

~~Facility name:~~	
~~Contact person:~~	
~~Cell:~~	~~Postal address:~~
~~Telephone:~~	~~Postal code:~~
~~Fax:~~	~~E-mail:~~

Describe the measures that will be taken to reduce, reuse or recycle waste:
The site supervisor shall establish a solid waste control system in order to prevent the spread of waste into the watercourses. Containers shall be provided for glass, paper, metals and plastics to separate the waste. All no recyclable solid waste would be disposed of at the nearby landfill site. For a description of the waste management practices to be followed, please see the EMPr attached as Appendix H.

(b) Emissions into the atmosphere

Will the development proposal produce emissions that will be released into the atmosphere?	YES	
If yes, does this require approval in terms of relevant legislation?		NO
If yes, what is the approximate volume(s) of emissions released into the atmosphere?	N/A	
Describe the emissions in terms of type and concentration and how these will be avoided/managed/treated/mitigated:		
The movement of construction vehicles, operation of machinery and other construction activities will generate noise, dust and vehicular emissions. These may impact on property owners adjacent to the servitude and the surrounding communities. The vehicular emissions will have short term impacts on the immediate surrounding areas. Mitigation measures to reduce construction related noise and dust levels will be implemented. Refer to the EMPr (Appendix H) for detailed emission management measures proposed during construction.		

6.3 WATER USE

(a) Indicate the source(s) of water for the development proposal by highlighting the appropriate box(es).

Municipal	

Note: Provide proof of assurance of water supply (e.g. Letter of confirmation from the municipality / water user associations, yield of borehole)

NA this is an approved Municipal water services provision project.

(b) If water is to be extracted from a groundwater source, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month:	N/A	~~m^3~~

(c) Does the development proposal require a water use permit / license from DWS? If yes, please submit the necessary application to the DWS and attach proof thereof to this application as an Appendix.	YES	

Pre-application consultation with the Department of Water and Sanitation was conducted and the pre-application enquiry lodged on (e-WULAAS). A message generated by the (e-WULAAS) was received indicating that the applicant should follow the process for a General Authorisation. Please see Appendix K for proof of submission.

(d) Describe the measures that will be taken to reduce water demand, and measures to reuse or recycle water:

As Section 21 (a) water use will not be applied for, the Contractor will not be permitted to abstract water from any of the watercourses that are near the construction footprint. It is further understood that construction water will be sourced by the Contractor through legal means (from the municipality) and in compliance to the NWA.

6.4 POWER SUPPLY

(a) Describe the source of power *e.g.* municipality / Eskom / renewable energy source.

Power will be sourced from Eskom. Connection points at the existing Kleinvallei Reservoir (for the pump station) and at the Vodacom tower (for the reservoir).

(b) If power supply is not available, where will power be sourced?

N/A sufficient power capacity exists. The applicant is the Stellenbosch Municipality and services necessary for implementation of the project will be provided by the Municipality.

6.5 ENERGY EFFICIENCY

(a) Describe the design measures, if any, that have been taken to ensure that the development proposal will be energy efficient:

The contractor will be advised to avoid multiples 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.

(b) Describe how alternative energy sources have been taken into account or been built into the design of the project, if any:

N/A

6.6 TRANSPORT, TRAFFIC AND ACCESS

Describe the impacts in terms of transport, traffic and access.

Existing roads such as the Bird Street (R304), Loerie Road and Distillery Road and other roads (including gravel roads) will be used for site access.

6.7 NUISANCE FACTOR (NOISE, ODOUR, ETC.)

Describe the potential nuisance factor or impacts in terms of noise and odours.

The noise and air emissions generated will be typical of road construction activities as a result of machine movement (e.g. hauling trucks and graders). The potential impacts with regards to nuisance factors (noise, odour, etc.) may include:

- Potential noise impact during the construction of the proposed development (e.g. hauling trucks and graders).
- Potential noise impact during the construction due to increase traffic and transporting of material to site .
- Potential increase in noise from workers and machinery during the construction of the proposed developments.
- Potential odour emissions from general food waste during the construction of the proposed development.

Note: Include impacts that the surrounding environment will have on the proposed development.

6.8 OTHER

Please refer to Section G Impact Assessment.

7 SECTION G: IMPACT ASSESSMENT, IMPACT AVOIDANCE, MANAGEMENT, MITIGATION AND MONITORING MEASURES

7.1 METHODOLOGY USED IN DETERMINING AND RANKING ENVIRONMENTAL IMPACTS AND RISKS ASSOCIATED WITH THE ALTERNATIVES

(a) Describe the **methodology** used in determining and ranking the nature, significance consequences, extent, duration and probability of potential environmental impacts and risks associated with the proposed development and alternatives.

Impact Assessment Methodology

Each issue identified during the BA process consists of components that on their own or in combination with each other give rise to potential impacts, either positive or negative from the project onto the environment or from the environment onto the project. The significance of the potential impacts for the study sites will be considered before and after identified mitigation is implemented.

Impact Assessment Criteria

The criteria used for the assessment of the potential impacts of the proposed project are described in Table 7-1.

Table 7-1: Impact Assessment Criteria

Criteria	Description
Nature	Includes a description of what causes the effect, what will be affected and how it will be affected.
Duration	Lifetime of the impact is measured in relation to the lifetime of the project.
Extent	Physical and spatial scale of the impact.
Intensity	Examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment.
Type	Description of the impact as positive, negative or neutral, and direct or indirect.
Consequence	Combination of duration, extent and intensity of impact in relation to the type.

Probability	This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the lifecycle of the activity, and not at any given time.
Significance	Synthesis of the characteristics described above and assessed as low, medium or high. Distinction will be made for the significance rating without the implementation of mitigation measures and with the implementation of mitigation measures.

10. Duration

The lifetime of the impact is measured in relation to the lifetime of the proposed project (Table 7-2).

Table 7-2: Description of Duration Criteria

Description	Explanation	Scoring
Short term	Impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than any of the development phases.	1
Short to medium term	Impact will be relevant through to the end of the construction phase.	2
Medium term	Impact will last up to the end of the development phases, where after it will be entirely negated.	3
Long term	Impact will continue or last for the entire operational lifetime of the development but will be mitigated by direct human action or by natural processes thereafter.	4
Permanent	The only impact class that is non-transitory. Mitigation by man or natural process will not occur in such a way or time span that the impact can be considered transient.	5

Extent

The physical and spatial scale of the impact is classified below (Table 7-3).

Table 7-3: Description of Extent Criteria

Description	Explanation	Scoring
Footprint	Impacted area extends only as far as the activity, such as footprint occurring within the total site area.	1
Site	Impact could affect the whole, or a significant portion of the site.	2
Regional	Impact could affect the area around the site including neighbouring farms, transport routes and adjoining towns.	3
National	Impact could have an effect that expands throughout the country (South Africa).	4
International	Impact has international ramifications that go beyond the boundaries of South Africa	5

Intensity

The assessment of the intensity of the impact will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project. The intensity will be measured using the criteria listed in Table 7-4.

Table 7-4: Description of Intensity Criteria

Description	Explanation	Scoring
Low	Impact alters the affected environment in such a way that the natural processes or functions are not affected.	2
Low-Medium	Impact alters the affected environment in such a way that the natural processes or functions are slightly affected.	4
Medium	Affected environment is altered, but functions and processes continue, albeit in a modified way.	6
Medium-High	Affected environment is altered, and the functions and processes are modified immensely.	8
High	Function or process of the affected environment is disturbed to the extent where the function or process temporarily or permanently ceases.	10

Consequence

Based on the above criteria, the consequence of issues will be determined using the following formula:

Consequence = Type × (Duration + Extent + Intensity)

This is the consequence of the impact is rated as follows (Table 7-5):

Table 7-5: Description of Consequence Criteria

Description	Explanation	Scoring
Extreme Detrimental	A very serious negative impact which may be sufficient by itself to prevent implementation of the Project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects. The impacts will be irreplaceable and irreversible should adequate mitigation and management measures not be successfully implemented.	-18 to-20
High Detrimental	A serious negative impact which may prevent the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and/or social) environment and result in severe effects. The impacts may result in the irreversible damage to irreplaceable environmental or social aspects should mitigation measures not be implemented.	-14 to > -17
Moderate Detrimental	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.	-10 to -13
Slight Detrimental	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.	-6 to -9
Negligible	An acceptable negative/positive impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative/positive medium to short term effects on the social and/or natural environment. The impacts are reversible and will not result in the loss of irreplaceable aspects.	-5 to 5

Slight Beneficial	A small positive impact. The impact will result in medium to short term effects on the social and/or natural environment.	6 to 9
Moderate Beneficial	An important positive impact. The impact is insufficient by itself to justify the implementation of the Project. These impacts will usually result in positive medium to long-term effect on the social and/or natural environment.	10 to 13
High Beneficial	A beneficial impact which may help to justify the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and/or social) environment.	14 to 17
Extreme Beneficial	A very beneficial impact which may be sufficient by itself to justify implementation of the Project. The impact may result in permanent positive change.	18 to 20

Probability

Probability describes the likelihood of the impact(s) occurring for any length of time during the lifecycle of the activity, and not at any given time. Table 7-6 shows the classes.

Table 7-6: Description of Probability Criteria

Description	Explanation	Scoring
Improbable	Possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is thus zero (0%).	1
Possible	Possibility of the impact occurring is very low, either due to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.	2
Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.	3
Highly likely	It is most likely that the impacts will occur at some stage of the Development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.	4
Definite	Impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied upon. The chance of this impact occurring is defined as 100%.	5

Confidence

The level of knowledge or information that the EAP or a specialist had in their judgement is rated as shown in Table 7-7. Note that this criterion is not given a numerical value.

Table 7-7: Description of Confidence Criteria

Criteria	Description
Low	Judgement is based on intuition and not on knowledge or information.
Medium	Judgement is based on common sense and general knowledge.
High	Judgement is based on scientific and/or proven information.

Reversibility

Reversibility is the ability of the affected environment to recover from the impact, with or without mitigation (Table 7-8). Note that this criterion is not given a numerical value.

Table 7-8: Description of Reversibility Criteria

Criteria	Description
Yes	The affected environment will be able to recover from the impact.
No	The affected environment will be unable to recover from the impact that is permanently modified.

Replaceability

Replaceability is an indication of the scarcity of the specific set of parameters that make up the affected environment (Table 7-9). That is, if lost can the affected environment be (a) recreated, or (b) is it a common set of characteristics and thus if lost is not considered a significant loss. Note that this criterion is not given a numerical value.

Table 7-9: Description of Replaceability Criteria

Criteria	Description
Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).
No	Affected environment is irreplaceable.

Level of Significance

Based on the above criteria, the significance of issues will be determined using the following formula:

Significance = Consequence × Probability

The significance of the impact is rated as follows (Table 7-10):

Table 7-10: Impact Assessment Significant Rating

Description	Explanation	Scoring
No Impact	There is no impact	0 – 10
Low	Impacts are less important. Some mitigation is required to reduce the negative impacts.	11 – 30
Medium	Impacts are important and require attention. Mitigation is required to reduce the negative impacts.	31 – 60
High	Impacts are of high importance. Mitigation is essential to reduce the negative impacts.	61 – 89
Fatal Flaw	Impacts present a fatal flaw, and alternatives must be considered	90 – 100

(b) Please describe any gaps in knowledge.

Unknown

(c) Please describe the underlying assumptions.

The BA Process:

- The BA process is multi-disciplinary, informed by the project team and EAP. It is necessary to assume that the information provided by the project team is accurate and true at the time of writing the report.
- No significant changes to the project are anticipated with regards to the narrative on the receiving environment for the period between completion of the report and implementation of the proposed project.
- Information regarding the project infrastructure was provided by the Applicant and the Project Engineer.

Aquatic Baseline Assessment:

- A single wet season aquatic survey was completed for this assessment. Thus, temporal trends were not investigated.

Social Impact Assessment

- It is assumed that Stellenbosch Municipality has satisfied itself of the motivation and economic feasibility of the project prior to commissioning an EIA process for the project;
- It is assumed that, should agricultural areas affected by the project be privately owned, owners are appropriately compensated for any loss in income, crops, infrastructure or land incurred as a result of the project. The SIA does therefore not focus on impacts on private landowners;
- The study does not motivate for or against the project, but rather seeks to give insight into the socio-economic character of the area and the significance of the anticipated socio-economic impacts created by the project. In the event that unacceptable social impacts are identified, this is clearly indicated in the report;
- The report is based largely on secondary data gathered during a desktop analysis. Limited primary field work was also conducted for this study to supplement the existing data;
- The most recent available census data is from Census 2011 (full census) and the 2016 Community Survey (limited census). Given the often rapidly changing nature of informal settlements, the census data is not representative of current conditions on the project site. However, it is considered sufficient to paint a socio-economic picture of the region, which has been supplemented with primary data obtained for this study; and
- It is assumed that no significant developments or changes in the socio-economic characteristics will take place in the area of influence between data collection and submission of the report.

(d) Please describe the uncertainties.

None

(e) Describe adequacy of the assessment methods used.

It should be noted that there is currently in South Africa no regulated methodology for assessing impacts. The method used is decided upon by the EAP. The assessment methods used are however in accordance with DEAT Guidelines on Integrated Environmental Management and Impact Assessment as well as the requirements of the EIA Regulations (2014), as amended, published in terms of the NEMA, as amended.

The methodology for assessing impacts was further practised by using techniques for Risk Assessment as found in the SANS 31010 of 2010. The National standards are the identical implementation of International Electrotechnical Commission (IEC) / International Organisation for Standardization (ISO) 31010:2009 and are adopted with the permission of the IEC and the ISO.

The assessment methodology further speaks to the nature, site related nature of the anticipated project activities as well as the anticipated duration of the said activities occurring.

7.2 IDENTIFICATION, ASSESSMENT AND RANKING OF IMPACTS TO REACH THE PROPOSED ALTERNATIVES INCLUDING THE PREFERRED ALTERNATIVE WITHIN THE SITE

Note: In this section the focus is on the identified issues, impacts and risks that influenced the identification of the alternatives. This includes how aspects of the receiving environment have influenced the selection.

(a) List the identified impacts and risks for each alternative.

Alternative 1 **(preferred alternative):**	The alternative assessed here is the pump station located at the Papegaaiberg Reservoir. The rising main linking the pump station and reservoir will follow the alignment of existing water mains up to the Kayamandi Reservoir, from where it will mainly follow existing dirt roads. The following impacts were identified- Planning, Design and Development Phase Impacts: 1. Direct loss of 3 000 m² of CR Swartland Granite Renosterveld vegetation due to pump station construction; 2. Encouragement and likely proliferation of IAPs and exotic grass and weed species within the development footprint and edges through soil disturbance; 3. Direct loss of wetland and wetland habitat; 4. Loss of wetland functionality; 5. Loss of wetland functionality leading to indirect loss of wetlands; 6. Change in the ambient noise quality; 7. Emissions to air causing change to the ambient air quality; 8. Increased traffic; 9. Negative impacts to the general health and safety of the community and site personnel; 10. Change in natural processes due to construction camp impacts 11. Job creation; 12. Contamination, compaction and loss of soil; 13. Change in the visual character; 14. Loss of cultural and archaeological heritage; 15. Loss of vegetation at the Papegaaiberg Nature Reserve; 16. Physical displacement due to removal of informal dwellings in the pipeline corridor; 17. Significance of loss of assets due to removal of informal structures (other than dwellings) in the pipeline corridor; 18. Accidental damage to informal structures outside of pipeline corridor; 19. Temporary loss of livelihoods due to removal of market stalls in the pipeline corridor; 20. Safety and security risk due to construction works; 21. Increase in nuisance to residents adjacent to the pipeline route; 22. Reduced access due to road closures; 23. Alteration in the current land-use activities; and 24. Waste and pollution. Operational Phase Impacts: 25. Encouragement and likely proliferation of IAPs and exotic grass and weed species within the development footprint and edges through soil disturbance; 26. Changes in the ambient noise quality; 27. Changes in the ambient air quality; 28. Change in the visual character; 29. Loss indigenous vegetation; and 30. Improved bulk water supply enabling expansion of low-cost housing in Kayamandi.
Alternative 2:	The reservoir will be built on the highest point above the Kayamandi township, to provide the maximum possible head (pressure) to the downstream area. Different locations for the pump station were considered in terms of electricity availability, risk to future vandalism, and integration with the existing water distribution network. Other alternatives were determined to be impractical during the feasibility assessment and therefore did not form part of the Scope of Works for this BA.

No-go Alternative:	Planning, Design and Development Phase Impacts: • No impact to geological/geohydrological/ecological/socio-economic/heritage and cultural-historical/noise/ visual receptors. Operational Phase Impacts: • No impact to geological/geohydrological/ecological/socio-economic/heritage and cultural-historical/noise/ visual receptors. Kindly note that the no-go option is assessed in this BA process as the alternative of not undertaking the proposed activity.

(b) Describe the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed; may cause irreplaceable loss of resources; and can be avoided, managed or mitigated.

The following table serves as a guide for summarising each alternative. The table should be repeated for each alternative to ensure a comparative assessment. (The EAP has to select the relevant impacts identified in blue in the table below for each alternative and repeat the table for each impact and risk).

7.2.1 PLANNING, DESIGN AND DEVELOPMENT PHASE

7.2.1.1 **PLANNING, DESIGN AND DEVELOPMENT PHASE**

ALTERNATIVE 1 (PREFERRED ALTERNATIVE)

Criteria	Rating	Rating Score	Description
Impact No.	**1**		
Potential impact and risk (name or identify risk):	Direct loss of 35 000 m² of CR Swartland Granite Renosterveld Vegetation		
A: Pre-Mitigation			
Nature of impact (describe):	Removal of vegetation during construction along the pipeline route (9 100 m2) and pump station site (3 000 m2) within the Papegaaiberg Nature Reserve. Disturbance of vegetation alongside pipeline, in the construction footprint. Impacts could however extend to beyond the development footprint to include areas adjacent to the pipeline that will be affected by the movement of construction vehicles alongside the trench. Thus, the footprint that could be considered in this case is 32 000m3 for the pipeline that could be lost if no mitigation measures are implemented. (Thus, 32 000m2 for pipeline and 3 000 m2 for the pump station).		
Duration of impact:	Long term	4	Without mitigation (occurring within the vegetation) this will forever alter the soil structure and as a result the plants that grow there in terms of composition and structure. With mitigation (by utilising the road) this is avoided entirely.
Extent of impact:	Footprint	1	The direct impact is not expected to extend beyond the direct footprint (20 m wide strip)
Intensity of impact:	High	10	Is high as clearing operations will totally remove the ecosystem within the footprint area and thus the function and processes of that area will cease entirely.
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Highly Detrimental	-15	A serious negative impact which may prevent the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and/or social) environment and result in severe effects. The impacts may result in the irreversible damage to irreplaceable environmental or social aspects should mitigation measures not be implemented.

Criteria	Rating	Rating Score	Description
Probability of occurrence:	Definite	5	Without mitigation vegetation will need to be cleared thus the probability is definite.
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	**High Negative**	**-75**	**Impacts are of high importance. Mitigation is essential to reduce the negative impacts.**
Confidence:	**High**	**Judgement is based on scientific and/or proven information.**	
Indirect impacts:	None		
Cumulative impact prior to mitigation:	Challenges with the re-establishment of vegetation post-construction should it be affected. Cumulative loss of CR Swartland Granite Renosterveld (FRg2) and Swartland Shale Renosterveld (FRs9) through clearing.		
Degree to which the impact can be avoided:	Medium		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		
Proposed mitigation:	• Utilising 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; • 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; and • All works should be monitored by an Environmental Control officer (ECO) and done in compliance with the EMPr and Vegetation Rehabilitation Plan included in the EMPr. • Maintenance should be undertaken in compliance with the Maintenance Management Plan (MMP) included in the EMPr.		
B: Post-Mitigation			
Duration of impact:	Medium term	3	As for pre-mitigation
Extent of impact:	Footprint	1	If the construction areas are clearly marked out and the surrounding areas are no-go areas, the disturbance can be minimised.
Intensity of impact:	Medium-High	8	The vegetation along the pipeline will re-establish itself over time, provided the proposed mitigation measures are implemented, however it will not establish to a pristine state.

Criteria	Rating	Rating Score	Description
			For the pump station site, removal here is permanent, however this area is 3000m2, and is already more than 50% sand cover that is not meaningfully contributing to the maintenance of the ecosystem.
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Moderately Detrimental	-12	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.
Probability of occurrence:	Definite	5	Mitigation will minimize the chance of loss of sensitive vegetation.
Significance rating of impact after mitigation:	Medium Negative	-60	Impacts are important and require attention. Mitigation is required to reduce the negative impacts.
Residual impacts:	Disturbance and clearance of CR vegetation types.		
Cumulative impact post mitigation:	• Challenges with the re-establishment of vegetation post-construction should it be affected; • Cumulative restoration of CR Swartland Granite Renosterveld (FRg2) and Swartland Shale Renosterveld (FRs9) through clearing; and • Mitigation will minimize the chance of loss of sensitive vegetation. Without mitigation vegetation will need to be cleared thus the probability is definite.		

Criteria	Rating	Rating Score	Description
Impact No.	**2**		
Potential impact and risk (name or identify risk):	Encouragement and likely proliferation of IAPs		
A: Pre-Mitigation			
Nature of impact (describe):	Encouragement and likely proliferation of IAPs and weed species within the development footprint and edges through soil disturbance		
Duration of impact:	Long term	4	Without mitigation these species will proliferate and drop seeds which can remain in the environment for many years and result in cycle after cycle of re-emergence thus 'long-term' duration.
Extent of impact:	Site	2	It is possible that these species spread laterally and downslope infesting further sections of the site.
Intensity of impact:	Medium	6	The affected environment will be altered and persist under moderate levels of IAP infestation however in the long term, if left unmanaged, the changes these species bring can change the functions and processes of the area significantly.
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Moderately Detrimental	-12	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.
Probability of occurrence:	Definite	5	Weeds and IAPs will occur where the soil is disturbed.

Criteria	Rating	Rating Score	Description
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Medium Negative	-60	Impacts are important and require attention. Mitigation is required to reduce the negative impacts.
Confidence:	High	Judgement is based on scientific and/or proven information.	
Indirect impacts:	None		
Cumulative impact prior to mitigation:	Colonisation of indigenous vegetation by IAPs and exotic grass.		
Degree to which the impact can be avoided:	Medium		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		
Proposed mitigation:	• Practicing 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 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; and • All works should be monitored by an Environmental Control officer (ECO) and done in compliance with the EMPr and Vegetation Rehabilitation and/or Aquatic Rehabilitation Plan (as appropriate) included in the EMPr. • Maintenance should be undertaken in compliance with the Maintenance Management Plan (MMP) included in the EMPr.		
B: Post-Mitigation			
Duration of impact:	Short term	1	As for pre-mitigation
Extent of impact:	Footprint	1	If the construction areas are clearly marked out and the surrounding areas are no-go areas, the disturbance can be minimised.
Intensity of impact:	Low	2	As for pre-mitigation
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Negligible	-4	An acceptable negative/positive impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative/positive medium to short term effects on the social and/or natural environment. The impacts are reversible and will not result in the loss of irreplaceable aspects.

Criteria	Rating	Rating Score	Description
Probability of occurrence:	Definite	5	Mitigation will minimize the chance of loss of sensitive vegetation.
Significance rating of impact after mitigation:	Low Negative	-20	Impacts are less important. Some mitigation is required to reduce the negative impacts.
Residual impacts:	Weeds and IAPs will occur where the soil is disturbed, if not properly managed.		
Cumulative impact post mitigation:	None.		

Criteria	Rating	Rating Score	Description
Impact No.	**3**		
Potential impact and risk (name or identify risk):	Loss of Wetland Functionality (Pipeline)		
A: Pre-Mitigation			
Nature of impact (describe):	Modification of wetland function or siltation of the watercourse resulting in a disturbance of the natural wetland processes		
Duration of impact:	Medium term	3	Equal to the duration of the construction phase
Extent of impact:	Site	2	Localised
Intensity of impact:	Medium-High	8	High intensity without mitigation
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Moderately Detrimental	-13	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.
Probability of occurrence:	Definite	5	Impact inevitable without appropriate mitigation
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	High Negative	-65	Impacts are of high importance. Mitigation is essential to reduce the negative impacts.
Confidence:	High	Judgement is based on scientific and/or proven information.	

Criteria	Rating	Rating Score	Description
Indirect impacts:	• Changes to drainage patterns from increased activity close to the wetland; • Impeding on stream flow; • Siltation of wetlands; • Erosion of channels and wetlands; • Loss of vegetation; • Direct loss of wetland areas; • Decrease in functionality; • Additional water quality impairment; • Compaction; • Altering hydromorphic soils; • Drainage patterns change; • Altering overland flow characteristics; and • Pollution due to spilled hydrocarbons (oils and fuels) and chemicals.		
Cumulative impact prior to mitigation:	Surrounding agricultural activities could be impacted through newly formed obstructions and limitations to wetland access.		
Degree to which the impact can be avoided:	Medium		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		
Proposed mitigation:	• Avoid, 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 100 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 100 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 100 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 100 m of the edge of any wetland or river; • Freshwater ecosystems located in close proximity to construction areas (i.e. within ~100 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;		

Criteria	Rating	Rating Score	Description
	• 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; and • Ensure that the EMPr is rigorously implemented under the guidance and regular auditing of an experienced ECO. • All works should be done in compliance with the EMPr and Aquatic Rehabilitation Plan included in the EMPr. • Maintenance should be undertaken in compliance with the Maintenance Management Plan (MMP) included in the EMPr.		
B: Post-Mitigation			
Duration of impact:	Short to medium term	2	Not for the entire duration of the construction phase.
Extent of impact:	Site	2	As for pre-mitigation
Intensity of impact:	Medium	6	Mitigation is required for the addressing of impacts
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Moderately Detrimental	-10	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.
Probability of occurrence:	Likely	3	Mitigation will minimize the impact
Significance rating of impact after mitigation:	**Low Negative**	**-30**	**Impacts are less important. Some mitigation is required to reduce the negative impacts.** Note: At the time of the assessment by the specialist the information at hand resulted in a negative impact of medium significance post mitigation to the receiving environment. However, more detailed information obtained and reviewed by the EAP has resulted in a negative impact of low significance after mitigation being identified. This is inline with the assessment of the specialist using the DWS assessment tool (reference section 11.2 page 36 of the wetland assessment Report).
Residual impacts:	Potential increase in sediment to the land drains and watercourses as a result of disturbance of ground during construction		
Cumulative impact post mitigation:	None.		

Criteria	Rating	Rating Score	Description
Impact No.	**4**		
Potential impact and risk (name or identify risk):	Loss of Wetland Functionality (Pipeline)		
A: Pre-Mitigation			
Nature of impact (describe):	Disturbance of the wetland areas resulting in a negative impact to the wetland habitat. The impact is restricted to freshwater ecosystems immediately adjacent to construction areas.		

Criteria	Rating	Rating Score	Description
Duration of impact:	Medium term	3	Could persist beyond the construction period
Extent of impact:	Site	2	Restricted to freshwater ecosystems immediately adjacent to construction areas
Intensity of impact:	Medium-High	8	Could be an impact of relatively high intensity without mitigation
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Moderately Detrimental	-13	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.
Probability of occurrence:	Highly likely	4	Highly likely without mitigation where construction is close to freshwater ecosystems
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Medium Negative	-52	Impacts are important and require attention. Mitigation is required to reduce the negative impacts.
Confidence:	High	Judgement is based on scientific and/or proven information.	
Indirect impacts:	Increased sediment, turbidity and toxic and heavy contaminates.		
Cumulative impact prior to mitigation:	Surrounding agricultural activities could be impacted through newly formed obstructions and limitations to wetland access.		
Degree to which the impact can be avoided:	Medium		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		

Criteria	Rating	Rating Score	Description
Proposed mitigation:	• Avoid, 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 100 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 100 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 100 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 100 m of the edge of any wetland or river; • Freshwater ecosystems located in close proximity to construction areas (i.e. within ~100 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; and • Ensure that the EMPr is rigorously implemented under the guidance and regular auditing of an experienced ECO. • All works should be done in compliance with the EMPr and Aquatic Rehabilitation Plan included in the EMPr. • Maintenance should be undertaken in compliance with the Maintenance Management Plan (MMP) included in the EMPr.		
B: Post-Mitigation			
Duration of impact:	Short to medium term	2	Not for the entire duration of the construction phase.
Extent of impact:	Footprint	1	As for pre-mitigation
Intensity of impact:	Medium	6	Mitigation is required for the addressing of impacts
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-9	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.

Criteria	Rating	Rating Score	Description
Probability of occurrence:	Likely	3	Mitigation will minimize the impact
Significance rating of impact after mitigation:	Low Negative	-27	**Impacts are less important. Some mitigation is required to reduce the negative impacts.** (Note: At the time of the assessment by the specialist the information at hand resulted in a negative impact of medium significance post mitigation to the receiving environment. However, more detailed information obtained and reviewed by the EAP has resulted in a negative impact of low significance after mitigation being identified. This is in line with the assessment of the specialist using the DWS assessment tool (reference section 11.2 page 36 of the wetland assessment Report).)
Residual impacts:	Potential disturbance of below ground flow regime due to the pipeline infrastructure underground, however this would be on a small scale, and the pipeline crosses the wetland just below the watershed (i.e. close to the top of the hill), and therefore does not have high water flows as systems further down the catchment slope.		
Cumulative impact post mitigation:	None.		

Criteria	Rating	Rating Score	Description
Impact No.	**5**		
Potential impact and risk (name or identify risk):	Loss of Wetland Functionality (pump station and reservoir)		
A: Pre-Mitigation			
Nature of impact (describe):	Loss of wetland functionality due to activities within 500 m of wetlands		
Duration of impact:	Medium term	3	Could persist beyond the construction period
Extent of impact:	Site	2	Impact not restricted to freshwater ecosystems immediately adjacent to construction areas
Intensity of impact:	Medium	6	Could be an impact of medium intensity without mitigation
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Moderately Detrimental	-11	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.
Probability of occurrence:	Possible	2	Possible without mitigation where construction is close to freshwater ecosystems
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	

Criteria	Rating	Rating Score	Description
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Low Negative	-22	Impacts are less important. Some mitigation is required to reduce the negative impacts.
Confidence:	High	Judgement is based on scientific and/or proven information.	
Indirect impacts:	• Changes to drainage patterns from increased activity close to the wetland; • Impeding on stream flow; • Siltation of wetlands; • Erosion of channels and wetlands; • Loss of vegetation; • Direct loss of wetland areas; • Decrease in functionality; • Additional water quality impairment; • Compaction; • Altering hydromorphic soils; • Drainage patterns change; and • Altering overland flow characteristics.		
Cumulative impact prior to mitigation:	Impacts associated with urbanisation and informal settlements already put pressure on downstream water resources. If not mitigated, the project can add to this existing cumulative impact.		
Degree to which the impact can be avoided:	High		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		
Proposed mitigation:	• 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; and • No “non-essential” vehicles or activities, dumping or clearing is permitted within the delineated wetland.		
B: Post-Mitigation			
Duration of impact:	Medium term	3	As for pre-mitigation
Extent of impact:	Site	2	As for pre-mitigation
Intensity of impact:	Low-Medium	4	Recommended mitigation measures should reduce impact intensity
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative

Criteria	Rating	Rating Score	Description
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-9	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Possible	2	Probability of impact would be reduced through mitigation
Significance rating of impact after mitigation:	Low Negative	-18	Impacts are less important. Some mitigation is required to reduce the negative impacts.
Residual impacts:	Probability of impact would be reduced through mitigation.		
Cumulative impact post mitigation:	None.		

Criteria	Rating	Rating Score	Description
Impact No.	**6**		
Potential impact and risk (name or identify risk):	Change in the ambient noise quality		
A: Pre-Mitigation			
Nature of impact (describe):	The noise generated will be typical construction noise.		
Duration of impact:	Short to medium term	2	Equal to the duration of the construction phase, temporary
Extent of impact:	Site	2	Sound generated during construction will generally affect the immediate area.
Intensity of impact:	Low-Medium	4	Noise generated will be typical construction noise as a result of machine movement (e.g. hauling trucks and graders)
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-8	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Definite	5	The proposed project requires the use of machinery
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Medium Negative	-40	Impacts are important and require attention. Mitigation is required to reduce the negative impacts.
Confidence:	Medium	Judgement is based on common sense and general knowledge.	

Criteria	Rating	Rating Score	Description
Indirect impacts:	N/A		
Cumulative impact prior to mitigation:	Surrounding agricultural activities, adjacent roads (Bird Street (R304), Loerie Road and Distillery Street) and housing settlement areas.		
Degree to which the impact can be avoided:	Low		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		
Proposed mitigation:	• 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; and • Stellenbosch Municipality Noise Policy/by-law 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.		
B: Post-Mitigation			
Duration of impact:	Short term	1	As for pre-mitigation
Extent of impact:	Site	2	As for pre-mitigation
Intensity of impact:	Low-Medium	4	As for pre-mitigation
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-7	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Possible	2	The proposed project requires the use of machinery
Significance rating of impact after mitigation:	Low Negative	-14	Impacts are less important. Some mitigation is required to reduce the negative impacts.
Residual impacts:	Noise generated will be typical construction noise as a result of machine movement (e.g. hauling trucks and graders). No residual impact after construction.		
Cumulative impact post mitigation:	None.		

Criteria	Rating	Rating Score	Description
Impact No.	**7**		

Criteria	Rating	Rating Score	Description
Potential impact and risk (name or identify risk):	Emissions to air causing change to the ambient air quality		
A: Pre-Mitigation			
Nature of impact (describe):	The dust generated will be typical construction dust		
Duration of impact:	Short to medium term	2	Equal to the duration of the construction phase
Extent of impact:	Site	2	The dust generated will be typical construction dust
Intensity of impact:	Low-Medium	4	Dust generation and emissions released could be as a result of machine movement (e.g. hauling trucks and graders) or excavations
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-8	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Likely	3	The proposed project requires digging of trenches and handling of stockpiles and backfilling activities
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Low Negative	-24	Impacts are less important. Some mitigation is required to reduce the negative impacts.
Confidence:	Medium	Judgement is based on common sense and general knowledge.	
Indirect impacts:	None.		
Cumulative impact prior to mitigation:	Depending on the season, additional dust generation could add to pre-existing dusty conditions, particularly in the dry summer months.		
Degree to which the impact can be avoided:	Low		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		

Criteria	Rating	Rating Score	Description
Proposed mitigation:	• Dust emissions must be monitored and comply with regulatory requirements, including the AQMP for the Stellenbosch 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; and • Construction vehicles must keep to the speed limits (25 km/h on the construction site).		
B: Post-Mitigation			
Duration of impact:	Medium term	3	As for pre-mitigation
Extent of impact:	Site	2	As for pre-mitigation
Intensity of impact:	Low	2	Mitigation measures will decrease the intensity of this impact.
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-7	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Likely	3	The proposed project requires digging of trenches and handling of stockpiles and backfilling activities.
Significance rating of impact after mitigation:	Low Negative	-21	Impacts are less important. Some mitigation is required to reduce the negative impacts.
Residual impacts:	None.		
Cumulative impact post mitigation:	None.		

Criteria	Rating	Rating Score	Description
Impact No.	**8**		
Potential impact and risk (name or identify risk):	Increased traffic and reduced access due to road closures		
A: Pre-Mitigation			

Criteria	Rating	Rating Score	Description
Nature of impact (describe):	Traffic could temporarily increase as a result of construction vehicles on the road. Furthermore, construction will require temporary partial and full road closures, affecting access to and mobility in Azania/Watergang and the western-most section of Enkanini.		
Duration of impact:	Short term	1	Equal to the duration of the construction phase
Extent of impact:	Regional	3	Impacts will be felt by residents of the study area and road users in the area.
Intensity of impact:	Medium	6	Traffic could temporarily increase as a result of construction vehicles on the road
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Moderately Detrimental	-10	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.
Probability of occurrence:	Highly likely	4	This impact will depend on the frequency of construction vehicles on the road as a result of the proposed project
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Medium Negative	-40	Impacts are important and require attention. Mitigation is required to reduce the negative impacts.
Confidence:	Medium	Judgement is based on common sense and general knowledge.	
Indirect impacts:	Increased traffic in the area due to construction vehicles using main roads in the area to get to the access roads to site.		
Cumulative impact prior to mitigation:	Access in the construction area, specifically in the areas of Azania/Watergang and Enkanini, is already constricted. Construction activities may temporarily further constrain access but residents.		
Degree to which the impact can be avoided:	Low		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		

Criteria	Rating	Rating Score	Description
Proposed mitigation:	• 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); • Phase construction in such a way as to limit the disruption to traffic; • Accommodate traffic during construction as far as possible; • Consult with Stellenbosch Municipality and engage local residents regarding specific access requirements; • Publicise access restrictions to the community; and • Implement standard construction road safety measures.		
B: Post-Mitigation			
Duration of impact:	Short term	1	As for pre-mitigation
Extent of impact:	Regional	3	As for pre-mitigation
Intensity of impact:	Low	2	Mitigation will decrease traffic congestion and promote safety on the road along the affected routes
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-6	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Possible	2	Mitigation measures will decrease the likelihood of this impact occurring
Significance rating of impact after mitigation:	Low Negative	-12	Impacts are less important. Some mitigation is required to reduce the negative impacts.
Residual impacts:	None.		
Cumulative impact post mitigation:	None		

Criteria	Rating	Rating Score	Description
Impact No.	**9**		
Potential impact and risk (name or identify risk):	General health, safety and security risk due to construction works		
A: Pre-Mitigation			
Nature of impact (describe):	Impact could affect the health and safety of the construction workers and surrounding residents through exposure to harmful substances or risk of injury.		
Duration of impact:	Long term	4	Impact could extend beyond the construction phase
Extent of impact:	Site	2	Impact will affect the construction workers and surrounding residents
Intensity of impact:	Medium	6	Impact could affect the health and safety of the construction workers and surrounding residents through exposure to harmful substances or risk of injury
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Moderately Detrimental	-12	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.
Probability of occurrence:	Likely	3	Without appropriate mitigation, health and safety of community members or construction worker may be impacted
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Medium Negative	-36	Impacts are important and require attention. Mitigation is required to reduce the negative impacts.
Confidence:	Medium	Judgement is based on common sense and general knowledge.	
Indirect impacts:	Risk to public safety as a result of increased traffic of vehicles and people.		
Cumulative impact prior to mitigation:	No significant direct cumulative socio-economic impacts were identified.		
Degree to which the impact can be avoided:	Medium		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		

Criteria	Rating	Rating Score	Description
Proposed mitigation:	• The public shall not be allowed to enter or near the working / construction areas; • Undertake construction in residential areas as quickly as possible, while observing all safety protocols; • 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; • Prevent unauthorised access to construction sites; • 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; • Consider the possibility of lighting the construction site at night while constructing in Enkanini; • Engage adjacent residents prior to construction and explain potential risks and safety measures; • Repair any damage to barriers and signage immediately; • Remove any water from the trench within a day, or as soon as possible, when constructing near Enkanini and Azania / Watergang; • Undertake weekly ECO site inspection to confirm implemented safety protocols are appropriate and adhered to; • Define conduct rules and responsibilities of security guards, and emergency protocols; and • Implement a grievance mechanism for people to report observations, suggestions and incidents. Ensure any submissions are addressed promptly.		
B: Post-Mitigation			
Duration of impact:	Short term	1	Mitigation measures will prevent potential impacts occurring beyond construction.
Extent of impact:	Site	2	As for pre-mitigation
Intensity of impact:	Low	2	Mitigation will maximise safety at the proposed project site
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Negligible	-5	An acceptable negative/positive impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative/positive medium to short term effects on the social and/or natural environment. The impacts are reversible and will not result in the loss of irreplaceable aspects.
Probability of occurrence:	Possible	2	If mitigation measures are implemented, the is a low chance of an impact occurring.
Significance rating of impact after mitigation:	No Impact Negative	-10	There is no impact
Residual impacts:	None.		
Cumulative impact post mitigation:	None.		

Criteria	Rating	Rating Score	Description
Impact No.	**10**		
Potential impact and risk (name or identify risk):	Employment during construction		
A: Pre-Mitigation			
Nature of impact (describe):	Provision of temporary working opportunities for the residents in the Kayamandi area.		
Duration of impact:	Medium term	3	Equal to the duration of the construction phase
Extent of impact:	Regional	3	Individuals from the affected local municipalities will benefit
Intensity of impact:	Low	2	A limited number of opportunities will become available, but given the lack of new opportunities, any additional ones have a marked impact
Type of impact (positive or negative):	Positive	1	Potential Impact is positive
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Slightly Beneficial	8	A small positive impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Likely	3	Local employment is a condition of contract for contractors
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Low Positive	24	-
Confidence:	Medium	Judgement is based on common sense and general knowledge.	
Indirect impacts:	Contribution to the unemployment rate decrease in the region for that interim and decrease in few numbers if discouraged job seekers in the surrounding area.		
Cumulative impact prior to mitigation:	N/A		
Degree to which the impact can be avoided:	Medium		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		

Criteria	Rating	Rating Score	Description
Proposed mitigation:	• 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.); • Promote employment of women; and • Monitor employment targets over the duration of construction.		
B: Post-Mitigation			
Duration of impact:	Medium term	3	
Extent of impact:	Regional	3	
Intensity of impact:	Medium-High	8	
Type of impact (positive or negative):	Positive	1	Potential Impact is positive
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Highly Beneficial	14	A beneficial impact which may help to justify the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and/or social) environment.
Probability of occurrence:	Highly likely	4	Local employment is a condition of contract for contractors
Significance rating of impact after mitigation:	Medium Positive	56	Impacts are important and require attention. Mitigation is required to reduce the negative impacts.
Residual impacts:	A limited number of opportunities will become available but given the lack of new opportunities in the area in general, any additional ones have a marked impact.		
Cumulative impact post mitigation:	Acquisition of limited skills training and building capacity to perform general and basic construction activities.		

Criteria	Rating	Rating Score	Description
Impact No.	**11**		
Potential impact and risk (name or identify risk):	Contamination, compaction and loss of topsoil		
A: Pre-Mitigation			
Nature of impact (describe):	Topsoil loss as a result of improper storage, runoff or contamination.		
Duration of impact:	Short to medium term	2	Will extend beyond the project construction phase if not mitigated
Extent of impact:	Footprint	1	Limited to the footprint and immediately adjacent areas
Intensity of impact:	Low-Medium	4	Without proper mitigation and management, it could have a detrimental effect on the surrounding environment
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative

Criteria	Rating	Rating Score	Description
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-7	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Possible	2	Due to the nature of the project soil erosion is can be expected, however within manageable means with the appropriate mitigation measures.
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Low Negative	-14	Impacts are less important. Some mitigation is required to reduce the negative impacts.
Confidence:	Medium	Judgement is based on common sense and general knowledge.	
Indirect impacts:	Without proper mitigation and management, it could have a detrimental effect to the adjacent watercourses and groundwater. Changes to topsoil physical and biological properties that reduce effectiveness of reuse for rehabilitation.		
Cumulative impact prior to mitigation:	Affected areas, some already stricken by erosion within the project area and an impact to indigenous vegetation, particularly the Papegaaiberg Nature Reserve.		
Degree to which the impact can be avoided:	Low		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		
Proposed mitigation:	• 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 watercourses; • Excavated and graded bare areas should not be left for long period without been constructed; and • 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.		
B: Post-Mitigation			
Duration of impact:	Short term	1	The duration of the potential impact is reduced with mitigation.
Extent of impact:	Footprint	1	As for pre-mitigation
Intensity of impact:	Low-Medium	4	Mitigation will minimize the effect of this impact
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative

Criteria	Rating	Rating Score	Description
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-6	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Possible	2	Due to the nature of the project soil erosion is can be expected, however manageable with the appropriate mitigation measures.
Significance rating of impact after mitigation:	Low Negative	-12	Impacts are less important. Some mitigation is **required to reduce the negative impacts.**
Residual impacts:	None		
Cumulative impact post mitigation:	None		

Criteria	Rating	Rating Score	Description
Impact No.	**12**		
Potential impact and risk (name or identify risk):	Change in the visual character		
A: Pre-Mitigation			
Nature of impact (describe):	The proposed activity requires the use of machinery; however, no significant visual alternations are expected during construction. It should be noted that the proposed activity is associated with existing reservoir sites.		
Duration of impact:	Short to medium term	2	Equal to the duration of the entire project and potential to extend beyond the construction phase if not mitigated.
Extent of impact:	Regional	3	The visual environmental will be affected due to the proposed project being likely visible to +200 m away.
Intensity of impact:	Low	2	The proposed activity is associated with an existing reservoir site, therefore existing infrastructure of the same form will reduce the visual impact of the proposed development.
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-7	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Likely	3	The proposed activity is associated with an existing reservoir site
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Low Negative	-21	Impacts are less important. Some mitigation is required to reduce the negative impacts.
Confidence:	Medium	Judgement is based on common sense and general **knowledge.**	
Indirect impacts:	Visibility of construction vehicles and site camp at the construction site.		
Cumulative impact prior to mitigation:	There is already an issue with dumping of waste in the area and if not mitigated the construction activities could add to this.		
Degree to which the impact can be avoided:	Low		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		

Criteria	Rating	Rating Score	Description
Proposed mitigation:	• 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; and • The proposed construction must match the receiving environment as best as practicably possible.		
B: Post-Mitigation			
Duration of impact:	Short term	1	Mitigations will ensure any impacts are dealt with quickly and temporary in nature
Extent of impact:	Footprint	1	Mitigations will ensure that visual construction impacts are limited to construction camps, which will be kept neat, and will be a temporary, small scale impact
Intensity of impact:	Low	2	Mitigation measures will ensure that visual impacts are reduced.
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Negligible	-4	An acceptable negative/positive impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative/positive medium to short term effects on the social and/or natural environment. The impacts are reversible and will not result in the loss of irreplaceable aspects.
Probability of occurrence:	Possible	2	Mitigation measures will reduce the chances or occasions that a visual impact will occur
Significance rating of impact after mitigation:	No Impact Negative	-8	There is no impact
Residual impacts:	None		
Cumulative impact post mitigation:	None		

Criteria	Rating	Rating Score	Description
Impact No.	**13**		
Potential impact and risk (name or identify risk):	Loss of cultural and archaeological heritage		
A: Pre-Mitigation			
Nature of impact (describe):	Loss of cultural and archaeological heritage due to disturbance or damage during construction		
Duration of impact:	Permanent	5	Equal to the duration of the construction phase
Extent of impact:	Site	2	Impact would be on site
Intensity of impact:	Medium-High	8	Likelihood that any sites of significance will be impacted

Criteria	Rating	Rating Score	Description
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Highly Detrimental	-15	A serious negative impact which may prevent the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and/or social) environment and result in severe effects. The impacts may result in the irreversible damage to irreplaceable environmental or social aspects should mitigation measures not be implemented.
Probability of occurrence:	Possible	2	Heritage impact assessment indicated that no heritage resources of significance are known to exist in the project area and none were found during the study. There is however always a small chance of encountering underground heritage or cultural resources such as graves during construction.
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	No	Affected environment is irreplaceable.	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	No	The affected environment will be unable to recover from the impact and will be permanently modified.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Low Neg**ative**	-30	Impacts are less important. **Some mitigation is required to reduce the negative impacts.**
Confidence:	High	Judgement is based on scientific and/or proven information.	
Indirect impacts:	None		
Cumulative impact prior to mitigation:	None		
Degree to which the impact can be avoided:	Medium		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		

Criteria	Rating	Rating Score	Description
Proposed mitigation:	• 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, access will be prohibited and the find be reported to HWC immediately. 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 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 NHRA. • Any extension to the project footprint shall require assessment by a qualified heritage practitioner prior to commencement of works.		
B: Post-Mitigation			
Duration of impact:	Permanent	5	
Extent of impact:	Footprint	1	
Intensity of impact:	Low	2	
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-8	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Improbable	1	Heritage impact assessment indicated that no heritage resources of significance are known to exist in the project area and none were found during the study.
Significance rating of impact after mitigation:	No Impact Negative	-8	There is no impact
Residual impacts:	None		
Cumulative impact post mitigation:	None		

Criteria	Rating	Rating Score	Description
Impact No.	**14**		
Potential impact and risk (name or identify risk):	Physical displacement due to removal of informal dwellings in the pipeline corridor		
A: Pre-Mitigation			
Nature of impact (describe):	• Involuntary physical displacement due to removal of informal dwellings in the pipeline corridor; and • Loss of assets due to removal of informal structures (other than dwellings) in the pipeline corridor.		
Duration of impact:	Permanent	5	Structures have to be removed from the pipeline corridor permanently
Extent of impact:	Footprint	1	Only dwellings within the pipeline corridor have to be removed
Intensity of impact:	High	10	Displacement affects highly vulnerable households
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Highly Detrimental	-16	A serious negative impact which may prevent the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and/or social) environment and result in severe effects. The impacts may result in the irreversible damage to irreplaceable environmental or social aspects should mitigation measures not be implemented.
Probability of occurrence:	Definite	5	Without mitigation, affected households will lose their dwellings
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	High Negative	-80	Impacts are of high importance. Mitigation is essential to reduce the negative impacts.
Confidence:	High	Judgement is based on scientific and/or proven information.	
Indirect impacts:	None		
Cumulative impact prior to mitigation:	If not mitigated, displaced persons would not be properly relocated and may re-establish on the servitude or in other inappropriate locations.		
Degree to which the impact can be avoided:	Low		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		

Criteria	Rating	Rating Score	Description
Proposed mitigation:	• Relocate affected households and PAPs to a suitable alternative site • Develop and implement a RAP in consultation with the affected stakeholders, considering stakeholder preferences regarding the type of assistance and compensation provided • Ensure that RAP restores or improves current living standards • Compile an inventory of houses, other buildings and all assets that will be removed		
B: Post-Mitigation			
Duration of impact:	Short term	1	With appropriate assistance / resettlement, households can re-establish in new location
Extent of impact:	Footprint	1	Only dwellings within the pipeline corridor are affected
Intensity of impact:	Low-Medium	4	With appropriate resettlement, households can be restored to similar or improved status, but uncertainty and adjustment have a negative impact in the interim
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-6	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Definite	5	With appropriate resettlement, households can re-establish in new location
Significance rating of impact after mitigation:	Low Negative	-30	
Residual impacts:	None		
Cumulative impact post mitigation:	None		

Criteria	Rating	Rating Score	Description
Impact No.	**15**		
Potential impact and risk (name or identify risk):	Loss of assets due to removal of informal structures (other than dwellings) in the pipeline corridor		
A: Pre-Mitigation			
Nature of impact (describe):	The project requires the removal of various informal structures (other than dwellings) within the proposed pipeline corridor in Enkanini. These include: • Two market stalls; • Three fences / patios; • One shaded car park and • Food and medicinal plant garden(s).		
Duration of impact:	Permanent	5	Structures have to be removed from the pipeline corridor permanently
Extent of impact:	Footprint	1	Only structures within the pipeline corridor have to be removed
Intensity of impact:	Medium	6	Impact affects highly vulnerable households, but does not affect dwellings
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Moderately Detrimental	-12	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.
Probability of occurrence:	Definite	5	Without mitigation, affected households will lose their investment in those structures
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Medium Negative	-60	Impacts are important and require attention. Mitigation is required to reduce the negative impacts.
Confidence:	High	Judgement is based on scientific and/or proven information.	
Indirect impacts:	None		
Cumulative impact prior to mitigation:	If not mitigated, displaced persons would not be properly relocated and may re-establish on the servitude or in other inappropriate locations.		
Degree to which the impact can be avoided:	Low		
Degree to which the impact can be managed:	High		

Criteria	Rating	Rating Score	Description
Degree to which the impact can be mitigated:	High		
Proposed mitigation:	• Compile an inventory of structures and all assets that will be removed • Determine a compensation strategy related to the value of materials, and consider established practice in comparable situations in the Stellenbosch Municipality		
B: Post-Mitigation			
Duration of impact:	Short term	1	With appropriate assistance, households are compensated, and impact reduced
Extent of impact:	Footprint	1	Only structures within the pipeline corridor are affected
Intensity of impact:	Low	2	With appropriate assistance, households are compensated, and impact reduced
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Negligible	-4	An acceptable negative/positive impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative/positive medium to short term effects on the social and/or natural environment. The impacts are reversible and will not result in the loss of irreplaceable aspects.
Probability of occurrence:	Possible	2	With appropriate compensation, there is limited probability of an impact
Significance rating of impact after mitigation:	No Impact Negative	-8	There is no impact
Residual impacts:	None		
Cumulative impact post mitigation:	None		

Criteria	Rating	Rating Score	Description
Impact No.	**16**		
Potential impact and risk (name or identify risk):	Temporary loss of livelihoods due to removal of market stalls in the pipeline corridor		
A: Pre-Mitigation			
Nature of impact (describe):	Two market stalls in the proposed pipeline route in Enkanini sell takeaway food to local residents and will have to be removed and therefore cease to operate.		
Duration of impact:	Short to medium term	2	If they cannot be relocated, then stalls cannot operate during the construction period
Extent of impact:	Footprint	1	Only stalls within the pipeline corridor are affected
Intensity of impact:	High	10	Impact would severely affect livelihood of affected operators

Criteria	Rating	Rating Score	Description
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Moderately Detrimental	-13	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.
Probability of occurrence:	Definite	5	Stalls have to move from the corridor
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	High Negative	-65	Impacts are of high importance. Mitigation is essential to reduce the negative impacts.
Confidence:	High	Judgement is based on scientific and/or proven information.	
Indirect impacts:	None		
Cumulative impact prior to mitigation:	Loss of incomes will add to the issues of poverty and food insecurity already experienced in surrounding informal settlements.		
Degree to which the impact can be avoided:	Low		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		
Proposed mitigation:	Compile and implement an LRP to address livelihoods linked to structures in the pipeline corridor		
B: Post-Mitigation			
Duration of impact:	Short term	1	Operations would only be affected during relocation
Extent of impact:	Footprint	1	Only stalls within the pipeline corridor are affected
Intensity of impact:	Low	2	Stalls can likely operate as before from a new nearby location
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Negligible	-4	An acceptable negative/positive impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative/positive medium to short term effects on the social and/or natural environment. The impacts are reversible and will not result in the loss of irreplaceable aspects.

Criteria	Rating	Rating Score	Description
Probability of occurrence:	Possible	2	If relocated, the impact might not occur
Significance rating of impact after mitigation:	No Impact Negative	-8	There is no impact
Residual impacts:	None		
Cumulative impact post mitigation:	None		

Criteria	Rating	Rating Score	Description
Impact No.	**17**		
Potential impact and risk (name or identify risk):	Accidental damage to informal structures outside of pipeline corridor		
A: Pre-Mitigation			
Nature of impact (describe):	Heavy machinery will excavate an approximately 3 m deep trench within a 6 – 6.5 m wide corridor close to informal structures, risking accidental damage to informal structures.		
Duration of impact:	Short to medium term	2	The possibility of accidental damage persists throughout the construction period
Extent of impact:	Site	2	Structures adjacent to the pipeline corridor will be at risk
Intensity of impact:	Medium	6	If damage occurs, this affects health and safety of occupants
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Moderately Detrimental	-10	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.
Probability of occurrence:	Likely	3	Given the narrow construction corridor, provisions have to be made for the possibility of the impact occurring
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Low Negative	-30	Impacts are less important. Some mitigation is required to reduce the negative impacts.
Confidence:	High	Judgement is based on scientific and/or proven information.	
Indirect impacts:	Accidental damage would potentially require financial inputs to fix affected structures and if not avoided or compensated will result in the affected owners of the structures incurring costs due to the project		

Criteria	Rating	Rating Score	Description
Cumulative impact prior to mitigation:	Incurring costs due to the project would put strain on the finances of the owners of the structures, further worsening already dire financial situations of residents in the area.		
Degree to which the impact can be avoided:	Low		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		
Proposed mitigation:	• Implement strict construction site safety protocols to minimise the risk of accidental damage to informal structures alongside (but outside of) the construction corridor • Compile a photographic inventory of all structures alongside (but outside of) the construction corridor as a baseline in the event of a claim • Implement a grievance mechanism for people to report observations, suggestions and reports of damage. Ensure any submissions are addressed promptly • Consider using smaller excavators or manual excavation • Undertake weekly ECO site inspection to confirm implemented safety protocols are appropriate and adhered to • Repair or compensate for damage caused by construction activities		
B: Post-Mitigation			
Duration of impact:	Short to medium term	2	The possibility of accidental damage persists throughout the construction period
Extent of impact:	Site	2	Structures adjacent to the pipeline corridor will be at risk
Intensity of impact:	Low	2	The impact will be minimal if damage is repaired or compensated for by the Project
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-6	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Improbable	1	With the implementation of strict construction site safety protocols, the probability of accidental damage is minimised
Significance rating of impact after mitigation:	No Impact Negative	-6	There is no impact
Residual impacts:	None		
Cumulative impact post mitigation:	None		

Criteria	Rating	Rating Score	Description
Impact No.	**18**		
Potential impact and risk (name or identify risk):	Increase in nuisance to residents adjacent to the pipeline route		
A: Pre-Mitigation			

Criteria	Rating	Rating Score	Description
Nature of impact (describe):	• Construction activities will take place adjacent to a number of sensitive receptors, construction can present a nuisance through: • Noise from construction activities; • Littering by construction crews; • Opportunistic crime due to increased activity in the area; and • Water or power outages due to relocation of formal or informal service infrastructure (cables, pipelines) in the construction corridor.		
Duration of impact:	Short to medium term	2	Nuisance will persist throughout the construction phase
Extent of impact:	Site	2	People using areas adjacent to the construction site are at risk
Intensity of impact:	Medium	6	Nuisance can be considerable
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Moderately Detrimental	-10	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.
Probability of occurrence:	Definite	5	Nuisance will definitely occur during construction
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Medium Negative	-50	Impacts are important and require attention. Mitigation is required to reduce the negative impacts.
Confidence:	High	Judgement is based on scientific and/or proven information.	
Indirect impacts:	None		
Cumulative impact prior to mitigation:	None		
Degree to which the impact can be avoided:	Low		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		

Criteria	Rating	Rating Score	Description
Proposed mitigation:	• Engage with communities before and regularly during construction to discuss planned activities, timeframes, management measures to reduce risks and nuisance, and to address grievances • Implement a grievance mechanism for people to report observations, suggestions and incidents. Ensure any submissions are addressed promptly • Control site staff / access • Move any valuable construction equipment to guarded site camps when not in use		
B: Post-Mitigation			
Duration of impact:	Short to medium term	2	Nuisance will persist throughout the construction phase
Extent of impact:	Site	2	People using areas adjacent to the construction site are at risk
Intensity of impact:	Low	2	With appropriate mitigation, nuisance can be reduced
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-6	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Highly likely	4	Nuisance cannot be entirely avoided
Significance rating of impact after mitigation:	Low Negative	-24	Impacts are less important. Some mitigation is required to reduce the negative impacts.
Residual impacts:	Some nuisance can be anticipated during construction but will cease once construction is completed and will be reduced through mitigation measures.		
Cumulative impact post mitigation:	None		

7.2.2 OPERATIONAL PHASE

Criteria	Rating	Rating Score	Description
Impact No.	**1**		
Potential impact and risk (name or identify risk):	Encouragement and likely proliferation of IAPs and exotic grass and weed species within the development footprint and edges through soil disturbance.		
A: Pre-Mitigation			
Nature of impact (describe):	Without mitigation these species will proliferate and drop seeds which can remain in the environment for many years and result in cycle after cycle of re-emergence thus 'long-term' duration.		
Duration of impact:	Long term	4	Without mitigation these species will proliferate and drop seeds which can remain in the environment for many years and result in cycle after cycle of re-emergence thus 'long-term' duration.
Extent of impact:	Site	2	It is possible that these species spread laterally and downslope infesting further sections of the site.
Intensity of impact:	Medium-High	8	The affected environment will be altered and persist under moderate levels of IAP infestation however in the long term, if left unmanaged, the changes these species bring can change the functions and processes of the area significantly.
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative

Criteria	Rating	Rating Score	Description
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Highly Detrimental	-14	A serious negative impact which may prevent the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and/or social) environment and result in severe effects. The impacts may result in the irreversible damage to irreplaceable environmental or social aspects should mitigation measures not be implemented.
Probability of occurrence:	Definite	5	Weeds and IAPs will occur where the soil is disturbed.
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	High Negative	-70	Impacts are of high importance. Mitigation is essential to reduce the negative impacts.
Confidence:	High	Judgement is based on scientific and/or proven information.	
Indirect impacts:	None		
Cumulative impact prior to mitigation:	If not mitigated, infestation by IAPs on site will compound existing issues of biodiversity and habitat loss being experienced in the Western Cape.		
Degree to which the impact can be avoided:	Low		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		
Proposed mitigation:	• It is suggested as practicing 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 then be stripped, stored nearby and kept free for APs 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.		
B: Post-Mitigation			
Duration of impact:	Short term	1	As for pre-mitigation
Extent of impact:	Footprint	1	As for pre-mitigation
Intensity of impact:	Low	2	Mitigation will minimise IAP occurrence.
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Negligible	-4	An acceptable negative/positive impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative/positive medium to short term effects on the social and/or natural environment. The impacts are reversible and will not result in the loss of irreplaceable aspects.
Probability of occurrence:	Definite	5	

Criteria	Rating	Rating Score	Description
Significance rating of impact after mitigation:	Low Negative	-20	Impacts are less important. Some mitigation is required to reduce the negative impacts.
Residual impacts:	None		
Cumulative impact post mitigation:	None		

Criteria	Rating	Rating Score	Description
Impact No.	**2**		
Potential impact and risk (name or identify risk):	Changes in the ambient noise quality.		
A: Pre-Mitigation			
Nature of impact (describe):	Noise generated by pump station.		
Duration of impact:	Long term	4	Equal to the duration of the operation phase
Extent of impact:	Site	2	Newly installed pumps at the existing Papegaaiberg Reservoir
Intensity of impact:	Low	2	Pumps will operate within the restrictions of local by-laws. Additionally, the adjacent land use near the new pump station is a cemetery so any impact on visitors to the cemetery would be occasional and temporary.
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-8	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Possible	2	Impacts are possible when people visit the cemetery however the consequence is anticipated to be low or none at all.
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	Yes	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Low Negative	-16	Impacts are less important. Some mitigation is required to reduce the negative impacts.
Confidence:	Medium	Judgement is based on common sense and general knowledge.	
Indirect impacts:	None		
Cumulative impact prior to mitigation:	None		
Degree to which the impact can be avoided:	.		
Degree to which the impact can be managed:	.		
Degree to which the impact can be mitigated:	High		
Proposed mitigation:	Stellenbosch Municipality is to ensure that the pump station operates within the requirements of local noise by-laws		
B: Post-Mitigation			
Duration of impact:	Long term	4	Same as pre-mitigation
Extent of impact:	Site	2	Same as pre-mitigation
Intensity of impact:	Low	2	Same as pre-mitigation
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative

Criteria	Rating	Rating Score	Description
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-8	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Possible	2	Impacts are possible when people visit the cemetery however the consequence is anticipated to be low or none at all.
Significance rating of impact after mitigation:	Low Negat**ive**	-16	Impacts are less important. Some mitigation is required to reduce the **negative impacts.**
Residual impacts:	None		
Cumulative impact post mitigation:	None		

Criteria	Rating	Rating Score	Description
Impact No.	**3**		
Potential impact and risk (name or identify risk):	Change in the visual character.		
A: Pre-Mitigation			
Nature of impact (describe):	The newly erected reservoir and pump station may cause a visual impact.		
Duration of impact:	Permanent	5	Equal to the duration of the operation phase
Extent of impact:	Site	2	The newly erected reservoir may cause a visual impact
Intensity of impact:	Low	2	The reservoir and pump station are being erected in areas that already have similar bulk water infrastructure. Additionally, the pump station site is located out of site of residents and cemetery users. The reservoir is not considered a large development and not immediately noticeable from a distance.
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-9	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Likely	3	The structures will be permanent
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)	No	Affected environment is irreplaceable.	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)	Yes	The affected environment will be able to recover from the impact.	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	Low Negative	-27	Impacts are less important. Some **mitigation is required to reduce the negative impacts.**
Confidence:	Medium	Judgement is based on common sense and general knowledge.	
Indirect impacts:	None		
Cumulative impact prior to mitigation:	None		
Degree to which the impact can be avoided:	Low		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		
Proposed mitigation:	There are no mitigations proposed for the operational stage as the structures are permanent		
B: Post-Mitigation			
Duration of impact:	Permanent	5	As for pre-mitigation
Extent of impact:	Site	2	As for pre-mitigation

Criteria	Rating	Rating Score	Description
Intensity of impact:	Low	2	As for pre-mitigation
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Slight Detrimental	-9	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.
Probability of occurrence:	Likely	3	As for pre-mitigation
Significance rating of impact after mitigation:	Low Negative	-27	Impacts are less important. Some mitigation is **required to reduce the negative impacts.**
Residual impacts:	None		
Cumulative impact post mitigation:	None		

Criteria	Rating	Rating Score	Description
Impact No.	**4**		
Potential impact and risk (name or identify risk):	Improved bulk water supply enabling expansion of housing		
A: Pre-Mitigation			
Nature of impact (describe):	Improved bulk water supply enabling expansion of housing in Kayamandi, including low cost housing. The return water pipeline is intended to provide bulk services connection for water reticulation to the Azania/Watergang area.		
Duration of impact:	Permanent	5	
Extent of impact:	Regional	3	
Intensity of impact:	Medium-High	8	
Type of impact (positive or negative):	Positive	1	Potential Impact is positive
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Highly Beneficial	16	A beneficial impact which may help to justify the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and/or social) environment.
Probability of occurrence:	Definite	5	
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)		N/A	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)		N/A	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	High Positive	80	Impacts are of high importance. Mitigation is essential to reduce the **negative impacts.**
Confidence:	Medium	Judgement is based on common sense and general knowledge.	
Indirect impacts:	Supports the municipality in tackling housing backlog in the municipality.		
Cumulative impact prior to mitigation:	Supports the municipality in tackling housing backlog in the municipality.		
Degree to which the impact can be avoided:	Low		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		

Criteria	Rating	Rating Score	Description
Proposed mitigation:	No mitigation needed; this is a high positive impact		

DECOMMISSIONING AND CLOSURE PHASE (NOT APPLICABLE)	
~~Potential impact and risk:~~	
~~Nature of impact:~~	
~~Extent and duration of impact:~~	
~~Consequence of impact or risk:~~	
~~Probability of occurrence:~~	
~~Degree to which the impact may cause irreplaceable loss of resources:~~	
~~Degree to which the impact can be reversed:~~	
~~Indirect impacts:~~	
~~Cumulative impact prior to mitigation:~~	
~~Significance rating of impact prior to mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)~~	
~~Degree to which the impact can be avoided:~~	
~~Degree to which the impact can be managed:~~	
~~Degree to which the impact can be mitigated:~~	
~~Proposed mitigation:~~	
~~Residual impacts:~~	
~~Cumulative impact post mitigation:~~	
~~Significance rating of impact after mitigation (e.g. Low, Medium, Medium-High, High, or Very-High)~~	

7.2.3 NO-GO ALTERNATIVE

Criteria	Rating	Rating Score	Description
Impact No.	**NO-GO Alternative**		
Potential impact and risk (name or identify risk):	Status quo is maintained and the municipality cannot provide potable water infrastructure		
A: Pre-Mitigation			
Nature of impact (describe):	Status quo is maintained and the municipality cannot provide potable water infrastructure necessary to open up new areas for housing development and the housing current backlog remains. A lack of affordable housing near to the town and Stellenbosch University and other businesses and industries in the area means that students and people who work in the area have to find accommodation outside of the town and commute in, increasing costs and emissions associated with road transport. A lack of housing also drives up prices of existing housing, forcing lower income earners to find accommodation outside of the town, creating a disproportionate impact on the lower income earners vs higher income earners and contributing to income inequality which is a major issue in South Africa. Water reticulation project at Watergang/Azania for which the return pipeline is planned is not able to be implemented (note the reticulation project is a separate project and not in the scope of this application).		
Duration of impact:	Permanent	5	
Extent of impact:	Regional	3	

Criteria	Rating	Rating Score	Description
Intensity of impact:	High	10	
Type of impact (positive or negative):	Negative	-1	Potential Impact is negative
Consequence of impact or risk (= Type × (Duration + Extent + Intensity))	Extremely Detrimental	-18	A very serious negative impact which may be sufficient by itself to prevent implementation of the Project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects. The impacts will be irreplaceable and irreversible should adequate mitigation and management measures not be successfully implemented.
Probability of occurrence:	Definite	5	
Replaceability: Degree to which the impact may cause irreplaceable loss of resources: (is the affected environment replaceable?)		N/A	
Reversibility: Degree to which the impact can be reversed: (will the affected environment be able to recover?)		N/A	
Significance rating of impact prior to mitigation: (Significance = Consequence × Probability)	High Negative	-90	Impacts are of high importance. **Mitigation is essential to reduce the negative impacts.**
Confidence:	High	Judgement is based on scientific and/or proven information.	
Indirect impacts:	Refer to Nature of Impact		
Cumulative impact prior to mitigation:	Refer to Nature of Impact		
Degree to which the impact can be avoided:	Low		
Degree to which the impact can be managed:	High		
Degree to which the impact can be mitigated:	High		
Proposed mitigation:	Implement the project proposed for construction of bulk water infrastructure needed as part of the Northern Expansion project		
B: Post-Mitigation			
Duration of impact:	Permanent	5	
Extent of impact:	Regional	3	
Intensity of impact:	High	10	
Type of impact (positive or negative):	Positive	1	Potential Impact is negative
Consequence of impact or risk: (= Type × (Duration + Extent + Intensity))	Extremely Beneficial	18	A very beneficial impact which may be sufficient by itself to justify implementation of the Project. The impact may result in permanent positive change.
Probability of occurrence:	Definite	5	
Significance rating of impact after mitigation:	High Positive	90	Impacts are of high importance. Mitigation is essential to reduce the negative impacts.
Residual impacts:	N/A		
Cumulative impact post mitigation:	N/A		

Note: The EAP may decide to include this section as Appendix J to the BAR.

(c) Provide a summary of the site selection matrix.

N/A – No site alternatives were comparatively assessed in this BA Process.

(d) Outcome of the site selection matrix.

N/A – No site alternatives were comparatively assessed in this BA Process.

7.3 SPECIALIST INPUTS/STUDIES, FINDINGS AND RECOMMENDATIONS

Note: Specialist inputs/studies must be attached to this report as **Appendix G** and must comply with the content requirements set out in Appendix 6 of the EIA Regulations, 2014 (as amended). Also take into account the Department's Circular EADP 0028/2014 (dated 9 December 2014) on the "*One Environmental Management System*" and the EIA Regulations, 2014, any subsequent Circulars, and guidelines available on the Department's website (**http://www.westerncape.gov.za/eadp**).

Provide a summary of the findings and impact management measures identified in any specialist report and an indication of how these findings and recommendations have been included in the BAR.

In summary, the main findings of the Wetland Baseline and Impact Assessment specialist study is as follows:

1. Aquatic Ecology

Three (3) wetland units were identified within the assessment boundary, all with the same wetland type, namely unchannelled valley bottom wetlands. The proposed pipeline will traverse a single HGM unit, namely HGM 3. The remaining two (2) HGM units will not be traversed and are considered to be at a lower risk due to the distance of these systems from the proposed infrastructure (>100 m). The average ecosystem services score was determined to be "Intermediate" for HGM 3 and "Moderately Low" for the remaining two units. The integrity (or health) of the wetland's ranges from Moderately Modified (HGM 1), Largely Modified (HGM 2) to Seriously Modified (HGM 3). The ecological importance and sensitivity of the three systems was determined to be Moderate. Taking into consideration the proposed development and the associated threats, a buffer width of 15 m was determined to be suitable for the three wetland areas.

Impact Assessment

It is evident from the buffer's extent that some of the proposed pipelines will impede into the delineated wetland and the assigned buffer zone for one wetland (HGM 3). This phenomenon emphasises the fact that the first step in the mitigation hierarchy, namely "avoidance" could not be met. Despite the unavoidable risk posed by the project, the post-mitigation risks posed by the project are expected to be Low for all phases of the project. This is based on the assumption that the prescribed mitigation measures and recommendations will be implemented for the project. Taking into account the direct risks posed, rehabilitation has been recommended. It is recommended that a rehabilitation plan be compiled for the placement of the pipeline across the wetland.

Specialist Recommendation

It is the specialist's opinion that no fatal flaws were identified for the project. Further to this, due to the expected post-mitigation Low risks a General Authorisation is permissible under GN 509.

In summary, the main findings of Botanical Impact Assessment specialist study is as follows:

1. Baseline Botanical Survey

From a botanical perspective the proposed pipeline corridor is invaluable due to the critically endangered vegetation type present (regardless of the condition of this vegetation). Although no species of conservation concern were found it is still a high likelihood that these may be present within the corridor. Any development within this vegetation type will thus have a high impact and thus should be avoided as much as possible. This is in line with its biodiversity spatial planning status and listing.

2. Specialist Recommendation

The site is fortunate to have a series of roadways that are already disturbed and follow the corridor very well. It makes complete sense to rather utilise these roadways (if and as much as possible) rather than causing an unnecessary high impact and loss of critically endangered vegetation within a nature reserve.

The main findings of the Heritage, Archaeological and Palaeontological specialist study is summarised as follows:

1. Site summary:
    a. *Archaeology*: During the site visit two isolated MSA quartzite flakes were found on the hilltop where the Kayamandi Northern reservoir is proposed. These flakes are likely to have been introduced to the area as the local rock is a form of Ecca shale rather than quartzite, and no other archaeological material was noted in the area.
    b. *Palaeontology*: the proposed development area lies in an area of low palaeontological sensitivity.
    c. *Historical Built Environment*: the proposed development area and the proposed works are sufficiently low key and distant for a significant impact on the surrounding heritage resources or cultural landscape to be unlikely.

Therefore, no significant archaeological or other heritage resources that might be impacted by the construction of the reservoir and installation of the pipeline were identified in the desktop review or walkover survey.

2. Specialist Recommendation:

It is the specialist's opinion that a heritage impact assessment is not required as no direct impacts on heritage resources are anticipated as a result of the construction of the reservoir and pump stations, and the installation of the pipelines.

The main findings of the Social Impact Assessment specialist study are summarised as follows:
Eleven structures in the western portion of Enkanini, which encroach on the gravel road / proposed pipeline corridor, must be permanently removed prior to construction.

The key potential (negative) socio-economic impacts associated with the proposed project include physical displacement of 11 structures belonging to five households in the pipeline corridor, loss of assets due to removal of other informal structures and a medicinal and food garden in the pipeline corridor and loss of livelihoods due to removal of market stalls in the pipeline corridor. Compilation and implementation of a Resettlement Action Plan (RAP) and Livelihoods Restoration Plan (LRP) is recommended by the Social Specialist to mitigate these impacts, and compensation should be provided for loss of other structures in the pipeline corridor, in accordance with Good International Industry Practice (GIIP) for management of social issues.

Other potential socio-economic impacts relate to accidental damage to informal structures outside of the pipeline corridor, safety and security risks, increase in nuisance and reduced access due to road closures during construction. Strict safety protocols are essential to mitigate construction-related risks in this densely populated area. Implementation of a grievance mechanism is recommended to enable people to report observations, suggestions and damages.

Potential benefits of the project include employment during construction and improved bulk water supply enabling expansion of low-cost housing in Kayamandi.

No significant direct cumulative socio-economic impacts were identified.

Assuming that the recommended mitigation measures will be effectively implemented, the impacts are deemed acceptable. The ultimate benefit of housing provision in the area is expected to outweigh impacts associated with the construction of the project. As such, if recommended mitigation measures are effectively implemented, the specialist is of the opinion that social impacts of the project are acceptable and, from a social perspective, there is no reason not to authorise the project.

NOTE: DEADP requested an update on progress in terms of finding a suitable location for the relocation of the identified people and structures. A Memo from the Stellenbosch Local Municipality was provided in response to DEADPs request and has been included in Appendix F5 ('SLM reblocking proposal').

The reblocking plan does not negate the need for a RAP and LRP to be conducted as described above and in the Social Impact Assessment.

7.4 ENVIRONMENTAL IMPACT STATEMENT

Provide an environmental impact statement of the following:

(i) A summary of the key findings of the EIA.

The BA process for the proposed Kayamandi Bulk Water Supply Pump station, Pipeline and Reservoir has described the status quo of the receiving environment and assessed the expected environmental and social impacts associated with the proposed project. The impacts were identified with input from key specialist studies. This process has enabled an all-inclusive integrated assessment of the impacts to the surrounding natural and social environment during the projected construction and operational phases of the project. The BA process, the associated assessment of impacts and the identification of residual risks allows for concluding the following:

- Alternatives considered as part of the application relate to the position of the reservoir. The preferred position is:
  - the pump station located at the Papegaaiberg Reservoir;
  - the rising main linking the pump station and reservoir following the alignment of existing water mains up to the Kayamandi Reservoir, from where it will mainly follow existing dirt roads; and
  - construction of the reservoir at the proposed site, uphill of Kayamandi.
- The construction of pump station and pipeline will result in the direct loss of Swartland Granite Renosterveld vegetation through the removal of vegetation within the Papegaaiberg Nature Reserve. The vegetation removal will however be limited and with the implementation of mitigation measures and active rehabilitation measures (guided by the Vegetation Rehabilitation Plan) the significance of the change to the receiving environment can be reduced to a medium impact;
- The construction of the pipeline infrastructure may result in the loss of wetland functionality and wetland habitat through impeding into the delineated wetland and the assigned buffer zone of HGM 3. The specialist report concluded that *despite the unavoidable risk posed by the project, the post-mitigation risks posed by the project are expected to be Low for all phases of the project. This is based on the assumption that the prescribed mitigation measures and recommendations will be implemented for the project.* A recommendation is made that a rehabilitation plan be compiled for the placement of the pipeline across the wetland. An Aquatic Rehabilitation Plan was developed for the proposed wetland crossing.
- The construction of the pipeline will require the relocation and resettlement of community members. At the time of assessment at least eleven (11) structures in the western portion of Enkanini that encroach on the gravel road / pipeline corridor from the elevated western side will need to be removed, to provide allowance of a minimum 6.5 m wide corridor. The servitude must remain accessible in future, therefore the structures in this corridor must be permanently removed. A Relocation Action Plan and Livelihoods Restoration Plan will need to be prepared to guide resettlement activities before construction in this area can begin.
- Although the project will not create significant new job opportunities the impact is still positive.
- No impact was identified in terms of the visual aspects of the site or the occurrence of heritage resources.
- During the operational phase care must be taken during maintenance activities in areas where Swartland Granite Grassland vegetation is prevalent, and the Vegetation Rehabilitation Plan must be followed. Furthermore, the likely proliferation of Invasive Alien Plants and exotic grass and weed species within the development footprint and edges through soil disturbance must be managed as per the mitigation measures included in this report and the attached EMPr (Appendix H).
- The implementation of the no-go alternative will result in the impacts related to the proposed development not being realised. The no-go alternative would however also result in the identified need for bulk water infrastructure development and bulk water supply not being met.

In conclusion, no environmental fatal flaws were identified which would prevent the proposed reservoir development, installation of the pipelines as well as all associated activities. The proposed development is considered to be the best practicable environmental option to meet the need for bulk water augmentation in the area.

(ii) Has a map of appropriate scale been provided, which superimposes the proposed development and its associated structures and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers?	YES	

(iii) A summary of the positive and negative impacts that the proposed development and alternatives will cause in the environment and community.

Based on the findings of the BA process, no consequences that cannot be mitigated to an acceptable level or fatal flaws were identified. Whilst some aspects of the project will result in a change in the receiving environment of high to medium negative significance during the construction and operational phases prior to the implementation of any control measures again, with the implementation of the recommended mitigation measures and Aquatic and Vegetation Rehabilitation Plans, the risk is acceptable and the changes to the

receiving environment are reduced to impacts of a low negative significance except one where the change is reduced to an impact of negative medium significance. This is still acceptable and not considered to be a fatal flaw.

Impacts resulting in a positive change to the receiving environment were also identified which include employment opportunities during the construction period and improved bulk water supply enabling expansion of low-cost housing in Kayamandi during the operational phase.

A summary of identified impacts for the construction phase is presented in Table 7-11 and a summary of the impacts for the operation phase is presented in Table 7-12.

Table 7-11: Summary of Impact Assessment (Construction Phase)

No.	Impact Description	Significance rating	
		Without Mitigation	With Mitigation
19.	Direct loss of 35 000 m² of CR Swartland Granite Renosterveld vegetation	High negative	Medium negative
20.	Encouragement and likely proliferation of Invasive Alien Plants and exotic grass and weed species within the development footprint and edges through soil disturbance	Medium negative	Low negative
21.	Loss of wetland functionality (Pipeline)	High negative	Low negative
22.	Direct loss of wetland and wetland habitat (Pipeline)	Medium negative	Low negative
23.	Loss of wetland functionality due to activities within 500m of wetlands (pump station and reservoir)	Low negative	Low negative
24.	Change in the ambient noise quality	Medium negative	Low negative
25.	Emissions to air causing change to the ambient air quality	Low negative	Low negative
26.	Increased traffic and reduced access due to road closures	Medium negative	Low negative
27.	General health, safety and security risk due to construction works	Medium negative	No impact
28.	Employment during construction	Low positive	Medium positive
29.	Contamination, compaction and loss of topsoil	Low negative	Low negative
30.	Change in the visual character	Low negative	No impact
31.	Loss of cultural and archaeological heritage	Low impact	No impact
32.	Physical displacement due to removal of informal dwellings in the pipeline corridor	High negative	Low negative
33.	Loss of assets due to removal of informal structures (other than dwellings) in the pipeline corridor	Medium Negative	No Impact

34.	Temporary loss of livelihoods due to removal of market stalls in the pipeline corridor	High negative	No Impact
35.	Accidental damage to informal structures outside of pipeline corridor	Low negative	No Impact
36.	Increase in nuisance to residents adjacent to the pipeline route	Medium negative	Low negative

Table 7-12: Summary of Impact Assessment (Operation Phase)

No.	Impact Description	Significance rating	
		Without Mitigation	With Mitigation
5.	Encouragement and likely proliferation of Invasive Alien Plants and exotic grass and weed species within the development footprint and edges through soil disturbance	High negative	Low negative
6.	Changes in the ambient noise quality	Low negative	Low negative
7.	Change in the visual character	Low negative	Low negative
8.	Improved bulk water supply enabling expansion of low-cost housing in Kayamandi	High positive	High positive

7.5 IMPACT MANAGEMENT, MITIGATION AND MONITORING MEASURES

(a) Based on the assessment, describe the impact management, mitigation and monitoring measures as well as the impact management objectives and impact management outcomes included in the EMPr. The EMPr must be attached to this report as Appendix H.

Considering the nature of the project, and that the natural / ecological systems are in a modified state the project is expected to have minimal impacts with the exception of the impact on the potential loss of CR Swartland Granite Renosterveld (FRg2) and Swartland Shale Renosterveld (FRs9) vegetation type through clearing for maintenance purposes. The first step in the mitigation hierarchy, namely "avoidance" could not be met in addressing this impact, therefore the second step, namely "minimize" will need to be applied in order to limit the impact on the affected vegetation. The risk associated with the proposed pipelines that will impede into the delineated wetland and the assigned buffer zone is considered to be moderate. This too cannot be "avoided" however mitigation measures and an Aquatic Rehabilitation Plan in the EMPr have been provided in order to "minimize" this impact.

Mitigation measures and recommendations should be implemented to ensure that the wetland area and CR vegetation types associated with the project are not impacted on further. No environmental fatal flaws or impacts of high significance were identified.

Reasonable measures should be taken to reduce the magnitude of negative impacts on the environment. All negative impacts will be manageable and mitigated by measures set out in the EMPr

Please refer to the Impact Assessment Tables above and Appendix H (EMPr, inclusive of Aquatic and Vegetation Rehabilitation Plans and Maintenance Management Plan) for further information.

(b) Describe any provisions for the adherence to requirements that are prescribed in a Specific Environmental Management Act relevant to the listed activity or specified activity in question.

NEM:BA: GN 1002 of 9 December 2012 National List of Ecosystems that are Threatened and in Need off Protection.

Rehabilitation of the pipeline route must be conducted as described in the EMPr and Vegetation Rehabilitation Plan.

(c) Describe the ability of the applicant to implement the management, mitigation and monitoring measures.

The applicant is obligated to safeguard the environment through the implementation of the mitigation measure and appointment of an ECO for the duration of the construction phase. The applicant is aware of the man agement, mitigation and monitoring measures required for the proposed construction and operation of the reservoir, pump stations and the installation of the pipelines. All mitigation measures would be implemented and monitored in terms of construction monitoring and in line with the auditing requirements of the EIA Regulations (2014) as amended.

Furthermore, the applicant has drafted an Environmental Management Framework with the aim of addressing and promoting both legal and moral obligations of the Stellenbosch Municipality towards the environment through policies and strategies (Stellenbosch Local Municipality, 2014).

The EMPr is intended to provide the guidelines needed to ensure all measures put in place are adhered to.
The applicant will include the EMPr in contractual documentation of the Contractor that will eventually be appointed to implement the project and the EMPR and the Contractor will indicate the budget needed to be able to do so as part of their contractual agreement with the applicant.

The Engineer will also make financial provision for the monitoring of the performance of the project in relation to the EMPr by an ECO in its contractual agreement with the applicant.

(d) Provide the details of any financial provisions for the management of negative environmental impacts, rehabilitation and closure of the proposed development.

Financial provisions must be made for the appointment of an ECO for the duration of the construction phase and the possibility of a Community Liaison officer (CLO) from the affected community. Provision should also be made to guarantee the availability of sufficient funds to manage the rehabilitation of residual impacts upon construction completion.

(e) Describe any assumptions, uncertainties, and gaps in knowledge which relate to the impact management, mitigation and monitoring measures proposed.

The following assumptions, limitations and constraints, associated with this Project, have been identified for this process:

- The BA process is multi-disciplinary, which is informed by the project team. It is thus necessary to assume that the information provided by the project team is accurate and true, at the time;
- Data shown in the reports were supplied by various sources and was used as received. The data was not verified;
- Public Participation Process: every effort was made to inform all possible stakeholders within the Project area, particularly during the COVID-19 pandemic; and
- Information presented by the stakeholders is presumed to be accurate and has been presented timeously in the study.

The following aspects were considered as limitations in the Wetland Baseline and Impact Assessment:

- Only wetlands that were likely to be impacted upon by proposed development activities were assessed in the field. Wetlands located within a 500 m radius of the sites but not in a position within the landscape to be measurably affected by the developments were not considered as part of this assessment;
- Areas characterised by external wetland indicators have been the focus for this study. Areas lacking these characteristics, i.e. built-up areas, roads etc. have not been focussed on;
- Some of the delineated wetlands are characterised by artificial water inputs, which provides difficulties in identifying hydromorphic soils;
- After the commencement of the site visit, the project boundaries were extended to include an additional pipeline to the south of the initial 500 m regulated area. The additional area was assessed via desktop means and no wetland were identified in the new area. A river was identified > 100m to the south of the pump station site. This additional area has however not been physically surveyed (see Figure 8 of the Wetland Report). It is recommended that prior to construction the site is surveyed by an aquatic specialist, and
- The GPS used for water resource delineations is accurate to within five meters. Therefore, the wetland delineation plotted digitally may be offset by at least five meters to either side.

The following assumptions and limitations have been considered for the Botanical Impact Assessment:

- No specific limitations were in place during the site assessment or compilation of this botanical report;
- The assessment was conducted on 20 November 2019 which is still within the optimal springtime window for botanical surveys in the general Cape Peninsula region; and
- Dense bush prevented movement through certain areas of the 50 m wide corridor however this is not a significant limitation as the species present were observable from the thicket edge and the vast majority of the site was able to be covered on foot.

8 SECTION H: RECOMMENDATIONS OF THE EAP AND SPECIALISTS

(a) In my view as the appointed EAP, the information contained in this BAR and the documentation attached hereto is sufficient to make a decision in respect of the listed activity(ies) applied for.	YES	

(b) If the documentation attached hereto is sufficient to make a decision, please indicate below whether, in your opinion, the listed activity(ies) should or should not be authorised:

Listed activity(ies) should be authorised:	YES	

This BA Report was compiled with input from key specialist studies which assisted in assessing the positive and negative impacts associated with the proposed project.

Listed Activity No(s):	**Describe the relevant Basic Assessment Activity(ies) in writing as per Listing Notice 1 (GN No. R. 983)**	**Describe the portion of the development that relates to the applicable listed activity as per the project description.**	**Identify if the activity is development / development and operational / decommissioning / expansion / expansion and operational.**	**Opinion on if identified listed activity(ies) should or should not be authorised**
9	The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0,36 metres or more; or (ii) with a peak throughput of 120 litres per second or more; excluding where— (a) such infrastructure is for bulk transportation of water or storm water or storm water drainage inside a road reserve or railway line reserve; or (b) where such development will occur within an urban area.	The proposed pipeline is 3 200 m long, with internal diameter of 450 mm and flow rate of variable flow rate of 75 -154 ℓ/s. The southern half of the route (1 400 m length) is outside of the urban edge This activity is thus applicable due to the length, diameter and flow rate of the pipeline that is located outside of the urban edge. Note: this activity was not included in the NOI but was identified as applicable and thus applied for. The Heritage opinion was updated accordingly.	Development	Yes, activity should be authorised. The proposed activity is aligned to the Stellenbosch Municipality's IDP and is in support of housing and development schemes over the next couple of years. Any change in the receiving environment related to the activity can be mitigated to acceptable levels.

12	The development of— ii. infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs—(a) within a watercourse	The proposed pipeline route crosses a wetland. The length of the crossing over the wetland is approximately 50 m. Construction width (trench width) may be up to 6.5 m wide. Thus, the footprint of the impact at this wetland crossing will be approximately 325 m^2	Development	Yes, activity should be authorised. Any change in the receiving environment related to the activity can be mitigated to acceptable levels.
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.	The proposed pipeline route will cross a wetland. The construction footprint will be 325 m^2 and the depth of construction will be approximately 2 m deep (thus 650 m^3) Thus, more than 10 m^3 of soil/sand will be removed from the watercourse during construction, most of which will then be replaced after placement of the pipeline to fill the excavation.	Development	Yes, activity should be authorised. Any change in the receiving environment related to the activity can be mitigated to acceptable levels.
Listed Activity No(s):	**Describe the relevant Basic Assessment Activity(ies) in writing as per Listing Notice 3 (GN No. R. 985)**	**Describe the portion of the development that relates to the applicable listed activity as per the project description.**	**Identify if the activity is development / development and operational / decommissioning / expansion / expansion and operational.**	**Opinion on if identified listed activity(ies) should or should not be authorised**
12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of	Clearance of an area of more than 300 m^2 indigenous vegetation will be required for the	Development	Yes, activity should be authorised. Any change in the receiving environment

	indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. **i. Western Cape** i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans.	proposed Kayamandi Bulk Water Project. Indigenous vegetation is present in the Papegaaiberg Nature Reserve. There are two (2) vegetation types within the Papegaaiberg Nature Reserve and have been classified as follows: CR – Swartland Granite Renosterveld (FRg2) (Government Gazette, 2011)6. CR – Swartland Shale Renosterveld (FRs9) (Government Gazette, 2011). Project components within the reserve include: Non-linear: Pump station site 3000 m^2. Linear: pipeline section in the reserve – approximately 1400 km long x 6.5 m wide will be cleared for trenching (9100 m^2). The botanical assessment indicated that 85% of this area is natural vegetation. Thus, 10 285 m^2 is considered natural or near natural.		related to the activity can be mitigated to acceptable levels.

[6] Government Gazette. (2011). *National list of ecosystems that are threatened and in need of protection.* Pretoria: Department of Environmental Affairs.

Provide reasons for your opinion

The proposed project is aligned to the Stellenbosch Municipality's IDP and is in support of housing and development schemes over the next couple of years. Therefore, to supply Kayamandi, as well as the future housing and development schemes in 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 assessment and mitigation measures provided in Section G and Appendix H (EMPr, inclusive of Aquatic and Vegetation Rehabilitation Plans and Maintenance Management Plan) provide further detail on the significance of the impacts and mitigation measures prescribed. In addition, any changes in the receiving environment related to the activity can be mitigated to acceptable levels.

The proposed activity will also have positive social impacts as a few temporary employment opportunities will be available for the local community. This would stimulate the local economy and creating opportunities for local entrepreneurs, thereby promoting the positive effects from existing operations in the surrounding area.

(c) Provide a description of any aspects that were conditional to the findings of the assessment by the EAP and Specialists which are to be included as conditions of authorisation.

The construction of the pipeline will require the relocation and resettlement of community members. At the time of assessment at eleven (11) structures in the western portion of Enkanini that encroach on the gravel road / pipeline corridor from the elevated western side will need to be removed, to provide allowance of a minimum 6.5 m wide corridor (33°55'26.79"S;18°50'27.93"). The servitude must remain accessible in future, therefore the structures in this corridor must be permanently removed. The SIA requires that a RAP and LRP are prepared and physical relocation done in terms of these plans, prior to starting construction in the Enkanini area.

It is recommended that authorisation is given with the condition that the RAP and LRP are prepared and implemented prior to the start of construction.

(d) If you are of the opinion that the activity should be authorised, please provide any conditions, including mitigation measures that should in your view be considered for inclusion in an environmental authorisation.

- A 15 m buffer zone should be implemented from all wetlands and water courses for associated infrastructure and activities apart from crossing point infrastructure and construction (i.e. rising main.) per the specialist recommendation as indicated in Figure 8-1 below;
- All other recommendations of the Wetland Baseline Study and Aquatic Rehabilitation Plan must be adhered to;
- The pipeline route in the Papegaaiberg Nature Reserve should stick to the existing dust road as far as possible. The final alignment of the pipeline must be provided to DEADP and CapeNature for approval, prior to the start of construction.
- The recommendations and mitigation measures provided in the Botanical Assessment and Vegetation Rehabilitation Plan should be adhered to. The topsoil and vegetation that is cleared would need to be removed, kept free of weeds and once the trenches are closed the topsoil replaced along with the vegetation in the form of mulch;
- The recommendations and mitigation measures in the EMPr, Aquatic and Vegetation Rehabilitation Plans should be adhered to;
- The Maintenance Management Plan should be implemented where Activity 19 of Listing 1 or Activity 19 of Listing 3 form part of any future maintenance activities. The EMPr and Aquatic and Vegetation Rehabilitation Plans shall also be implemented for maintenance activities;
- A suitably qualified ECO and CLO must be appointed to monitor the construction activities;
- Method statements must be compiled, clearly outlining how the contractor will minimize environmental impacts for applicable construction activities;
- No tools or other materials should be stored in any of the watercourses;
- No-go areas must be identified, and related buffers be implemented and observed, particularly within the Papegaaiberg Nature Reserve and only the area required for construction purposes should be accessed;
- Compilation and implementation of a RAP and an LRP is required for the structures and people that need to be relocated from Enkanini;

- Monitoring inspections must be undertaken by a specialist during construction and rehabilitation for signs of erosion and any IAPs due to the critically endangered vegetation type present (regardless of the condition of this vegetation);
- Pre-construction photo survey shall be undertaken by the ECO.
- The topsoil and vegetation that is cleared would need to be removed, kept free of weeds and once the trenches are closed the topsoil replaced along with the vegetation in the form of mulch.

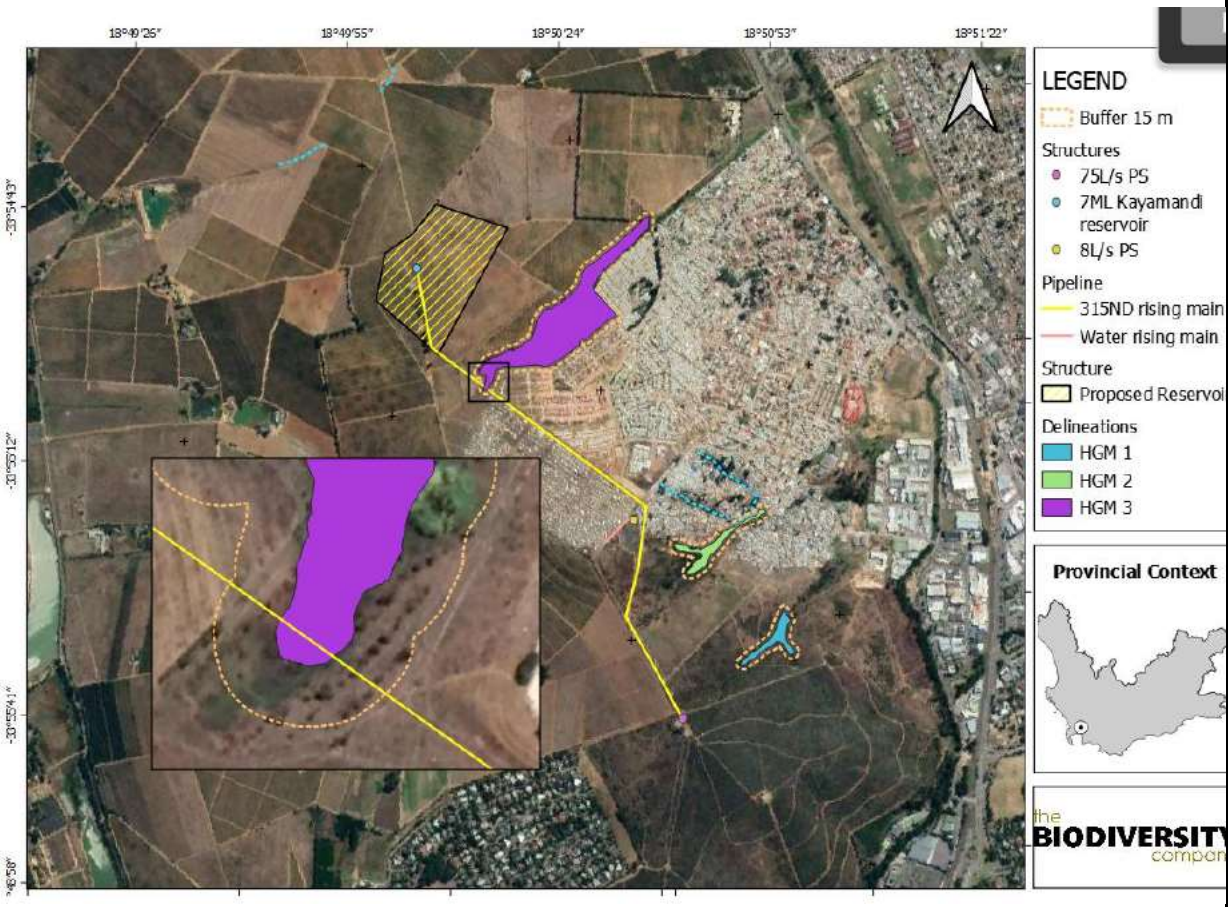

Figure 8-1: Extent of recommended buffer zones

(e) Please indicate the recommended periods in terms of the following periods that should be specified in the environmental authorisation:

i.	the period within which commencement must occur;	**July/Aug 2021**
ii.	the period for which the environmental authorisation is granted and the date on which the development proposal will have been concluded, where the environmental authorisation does not include operational aspects;	**5 years**
iii.	the period for which the portion of the environmental authorisation that deals with non-operational aspects is granted; and	**5 years**
iv.	the period for which the portion of the environmental authorisation that deals with operational aspects is granted.	**Lifetime on project**

9 SECTION I: APPENDICES

The following appendices must be attached to this report:

APPENDIX			Confirm that Appendix is attached
Appendix A:	**Locality map**		Y
Appendix B:	**Site development plan(s)**		Y
	A map of appropriate scale, which superimposes the proposed development and its associated structures and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffer areas;		Y
Appendix C:	**Photographs**		Y
Appendix D:	**Biodiversity overlay map**		Y
Appendix E:	**Permit(s) / license(s) from any other Organ of State, including service letters from the municipality.**		
	Appendix E1:	**Copy of comment from HWC.**	Y
Appendix F:	**Public participation information: including a copy of the register of I&APs, the comments and responses report, proof of notices, advertisements and any other public participation information as is required in Section C above.**		Y
Appendix G:	**Specialist Report(s)**		Y
Appendix H:	**EMPr (inclusive of Aquatic and Vegetation Rehabilitation Plans), and Maintenance Management Plan**		Y
Appendix I:	**Additional information related to listed waste management activities (if applicable)**		NA
Appendix J:	**If applicable, description of the impact assessment process followed to reach the proposed preferred alternative within the site.**		NA, all included in the BA Report above
Appendix K:	**Any Other ((EAP's Curriculum Vitae & List of affected properties)).**		Y

10 SECTION J: DECLARATIONS

10.1 DECLARATION OF The Applicant

Note: Duplicate this section where there is more than one Applicant.

I....., ID number .....in my personal capacity or duly authorised thereto hereby declare/affirm that all the information submitted or to be submitted as part of this application form is true and correct, and that:

- I am fully aware of my responsibilities in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA"), the Environmental Impact Assessment ("EIA") Regulations, and any relevant Specific Environmental Management Act and that failure to comply with these requirements may constitute an offence in terms of relevant environmental legislation;
- I am aware of my general duty of care in terms of Section 28 of the NEMA;

- I am aware that it is an offence in terms of Section 24F of the NEMA should I commence with a listed activity prior to obtaining an Environmental Authorisation;

- I appointed the Environmental Assessment Practitioner ("EAP") (if not exempted from this requirement) which:
  - meets all the requirements in terms of Regulation 13 of the NEMA EIA Regulations; or
  - meets all the requirements other than the requirement to be independent in terms of Regulation 13 of the NEMA EIA Regulations, but a review EAP has been appointed who does meet all the requirements of Regulation 13 of the NEMA EIA Regulations;

- I will provide the EAP and any specialist, where applicable, and the Competent Authority with access to all information at my disposal that is relevant to the application;

- I will be responsible for the costs incurred in complying with the NEMA EIA Regulations and other environmental legislation including but not limited to –
  - costs incurred for the appointment of the EAP or any legitimately person contracted by the EAP;
  - costs in respect of any fee prescribed by the Minister or MEC in respect of the NEMA EIA Regulations;
  - Legitimate costs in respect of specialist(s) reviews; and
  - the provision of security to ensure compliance with applicable management and mitigation measures;

- I am responsible for complying with conditions that may be attached to any decision(s) issued by the Competent Authority, hereby indemnify, the government of the Republic, the Competent Authority and all its officers, agents and employees, from any liability arising out of the content of any report, any procedure or any action for which I or the EAP is responsible in terms of the NEMA EIA Regulations and any Specific Environmental Management Act.

Note: If acting in a representative capacity, a certified copy of the resolution or power of attorney must be attached.

Signature of the Applicant: Date:

Name of company (if applicable):

10.2 THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

I **Catherine Smith**, as the appointed EAP hereby declare/affirm:

- the correctness of the information provided as part of this Report;
- that all the comments and inputs from stakeholders and I&APs have been included in this Report;
- that all the inputs and recommendations from the specialist reports, if specialist reports were produced, have been included in this Report;
- any information provided by me to I&APs and any responses by me to the comments or inputs made by I&APs;
- that I have maintained my independence throughout this EIA process, or if not independent, that the review EAP has reviewed my work (Note: a declaration by the review EAP must be submitted);
- that I have throughout this EIA process met all of the general requirements of EAPs as set out in Regulation 13;
- I have throughout this EIA process disclosed to the applicant, the specialist (if any), the Department and I&APs, all material information that has or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared as part of the application;
- have ensured that information containing all relevant facts in respect of the application was distributed or was made available to I&APs and that participation by I&APs was facilitated in such a manner that all I&APs were provided with a reasonable opportunity to participate and to provide comments;
- have ensured that the comments of all I&APs were considered, recorded and submitted to the Department in respect of the application;
- have ensured the inclusion of inputs and recommendations from the specialist reports in respect of the application, if specialist inputs and recommendations were produced;
- have kept a register of all I&APs that participated during the PPP; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations, 2014 (as amended).

Signature of the EAP:	
Name of Company:	AECOM SA (Pty) Ltd
Date:	2021 04 26

10.3 THE REVIEW ENVIRONMENTAL ASSESSMENT PRACTITIONER

I ……, as the appointed Review EAP hereby declare/affirm:

- that I have reviewed all the work produced by the EAP;
- the correctness of the information provided as part of this Report;
- that I have, throughout this EIA process met all of the general requirements of EAPs as set out in Regulation 13;
- I have, throughout this EIA process disclosed to the applicant, the EAP, the specialist (if any), the review specialist (if any), the Department and I&APs, all material information that has or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared as part of the application; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations, 2014 (as amended).

Signature of the Review EAP: _____

Name of Company: _____

Date: _____

10.4 THE SPECIALIST

Note: Duplicate this section where there is more than one specialist.

I JOHN GRIBBLE as the appointed specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
  - other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
  - am not independent, but another specialist that meets the general requirements set out in Regulation 13 have been appointed to review my work (Note: a declaration by the review specialist must be submitted);
- in terms of the remainder of the general requirements for a specialist, am fully aware of and meet all of the requirements and that failure to comply with any the requirements may result in disqualification;
- have disclosed/will disclose, to the applicant, the Department and interested and affected parties, all material information that have or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application;
- have ensured/will ensure that information containing all relevant facts in respect of the application was/will be distributed or was/will be made available to interested and affected parties and the public and that participation by interested and affected parties was/will be facilitated in such a manner that all interested and affected parties were/will be provided with a reasonable opportunity to participate and to provide comments;
- have ensured/will ensure that the comments of all interested and affected parties were/will be considered, recorded and submitted to the Department in respect of the application;
- have ensured/will ensure the inclusion of inputs and recommendations from the specialist reports in respect of the application, where relevant;
- have kept/will keep a register of all interested and affected parties that participate/d in the public participation process; and
- am aware that a false declaration is an offence in terms of regulation 48 of the 2014 NEMA EIA Regulations.

Note: The terms of reference of the review specialist must be attached.

Signature of the specialist:

ACO ASSOCIATES

Name of company:

13 - 11 - 2019

Date:

The Specialist

Note: Duplicate this section where there is more than one specialist.

I Ivan Baker as the appointed specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
  - other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
  - am not independent, but another specialist that meets the general requirements set out in Regulation 13 have been appointed to review my work (Note: a declaration by the review specialist must be submitted);
- in terms of the remainder of the general requirements for a specialist, am fully aware of and meet all of the requirements and that failure to comply with any the requirements may result in disqualification;
- have disclosed/will disclose, to the applicant, the Department and interested and affected parties, all material information that have or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application;
- have ensured/will ensure that information containing all relevant facts in respect of the application was/will be distributed or was/will be made available to interested and affected parties and the public and that participation by interested and affected parties was/will be facilitated in such a manner that all interested and affected parties were/will be provided with a reasonable opportunity to participate and to provide comments;
- have ensured/will ensure that the comments of all interested and affected parties were/will be considered, recorded and submitted to the Department in respect of the application;
- have ensured/will ensure the inclusion of inputs and recommendations from the specialist reports in respect of the application, where relevant;
- have kept/will keep a register of all interested and affected parties that participate/d in the public participation process; and
- am aware that a false declaration is an offence in terms of regulation 48 of the 2014 NEMA EIA Regulations.

Note: The terms of reference of the review specialist must be attached.

Signature of the specialist:

The Biodiversity Company

Name of company:

2020-12-09

Date:

The Specialist

Note: Duplicate this section where there is more than one specialist.

I Sean Altern as the appointed specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
  - other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
  - am not independent, but another specialist that meets the general requirements set out in Regulation 13 have been appointed to review my work (Note: a declaration by the review specialist must be submitted);
- in terms of the remainder of the general requirements for a specialist, am fully aware of and meet all of the requirements and that failure to comply with any the requirements may result in disqualification;
- have disclosed/will disclose, to the applicant, the Department and interested and affected parties, all material information that have or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application;
- have ensured/will ensure that information containing all relevant facts in respect of the application was/will be distributed or was/will be made available to interested and affected parties and the public and that participation by interested and affected parties was/will be facilitated in such a manner that all interested and affected parties were/will be provided with a reasonable opportunity to participate and to provide comments;
- have ensured/will ensure that the comments of all interested and affected parties were/will be considered, recorded and submitted to the Department in respect of the application;
- have ensured/will ensure the inclusion of inputs and recommendations from the specialist reports in respect of the application, where relevant;
- have kept/will keep a register of all interested and affected parties that participate/d in the public participation process; and
- am aware that a false declaration is an offence in terms of regulation 48 of the 2014 NEMA EIA Regulations.

Note: The terms of reference of the review specialist must be attached.

Signature of the specialist:

NCC Environmental Services (Pty) Ltd

Name of company:

2020-12-09

Date:

The Specialist

Note: Duplicate this section where there is more than one specialist.

I Sue Reuther as the appointed specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
  - other than fair remuneration for work performed/to be performed in terms of this application, have no business, financial, personal or other interest in the activity or application and that there are no circumstances that may compromise my objectivity; or
  - am not independent, but another specialist that meets the general requirements set out in Regulation 13 have been appointed to review my work (Note: a declaration by the review specialist must be submitted);
- in terms of the remainder of the general requirements for a specialist, am fully aware of and meet all of the requirements and that failure to comply with any the requirements may result in disqualification;
- have disclosed/will disclose, to the applicant, the Department and interested and affected parties, all material information that have or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application;
- have ensured/will ensure that information containing all relevant facts in respect of the application was/will be distributed or was/will be made available to interested and affected parties and the public and that participation by interested and affected parties was/will be facilitated in such a manner that all interested and affected parties were/will be provided with a reasonable opportunity to participate and to provide comments;
- have ensured/will ensure that the comments of all interested and affected parties were/will be considered, recorded and submitted to the Department in respect of the application;
- have ensured/will ensure the inclusion of inputs and recommendations from the specialist reports in respect of the application, where relevant;
- have kept/will keep a register of all interested and affected parties that participate/d in the public participation process; and
- am aware that a false declaration is an offence in terms of regulation 48 of the 2014 NEMA EIA Regulations.

Note: The terms of reference of the review specialist must be attached.

SRK Consulting - Certified Electronic Signature
srk consulting
561535/44172/Document
5449-9453-8459-REDT-09/12/2020
This signature has been printed digitally. The Author has given permission for its use for this document. The details are stored in the SRK Signature Database

Signature of the specialist:

SRK Consulting (South Africa) (Pty) Ltd
Name of company:

2020-12-09
Date:

~~10.5~~ THE ~~REVIEW SPECIALIST~~

~~I……, as the appointed Review Specialist hereby declare/affirm:~~

- ~~that I have reviewed all the work produced by the Specialist(s);~~
- ~~the correctness of the specialist information provided as part of this Report;~~
- ~~that I have, throughout this EIA process met all of the general requirements of specialists as set out in Regulation 13;~~
- ~~I have, throughout this EIA process disclosed to the applicant, the EAP, the review EAP (if applicable), the Specialist(s), the Department and I&APs, all material information that has or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared as part of the application; and~~
- ~~I am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations, 2014 (as amended).~~

~~Signature of Review Specialist:~~ _____

~~Name of Company:~~ _____

~~Date:~~ _____

11 SECTION K: REFERENCES

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