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DRAFT BASIC ASSESSMENT REPORT

**Proposed upgrade of the water
pipeline network in Carlswald,
Gauteng Province**

GDARD Reference No.: To Be Confirmed

Report No: 20085-46-Rep-001-Carlswald BAR-Rev0

Submitted to:

**Gauteng Department Agriculture
and Rural Development**

56 Eloff Street
Johannesburg
2000

Submitted on behalf of:

Johannesburg Water SOC Limited

56 Eloff Street
Marshalltown
Johannesburg
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October 2023

20085

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**DOCUMENT CONTROL SHEET**

Project Title : **Proposed upgrade of the water pipeline network in Carlswald, Gauteng Province**

Project No : **20085**

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DOCUMENT APPROVAL

ACTION	DESIGNATION	NAME	DATE	SIGNATURE
Prepared	Senior EAP	Natasha Lalie	26 September 2023	
Reviewed	Civil Engineer	Jan Swart	29 September 2023	
Approved	Project Manager	Sehlodi Mamogobo	29 September 2023	

EXECUTIVE SUMMARY

1. INTRODUCTION AND BACKGROUND

Johannesburg Water SOC Ltd (JW) appointed Zitholele Consulting (Pty) Ltd (herein referred to as Zitholele) to undertake an Application for Environmental Authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) and the Environmental Impact Assessment Regulations of 2014 (GN R.982) as amended.

The Carlswald area is currently supplied with water from the Erand Reservoir which has a capacity of 27 hours Average Annual Daily Demand (AADD) for the current scenario, and 25 hours AADD in the future. JW's Design Guidelines stipulate 36 hours AADD as the design requirement, which means that the Erand Reservoir does not have the capacity to supply water for both the present and future scenarios.

The proposed development involves the construction of a new 20 Megalitre (ML) Carlswald Reservoir to service the surrounding areas, and the upgrade of the water pipeline network in the Carlswald area. The project entails the installation of a new water pipeline within the municipal road reserve, with an approximate length of 5.1 kilometres from the proposed reservoir to the end of the route i.e., outside the Blue Hills Country Estate entrance. The new pipeline will tie into an existing pipeline at the end of the route.

Applicant's representative

The details of the JW's designated representative are as follows:

Name:	Ms. Joyce Ngobebe
Company:	Johannesburg Water SOC Limited
Designation:	Environmental Manager
Telephone:	011 688 1443
Email:	joyce.ngobebe@jwater.co.za

Environmental Assessment Practitioner

Zitholele has been appointed as the designated Environmental Assessment Practitioner (EAP) to conduct the Application for Environmental Authorization by way of a Basic Assessment (BA) process for submission to the Competent Authority (CA), i.e., Gauteng Department of Agriculture and Rural Development (GDARD), on behalf of the Applicant. Details of the project team members are provided below:

Role:	Environmental Assessment Practitioner (EAP)
Name and Surname:	Ms. Natasha Lalie
Highest Qualification:	M.Sc. Environment and Society
Professional Registration:	Environmental Assessment Practitioner's Association of South Africa (EAPASA): Registered EAP (Reg. No. 2021/3611)
Company Represented:	Zitholele Consulting (Pty) Ltd
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CV of the EAP is provided in Appendix I1.

2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1. Location of the activity

The proposed water pipeline upgrade is in Carlswald, Midrand which falls under the jurisdiction of the City of Johannesburg Metropolitan Municipality in the Gauteng Province. Three network pipeline routes were investigated, i.e. Network 1, 2 and 3 and the route descriptions are provided below. The preferred route alignment is Network 2.

Network 1 (refer to Figure 1): The pipeline route alignment starts from the proposed reservoir and will then be taken along the Whisken and Neptune Avenue intersection (Point A) and along Whisken Road in a north westerly direction, where it encounters a 210° bend, before it proceeds into Arthur Avenue. It then continues in a westly direction where it crosses the R55 (Main Road). The pipeline route then continues onto Papenfus Drive alongside the road reserve where it passes through the Beaulieu Country Estate Guard House, and then enters through into the road reserve of Papenfus Drive within the Estate. The pipeline route alignment then crosses the Papenfus Drive and Stallion Road intersection and proceeds inside the Papenfus Drive Road reserve for 2.13km to where it ends outside the Blue Hills Country Estate entrance (Point B). A detailed A3 locality map of the study area is provided in Appendix C.

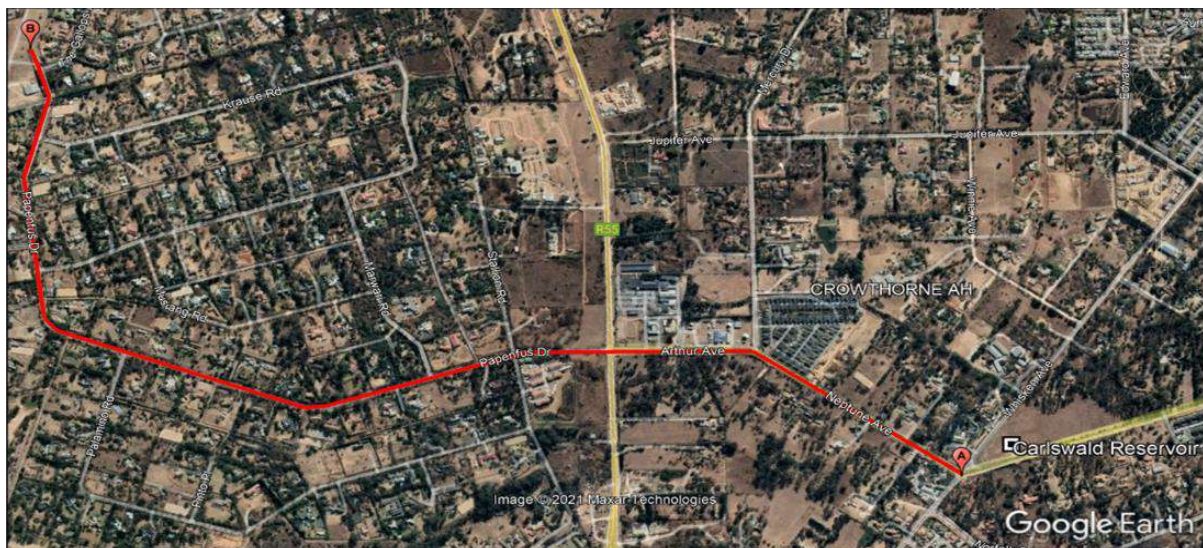


Figure 1: Location of Network 1

Network 2 (refer to Figure 2): The pipeline route alignment starts at the proposed reservoir and is then taken across Whisken and Neptune Avenue intersection (Point A), it will then move in a south-westerly direction where it turns 90° on Whisken Avenue and continues towards a north-westerly direction on Whisken Avenue until it crosses the R55 (Main Road) to the western side of the road. The pipeline then continues in a northerly direction inside the R55 road reserve for 0.48km where it turns 90° into an unused road reserve entering Beaulieu Estate on Stallion Road. The pipeline crosses Stallion Road

and turns 90° where it continues in a northerly direction towards Papenfus Drive. From the Stallion Road and Papenfus Drive intersection, the pipeline proceeds alongside Papenfus Drive for 2.13 km where it ends outside the Blue Hills Country Estate entrance (Point B). A detailed A3 locality map of the study area is provided in Appendix C.

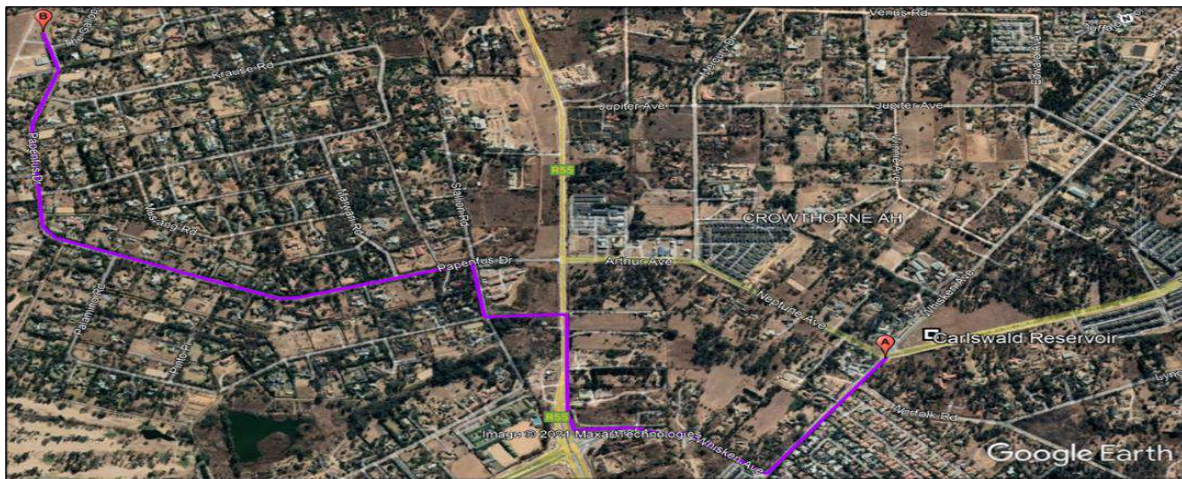


Figure 2: Location of Network 2

Network 3 (refer to Figure 3): The pipeline route alignment starts at the proposed reservoir and is then taken across the Whiskey and Neptune Avenue intersection (Point A), it then moves in a north-easterly direction along Whiskey Avenue. The pipeline route alignment then crosses Whiskey Avenue, and continues until it reaches Pluto Road, where it turns 90° into Pluto Road. From there, the pipeline travels for 0.3 km where it makes a 126° bend, and continues north into Winne Avenue, until it reaches Jupiter Avenue. The pipeline turns in an easterly direction onto Jupiter Avenue, where it travels for 1km to where it reaches the R55 (Main Road). From the R55, the pipeline travels south, along the road for about 0.45km, where it turns 90° into an unused road reserve entering Beaulieu Estate, on Stallion Road. The pipeline crosses Stallion Road and bends at 90° where it continues in southerly direction towards Papenfus Drive. From the Stallion Road and Papenfus Drive intersection, the pipeline proceeds alongside Papenfus Drive for 2.13 km where it ends outside the Blue Hills Country Estate entrance (Point B). A detailed A3 locality map of the study area is provided in Appendix C.



Figure 3: Location of Network 3

2.2. Footprint of pipeline

The footprints of the proposed alternative sites are indicated below:

Table 1: Details of the proposed pipeline routes

PROJECT COMPONENT	DESCRIPTION
Pipeline length	<ul style="list-style-type: none">• Pipeline Network 1: ~3.25 km• Pipeline Network 2: ~4.11 km• Pipeline Network 3: ~5.17 km
Pipeline Width	Ranges between 125mm and 600mm for each pipeline route alignment

2.3. Proposed infrastructure

The Site Layout Plan indicating existing and proposed pipelines is provided in Figure 4, Figure 5, Figure 5 and Figure 6. A high-resolution A3 version of the Site Layout Plan is further included in Appendix C of this Basic Assessment Report (BAR).

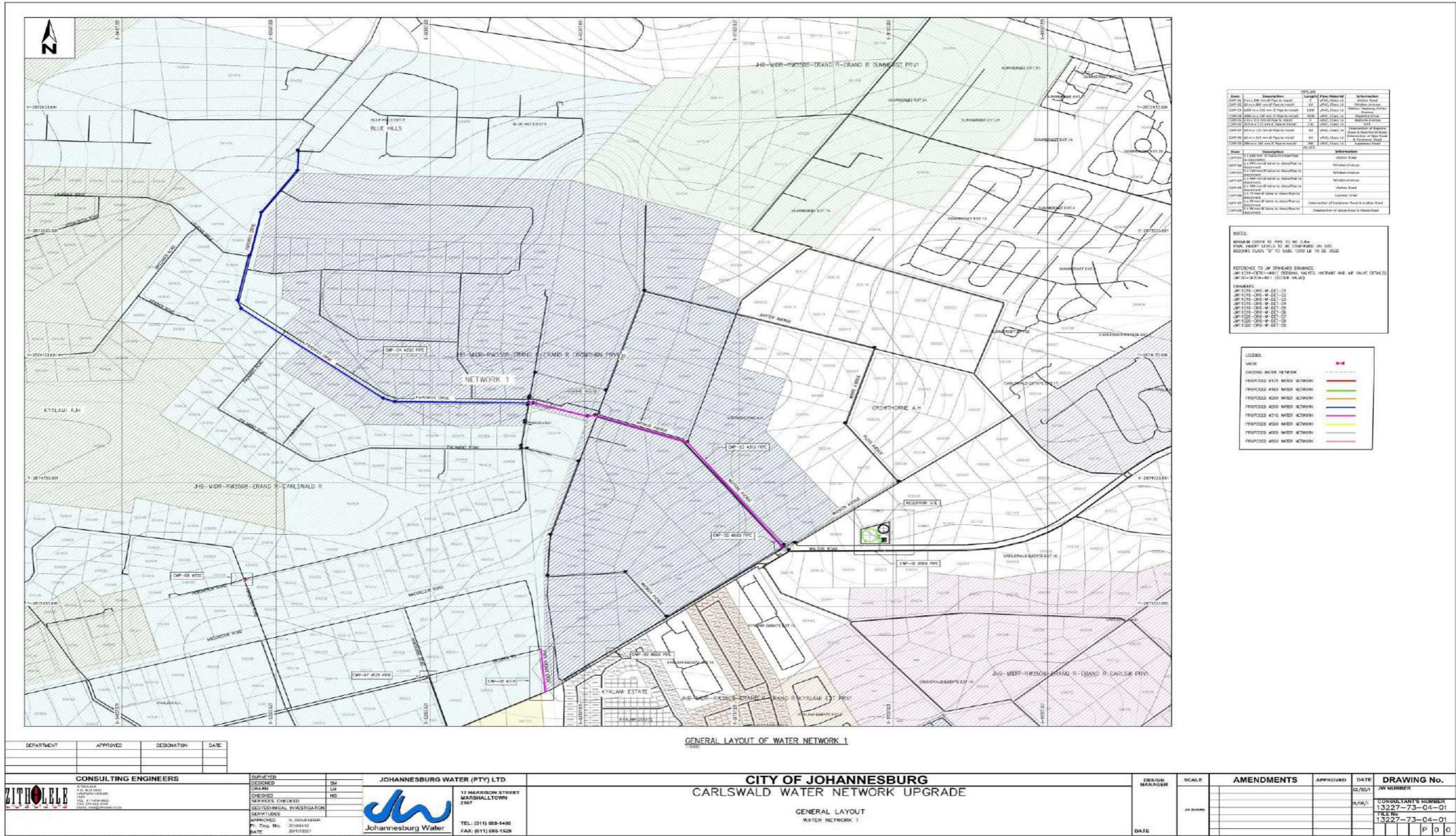


Figure 4: Site Layout Plan of existing and proposed infrastructure at Pipeline Network 1

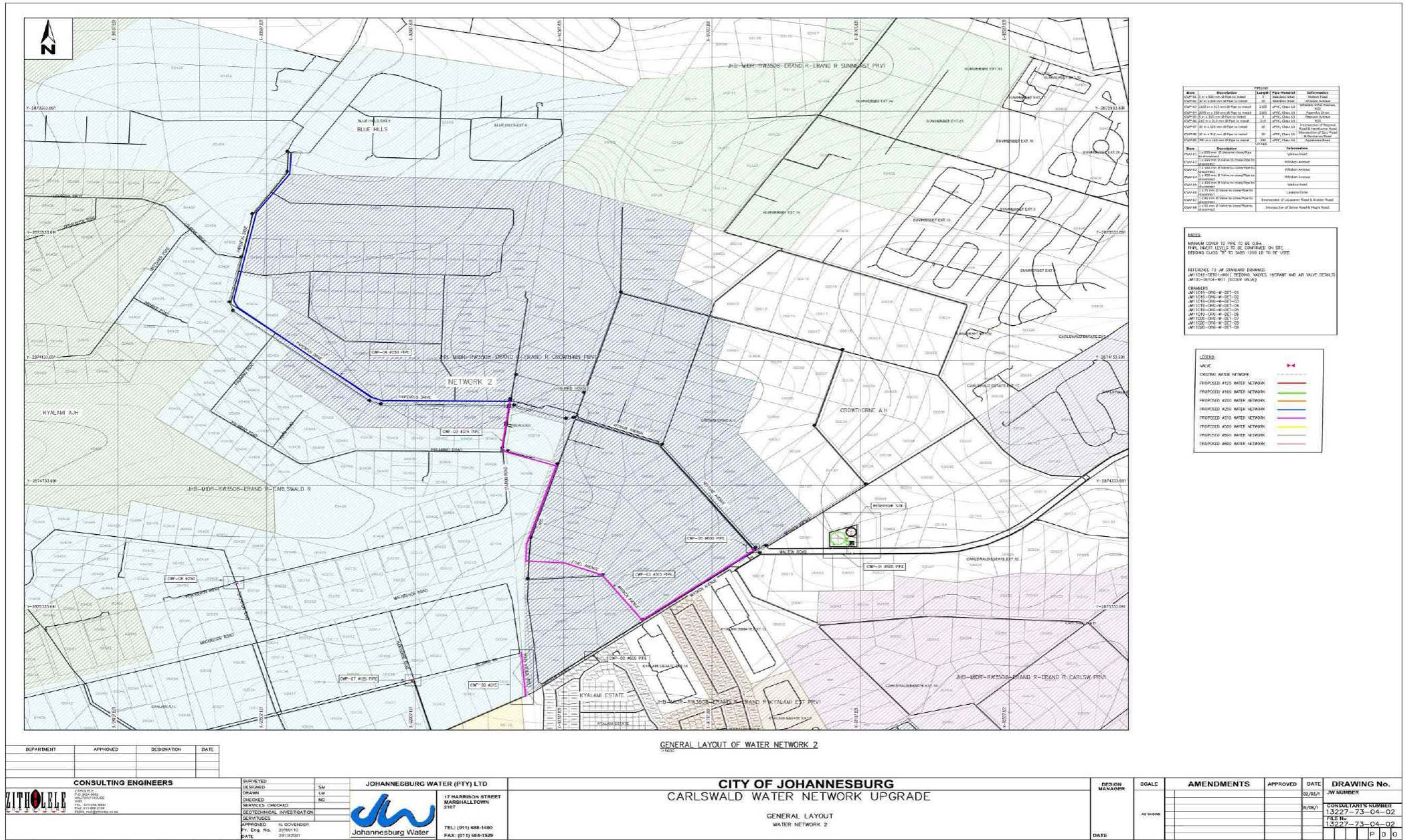


Figure 5: Site layout drawing of existing and proposed infrastructure at Pipeline Network 2

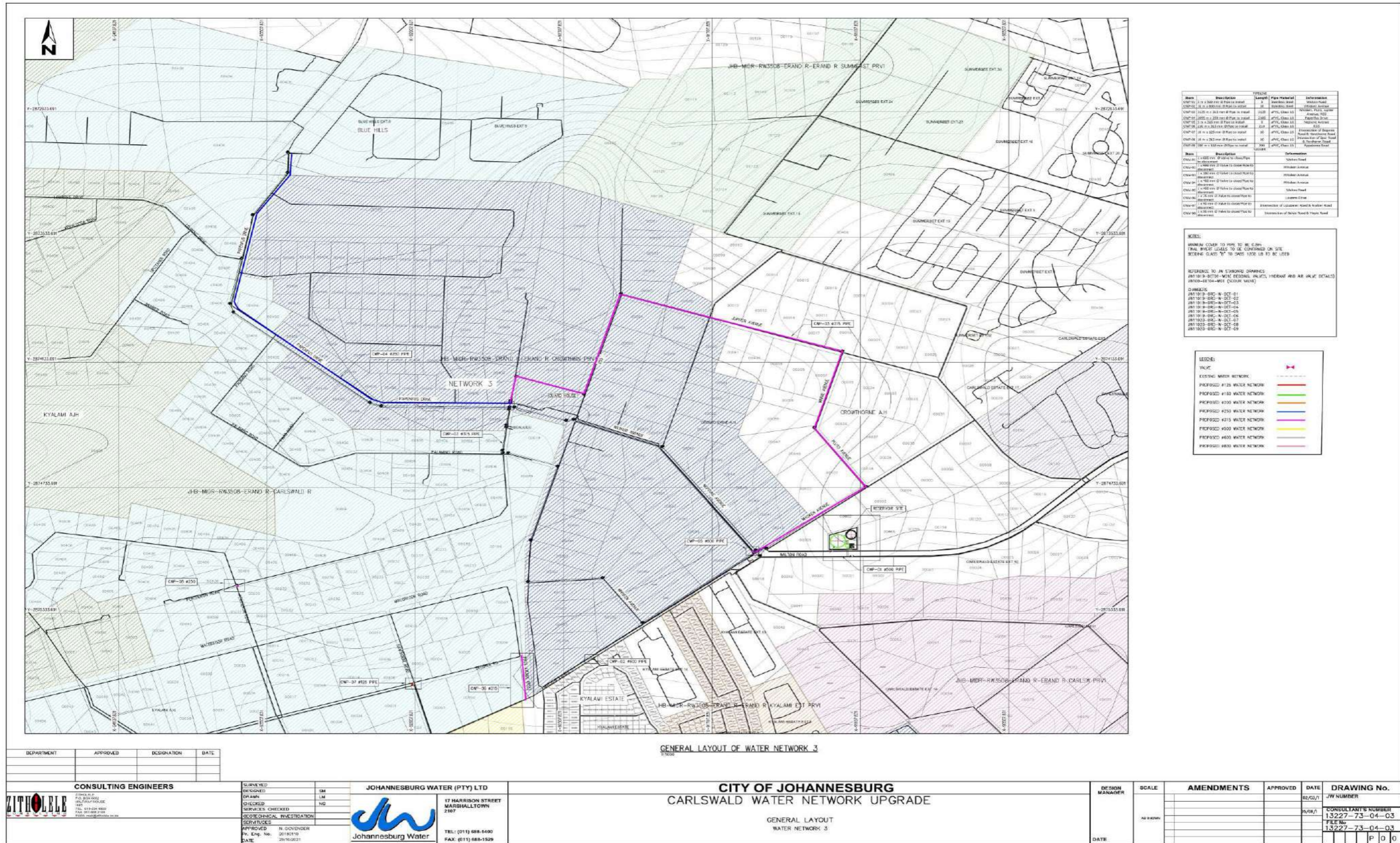


Figure 6: Site layout drawing of existing and proposed infrastructure at Pipeline Network 3

2.4. Requirement for Services

Water Management

The proposed installation of pipeline will not require water. Where concrete is required, it will be delivered to site readily mixed and ready for usage. In the event that water supply will be interrupted during construction, Johannesburg Water will inform the affected residents three days prior to the disruption of the water supply.

Waste Management

The proposed installation of the preferred pipeline will not produce any waste. Excavated materials will be used as backfill, after installation of the pipeline, to cover the open trenches. Excess excavated materials will be removed from site and the site rehabilitated.

Stormwater Management

The following stormwater mitigation measures will be adhered to, during the construction phase of the project:

- Sandbags will be used in controlling storm water during construction, storm water runoff will be diverted away from works/disturbed area.
- If necessary, temporary cut off drains and berms may be constructed to divert/capture storm water run-off;
- Should trenches need to be dewatered, this will be done without causing damage to existing vegetation;
- The disturbed area will be minimized, by phasing or sequencing construction and preserving existing vegetation where possible; and
- The site will be inspected regularly, and properly maintained, especially after heavy rain events.

Electricity

The proposed installation of pipeline will not require electricity. Therefore, no electricity will be sourced.

Traffic Management

The proposed construction activities and installation of the water pipeline will occur within the road reserve, and the methodology will be that of trenchless technology where the pipes cross the road. Where the trenchless methodology cannot be utilized, an application for open trench method will be submitted to the Johannesburg Roads Agency for approval. Adequate road signage will be placed on site, indicating the construction ahead, speed limit, and etc.

One lane of the two-lane roads will be kept open at all times with traffic regulation and stop and go points at the location where the one lane access is implemented.

2.5. Development phases

Pre-construction/Planning phase

Activities associated with the pre-construction phase includes the following:

- Undertaking necessary environmental approvals, authorizations, and registrations in terms of the applicable environmental legislation. Zitholele has been appointed to undertake the Basic Assessment process to obtain an Environmental Authorization (EA) for the installation of the pipeline.
- Appointment of a suitable contractor to undertake the construction during the installation process after an EA has been granted by the GDARD. Please note that a General Authorisation (GA) has been granted by the Department of Water and Sanitation (DWS).

No intrusive activities that would require authorization or a license will therefore be undertaken during the pre-construction phase.

Construction phase

Construction activities associated with the installation of the pipeline in Carlswald includes the following:

- Construction of temporary safety structures.
- Survey and setting out - Design alignment and extent of cut to be marked onto ground.
- Site clearance of the pipeline route for construction.
- Temporary wooden profiles to be set up to maintain safe excavation slopes.
- Excavation of the trenches within limits set out and stockpiling for re-use.
- Trench bottoms to be compacted.
- Installation of the pipe bedding cradle.
- Laying and joining the pipeline.
- Backfill of the trench with suitable material in layers of 150 mm.
- Compaction of each 150 mm layer of backfill.
- Testing of the pipeline post-construction.

Operational phase

Operational activities will be provision of clean water to the Carlswald area. Routine maintenance of the water pipeline will take place as required by JW.

Decommissioning phase

Johannesburg Water is not intending to decommission the pipeline and it will be operated over a long-term period to cater for future demands within the area.

2.6. Description of the Receiving Environment

A brief description of the receiving environment is provided in the sections that follow.

Climate

The proposed pipeline is in Johannesburg, which falls under the climatic conditions of Johannesburg. Johannesburg is located on the highveld plateau and has a subtropical highland climate. The city experiences a sunny climate, with the summer months, which is from October to April, characterized by hot days, followed by afternoon thundershowers and cool evenings. The winter months are dry, and sunny days are followed by cold nights and are from May to September. Temperatures in Johannesburg are usually mild due to the city's high elevation, with an average maximum daytime temperature in January of 25.6 °C, dropping to an average maximum of around 16 °C in June.

Geology

The rocks of four major stratigraphy sequences are represented in Johannesburg. The oldest rock in the area comprises of the most primitive assemblages on earth. These are isolated remnants of the greenstones which survived assimilation by the Archaean Basement granitic rocks. The Archaean Basement granitic rocks occur in the northern suburbs of Johannesburg and on weathering produced soils with a collapsible fabric. Sediments of the Witwatersrand Supergroup partly cover the granitic rocks, deeply weathered, and occur in abundance in all rock types in the city. A variety of transported soils of the Quaternary Period led to a ubiquitous blanket covering the underlying residual soils or bedrock. The quartzite, however, contains very small amounts of pyrite which, under certain conditions, gives rise to an aggregate with potentially deleterious chemical properties. Mining residue deposits in the form of slimes dams and sand dumps are common in many residential and industrial townships of Johannesburg (Johannes H. De Beer, 1986).

Hydrology

The survey area falls within the Limpopo (A) Primary catchment and the Crocodile (west) Marico Water Management Area (WMA). The project area falls within the A21C quaternary catchment, which is drained toward the northwest by the Jukskei River, which is the main watercourse that drains the catchment area. The Jukskei River forms a confluence with the Crocodile (west) River to the north, continuing as the Crocodile (west) River northwards to confluence with the Marico River. This confluence forms the Limpopo River, which then runs eastwards, forming the northern border of South Africa with Zimbabwe. The Limpopo River continues eastwards through Mozambique to drain into the Indian Ocean.

Terrestrial Biodiversity and Surface Water

A Terrestrial Biodiversity and Surface Water Ecosystems Ecological and Impact Survey was undertaken by EnviRoss. Refer to Appendix G2.

The paragraphs below summarize the findings of this study.

There are three wetland units that occur within the survey area of the three alternative route alignments. Wetland #1 will be impacted by Pipeline Network 3. This wetland unit originates northeast

of the development, within an area surrounded by residential smallholdings. This wetland unit continues in a south-westerly direction through the residential smallholdings, where there are numerous small-scale impoundments, before being diverted underground to accommodate the Crowthorne Shopping Centre. The watercourse daylights again as part of the stormwater management system of the shopping Centre at the intersection of Main Road and Arthur Drive (to the east) and Papenfus Drive (to the west), where it is part of Wetland #2. It is noted that Network 2 will cross Wetland #2. It is diverted beneath the road intersection and then continues in a south-western direction through the residential smallholdings of Beaulieu Estate, to confluence with the Jukskei River. This section of the watercourse also includes numerous small-scale impoundments. Wetland #2 originates east of the developments within the Carlswald residential smallholdings area that will be impacted by Network 2. It tends to be a poorly developed unchanneled valley bottom wetland unit, again subject to numerous impoundments along its course, which flows in a south-western direction to cross over Main Road. Due to the impoundments, and the lack of substantive water flowing into the system, it tends to lose momentum, with most of the wetland features being prominent on the eastern side of Main Road. Under high rainfall conditions, this watercourse confluences with the watercourse associated with wetland units 1 and 2, before the confluence with the Jukskei River (EnviRoss, 2022).

Ecosystem Analysis

The survey area falls within a vegetation unit that is regarded as endangered, namely Egoli Granit Grassland of the Mesic highveld Grassland bioregion, which falls within the Grassland biome. The development area pertaining to the pipeline includes the maintained pavements and road reserves of residential holdings and the commercial sector and therefore falls within an already transformed zone. The relevance of the threatened status of the vegetation unit (in its primary state) is therefore irrelevant to the pipeline alignment, regardless of which of the three alternatives is preferred. The proposed reservoir site falls within an open grassland. Although some representation of Egoli Granite Grassland vegetation features has been retained, this site is managed and maintained, and is subject to a high level of disturbances. The grassland area is also relatively small and ecologically isolated. This site also therefore bears limited relevance to conservation of threatened ecosystems (EnviRoss, 2022).

Conservation Areas

The pipeline route networks have an association with zones designated as Ecological Support Areas (ESAs), which coincides with known linear wetland features within the area, as these habitat features tend to be ecologically connected and therefore support migratory freedom of mobile faunal species that can then exploit the habitat availability within the area. The Gauteng C-Plan also indicates these areas as wetland and watercourse features, and therefore designates conservation buffer zones to these features. This tends to coincide with the 30m conservation buffer zones designated to the delineated habitat features (EnviRoss, 2022).

Areas of cultural/heritage significance

An exemption from undertaking a Heritage Impact Assessment (HIA) was undertaken by Beyond Heritage, for the proposed development (refer to Appendix G3). The findings of this study are summarized herein.

The three alternatives are located within the road reserves within the built-up suburbs. The surrounding environment consists of a suburban landscape made up of large properties and upscale housing developments. Existing infrastructure includes various pipelines, powerlines and tar roads traversing through the suburb. The landscape surrounding the proposed project area focuses on equestrian activities, with most properties built to accommodate some form of equestrian sport or livery. The site has no heritage resources present. No heritage indicators appear on historical maps prior to the establishment of the residential suburbs, and previous agricultural activities are visible, indicating that the study area is of low heritage potential (refer to Appendix G3 specialist report).

Socio-economic

The City of Johannesburg Local Municipality is situated in the Gauteng Province and covers an area of 1 645km². It is the largest city in South Africa, and the provincial capital of Gauteng, which is the wealthiest province in South Africa (Stats SA). According to Census 2011, the population within City of Johannesburg is about 4 434 827 people with about 72,7% of the working age, 23,2% of young people and 4,1% of the elderly people. The unemployment rate in the municipality is approximately 25%, with the unemployed being majority youth. Only 34,7% of the age group 20+ people in the municipality have a matric qualification.

2.7. DFFE Screening Tool

A desktop preliminary screening of the development site was undertaken on 21 June 2021 using the Department of Forestry, Fisheries and Environment's (DFFE's) online National Screening Tool (<https://screening.environment.gov.za/screeningtool/>). The findings of the Screening Report included the following (refer to the DFFE Screening Report in Appendix I4):

- The following list of Specialist Assessments were identified by the screening tool for further assessment:
 - Agricultural Impact Assessment.
 - Archaeological and Cultural Heritage Impact Assessment.
 - Palaeontological Impact Assessment.
 - Terrestrial Biodiversity Impact Assessment.
 - Aquatic Biodiversity Impact Assessment.
 - Geotechnical Assessment.
 - Socio-Economic Impact Assessment.
 - Plant Species Assessment.
 - Animal Species Assessment.

The proposed pipeline upgrade will trigger listed activities in terms of Listing Notice 1 and 3 of the EIA Regulations 2014, as amended and therefore, an EA is required. Refer to Table 2 that explains the Specialist assessments identified in terms of the DFFE Screening Tool Assessment. The table below includes a motivation as to why some of the Specialist Studies are not relevant for the proposed water pipeline upgrade.

Table 2: Specialist assessments identified in terms of the DFFE Screening Tool Assessment

Specialist Study	Motivation
Agricultural Impact Assessment	This study is not deemed relevant for the proposed water pipeline upgrade. The pipeline route alignment occurs within the road reserve and agricultural practices would therefore not be sustainable within a road reserve in a built-up urban area. The proposed reservoir occurs on vacant land and 60% of this area will be used for the reservoir. The laydown area will be located at this site. The site is owned by City of Johannesburg Metropolitan Municipality (CoJ), and it is CoJ's mandate to provide access to water, which is a basic need. Furthermore, agricultural practices within a built-up urban area are not a compatible land use within the greater study area.
Archaeological and Cultural Heritage Impact Assessment	The study area was surveyed by an Archaeologist and no heritage resources were observed. An exemption letter (Appendix G3) has been compiled and will be submitted to the South African Heritage Resources Agency (SAHRA). No Heritage Impact Assessment (HIA) will therefore be undertaken.
Palaeontological Impact Assessment	<p>The theme is low sensitivity, according to the South African Heritage Resources Information System (SAHRIS) Map. Therefore, no study is required.</p> <p>Based on the SAHRA paleontological map the study area is of insignificant/zero sensitivity and no further palaeontological studies are necessary. Refer to Section 3.2 of the Exemption letter (Appendix G3) which provides a motivation for not undertaking a Palaeontological Impact Assessment.</p>
Terrestrial Biodiversity Impact Assessment	The Terrestrial Biodiversity Impact Assessment was undertaken and is included in Appendix G2. Refer to the findings of the study in Section.
Aquatic Biodiversity Impact Assessment	The Aquatic Biodiversity Impact Assessment was included in the ecological survey conducted by EnviRoss (Refer to Appendix G2). The findings of the study are summarized in Section D. This study covers the wetlands occurring within a 500m radius of the proposed pipeline route alternatives.
Socio-Economic Impact Assessment	<p>The socio-economic impacts on the receiving environment i.e., traffic, dust, visual, noise, safety and security etc, will be minimised with the implementation of mitigation measures that are included in the Environmental Management Programme (EMPr), which is a legally-binding document for implementation by the Developer.</p> <p>The community will be given notice when construction will take place in their vicinity to ensure minimal disruptions to access to private property. Construction activities within the road reserve will be fast-tracked to ensure minimal delays to traffic flow on the municipal roads.</p> <p>Disruptions to water supply will be communicated to the affected parties in advance.</p> <p>The Contractor will be responsible for rehabilitation of the construction area and the road verges that will be affected by the construction activities.</p> <p>Through the Public Participation Process, potential Interested and Affected Parties (I&APs) will be notified of the project and will be given an opportunity to participated and raise comments.</p> <p>Based on the above motivation, a Socio-Economic Impact Assessment has not been undertaken.</p>
Geotechnical Assessment	Refer to the Geotechnical Assessment in Appendix G1. The findings of this study are provided in Appendix G1.
Animal Species Assessment	This is covered in the Terrestrial Biodiversity Impact Assessment (Appendix G2).

Specialist Study	Motivation
Plant Species Assessment	This is covered in the Terrestrial Biodiversity Impact Assessment (Appendix G2).

2.8. Listed Activities triggered by the proposed development.

The proposed activity is underpinned by the legal provisions of the National Environmental Management Act, No. 107 of 1998 (NEMA), as amended, and the National Water Act, No. 36 of 1998. As set out in Regulations 19 of the National Environmental Management Act (NEMA) Environmental Impact Assessment Regulations, 2014, as amended, the proposed project is subjected to a Basic Assessment Process (Government Notice No. R.982). JW has appointed Zitholele Consulting (Pty) Ltd as the Independent Environmental Impact Assessment Practitioner (EAP) to undertake the Basic Assessment Process and Water use Authorization (WUA) process for the proposed project. Refer to (Table 3) below which provides a description of the listed activities that are triggered for the proposed water pipeline upgrade.

Table 3: Description of the listed activity associated with the project

Listed Activities as listed in the EIA Regulations of 2014 (as amended) of National Environmental Management Act 107 of 1998	Applicability to proposed project
Listing Notice 1 (GN R.983), Activity 19: The infilling or depositing of any material of more than 10 cubic meters into, or the dredging, excavating, removal or moving of soil, sand, shells, shell grit, pebbles, or rock of more than 10 cubic meters from a watercourse.	The upgrade of the pipeline may entail excavations and removal of soil from a wetland that will be more than 10 cubic metres.
Listing Notice 3 (GN 985), Activity 14: The Development of (ii) infrastructure or structures with a physical footprint of 10square metres or more (a) Where such development occurs within a watercourse in c, Gauteng Province at iv. Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in Bio-regional plans.	The pipeline route may cross a wetland and the area is categorised as an Ecological Support Area (ESA) in terms of the Gauteng Conservation Plan.
Listing Notice 3 (GN 985), Activity 23: The expansion of (ii) infrastructure or structures where the physical footprint is expanded by 10 metres or more. Gauteng Province at iv. Sites identified as Critical Biodiversity Areas (CBAs) or Ecological Support Areas (ESAs) in the Gauteng Conservation Plan or in Bio-regional plans.	The pipeline route may cross a wetland and the area is categorised as an Ecological Support Area in terms of the Gauteng Conservation Plan.

2.9. Summary of Specialist Studies

Ecological Survey, including Wetland Assessment

Following the field survey of the survey corridor associated with the proposed Johannesburg Water reservoir establishment, and the associated pipeline network development in Carlswald, Gauteng,

the following salient recommendations can be proposed to aid in the conservation of the overall ecological integrity and functionality of the area associated with the project site:

- The Screening Tool analysis indicated that the project area had limited ecologically sensitive features for the various themes. The ecologically sensitive areas were limited to the wetland units that intersect the survey area and the various pipeline network alternatives. The field survey reiterated much of the data ascertained through the Screening Tool analysis.
- Evaluation of the provincial ecological conservation data (GDARD C-Plan vers 3.3) indicated similar results, with the linear wetland units being included as Ecological Support Areas (ESAs), largely due to these linear units promoting ecological connectivity for migratory species.
- The infrastructure associated with the proposed development aligns with areas of historical degradation and habitat transformation. It is therefore regarded as an ecologically transformed habitat type that the infrastructure footprints will impact upon.
- There were three wetlands crossing points identified that associated with the various pipeline network alternatives. These units have been delineated and the mandatory 30 m conservation buffer zones have been presented in (Figure 7).

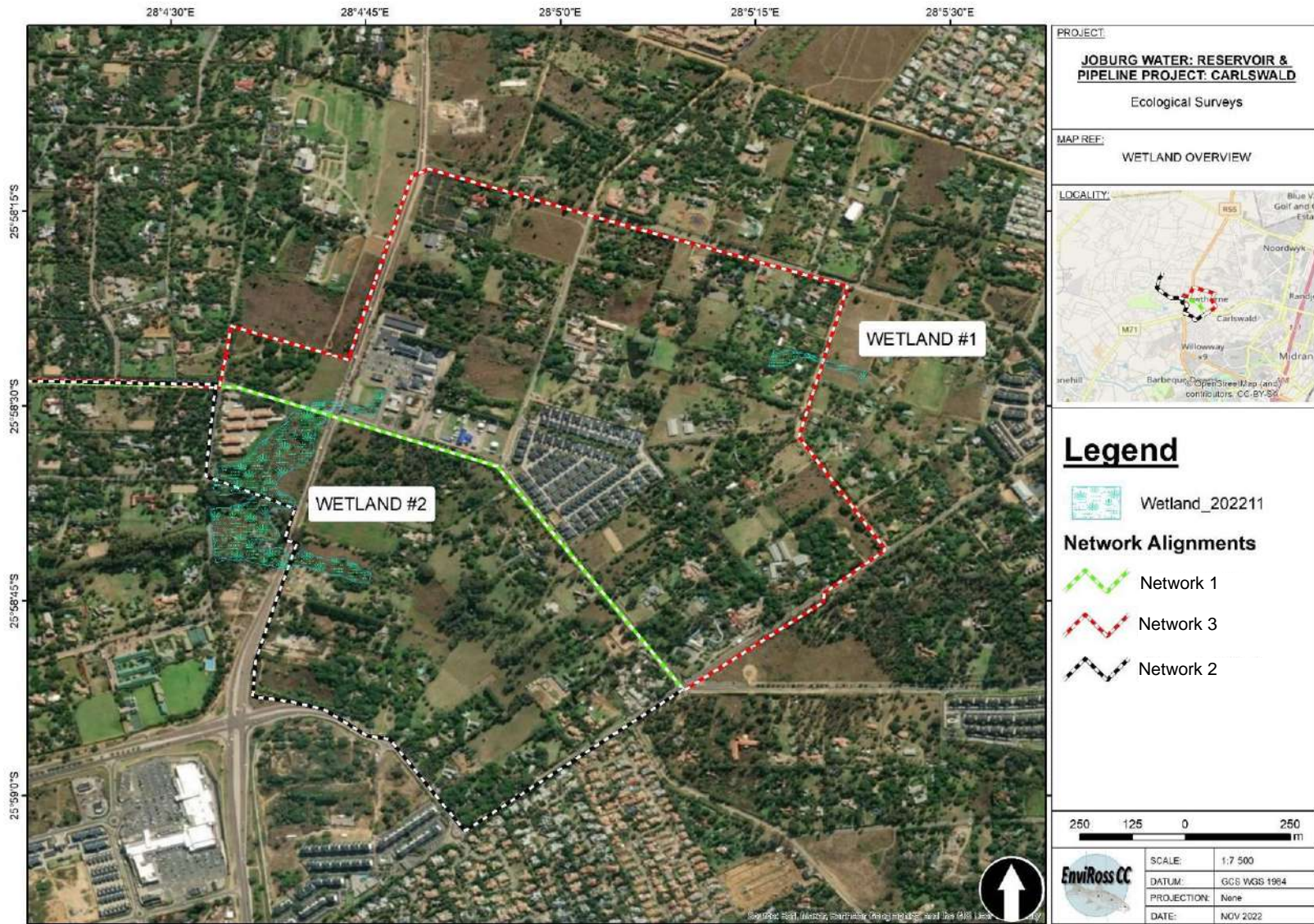


Figure 7: Wetland Unit #1 and unit#2, showing how it interacts with the pipeline network 2 and 3 alignment

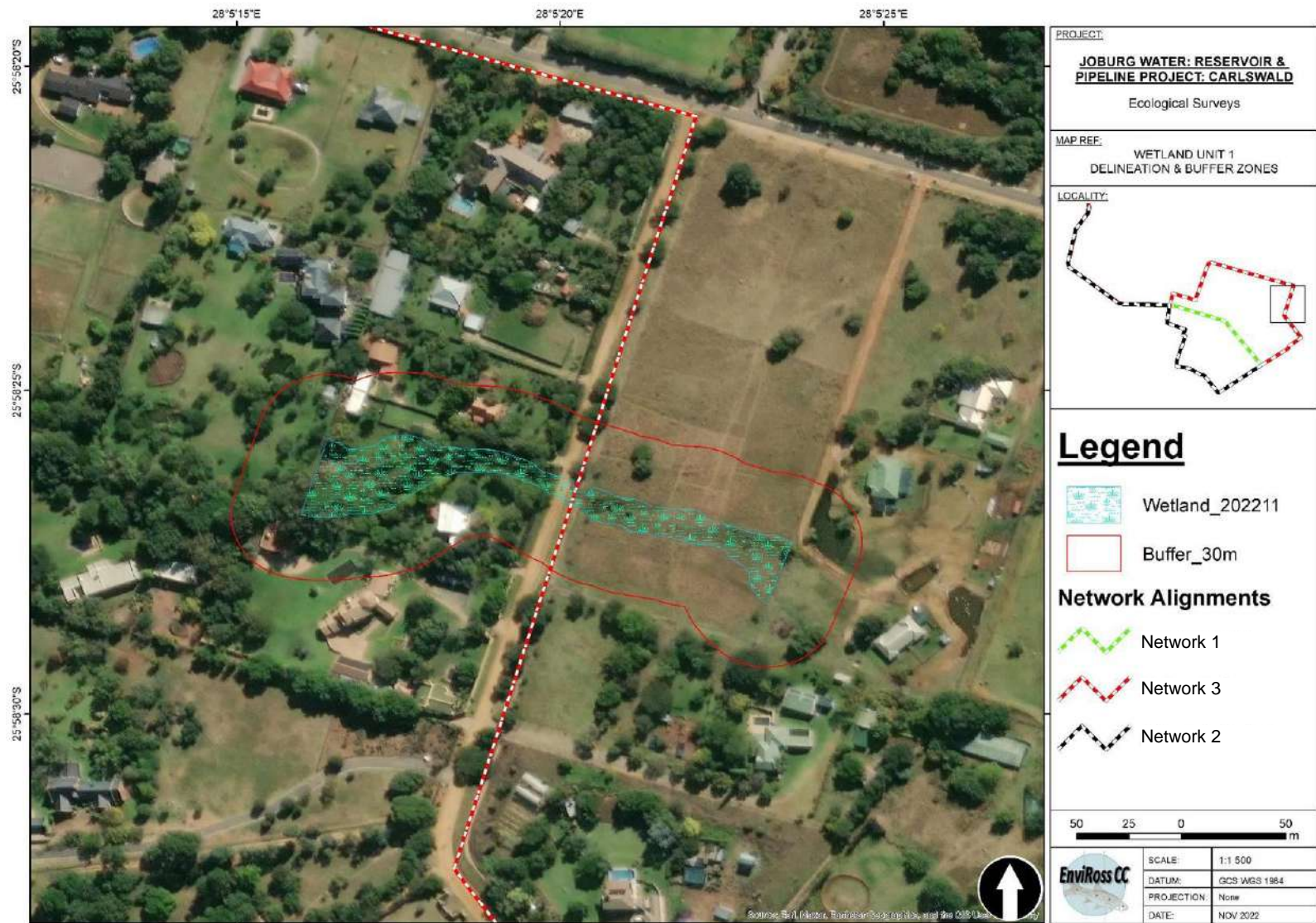


Figure 8: Wetland Unit #1 together with the mandatory 30 m buffer zones, showing how it interacts with the pipeline network 3 alignment

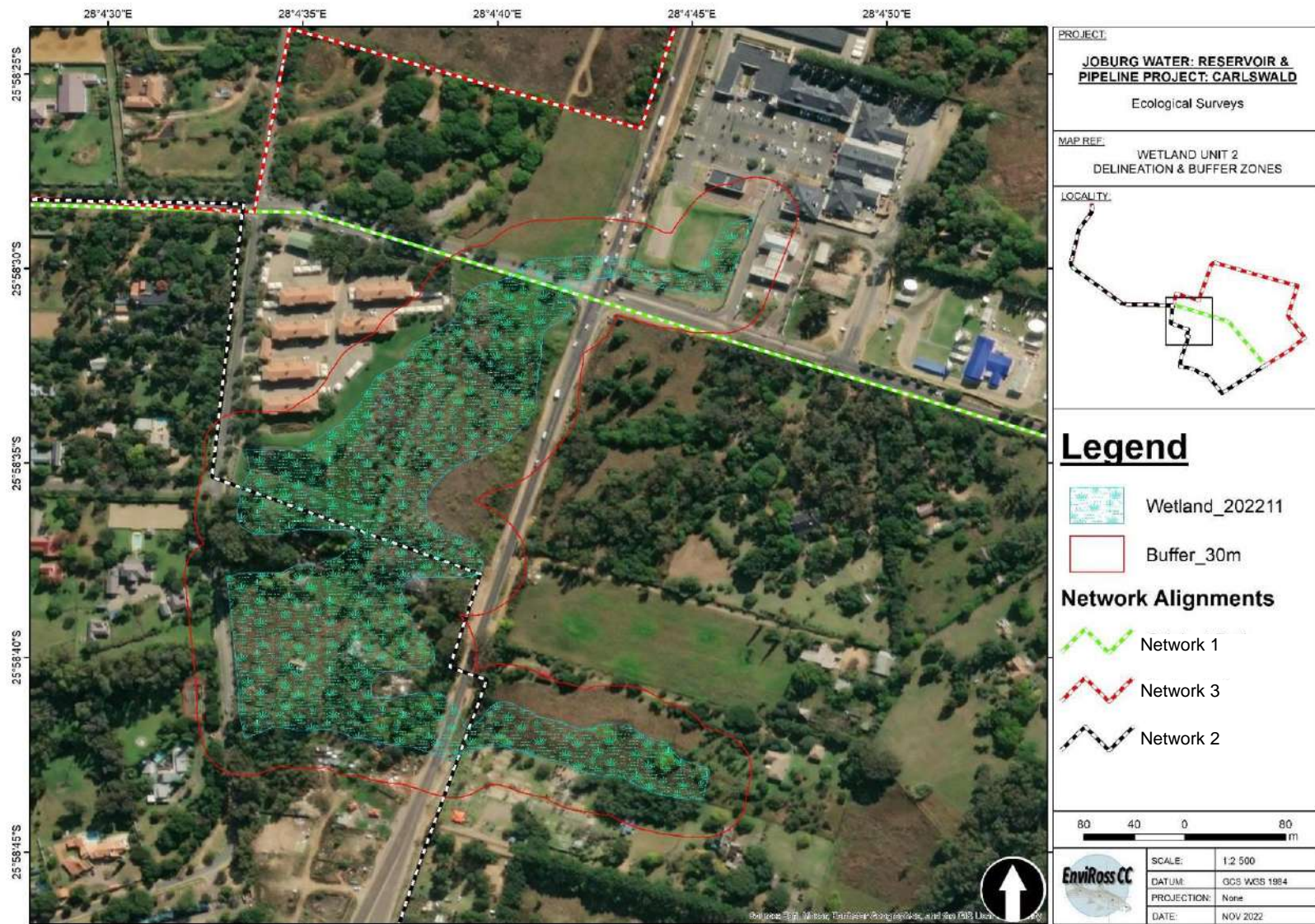


Figure 9: Wetland Unit #2 together with the mandatory 30 m buffer zones, showing how it interacts with the pipeline network 1 and 2 alignments

- These wetland units were shown to be poorly developed and have suffered considerable transformation through pressures and drivers of ecological change at both the local and catchment scales. The overall significance of the ecological impacts to these units is low.
- The Risk Assessment Matrix (RAM) showed a moderate to low risk to surface water ecosystem habitat units. Moderate risk ratings occur where construction activities fall within wetland zones. Risk ratings reduce with distance from these surface water habitat units. All risk ratings can be reduced to low with the implementation of suitable mitigation measures that have been presented.
- The general impact significance of the potential impacting features to both surface water and terrestrial ecosystems showed low overall significance, with all impacts rendered insignificant with the application of the proposed mitigation measures.
- Network 1 has the least association with wetland units relative to the other two alternatives. It is also the most direct and shortest route relative to the other presented alternatives however it is not feasible from an engineering point of view as the route has been highly transformed and does not offer enough working space.
- Network 3, Although originally thought to be feasible it was found to be fatally flawed upon closer investigation, as the proposed pipeline alignment does not enable flow to gravitate to the required standpoints and achieve the required pressures (2 bar) as per JW's Design Guidelines.
- Network 2 has been identified as the preferred route, although the pipeline along Network 2 goes through a wetland unit it should be noted that with simple mitigation measures considered the impact is considered not to present a fatal flaw and can be developed.
- It is recommended that the pipeline be coupled to the existing bridge/culvert infrastructure at the downstream side at any wetland/watercourse crossing point if at all feasible, meaning that excavations through the wetland zone would be avoided altogether. If that is not feasible, then it is recommended that excavations take place at the upstream side of the crossing point to abate the impacts of erosion that normally manifest at the downstream side.
- The most pertinent mitigation measures relevant to the project is the active management of erosion and alien vegetation control throughout all phases of the proposed development.
- Mitigation measures to reduce the overall significance of the proposed development activities have been proposed and have been shown to significantly reduce the long-term ecological impacts. Limited residual impacts should remain following correct site rehabilitation, as limited surface infrastructure will remain following completion of the construction phase.
- A monitoring programme should be implemented to assess the long-term success of the implemented mitigation measures pertaining to erosion management and potential emergence of exotic vegetation recruitment within disturbed areas.
- The overall impact significance of the proposed project is thought to be minor, with limited residual impacts expected to remain. Therefore, the project would be supported if mitigation measures are adhered to.

It should be noted that, to conserve the ecological structures within the region, a holistic habitat conservation approach should be adopted. This includes keeping general habitat destruction and

construction footprints to an absolute minimum within the terrestrial habitat. Conserving the habitat units will ultimately conserve the species communities that depend on it for survival. This can only be achieved by the efforts of the contractor during the various processes of the construction phase.

Heritage Assessment

The project area is completely transformed through the establishment of existing water pipelines as well as residential suburbs. Based on Topographic maps, the area was undeveloped and used for agricultural activities until 1957 with the establishment of roads and then the subsequent establishment of structures from 1964. The study area was completely transformed into various residential suburbs around the project area throughout the years. No heritage indicators appear on historical maps prior to the establishment of the residential suburbs, and previous agricultural activities are visible, indicating that the study area is of low heritage potential. This was confirmed during the site visit, and no evidence of heritage resources was noted. According to the SAHRA paleontological map, the paleontological sensitivity is determined as zero/ insignificant, and no further studies are required for this aspect.

2.10. Alternatives

Based on the findings from the specialist assessments which have been undertaken for the three alternative routes, it is concluded that the preferred alternative is Network 2. At road crossings, the method of construction will be pipe-jacking to avoid traffic disruptions. Construction for the remainder of the route alignment will be open excavation/trenching method.

It was found that Network 1 and 3 are not feasible due to constructability challenges. Network 1 has many sections along the route that have several existing services and there are constraints which would render the installation of the pipeline very challenging. A large section of this route is highly trafficked throughout the day, therefore construction along this route alignment would be problematic.

Although originally thought to be feasible, Network 3 was found to be fatally flawed upon closer investigation, as the proposed pipeline alignment does not enable flow to gravitate to the required standpoints and achieve the required pressures (2 bar) as per JW's Design Guidelines.

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LIST OF APPENDICES

Appendix A: Site plan(s) – *(must include a scaled layout plan of the proposed activities overlain on the site sensitivities indicating areas to be avoided including buffers)*

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Route position information

Appendix E: Public participation information

Appendix E1 – Proof of site notice

Appendix E2 – Written notices issued as required in terms of the regulations

Appendix E3 – Proof of newspaper advertisements

Appendix E4 – Communications to and from interested and affected parties during project announcement

Appendix E5 – Minutes of any public and/or stakeholder meetings

Appendix E6 - Comments and Responses Report *(to be provided with Final BAR)*

Appendix E7 –Comments from I&APs on Basic Assessment (BA) Report *(to be provided with Final BAR)*

Appendix E8 –Comments from I&APs on amendments to the BA Report *(to be provided with Final BAR)*

Appendix E9 – Copy of the register of I&APs

Appendix F: Water use license(s) authorisation (refer to the General Authorisation dated 23 August 2023)

SAHRA information, service letters from municipalities, water supply information (n/a)

Appendix G: Specialist reports

Appendix G1: Geotechnical Assessment

Appendix G2: Terrestrial Biodiversity & Surface Water Ecosystems Ecological and Impact Surveys Assessment

Appendix G3: Exemption for a Heritage Impact Assessment

Appendix H: EMPr

Appendix I1: Project Team CV

Appendix I2: Minutes of Pre-Application Meeting with GDARD

Appendix I3: Application for Environmental Authorisation Form

Appendix I4: Screening Tool Report

LIST OF ACRONYMS

AADD	Annual Average Daily Demand
BA	Basic Assessment
BAR	Basic Assessment Report
CA	Competent Authority
CBA	Critical Biodiversity Area
DFFE	Department of Forestry, Fisheries and the Environment
DWS	Department of Water and Sanitation
EA	Environmental Authorization
EAP	Environmental Assessment Practitioner
EAPASA	Environmental Assessment Practitioners Association of South Africa
ESA	Ecological Support Area
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
GA	General Authorisation
GAPA	Gauteng Agriculture Potential Atlas
GDARD	Gauteng Department of Agriculture and Rural Development
GPEMF	Gauteng Province Environmental Management Framework
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
JW	Johannesburg Water
MI	Megalitre
NEMA	National Environmental Management Act 107 of 1998 (as amended)
NEMBA	National Environmental Management: Biodiversity Act 10 of 2004
NEMWA	National Environmental Management Waste Act 59 of 2008
NWA	National Water Act 36 of 1998
OHS	Occupational Health and Safety Act 85 of 1993
PAIA	Promotion of Access to information Act 2 of 2000
PPP	Public Participation Process

RAM	Risk Assessment Matrix
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
TP	Test Pit
WUA	Water Use Authorisation
WUL	Water Use License



Basic Assessment Report in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended, and the Environmental Impact Assessment Regulations, 2014 (Version 1/2022)

Kindly note that:

1. This **Basic Assessment Report** is the standard report required by GDARD in terms of the EIA Regulations, 2014.
2. This template is current as of April 2022. It is the responsibility of the EAP to ascertain whether subsequent versions of the template have been published or produced by the competent authority.
3. A draft Basic Assessment Report must be submitted, for purposes of comments within a period of thirty (30) days, to all State Departments administering a law relating to a matter likely to be affected by the activity to be undertaken.
4. **A draft Basic Assessment Report must be submitted, for purposes of comments within a period of thirty (30) days, to a Competent Authority (uploaded to the EIA online system) empowered in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended to consider and decide on the application. The EIA online system can be accessed at <https://eia.gauteng.gov.za>.**
5. **A copy (PDF) of the final report and attachments must be uploaded to the EIA online system. The EIA online system can be accessed at <https://eia.gauteng.gov.za>.**
6. **Draft and final reports submitted in terms of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) must be emailed to environmentsue@gauteng.gov.za.**
7. The report 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 report is in the form of a table that can extend itself as each space is filled with typing.
8. Selected boxes must be indicated by a cross and, when the form is completed electronically, must also be highlighted.
9. An incomplete report may lead to an application for environmental authorisation or Waste Management License being refused.
10. Any report that does not contain a titled and dated full colour large scale layout plan of the proposed activities including a coherent legend, overlain with the sensitivities found on site may lead to an application for environmental authorization or Waste Management License being refused.
11. The use of "not applicable" in the report must be done with circumspection because if it is used in respect of material information that is required by the competent authority for assessing the application, it may result in the application for environmental authorisation or Waste Management License being refused.
12. The applicant must fill in all relevant sections of this form. Incomplete applications will not be processed. The applicant will be notified of the missing information in the acknowledgement letter that will be sent within 10 days of receipt of the application.
13. Unless protected by law, and clearly indicated as such, all information filled in on this application will become public information on receipt by the competent authority. The applicant/EAP must provide any interested and affected party with the information contained in this application on request, during any stage of the application process.
14. Although pre-application meeting with the Competent Authority is optional, applicants are advised to have these meetings prior to submission of application to seek guidance from the Competent Authority.

DEPARTMENTAL DETAILS

Gauteng Department of Agriculture and Rural Development
 Attention: Administrative Unit of the Sustainable Utilisation of the Environment (SUE) Branch
 P.O. Box 8769
 Johannesburg
 2000

Ground floor, Umnotho House, 56 Eloff Street, Johannesburg

Administrative Unit telephone number: (011) 240 3051/3052
 Department central telephone number: (011) 240 2500

(For official use only)

NEAS Reference Number:						
File Reference Number:						
Application Number:						
Date Received:						

If this BAR has not been submitted within 90 days of receipt of the application by the competent authority and permission was not requested to submit within 140 days, please indicate the reasons for not submitting within time frame.

N/A

Is a closure plan applicable for this application and has it been included in this report? NO

if not, state reasons for not including the closure plan.
The proposed project is for an upgrade of water pipelines in the Carlswald area which will be permanent infrastructure.

Has a draft report for this application been submitted to a competent authority and all State Departments administering a law relating to a matter likely to be affected as a result of this activity? YES

Is a list of the State Departments referred to above attached to this report including their full contact details and contact person? YES

If no, state reasons for not attaching the list.
N/A

Have State Departments including the competent authority commented? NO

If no, why?
An opportunity for all State Departments to comment will be during the 30-day public review period of this Basic Assessment Report.

SECTION A: ACTIVITY INFORMATION

1. PROPOSAL OR DEVELOPMENT DESCRIPTION

Project title (must be the same name as per application form):

Proposed upgrade of the water pipeline network in Carlswald, Gauteng Province

Select the appropriate box

The application is for an upgrade of an existing development

The application is for a new development

Other, specify

Does the activity also require any authorisation other than NEMA EIA authorisation?

YES

If yes, describe the legislation and the Competent Authority administering such legislation

A General Authorisation has been issued by the Department of Water and Sanitation in terms of Section 21 (c) and 21(i) water use activities of the National Water Act, 1998 (Act No. 36 of 1998) on 23 August 2023. Refer to Appendix F.

If yes, have you applied for the authorisation(s)?

YES

If yes, have you received approval(s)? (attach in appropriate appendix)

NO

2. APPLICABLE LEGISLATION, POLICIES AND/OR GUIDELINES

List all legislation, policies and/or guidelines of any sphere of government that are applicable to the application as contemplated in the EIA regulations:

Title of legislation, policy or guideline:	Administering authority:	Promulgation Date:
National Environmental Management Act, 1998 (Act No. 107 of 1998 as amended).	National & Provincial	27 November 1998
The Constitution of the Republic of South Africa (Act 106 of 1998)	The Judiciary	18 December 1996
NEMA Environmental Impact Assessment (EIA) Regulations 2014, as amended in April 2017 (published in Government Notice No. R.326)	Gauteng Department of Agriculture and Rural Development (GDARD)	4 December 2014, amended on the 07 April 2018
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	The South African Heritage Resource Agency (SAHRA)	28 April 1999
National Water Act, 1998 (Act No. 36 of 1998)	Department of Water and Sanitation (DWS)	20 August 1998
Promotion of Access to Information Act 2 of 2000 (PAIA)	Department of Justice	9 March 2001
Occupational Health and Safety Act 85 of 1993	Department of Labour	July 1993
Gauteng Province Environmental Management Framework (GPEMF)	Gauteng Department of Agriculture and Rural Development (GDARD)	March 2018
Johannesburg Biodiversity Strategy and Action Plan	City of Johannesburg Metropolitan Municipality	2015

Public Participation Guideline in Terms of National Environmental Management Act, 1998 Environmental Impact Assessment Regulations	Department of Forestry, Fisheries, and the Environment	2017
Guidelines For Species Listed as Invasive in Terms of Section 70 of National Environmental Management: Biodiversity Act, 2004 (Act No. 10 OF 2004) (NEMBA)	Department of Forestry, Fisheries, and the Environment	September 2015
Guideline on Need and Desirability	Department of Forestry, Fisheries, and the Environment	2017
Gauteng Sustainable Development Guideline	Gauteng Department of Agriculture and Rural Development (GDARD)	April 2017

Description of compliance with the relevant legislation, policy or guideline:

Legislation, policy or guideline	Description of compliance
National Environmental Management Act 107 of 1998 (NEMA) and subsequent amendments to the Act.	The NEMA (as amended) is regarded as South Africa's environmental framework legislation which provides for environmental management and gives effect to section 24 of the Constitution. The Basic Assessment and Public Participation processes were undertaken in strict compliance with the NEMA, as amended.
The Constitution of the Republic of South Africa (Act 106 of 1998)	Section 24 of the Constitution of the Republic of South Africa provides for a comprehensive environmental right. Therefore, stakeholders and Interested and Affected Parties may exercise their right through providing comment during the PP process and raising issues of concern that are likely to infringe upon their environmental right. The Basic Assessment process recognises this right, and the EAP has recorded, considered and responded to any and all issues of concern raised by the I&APs.
NEMA Environmental Impact Assessment (EIA) Regulations 2014 as amended (published in Government Notice No. R.326)	The Basic Assessment Process for the proposed project has been carried out in accordance with the Regulations 19 and 20 of the NEMA EIA Regulations, 2014.
National Water Act, 1998 (Act No. 36 of 1998)	A General Authorisation - GA) has been issued by the Department of Water and Sanitation on 23 August 2023 (Refer to the GA in Appendix F). The GA is to undertake Section 21 (c) and (i) water uses for the upgrade of the water pipeline in Carlswald, mainly for the wetland crossings and the proposed pipeline within 500m of the wetlands.
National Heritage Resources Act, 1999 (Act No. 25 of 1999)	This Act regulates all aspects of the protection of cultural heritage, archaeological and palaeontological resources within South Africa. Heritage/cultural and paleontological resources were taken into consideration as part of the proposed project. An Exemption from undertaking a Heritage Impact Assessment has been undertaken for the Basic Assessment Process.
Promotion of Access to Information Act 2 of 2000 (PAIA)	As per the NEMA EIA Regulations, 2014, as well as the principles/objectives of the PAIA, the Basic Assessment Report as well as all supporting

	documentation (e.g., specialist studies) will be made available to the public.
Occupational Health and Safety Act 85 of 1993	This is primarily intended to provide for the health and safety of persons at work and for the health and safety of persons in connection with the activities of persons at work. All work that is carried out for the implementation of the project activities as well as during each phase of the project lifecycle should be carried out in accordance with the provisions of the OHS Act.
Integrated Environmental Management Guideline Series (Guideline 5) Companion to the EIA Regulations 2010 published in Government Notice 805 (10 October 2012)	The aim of the guideline is to provide a detailed consideration of the practical implementation of the NEMA EIA Regulations. The guideline also provides guidance and clarity on the EA Process to be followed and interpretation of the listed activities. The guideline was used as a reference document to the applicability of the NEMA EIA Regulations, 2014 on the proposed project.
Integrated Environmental Management Guideline Series (Guideline 7) Public Participation in the EIA Process published in Government Notice 805 (10 October 2012)	The guideline is intended to provide information on the benefits of public participation, the minimum legal requirements for the Public Participation Process (PPP), the steps of the PPP, guidelines for planning a PPP and a description of the roles and responsibilities of the various role-players. The guideline was referred to, to facilitate an adequate understanding of the execution of the PPP.
Gauteng Province Environmental Management Framework (GPEMF)	The objective of the GEMF is to guide sustainable land use management within the Gauteng Province. The GPEMF stipulates certain zones where development may take place without the need to obtain an Environmental Authorisation (EA). These zones have been considered in the application.
Johannesburg Biodiversity Strategy and Action Plan	The purpose of the Johannesburg Biodiversity Strategy is to inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact biodiversity. This is done by providing a map of biodiversity priority areas, including Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESA), with accompanying land-use planning and decision-making guidelines. Biodiversity priority areas including CBAs and ESAs surrounding the proposed upgrade were considered in this application.
Public Participation Guideline in Terms of National Environmental Management Act, 1998 Environmental Impact Assessment Regulations	The guideline is intended to provide information on the benefits of public participation, the minimum legal requirements for the Public Participation Process (PPP), the steps of the PPP, guidelines for planning a PPP and a description of the roles and responsibilities of the various role-players. The guideline was referred to, to facilitate an adequate understanding of the execution of the PPP.
Guidelines For Species Listed as Invasive in Terms of Section 70 of National Environmental Management:	The Listed Invasive Species were also published on 1 August 2014 as Government Notice No. 599 National Environmental Management: Biodiversity Act (10/2004): "Alien and Invasive Species List,

Biodiversity Act, 2004 (ACT NO. 10 OF 2004) (NEMBA)	2014". In terms of Section 70 (1) of the National Environmental Management: Biodiversity Act, 559 species /groups of species were listed (they are annexed to this report as Annex 2). It is the management of these species that are covered by this Framework Guidelines Document. The proposed development has the potential to contribute to the spread of alien invasive species. These guidelines were therefore considered in this application.
Guideline on Need and Desirability in Terms of National Environmental Management Act, 1998	Providing an appropriate motivation for the development of a particular project is a compulsory requirement in the environmental impact assessment process for such development. The guideline is intended to provide questions that must be answered to indicate the Need and Desirability of the proposed development. This guideline was therefore considered in the formulation of the motivation for this application.
Gauteng Sustainable Development Guideline	This guideline is aimed at guiding the officials in the GDARD and the municipalities to adopt the principles of greening buildings and infrastructure when reviewing development plans and Environmental Impact Assessment development applications. It guides the developers and investors on how buildings (residential, commercial, and manufacturing) and infrastructure should be designed, developed, and operated with a view to reducing environmental risks, enhancing social benefits, and promoting development and infrastructure sustainability interface. The principles and implementation approach advocated in the guideline was considered in this application.

3. ALTERNATIVES

Describe the proposal and alternatives that are considered in this application. Alternatives should include a consideration of all possible means by which the purpose and need of the proposed activity could be accomplished. The determination of whether the site or activity (including different processes etc.) or both is appropriate needs to be informed by the specific circumstances of the activity and its environment.

The no-go option must in all cases be included in the assessment phase as the baseline against which the impacts of the other alternatives are assessed. **Do not include the no go option into the alternative table below.**

Note: After receipt of this report the competent authority may also request the applicant to assess additional alternatives that could possibly accomplish the purpose and need of the proposed activity if it is clear that realistic alternatives have not been considered to a reasonable extent.

Please describe the process followed to reach (decide on) the list of alternatives below

A site investigation was conducted to identify the existing site constraints along the proposed pipeline route. The pipeline route alignments considered, was aimed at ensuring the least disruption to traffic and existing services, and therefore, the route/s for the installation of the pipeline occur within the municipal road reserve. This also avoids construction within privately-owned property. Therefore, three alternative pipeline route alignments, i.e. Network 1, 2 and 3, were identified for the water distribution network connecting from the proposed reservoir to an existing water pipeline tie-in point, located just outside the Blue Hills Country Estate entrance on Papefufus Drive.

Provide a description of the alternatives considered

No.	Alternative type, either alternative: site on property, properties, activity, design, technology, energy, operational or other(provide details of "other")	Description				
1	Proposal (Network 2) – (preferred route)	<p>Site Access</p> <p>The pipeline network starts at the proposed reservoir and will be taken along Whisken Avenue which becomes Ethel Avenue, along the R55 and across the R55 through vacant property and then along the road reserve of Percheron Road and then within the road reserve of Papenfus Drive in the Carlswald area. The pipeline route will end just outside the entrance to Blue Hills Country Estate entrance where it will tie into an existing pipeline.</p> <p>Site Constraints</p> <p>The following are the constraints identified along Network 2.</p> <ul style="list-style-type: none"> • Driveways: The pipeline continues through multiple driveways of both residential and commercial properties. • Existing service cables and pipes: The pipeline continues through existing electrical and telecommunication cables, as well as water pipelines servicing the area. • Heavily trafficked intersection and road: The Walton/Whisken/Neptune Avenue intersection is a heavily trafficked intersection during peak and off-peak times. The pipeline continues onto Whisken Avenue (South) which is mildly trafficked during off-peak hours. <p>Advantages and disadvantages for proposed Network 2 are shown in Table 4 below.</p> <p>Table 4: Advantages and disadvantages for Network 2</p> <table border="1"> <thead> <tr> <th data-bbox="528 1800 836 1845">Advantages</th> <th data-bbox="836 1800 1166 1845">Disadvantages</th> </tr> </thead> <tbody> <tr> <td data-bbox="528 1845 836 2000">Hydraulically – it meets the minimum JW Design Guidelines</td> <td data-bbox="836 1845 1166 2000">There are constraints including large trees, existing pipework, as well as telecommunication cables</td> </tr> </tbody> </table>	Advantages	Disadvantages	Hydraulically – it meets the minimum JW Design Guidelines	There are constraints including large trees, existing pipework, as well as telecommunication cables
Advantages	Disadvantages					
Hydraulically – it meets the minimum JW Design Guidelines	There are constraints including large trees, existing pipework, as well as telecommunication cables					

			and poles that this route encounters.	
		There is sufficient working space on both sides of the road to manoeuvre past some of the identified constraints.	The pipeline continues past several driveways of residential (private and security estates) and commercial properties.	
		There are minimal road crossings of the pipeline – minimal disturbances to traffic.	550m of the pipeline runs along the very busy R55 (Main Road).	
		The usage of trenchless technologies is limited to small sections along the pipeline.		
		The pipeline enters Beaulieu Estate via a servitude located at 25°58'37.26"S, 28° 4'40.11"E instead of going through the guard house, as in Network 1.		
2	Alternative 1 (Network 1)	<p><u>Site Access</u></p> <p>The pipeline route starts at the proposed reservoir. The route then travels along Neptune Avenue, through to Arthur Avenue and crosses the R55 to Papenfus Drive in the Carlswald area. The pipeline route will be installed within the municipal road reserve from the start to the end of the route.</p> <p><u>Site Constraints</u></p> <p>The following are the constraints identified along Network 1:</p> <ul style="list-style-type: none"> Existing service cables and pipes: There are multiple existing telecommunication lines, stormwater, and water pipelines through which this pipeline route crosses. Heavily trafficked intersection and road: The Walton/Whisken/Neptune Avenue intersection is a heavily trafficked intersection during peak and off-peak times. The pipeline continues onto Neptune Avenue which is mildly trafficked during off-peak hours. Limited Access: The width of the sidewalk along Arthur Avenue is very limited. 		

		<ul style="list-style-type: none"> • Beaulieu Country Estate Guard House: The pipeline network continues through an existing guard house of the Beaulieu Country Estate. <p>Advantages and disadvantages for proposed Network 1 are shown in Table 5.</p> <p>Table 5: Advantages and disadvantages for Network 1</p> <table border="1"> <thead> <tr> <th data-bbox="528 562 954 607">Advantages</th> <th data-bbox="954 562 1394 607">Disadvantages</th> </tr> </thead> <tbody> <tr> <td data-bbox="528 607 954 775">Hydraulically sound – preferred route by JW</td> <td data-bbox="954 607 1394 775">There are many constraints including large trees, existing pipework, as well as telecom cables and poles that this route encounters.</td> </tr> <tr> <td data-bbox="528 775 954 869">Shortest overall pipeline length from the other alternative options.</td> <td data-bbox="954 775 1394 869">There is insufficient working space within the sidewalks of the road.</td> </tr> <tr> <td data-bbox="528 869 954 952"></td> <td data-bbox="954 869 1394 952">The pipeline runs through guard house of Beaulieu Country Estate.</td> </tr> <tr> <td data-bbox="528 952 954 1120"></td> <td data-bbox="954 952 1394 1120">The costs are high for construction – the pipeline would need to employ trenchless technologies along large sections of the pipeline route.</td> </tr> <tr> <td data-bbox="528 1120 954 1285"></td> <td data-bbox="954 1120 1394 1285">The route is highly trafficked and may cause major disturbances to commuters during implementation phase.</td> </tr> </tbody> </table>	Advantages	Disadvantages	Hydraulically sound – preferred route by JW	There are many constraints including large trees, existing pipework, as well as telecom cables and poles that this route encounters.	Shortest overall pipeline length from the other alternative options.	There is insufficient working space within the sidewalks of the road.		The pipeline runs through guard house of Beaulieu Country Estate.		The costs are high for construction – the pipeline would need to employ trenchless technologies along large sections of the pipeline route.		The route is highly trafficked and may cause major disturbances to commuters during implementation phase.
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	The route is highly trafficked and may cause major disturbances to commuters during implementation phase.													
3	Alternative 2 (Network 3)	<p>Site Access</p> <p>The pipeline starts at the proposed reservoir and will take along Whisken Avenue, through to Pluto Road, Winnie Avenue and along the R55 to Papenfus Drive in the Carlswald area.</p> <p>Site Constraints</p> <p>The following are the constraints identified along Network 3:</p> <ul style="list-style-type: none"> • Driveways: The pipeline continues through multiple driveways of both residential and commercial properties. • Existing service cables and pipes: The pipeline route continues through existing 												

		<p>electrical and telecommunication cables, as well as water pipelines servicing the area.</p> <ul style="list-style-type: none"> • Heavily trafficked intersection and road: The Walton/Whisken/Neptune Avenue intersection is a heavily trafficked intersection during peak and off-peak times. The pipeline continues onto Whisken Avenue (North) which is mildly trafficked during off-peak hours. <p>Advantages and disadvantages for proposed Network 3 are shown in Table 6 below.</p> <p>Table 6: Advantages and disadvantages for Network 3</p> <table border="1"> <thead> <tr> <th data-bbox="528 801 839 846">Advantages</th> <th data-bbox="839 801 1166 846">Disadvantages</th> </tr> </thead> <tbody> <tr> <td data-bbox="528 846 839 1055">80% of the pipeline runs along very low trafficked and gravelled roads.</td> <td data-bbox="839 846 1166 1055">There are constraints including large trees, existing pipework, as well as telecom cables and poles that this route encounters.</td> </tr> <tr> <td data-bbox="528 1055 839 1263">There is sufficient working space on both sides of the road to manoeuvre past some of the identified constraints.</td> <td data-bbox="839 1055 1166 1263">The pipeline continues past several driveways of residential (private and security estates) and commercial properties.</td> </tr> <tr> <td data-bbox="528 1263 839 1429">There are minimal road crossings of the pipeline – minimal disturbances to traffic.</td> <td data-bbox="839 1263 1166 1429">550m of the pipeline runs along the very busy R55 (Main Road).</td> </tr> <tr> <td data-bbox="528 1429 839 1594">The usage of trenchless technologies is limited to small sections along the pipeline.</td> <td data-bbox="839 1429 1166 1594">Hydraulically – this route is not feasible as a gravity pipeline network.</td> </tr> <tr> <td data-bbox="528 1594 839 1888">The pipeline enters Beaulieu Estate via a servitude located 25°58'26.38" S, 28° 4'44.20" E instead of going through the guard house as in Network 1.</td> <td data-bbox="839 1594 1166 1888"></td> </tr> </tbody> </table>	Advantages	Disadvantages	80% of the pipeline runs along very low trafficked and gravelled roads.	There are constraints including large trees, existing pipework, as well as telecom cables and poles that this route encounters.	There is sufficient working space on both sides of the road to manoeuvre past some of the identified constraints.	The pipeline continues past several driveways of residential (private and security estates) and commercial properties.	There are minimal road crossings of the pipeline – minimal disturbances to traffic.	550m of the pipeline runs along the very busy R55 (Main Road).	The usage of trenchless technologies is limited to small sections along the pipeline.	Hydraulically – this route is not feasible as a gravity pipeline network.	The pipeline enters Beaulieu Estate via a servitude located 25°58'26.38" S, 28° 4'44.20" E instead of going through the guard house as in Network 1.		
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	Etc.														

In the event that no alternative(s) has/have been provided, a motivation must be included in the table below.

No technology alternatives were assessed for the proposed project. The standard technology for water pipeline upgrades as per JW's requirements shall apply.

4. PHYSICAL SIZE OF THE ACTIVITY

Indicate the total physical size (footprint) of the proposal as well as alternatives. Footprints are to include all new infrastructure (roads, services etc), impermeable surfaces and landscaped areas:

Proposed activity (**Total environmental (landscaping, parking, etc.) and the building footprint**) i.e. Network 2

Size of the activity:

20 ha (5ha)

Alternatives:

Alternative 1 (if any)

Alternative 2 (if any)

Ha/ m²

or, for linear activities:

Proposed activity

Length of the activity:

4.11 km

Alternatives:

Alternative 1 (Network 1)

Alternative 2 (Network 3)

3.25 km

5.17 km

m/km

Indicate the size of the site(s) or servitudes (within which the above footprints will occur):

Proposed activity

Size of the site/servitude:

20m (width of servitude)

Alternatives:

Alternative 1 (if any)

Alternative 2 (if any)

Ha/m²

5. SITE ACCESS

Proposal

PLEASE NOTE THAT PROPOSAL HEREIN REFERS TO PIPELINE NETWORK 2. I.E. THE PREFERRED ROUTE ALIGNMENT

Does ready access to the site exist, or is access directly from an existing road?

YES

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

N/A – this is a pipeline network that is proposed.

Include the position of the access road on the site plan (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

Alternative 1 (Network 1)

Does ready access to the site exist, or is access directly from an existing road?

YES

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

N/A

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

Alternative 2 (Network 3)

Does ready access to the site exist, or is access directly from an existing road?

YES

If NO, what is the distance over which a new access road will be built

Describe the type of access road planned:

N/A

Include the position of the access road on the site plan. (if the access road is to traverse a sensitive feature the impact thereof must be included in the assessment).

PLEASE NOTE: Points 6 to 8 of Section A must be duplicated where relevant for alternatives

Section A 6-8 has been duplicated Number of times
(only complete when applicable)

6. LAYOUT OR ROUTE PLAN

A detailed site or route (for linear activities) plan(s) must be prepared for each alternative site or alternative activity. It must be attached to this document. The site or route plans must indicate the following:

- the layout plan is printed in colour and is overlaid with a sensitivity map (if applicable);
- layout plan is of acceptable paper size and scale, e.g.
 - A4 size for activities with development footprint of 10sqm to 5 hectares;
 - A3 size for activities with development footprint of > 5 hectares to 20 hectares;
 - A2 size for activities with development footprint of >20 hectares to 50 hectares);
 - A1 size for activities with development footprint of >50 hectares);
- The following should serve as a guide for scale issues on the layout plan:
 - A0 = 1: 500
 - A1 = 1: 1000
 - A2 = 1: 2000
 - A3 = 1: 4000
 - A4 = 1: 8000 (±10 000)
- shapefiles of the activity must be included in the electronic submission on the CD's;
- the property boundaries and Surveyor General numbers of all the properties within 50m of the site;
- the exact position of each element of the activity as well as any other structures on the site;
- the position of services, including electricity supply cables (indicate above or underground), water supply pipelines, boreholes, sewage pipelines, septic tanks, storm water infrastructure;
- servitudes indicating the purpose of the servitude;
- sensitive environmental elements on and within 100m of the site or sites (including the relevant buffers as prescribed by the competent authority) including (but not limited thereto):
 - Rivers and wetlands;
 - the 1:100 and 1:50 year flood line;
 - ridges;
 - cultural and historical features;
 - areas with indigenous vegetation (even if it is degraded or infested with alien species);
- Where a watercourse is located on the site at least one cross section of the water course must be included (to allow the position of the relevant buffer from the bank to be clearly indicated)

FOR LOCALITY MAP (NOTE THIS IS ALSO INCLUDED IN THE APPLICATION FORM REQUIREMENTS)

- the scale of locality map must be at least 1:50 000. For linear activities 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 locality map and all other maps must be in colour;
- locality map must show property boundaries and numbers within 100m of the site, and for poultry and/or piggery, locality map must show properties within 500m and prevailing or predominant wind direction;
- for gentle slopes the 1m contour intervals must be indicated on the map and whenever the slope of the site exceeds 1:10, the 500mm contours must be indicated on the map;
- areas with indigenous vegetation (even if it is degraded or infested with alien species);
- locality map must show exact position of development site or sites;
- locality map showing and identifying (if possible) public and access roads; and
- the current land use as well as the land use zoning of each of the properties adjoining the site or sites.

7. SITE PHOTOGRAPHS

Colour photographs from the center of the site must be taken in at least the eight major compass directions with a description of each photograph. Photographs must be attached under the appropriate Appendix. It should be supplemented with additional photographs of relevant features on the site, where applicable.

Refer to Site Photographs in Appendix B.

8. FACILITY ILLUSTRATION

A detailed illustration of the activity must be provided at a scale of 1:200 for activities that include structures. The illustrations must be to scale and must represent a realistic image of the planned activity. The illustration must give a representative view of the activity to be attached in the appropriate Appendix.

Refer to Site Layout Plans in Appendix C.

SECTION B: DESCRIPTION OF RECEIVING ENVIRONMENT

Note: Complete Section B for the proposal and alternative(s) (if necessary)

Instructions for completion of Section B for linear activities

- 1) For linear activities (pipelines etc) it may be necessary to complete Section B for each section of the site that has a significantly different environment.
- 2) Indicate on a plan(s) the different environments identified
- 3) Complete Section B for each of the above areas identified
- 4) Attach to this form in a chronological order
- 5) Each copy of Section B must clearly indicate the corresponding sections of the route at the top of the next page.

Section B has been duplicated for sections of the route N/A times

Instructions for completion of Section B for location/route alternatives

- 1) For each location/route alternative identified the entire Section B needs to be completed
- 2) Each alternative location/route needs to be clearly indicated at the top of the next page
- 3) Attach the above documents in a chronological order

Section B has been duplicated for location/route alternatives N/A times (complete only when appropriate)

Instructions for completion of Section B when both location/route alternatives and linear activities are applicable for the application

Section B is to be completed and attachments order in the following way

- All significantly different environments identified for Alternative 1 is to be completed and attached in a chronological order; then
- All significantly different environments identified for Alternative 2 is to be completed and attached chronological order, etc.

Section B - Section of Route N/A (complete only when appropriate for above)

Section B – Location/route Alternative No. N/A (complete only when appropriate for above)

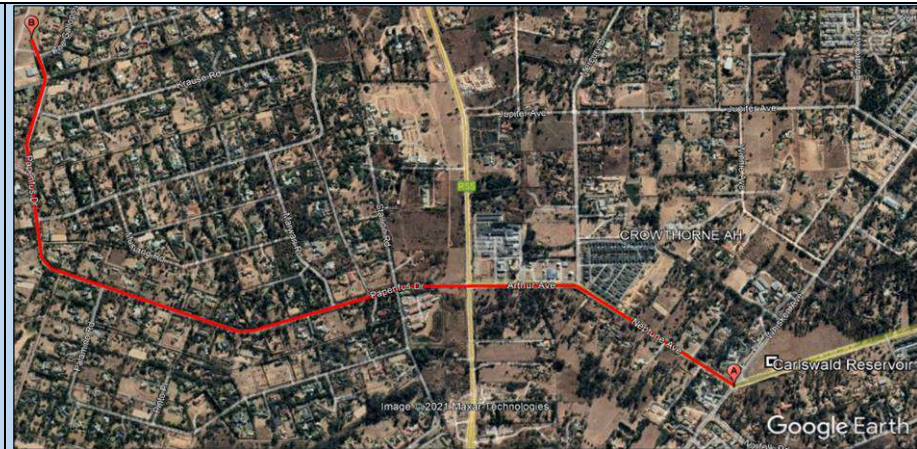
1. PROPERTY DESCRIPTION

PROPERTY DESCRIPTION: (INCLUDING PHYSICAL ADDRESS AND FARM NAME, PORTION ETC.)

The proposed water pipeline upgrade is located in Carlswald, Midrand which falls under the jurisdiction of the City of Johannesburg Municipality in the Gauteng Province. The three pipeline route alignments can be accessed from the following roads:

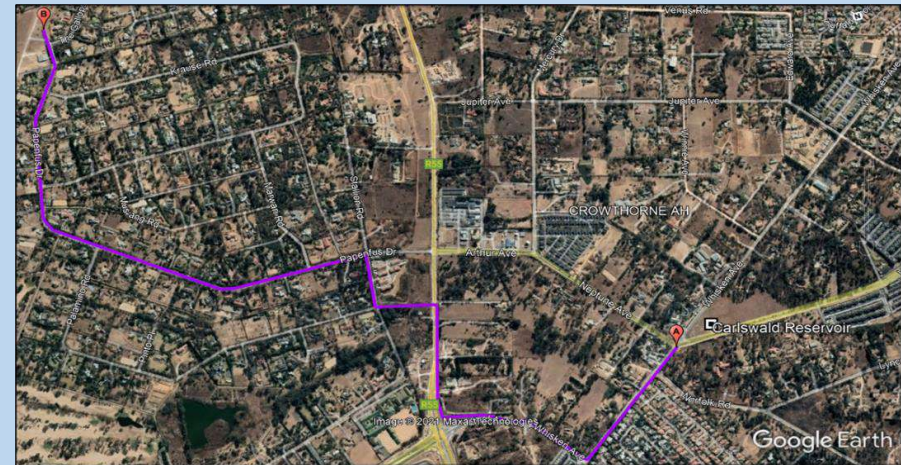
Alternative 1:

Network 1: The pipeline route starts at the proposed reservoir and will travel from the Whisken and Neptune Ave intersection (point A) in a north westerly direction where it encounters a 210° bend, before it proceeds into Arthur Avenue. It then continues in a westerly direction where it crosses the R55 (Main Road). The pipeline then continues onto Papenfus Drive alongside the road where it passes through the Beaulieu Country Estate Guard House, and then enters through into the Estate. The pipeline then crosses Stallion Road and proceeds alongside Papenfus Drive for 2.11km to where it terminates next to the Blue Hills Country Estate entrance (point B).



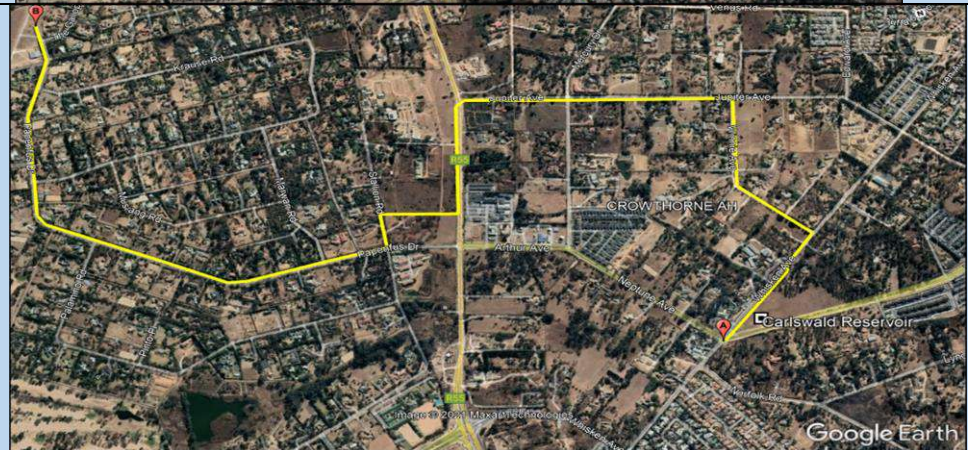
Proposal (preferred):

Network 2: The pipeline route starts at the proposed reservoir and will travel from the Whisken and Neptune Avenue intersection (Point A) in a south-westerly direction where it bends 90° and continues towards a north-west direction up until it crosses the R55 (Main Road). The pipeline then continues in a north direction along the R55 for 0.48km where it turns 90° into a servitude entering Beaulieu on Stallion Road. The pipeline crosses Stallion Road and bends by 90° where it continues in northerly direction towards Papenfus Drive. From the Stallion Road and Papenfus Dr intersection, the pipeline proceeds alongside Papenfus Drive for 2.11 km where it terminates next to the Blue Hills Country Estate entrance (Point B).



Alternative 2:

Network 3: The pipeline route starts at the proposed reservoir and will travel from the Whisken and Neptune Avenue intersection (Point A) in a north-easterly direction along Whisken Avenue. The pipeline route then crosses Whisken Avenue and will continue up until it reaches Pluto Rd where it turns 90° into Pluto Rd. From there the pipeline travels for 0.3 km where it makes a 126° bend and continues north into Winne Avenue until it reaches Jupiter Avenue. The pipeline turns in an easterly direction onto Jupiter Avenue where it travels for 1km to where it reaches the R55 (Main Road). From the R55, the pipeline travels south along the road for about 0.45km, where it turns 90° into a servitude entering Beaulieu Estate on Stallion Road. The pipeline crosses Stallion Road and bends by 90° where it continues in southerly direction towards Papenfus Drive. From the Stallion Road and Papenfus Drive intersection, the pipeline proceeds alongside Papenfus Drive for 2.11 km where it terminates next to the Blue Hills Country Estate entrance (Point B).



2. ACTIVITY POSITION

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 decimal degrees. The degrees should have at least six decimals to ensure adequate accuracy. The projection that must be used in all cases is the WGS84 spheroid in a national or local projection.

Alternative:	Latitude (S):	Longitude (E):
Proposed reservoir site	25°58'50.09"S	28°05'21.47"E

In the case of linear activities:

Alternative (PROPOSED NETWORK 2 – preferred route):	Latitude (S):	Longitude (E):
• Starting point of the activity	25°58'51.85"S	28°05'09.48"E
• Middle point of the activity	25°58'52.67"S	28° 4'35.96"E
• End point of the activity	25°58'52.67"S	28°04'02.12"E

In the case of linear activities:

Site Alternative Pipeline Route/Network 1:	Latitude (S):	Longitude (E):
<input type="checkbox"/> Starting point of the activity	25°58'51.85"S	28°05'09.48"E
<input type="checkbox"/> Middle point of the activity	25°58'28.55"S	28°04'33.85"E
<input type="checkbox"/> End point of the activity	25°57'49.15"S	28°04'02.12"E

Site Alternative Pipeline Route/Network 3:	Latitude (S):	Longitude (E):
<input type="checkbox"/> Starting point of the activity	25°58'51.85"S	28°05'09.48"E
<input type="checkbox"/> Middle point of the activity	25°58'12.27"S	28° 4'48.47"E
<input type="checkbox"/> End point of the activity	25°57'49.15"S	28°04'02.12"E

For route alternatives that are longer than 500m, please provide co-ordinates taken every 250 meters along the route and attached in the appropriate Appendix.

Addendum of route alternatives attached

YES

Refer to the co-ordinates along the preferred route, Network 2 in Appendix D.

The 21-digit Surveyor General code of each cadastral land parcel

PROPOSAL																				
ALT. 1																				
ALT. 2																				
etc.																				

Table 7: Property Descriptions and 21-digit SG codes for each cadastral land parcel along the preferred pipeline route alignment i.e. Network 2

Property Description	SG Code
Portion 360 of Farm Witpoort No. 406 JR	T0JR00000000040600360
Remainder of Farm Witpoort No. 406 JR	T0JR00000000040600000
Portion 492 of Farm Witpoort No. 406 JR	T0JR00000000040600492
Portion 568 of Farm Witpoort No. 406 JR	T0JR00000000040600568

Property Description	SG Code
Portion 357 of Farm Witpoort No. 406 JR	T0JR00000000040600357

3. GRADIENT OF THE SITE

Indicate the general gradient of the site.

Flat	1:50 – 1:20	
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4. LOCATION IN LANDSCAPE

Indicate the landform(s) that best describes the site.

	Plain	
--	-------	--

5. GROUNDWATER, SOIL AND GEOLOGICAL STABILITY OF THE SITE

a) Is the site located on any of the following?

Shallow water table (less than 1.5m deep)	NO
Dolomite, sinkhole or doline areas	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 (clay fraction more than 40%)	NO
Any other unstable soil or geological feature	NO
An area sensitive to erosion	NO

(Information in respect of the above will often be available at the planning sections of local authorities. Where it exists, the 1:50 000 scale Regional Geotechnical Maps prepared by Geological Survey may also be used).

b) are any caves located on the site(s) NO

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):	Longitude (E):
°	°

c) are any caves located within a 300m radius of the site(s) NO

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):	Longitude (E):
°	°

d) are any sinkholes located within a 300m radius of the site(s) NO

If yes to above provide location details in terms of latitude and longitude and indicate location on site or route map(s)

Latitude (S):	Longitude (E):
°	°

If any of the answers to the above are "YES" or "unsure", specialist input may be requested by the Department

A geotechnical assessment was undertaken and can be noted as Appendix G1. Available geological maps indicate that the pipeline route is underlain by granite of the Johannesburg granite dome. This was confirmed during the present investigation. Residual soils have developed from the weathering of the granite bedrock. The general soil profile is described below.

The upper soil layer along the route generally comprises medium dense / medium dense to dense layered gravely silty sand of fill origin. the fill is of the order of 0,2m to 0,6m thick. test pit TP3 was

terminated at 1,2m depth within fill material as concrete pipes were encountered at this depth in the above test pit. no fill was noted in test pits TP 2, TP7, TP 4, TP 21 or TP22.

The fill is underlain by loose ranging to medium dense to dense in places intact and pin holed silty sand of transported hill wash origin. the hill wash extends to depths varying between 0,2m and 1,1m (average depth 0,65m). no hill wash was noted in test pits TP 3, TP4, TP 7, TP 8 and TP 14. The hill wash occurs as the upper soil layer in test pits TP 2, TP 21 and TP 22. The hill wash is underlain by loose to medium dense varying to medium dense to dense intact silty sandy gravel. this gravel layer represents the transported pebble marker. the pebble marker extends to depths varying between 0,7m and 1,0m. No pebble marker was noted in test pits TP 1, TP 3 to TP 6, TP 13, TP 14 and TP 22.

The pebble marker is locally underlain by medium dense / medium dense to dense ferruginous nodular ferric rete in the vicinity of test pits TP 2 and TP 12. These test pits were terminated within the nodular ferricrete at 1,5m depth. the fill, hill wash and pebble marker soils are generally underlain by medium dense to dense cemented and ferruginous silty sand reworked residual granite.

Test pits TP 1, TP 9, TP 11, TP 13 and TP 22 were terminated upon very dense reworked residual granite at depths varying between 1,2m and 1,4m. Test pits TP 5, TP6, TP 10 and TP 14 were terminated at 1,5m depth without refusal being obtained within the reworked residual granite. the reworked residual granite is locally underlain by medium dense to dense jointed silty gravelly sand of residual granite origin. test pits TP 4, TP 7 and TP 8 were terminated within the residual granite at 1,5m depth while the residual granite extends to depths more than 3,0m in the vicinity of test pit TP 21.

No perched water table or zones of seepage were noted in any of the test pits excavated along the proposed pipeline route.

A geotechnical assessment was undertaken and can be noted as Appendix G1. Available geological maps indicate that the pipeline route is underlain by granite of the Johannesburg granite dome. This was confirmed during the present investigation. Residual soils have developed from the weathering of the granite bedrock. The general soil profile is described below.

The upper soil layer along the route generally comprises medium dense / medium dense to dense layered gravelly silty sand of fill origin. the fill is of the order of 0,2m to 0,6m thick. test pit TP3 was terminated at 1,2m depth within fill material as concrete pipes were encountered at this depth in the above test pit. no fill was noted in test pits TP 2, TP7, TP 4, TP 21 or TP22.

The fill is underlain by loose ranging to medium dense to dense in places intact and pin holed silty sand of transported hill wash origin. the hill wash extends to depths varying between 0,2m and 1,1m (average depth 0,65m). no hill wash was noted in test pits TP 3, TP4, TP 7, TP 8 and TP 14. The hill wash occurs as the upper soil layer in test pits TP 2, TP 21 and TP 22. The hill wash is underlain by loose to medium dense varying to medium dense to dense intact silty sandy gravel. this gravel layer represents the transported pebble marker. the pebble marker extends to depths varying between 0,7m and 1,0m. No pebble marker was noted in test pits TP 1, TP 3 to TP 6, TP 13, TP 14 and TP 22.

The pebble marker is locally underlain by medium dense / medium dense to dense ferruginous nodular ferric rete in the vicinity of test pits TP 2 and TP 12. These test pits were terminated within the nodular ferricrete at 1,5m depth. the fill, hill wash and pebble marker soils are generally

underlain by medium dense to dense cemented and ferruginous silty sand reworked residual granite.

Test pits (TP) 1, TP 9, TP 11, TP 13 and TP 22 were terminated upon very dense reworked residual granite at depths varying between 1,2m and 1,4m. Test pits TP 5, TP6, TP 10 and TP 14 were terminated at 1,5m depth without refusal being obtained within the reworked residual granite. the reworked residual granite is locally underlain by medium dense to dense jointed silty gravelly sand of residual granite origin. test pits TP 4, TP 7 and TP 8 were terminated within the residual granite at 1,5m depth while the residual granite extends to depths more than 3,0m in the vicinity of test pit TP 21.

No perched water table or zones of seepage were noted in any of the test pits excavated along the proposed pipeline route.

6. AGRICULTURE

Does the site have high potential agriculture as contemplated in the Gauteng Agricultural Potential Atlas (GAPA 4)? YES NO

Please note: The Department may request specialist input/studies in respect of the above.

7. GROUNDCOVER

To be noted that the location of all identified rare or endangered species or other elements should be accurately indicated on the site plan(s).

Indicate the types of groundcover present on the site and include the estimated percentage found on site

Natural veld - good condition % =	Natural veld with scattered aliens % =	Natural veld with heavy alien infestation % =	Veld dominated by alien species % = 20%	Landscaped (vegetation) % = 5%
Sport field % =	Cultivated land % =	Paved surface (hard landscaping) % = 20%	Building or other structure % = 50%	Bare soil % = 5%

Please note: The Department may request specialist input/studies depending on the nature of the groundcover and potential impact(s) of the proposed activity/ies.

Are there any rare or endangered flora or fauna species (including red list species) present on the site YES NO

If YES, specify and explain:

N/A

Are there any rare or endangered flora or fauna species (including red list species) present within a 200m (if within urban area as defined in the Regulations) or within 600m (if outside the urban area as defined in the Regulations) radius of the site. YES NO

If YES, specify and explain:

N/A

Are there any special or sensitive habitats or other natural features present on the site? YES NO

If YES, specify and explain:

According to the Ecological Survey conducted by EnviRoss, there were three wetland crossing points identified that associated with the various pipeline alternatives. These units have been delineated with the mandatory 30m conservation buffer zones. These wetland units were shown to be poorly developed and have suffered considerable transformation through pressures and drivers of ecological change at both the local and catchment scales. The overall significance of the ecological impacts to these units is low. The Risk Assessment Matrix (RAM) showed a moderate to low risk to surface water ecosystem habitat units. Moderate risk ratings occur where construction activities fall within wetland zones. Risk ratings reduce with distance from these surface water habitat units. All risk ratings can be reduced to low with the implementation of suitable mitigation measures that have been presented.

The proposed reservoir site includes an area of grassland that still includes some natural features, albeit largely transformed. Site disturbances through management and maintenance of the grassland, ecological isolation and transformations suffered through the fringing effects of surrounding infrastructure development, are all factors that have led to the loss of structure of the vegetation unit. Representation of primary vegetation features no longer exist within the confines of the site.

The nature of the project area is such that exotic vegetation is a dominant feature within the maintained pavements, gardens, and road reserve areas. Exotic floral species have been specifically cultivated for aesthetic value along maintained pavements associated with residential areas. Recruitment of exotic vegetation was only noteworthy within wetland areas, where the availability of resources promoted the recruitment and spread of opportunistic and invasive flora. The project development area tends to be routinely maintained and therefore opportunism for exotic vegetation invasion is limited. Stands of Eucalyptus and wattles (*Acacia mearnsii*) were noted, which are presumably reminiscent of historical land use practices within the area. Annual weeds such as *Conyza* spp, *Tagetes minuta*, *Bidens bipinnata*, *Schkuhria bipinnata*, *Jalapa mirabilis*, *Verbena* spp, and various other weeds were commonplace.

Hypoxis hemerocallidea (Hypoxidaceae), which is classified as nationally declining (an Orange listed species) is a Provincially Protected plant species, due to collection pressure for the traditional medicine trade, was noted along a small section of Network 2 alignment. This species is bulbous and takes readily to removal and relocation or removal, temporary cultivation and then returning to the site during the post construction phase.


The general impact significance of the potential impacting features to both surface water and terrestrial ecosystems showed low overall significance, with all impacts rendered insignificant with the application of the proposed mitigation measures.

The Ecological Survey report is attached on Appendix G2.

Was a specialist consulted to assist with completing this section YES

If yes complete specialist details

Name of the specialist:	EnviRoss CC		
Qualification(s) of the specialist:	PhD, Pr Sci Nat (Ecological & Aquatic sciences)		
Postal address:	34 Farm Street, Bryanston		
Postal code:	2191		
Telephone:	082 293 5752	Cell:	082 293 5752
E-mail:	mathew@enviross.co.za	Fax:	n/a
Are any further specialist studies recommended by the specialist?			NO
If YES, specify:	N/A		
If YES, is such a report(s) attached?			YES <input type="checkbox"/> NO <input type="checkbox"/>
If YES list the specialist reports attached below	N/A		

Signature of specialist:  Date: 6 August 2023

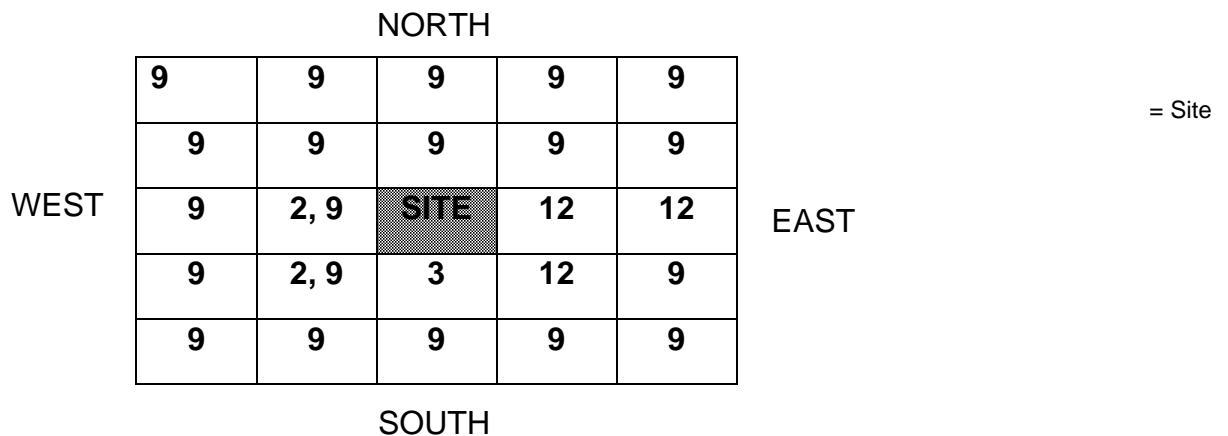
Please note; If more than one specialist was consulted to assist with the filling in of this section then this table must be appropriately duplicated

8. LAND USE CHARACTER OF SURROUNDING AREA

Using the associated number of the relevant current land use or prominent feature from the table below, fill in the position of these land-uses in the vacant blocks below which represent a 500m radius around the site

1. Vacant land	2. River, stream, wetland	3. Nature conservation area	4. Public open space	5. Koppie or ridge
6. Dam or reservoir	7. Agriculture	8. Low density residential	9. Medium to high density residential	10. Informal residential
11. Old age home	12. Retail	13. Offices	14. Commercial & warehousing	15. Light industrial
16. Heavy industrial ^{AN}	17. Hospitality facility	18. Church	19. Education facilities	20. Sport facilities
21. Golf course/polo fields	22. Airport ^N	23. Train station or shunting yard ^N	24. Railway line ^N	25. Major road (4 lanes or more) ^N
26. Sewage treatment plant ^A	27. Landfill or waste treatment site ^A	28. Historical building	29. Graveyard	30. Archeological site
31. Open cast mine	32. Underground mine	33. Spoil heap or slimes dam ^A	34. Small Holdings	
Other land uses (describe):				

NOTE: Each block represents an area of 250m X 250m, if your proposed development is larger than this please use the appropriate number and orientation of hashed blocks



Note: More than one (1) Land-use may be indicated in a block

Please 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 activity/ies. Specialist reports that look at health & air quality and noise impacts may be required for any feature above and in particular those features marked with an “^A” and with an “^N” respectively.

Have specialist reports been attached
If yes indicate the type of reports below

YES

Terrestrial Biodiversity Impact Assessment
 Aquatic Biodiversity Impact Assessment
 Please note the above two Specialist Studies are incorporated into one report entitled “Terrestrial Biodiversity & Surface Water Ecosystems Ecological and Impact Surveys” (refer to Appendix G2).

 Exemption Letter for a Heritage Impact Assessment (refer to Appendix G3).
 Geotechnical Assessment (refer to Appendix G1).

9. SOCIO-ECONOMIC CONTEXT

Describe the existing social and economic characteristics of the area and the community condition as baseline information to assess the potential social, economic and community impacts.

The City of Johannesburg is a Category A Metropolitan Municipality which is one of the three Metros of the Gauteng Province and the 8 in South Africa. Johannesburg is the most advanced commercial city in Africa and the engine room of the South African and regional economy. It is a city with a unique, African character, world-class infrastructure in the fields of telecommunications, transportation, water and power, and with globally competitive health care and educational facilities. However, the city is also one of contrasts – home to both wealthy and poor, residents and refugees, global corporations, and emerging enterprises.

The area is characterised by a predominantly semi-rural environment in the west and dense urban townships in the east. The sub area forms the western boundary of the Midrand metropolitan node. Two potential neighbourhood nodes in Noordwyk Ext 23 and Blue Hills serve the entire sub area. Three north-south mobility routes and one east-west mobility spine connect the sub area to the rest of the region and the City of Tshwane. While most of Sub Area 5 falls within the Urban Development Boundary, the extreme western sections of Blue Hills A.H fall outside the UDB. The site itself is enclosed within Summerset Extension 23 township.

10. CULTURAL/HISTORICAL FEATURES

Please be advised that if section 38 of the National Heritage Resources Act 25 of 1999 is applicable to your proposal or alternatives, then you are requested to furnish this Department with written comment from the South African Heritage Resource Agency (SAHRA) – Attach comment in appropriate annexure

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, powerline, 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 5 000 m2 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 10 000 m2 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.

Are there any signs of culturally (aesthetic, social, spiritual, environmental) or historically significant elements, as defined in section 2 of the National Heritage Resources Act, 1999, (Act No. 25 of 1999), including archaeological or palaeontological sites, on or close (within 20m) to the site?
If YES, explain:

	NO
--	----

N/A

If uncertain, the Department may request that specialist input be provided to establish whether there is such a feature(s) present on or close to the site.

Briefly explain the findings of the specialist if one was already appointed:

An exemption letter for a Heritage Impact Assessment (HIA) was undertaken by a registered Archaeologist from Beyond Heritage and is included in Appendix G3. The findings of the desktop studies and site visit by the archaeologist is provided below. The project area is completely transformed through the establishment of existing water pipelines as well as residential suburbs. Based on Topographic maps, the area was undeveloped and used for agricultural activities until 1957 with the establishment of roads, and then the subsequent establishment of structures from 1964. The study area was completely transformed into various residential suburbs around the project area throughout the years. No heritage indicators appear on historical maps prior to the establishment of the residential suburbs, and previous agricultural activities are visible, indicating that the study area is of low heritage potential. This was confirmed during the site visit, and no evidence of heritage resources was noted.

According to the South African Heritage Resources Agency (SAHRA) paleontological map, the palaeontological sensitivity is determined as zero/ insignificant, and no further studies are required for this aspect.

The Heritage and Palaeontology exemption letter is attached in **Appendix G3**.

A heritage case will be uploaded on the South African Heritage Resources Information System (SAHRIS) that will include the Basic Assessment Report and Appendices and the Exemption from undertaking an HIA. The comments received from SAHRA will be provided to GDARD in the Final BAR.

Will any building or structure older than 60 years be affected in any way?
 Is it necessary to apply for a permit in terms of the National Heritage Resources Act, 1999 (Act 25 of 1999)?
 If yes, please attached the comments from SAHRA in the appropriate Appendix

	NO
	NO

Comments from SAHRA will be included in the forthcoming Final BAR.

SECTION C: PUBLIC PARTICIPATION (SECTION 41)

The Environmental Assessment Practitioner must conduct public participation process in accordance with the requirement of the EIA Regulations, 2014.

1. LOCAL AUTHORITY PARTICIPATION

Local authorities are key interested and affected parties in each application and no decision on any application will be made before the relevant local authority is provided with the opportunity to give input. The planning and the environmental sections of the local authority must be informed of the application at least thirty (30) calendar days before the submission of the application to the competent authority.

Was the draft report submitted to the local authority for comment? YES

If yes, has any comments been received from the local authority? YES NO

If "YES", briefly describe the comment below (also attach any correspondence to and from the local authority to this application):

The Basic Assessment Report is currently under a 30-day public review period. No comments received to date; however, this section and comments and response report will be updated after the public review period.

If "NO" briefly explain why no comments have been received or why the report was not submitted if that is the case.

N/A - The Basic Assessment Report is currently under a 30-day public review period. No comments received to date; however, this section and comments and response report will be updated after the public review period.

2. CONSULTATION WITH OTHER STAKEHOLDERS

Any stakeholder that has a direct interest in the activity, site or property, such as servitude holders and service providers, should be informed of the application at least **thirty (30) calendar days** before the submission of the application and be provided with the opportunity to comment.

Has any comment been received from stakeholders? YES NO

If "YES", briefly describe the feedback below (also attach copies of any correspondence to and from the stakeholders to this application):

The comments and response report will be attached with the Final Basic Assessment Report

If "NO" briefly explain why no comments have been received

N/A

3. GENERAL PUBLIC PARTICIPATION REQUIREMENTS

The Environmental Assessment Practitioner must ensure that the public participation process is adequate and must determine whether a public meeting or any other additional measure is appropriate or not based on the particular nature of each case. Special attention should be given to the involvement of local community structures such as Ward Committees and ratepayers associations. Please note that public concerns that emerge at a later stage that should have been addressed may cause the competent authority to withdraw any authorisation it may have issued if it becomes apparent that the public participation process was flawed.

The EAP must record all comments and respond to each comment of the public / interested and affected party before the application report is submitted. The comments and responses must be captured in a Comments and Responses Report as prescribed in the regulations and be attached to this application.

On 26 August 2022, site notices were placed at strategic locations along the pipeline route to announce the Basic Assessment Process (refer to site notice text and site notice placement in Appendix E1). A Background Information Document (BID) was available on the Zitholele website, on 26 August 2022 (refer to the BID in Appendix E2).

No comments were received during the announcement of the project.

A notification of the availability of the Draft BAR was made to potential I&APs on 9 March 2023. However, this Draft BAR was withdrawn, due to technical glitches experienced.

However, I&APs responded with comments during this period. Refer to the Comments and Responses Report in Appendix E4.

The Ward Councilor, Ms. Annette Deppe (Ward 132) requested a Public Meeting. On 21 June 2023, a Public Meeting was held via MS Teams at 17h30. Refer to the minutes of the Public Meeting in Appendix E5.

Please note that the Draft Basic Assessment Report has been made available for public review and comment for a period of 30 days from 5 October 2023 to 6 November 2023 on the Zitholele website at <https://zitholele.co.za/environmental/> under the heading Carlswald Pipeline BAR and a hard copy of the report will be available at the Halfway House Library. A virtual Public Meeting will be held via MS Teams on 21 October 2023. The minutes of the meeting will be distributed to the attendees of the meeting. The comments that will be received during the public review of the Draft BAR and the EAP's responses thereto, will be included in a Comments and Responses that will be submitted to GDARD with the Final BAR for review towards decision-making.

Notification of the availability of the Draft BAR for public review and comment, will be undertaken as follows:

- Publication of an advertisement in the Midrand Reporter;
- Placement of site notices at strategic places along the pipeline route alignment; and
- Notification letters will be distributed to I&APs on the preliminary I&AP database.

Proof of notification will be provided in the forthcoming Final BAR that will be submitted to GDARD.

4. APPENDICES FOR PUBLIC PARTICIPATION

All public participation information is to be attached in the appropriate Appendix. The information in this Appendix is to be ordered as detailed below.

Appendix 1 – Proof of site notice

Refer to the site notice text and proof of placement on 26 August 2022 in Appendix E1. Refer to the Site Notice Text with regards to the availability of the Draft BAR for public review and comment from 5 October 2023 to 6 November 2023 in Appendix E1. Proof of placement will be provided with the Final BAR to GDARD.

Appendix 2 – Written notices issued as required in terms of the regulations.

Refer to the notification letter informing the public of the availability of the Draft BAR for public review and comment from 5 October 2023 to 6 November 2023 in Appendix E2. Proof of distribution will be provided with the Final BAR to GDARD.

Appendix 3 – Proof of newspaper advertisements

Refer to the newspaper advert informing the public of the availability of the Draft BAR for public review and comment from 5 October 2023 to 6 November 2023 in Appendix E3. Proof of publication will be provided with the Final BAR to GDARD.

Appendix 4 – Communications to and from interested and affected parties

A notification of the availability of the Draft BAR was made to potential I&APs on 9 March 2023. However, this Draft BAR was withdrawn due to technical glitches experienced.

However, I&APs responded with comments during this period. Refer to the Comments and Responses Report in Appendix E4.

Comments and responses on the Draft BAR that is available for public review and comment from 5 October 2023 to 6 November 2023 will be provided to the GDARD with the submission of the Final BAR.

Appendix 5 – Minutes of any public and/or stakeholder meetings

The Ward Councillor, Ms. Annette Deppe (Ward 132) requested a Public Meeting. On 21 June 2023, a Public Meeting was held via MS Teams at 17h30. Refer to the minutes of the Public Meeting in Appendix E5.

Appendix 6 - Comments and Responses Report

A notification of the availability of the Draft BAR was made to potential I&APs on 9 March 2023. However, this Draft BAR was withdrawn due to technical glitches experienced.

However, I&APs responded with comments during this period. Refer to the Comments and Responses Report in Appendix E4.

Comments and responses on the Draft BAR that is available for public review and comment from 5 October 2023 to 6 November 2023 will be provided to the GDARD with the submission of the Final BAR.

Appendix 7 –Comments from I&APs on Basic Assessment (BA) Report

A notification of the availability of the Draft BAR was made to potential I&APs on 9 March 2023. However, this Draft BAR was withdrawn due to technical glitches experienced.

However, I&APs responded with comments during this period. Refer to the Comments and Responses Report in Appendix E4.

Comments and responses on the Draft BAR that is available for public review and comment from 5 October 2023 to 6 November 2023 will be provided to the GDARD with the submission of the Final BAR.

Appendix 8 –Comments from I&APs on amendments to the BA Report

A notification of the availability of the Draft BAR was made to potential I&APs on 9 March 2023. However, this Draft BAR was withdrawn due to technical glitches experienced.

However, I&APs responded with comments during this period. Refer to the Comments and Responses Report in Appendix E4.

Comments and responses on the Draft BAR that is available for public review and comment from 5 October 2023 to 6 November 2023 will be provided to the GDARD with the submission of the Final BAR.

Appendix 9 – Copy of the register of I&APs

Refer to the Preliminary I&APs database in Appendix E9.

SECTION D: RESOURCE USE AND PROCESS DETAILS

Note: Section D is to be completed for the proposal and alternative(s) (if necessary)

Instructions for completion of Section D for alternatives

- 1) For each alternative under investigation, where such alternatives will have different resource and process details (e.g. technology alternative), the entire Section D needs to be completed
- 4) Each alternative needs to be clearly indicated in the box below
- 5) Attach the above documents in a chronological order

Section D has been duplicated for alternatives times
(complete only when appropriate)

Section D Alternative No. (complete only when appropriate for above)

1. WASTE, EFFLUENT, AND EMISSION MANAGEMENT

Solid waste management

Will the activity produce solid construction waste during the construction/initiation phase?

If yes, what estimated quantity will be produced per month?

How will the construction solid waste be disposed of (describe)?

Where will the construction solid waste be disposed of (describe)?

Will the activity produce solid waste during its operational phase?

If yes, what estimated quantity will be produced per month?

How will the solid waste be disposed of (describe)?

Has the municipality or relevant service provider confirmed that sufficient air space exists for treating/disposing of the solid waste to be generated by this activity?

Where will the solid waste be disposed if it does not feed into a municipal waste stream (describe)?

Note: If the solid waste (construction or operational phases) will not be disposed of in a registered landfill site or be taken up in a municipal waste stream, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Can any part of the solid waste be classified as hazardous in terms of the relevant legislation?

If yes, inform the competent authority and request a change to an application for scoping and EIA.

Is the activity that is being applied for a solid waste handling or treatment facility?

If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.

Describe the measures, if any, that will be taken to ensure the optimal reuse or recycling of materials:

Liquid effluent (other than domestic sewage)

Will the activity produce effluent, other than normal sewage, that will be disposed of in a municipal sewage system?

If yes, what estimated quantity will be produced per month?

If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the liquid effluent to be generated by this activity(ies)?

Will the activity produce any effluent that will be treated and/or disposed of on site? NO
 If yes, what estimated quantity will be produced per month?

If yes describe the nature of the effluent and how it will be disposed.
 N/A

Note that if effluent is to be treated or disposed on site the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA

Will the activity produce effluent that will be treated and/or disposed of at another facility? NO

If yes, provide the particulars of the facility:

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

Describe the measures that will be taken to ensure the optimal reuse or recycling of waste water, if any:
 N/A

Liquid effluent (domestic sewage)

Will the activity produce domestic effluent that will be disposed of in a municipal sewage system? NO
 If yes, what estimated quantity will be produced per month?
 If yes, has the municipality confirmed that sufficient capacity exist for treating / disposing of the domestic effluent to be generated by this activity(ies)?

Will the activity produce any effluent that will be treated and/or disposed of on site? NO
 If yes describe how it will be treated and disposed off.

N/A

Emissions into the atmosphere

Will the activity release emissions into the atmosphere? NO
 If yes, is it controlled by any legislation of any sphere of government? NO
 If yes, the applicant should consult with the competent authority to determine whether it is necessary to change to an application for scoping and EIA.
 If no, describe the emissions in terms of type and concentration:

No emissions will emanate from the proposed activity, the only emissions will be from the plant onsite which does not require an emission's license

2. WATER USE

Indicate the source(s) of water that will be used for the activity
 municipal

If water is to be extracted from groundwater, river, stream, dam, lake or any other natural feature, please indicate the volume that will be extracted per month: N/A

If Yes, please attach proof of assurance of water supply, e.g. yield of borehole, in the appropriate Appendix
 Does the activity require a water use permit from the Department of Water Affairs? YES NO

If yes, list the permits required
 There will be no abstraction from groundwater and surface water for the proposed development.

A General Authorization (GA) has been issued by the DWS on 23 August 2023, in terms of Section 21 (c) and (i) water use activities as stipulated in the National Water Act, 1998 (Act No. 36 of 1998). Refer to the GA in Appendix F.

If yes, have you applied for the water use permit(s)? YES
 If yes, have you received approval(s)? (attached in appropriate appendix) YES

3. POWER SUPPLY

Please indicate the source of power supply e.g. Municipality / Eskom / Renewable energy source

N/A. The proposed activity will not require a power supply.

If power supply is not available, where will power be sourced from?

N/A. The proposed activity will not require a power supply.

4. ENERGY EFFICIENCY

Describe the design measures, if any, that have been taken to ensure that the activity is energy efficient:

N/A. The proposed activity will not require any energy source.

Describe how alternative energy sources have been taken into account or been built into the design of the activity, if any:

N/A. The proposed activity will not require any energy source.

SECTION E: IMPACT ASSESSMENT

The assessment of impacts must adhere to the minimum requirements in the EIA Regulations, 2014, and should take applicable official guidelines into account. The issues raised by interested and affected parties should also be addressed in the assessment of impacts as well as the impacts of not implementing the activity (Section 24(4)(b)(i)).

1. ISSUES RAISED BY INTERESTED AND AFFECTED PARTIES

Summarise the issues raised by interested and affected parties.

To date, the following issues were raised by the I&APs:

- Motivation for the proximity of the proposed pipeline route near the Beaulieu Estate and Blue Hills Country Estate;
- Timeframes for construction;
- Request for Site Layout Plan; and
- Impact on wetlands.

Additional issues that arise during public review of the Draft BAR will be provided in the forthcoming Final BAR that will be submitted to GDARD.

Summary of response from the practitioner to the issues raised by the interested and affected parties (including the manner in which the public comments are incorporated or why they were not included)

(A full response must be provided in the Comments and Response Report that must be attached to this report):

Comments	Responses
Motivation for the proximity of the proposed pipeline route near the Beaulieu Estate and Blue Hills Country Estate	<p>Many developments have been halted in the Carlswald area, due to the current infrastructure not being able to support any further developments. The rationale behind constructing the proposed reservoir is to open enough infrastructure for new developments to take place.</p> <p>The proposed pipeline will need to connect onto the existing pipeline / tie-in which occurs just outside the entrance to the Blue Hills Country Estate, which will also benefit Beaulieu Estate. Capacity in the Beaulieu area will be improved in terms of pressure requirements.</p>
Timeframes for construction	<p>Once the necessary authorizations have been obtained, the detailed design will commence, which takes approximately two (2) months. Thereafter documents will be sent to JW to initiate the tender process.</p> <p>Construction could take roughly 6 to 8 months.</p>
Request for Site Layout Plan	The Site Layout Plan is included in the Draft BAR that has been made available for public review and comment.
Impact on wetlands	<p>Network 2 would impact on a relatively small and poorly developed wetland unit, and it would not be regarded as problematic as the impact is temporary and the wetland should be able to regenerate.</p> <p>With the implementation of mitigation measures, the significance of the impact on</p>

	wetlands will be low. This route alignment is not fatally flawed and can be developed.
--	--

To be updated after the public review period of the Draft BAR.

2. IMPACTS THAT MAY RESULT FROM THE CONSTRUCTION AND OPERATIONAL PHASE

AS MENTIONED EARLIER, NETWORK 1 AND 3 ARE NOT FEASIBLE FOR CONSTRUCTION DUE TO THE FOLLOWING REASONS:

- **NETWORK 1:** This route is not feasible for construction, due to the various challenges in construction. There are many sections along the route that has several existing services and constraints, which would render the installation of the pipeline very challenging. Also, a large section of this pipeline route alignment is highly trafficked throughout the day, which would make the accommodation of traffic very challenging.
- **NETWORK 3:** This route is fatally flawed as the proposed pipeline alignment does not enable flow to gravitate to the required standpoints. This makes the achievement of the required pressures (2 bar) difficult to achieve and it is therefore not in accordance with Johannesburg Water (JW's) design guidelines.

ALTERNATIVE PIPELINE ROUTE WAS THEREFORE TAKEN FORWARD FOR THE IMPACT ASSESSMENT. REFER TO THE SECTION BELOW FOR AN ASSESSMENT OF THE PREFERRED ROUTE ALTERNATIVE I.E. NETWORK 2.

CONSTRUCTION PHASE IMPACTS

- Destruction of sensitive habitat within areas designated as high ecological sensitivity;
- Loss of topsoil due to poor topsoil management and site management;
- Spillage of hydrocarbons or oils within the development footprint result in the indirect contamination of surrounding terrestrial and/or aquatic environment via existing stormwater infrastructure;
- Soil erosion as a result of unprotected stockpiles of stored topsoil and vegetation removal, which will cause sedimentation of watercourses.
- Spillage of hydrocarbons may result in the indirect contamination of groundwater resources through infiltration into underlying soils.
- Impact on existing traffic patterns and infrastructure on local roads.
- Open trenches may pose a health hazard to residents and vehicles.
- Increased employment opportunities and economic growth.
- Creation of temporary skilled and unskilled job opportunities directly on the project.

OPERATIONAL PHASE IMPACTS

- Distribution of water to residents and for future development and contributing to water provision goals.
- Impacts on water quality within wetland.

Briefly describe the methodology utilised in the rating of significance of impacts

Impact Assessment Methodology

The impacts will be ranked according to the methodology described below. Where possible, mitigation measures will be provided to manage impacts. To ensure uniformity, a standard impact assessment methodology will be utilised so that a wide range of impacts can be compared with each other. The impact assessment methodology makes provision for the assessment of impacts against the following criteria, as discussed below.

DIRECT, INDIRECT & CUMULATIVE

Descriptor	Definition
Direct Impact	Direct impacts are impacts that are caused directly by the activity and generally occur at the same time and the place of the activity. These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.
Indirect Impact	Indirect impacts of an activity are indirect or induced changes that may occur because of the activity. These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken, or which occur at a different place because of the activity.
Cumulative Impact	Cumulative impacts are impacting that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities. Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

IMPACT DIRECTION

Descriptor	Definition
Positive	Environment overall will benefit from the impact/risk
Negative	Environment overall will be adversely affected by the impact/risk
Neutral	Environment overall will not be affected

SPATIAL EXTENT OF IMPACT

Extent Descriptor	Definition	Rating
Site	Impact footprint remains within the boundary of the site.	1
Local	Impact footprint extends beyond the boundary of the site to the adjacent surrounding areas.	2
Regional	Impact footprint includes the greater surrounds and may include an entire municipal or provincial jurisdiction.	3
National	The scale of the impact is applicable to the Republic of South Africa.	4
Global	The impact has global implications	5

DURATION OF IMPACT

Duration descriptor	Definition	Rating
Construction / Decommissioning phase only	The impact endures for only as long as the construction or the decommissioning period of the project activity. This implies that the impact is fully reversible.	1

Short term	The impact continues to manifest for a period of between 3 and 5 years beyond construction or decommissioning. The impact is still reversible.	2
Medium term	The impact continues between 6 and 15 years beyond the construction or decommissioning phase. The impact is still reversible with relevant and applicable mitigation and management actions.	3
Long term	The impact continues for a period more than 15 years beyond construction or decommissioning. The impact is only reversible with considerable effort in implementation of rigorous mitigation actions.	4
Permanent	The impact will continue indefinitely and is not reversible.	5

POTENTIAL INTENSITY OF IMPACT

Criteria for impact rating of potential intensity of a negative impact.

Potential Intensity Descriptor	Definition of negative impact	Rating
Low	Negative change with no associated consequences.	1
Moderate-Low	Nuisance impact	2
Moderate	Substantial alteration and/or reduction in environmental quality/loss of habitat/loss of heritage/loss of welfare amenity	4
Moderate-High	Severe alteration to faunal or floral populations/loss of livelihoods/individual economic loss.	8
High	Extreme alteration to human health linked to mortality/loss of a species/endemic habitat.	16

Criteria for the impact rating of potential intensity of a positive impact.

Potential Intensity Descriptor	Definition of positive impact	Rating
Low	Positive change with no other consequences.	1
Moderate-Low	Economic development	2
Moderate	Improved environmental quality/improved individual livelihoods.	4
Moderate-High	Net improvement in human welfare	8

PROBABILITY / LIKELYHOOD OF IMPACT

Likelihood Descriptor	Definition	Rating
Improbable	The possibility of the impact occurring is negligible and only under exceptional circumstances.	0.1
Very Unlikely	The possibility of the impact occurring is low with a less than 30% chance of occurring.	0.2
Unlikely	The impact has a 30% to 50% chance of occurring.	0.5
Likely	The impact has a 51% to 90% chance of occurring.	0.75
Definite	The impact has a >90% chance of occurring regardless of preventative measures.	1

SIGNIFICANCE RATING SCALE

Score	Implications for Decision-making	Rating
< 3	The risk/impact may result in minor alterations of the environment and can be easily avoided by implementing appropriate mitigation measures and will not have an influence on decision-making. Project can be authorised with low risk of environmental degradation	Low
3 - 9	The risk/impact will result in moderate alteration of the environment and can be reduced or avoided by implementing the appropriate mitigation measures and will only have an influence on the decision-making if not mitigated. Project can be authorised but with conditions and routine inspections. Mitigation measures must be implemented.	Moderate

10 - 20	The risk/impact will result in major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making. Project can be authorised but with strict conditions and high levels of compliance and enforcement. Monitoring and mitigation are essential.	High
21 - 26	The risk/impact will result in very major alteration to the environment even with the implementation on the appropriate mitigation measures and will have an influence on decision-making. The project cannot be authorised unless major changes to the engineering design are carried out to reduce the significance rating.	Fatally Flawed

Reversibility of the Impacts: The extent to which the impacts/risks are reversible assuming that the project has reached the end of its life cycle (decommissioning phase):

Descriptor	Definition
High reversibility	Impact is highly reversible at end of project life.
Moderate reversibility	Moderate reversibility of impacts.
Low reversibility	Low reversibility of impacts.
Impacts are non-reversible	The impact is permanent, i.e., this is the least favourable assessment for the environment.

Irreplaceability of Receiving Environment/Resource Loss caused by impacts/risks: The degree to which the impact causes irreplaceable loss of resources if the project has reached the end of its life cycle (decommissioning phase):

Descriptor	Definition
High irreplaceability	The project will destroy unique resources that cannot be replaced, i.e., this is the least favourable assessment for the environment
Moderate irreplaceability	Moderate irreplaceability of resources
Low irreplaceability	Low irreplaceability of resources.
Resources are replaceable	The affected resource is easy to replace/rehabilitate, i.e., this is the most favourable assessment for the environment.

Confidence: The degree of confidence in predictions based on available information and specialist knowledge

Descriptor	Definition
Low	EAP / Specialist has low confidence in assessment due to significant limitations such as unavailability of data or information
Medium	EAP / Specialist has medium confidence in assessment due to some limitations such as unavailability of data or information
High	EAP / Specialist has high confidence in assessment.

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the construction phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

Alternative Pipeline Network 2 (preferred route)

Impact Analysis for Construction Phase

Impact Description		Impact type	Extent (E)	Duration (D)	Potential Intensity (P)	Likelihood (L)	Impact Rating & Significance (IR&S)	Mitigation & Management Measures	
Impact	Direct Impact:	Significance without Mitigation						<ul style="list-style-type: none"> The ecologically sensitive features have been delineated and mapped. Conservation buffer zones have also been designated to these areas. Indiscriminate habitat destruction to be avoided and the proposed development should remain as localized as possible (including support areas and services). 	
Impact Direction:	Negative	Existing Impact	1	4	2	0.2	1 - LOW		
Aspect:	Wetland units	Project Impact	1	4	2	0.1	1 - LOW		
Potential Impact:		Significance with Mitigation							
Destruction of sensitive habitat within areas designated as high ecological sensitivity.	Residual Impact	1	4	1	0.1	1 - LOW			
	Reversibility	Low reversibility							
	Irreplaceability	Moderate irreplaceability							
	Cumulative Impact								Description of Cumulative Impact
	Cumulative Impact	1	2	1	0.2	1 - LOW			
Confidence	High								
Impact Description		Impact type	E	D	P	L	IR&S	Mitigation & Management Measures	
Impact	Direct Impact:	Significance without Mitigation						<ul style="list-style-type: none"> Topsoil must be placed and stored at a designated area. Topsoil stockpiles should not be stacked higher than 1.5m in height. Topsoil stockpiles should be shocked by a designated responsible person daily for 	
Impact Direction:	Negative	Existing Impact	1	1	2	0.2	1 - LOW		
Aspect:	Topsoil management	Project Impact	1	1	4	0.5	3 - MOD		
Potential Impact:		Significance with Mitigation							
	Residual Impact	1	1	1	0.2	1 - LOW			
	Reversibility	Moderate reversibility							

Impact Description		Impact type	Extent (E)	Duration (D)	Potential Intensity (P)	Likelihood (L)	Impact Rating & Significance (IR&S)	Mitigation & Management Measures	
Loss of topsoil due to poor topsoil management and site management.		Irreplaceability	Low irreplaceability					evidence of disturbance or erosion. In the event erosion is identified, the stockpiles should be reshaped and covered with a cover top prevent water ingress into the topsoil stockpile. Description of Cumulative Impact Low cumulative impact is anticipated as the residual impact is considered neglectable and the potential impact on the surrounding topsoil resources will be eliminated or limited to site.	
		Cumulative Impact							
		Cumulative Impact	1	1	2	0.2	1 - LOW		
		Confidence	High						
Impact Description		Impact type	E	D	P	L	IR&S	Mitigation & Management Measures	
Impact	Direct Impact:	Significance without Mitigation							
Impact Direction:	Negative	Existing Impact	2	3	2	0.5	4 - MOD	<ul style="list-style-type: none"> Drip trays or appropriate spillage containers must be used when components that require petrochemicals or lubricating oils are installed and filled. The applicant must identify and capacitate a designated staff member/s to execute the containment and clean-up of any spillages that may occur during installation of infrastructure. The applicant must facilitate environmental awareness, emergency preparedness and emergency response procedures training to staff/contractors involved in the installation of plant. 	
Aspect:	Aquatic and terrestrial	Project Impact	2	3	2	0.2	1 - LOW		
<u>Potential Impact:</u>		Significance with Mitigation							
Spillage of hydrocarbons or oils within the development footprint result in the indirect contamination of surrounding terrestrial and/or aquatic environment via existing stormwater infrastructure.		Residual Impact	2	2	2	0.2	1 - LOW		
		Reversibility	High reversibility						
		Irreplaceability	Moderate irreplaceability						

Impact Description		Impact type	Extent (E)	Duration (D)	Potential Intensity (P)	Likelihood (L)	Impact Rating & Significance (IR&S)	Mitigation & Management Measures
								<ul style="list-style-type: none"> Any spillages that occur must be contained and cleaned up immediately by the designated trained staff. No material, substances or liquids may be placed or disposed into any stormwater infrastructure or areas not designated for storage of waste at any time.
		Cumulative Impact					Description of Cumulative Impact	
		Cumulative Impact	2	2	2	0.2	1 - LOW	Low cumulative impact is anticipated as the residual impact is considered neglectable and the potential impact on the surrounding terrestrial and aquatic environment will be eliminated or limited to site.
		Confidence	Medium					
Impact Description		Impact type	E	D	P	L	IR&S	Mitigation & Management Measures
Impact	Direct Impact:	Significance without Mitigation						<ul style="list-style-type: none"> Appropriate measures should be implemented to prevent potential soil pollution through fuel and oil leaks and spills and then compliance monitored by an appropriate person. Make sure construction vehicles are maintained and serviced to prevent oil and fuel leaks. All vehicles and plant must be checked daily for potential leaks and spillages. Where spillages have been identified, it must be cleaned and remediated immediately by
Impact Direction:	Negative	Existing Impact	1	1	1	0.2	1 - LOW	
Aspect:	Soil	Project Impact	1	3	2	0.5	3 - MOD	
<u>Potential Impact:</u>		Significance with Mitigation						
Soil erosion will take affect any unprotected soils that have suffered disturbances, including unprotected stockpiles of stored topsoil.		Residual Impact	1	1	2	0.2	1 - LOW	
		Reversibility	High reversibility					
		Irreplaceability	Low irreplaceability					

Impact Description		Impact type	Extent (E)	Duration (D)	Potential Intensity (P)	Likelihood (L)	Impact Rating & Significance (IR&S)	Mitigation & Management Measures
<p>Stormwater drainage features will also induce erosion impacts.</p> <p>Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general environment and surrounding watercourses.</p>								<p>removing the contaminated soil and disposing it in an environmentally responsible manner.</p> <ul style="list-style-type: none"> Where unavoidable, emergency on-site maintenance should be done over appropriate drip trays and all oil or fuel must be disposed of according to waste regulations. Drip trays must be placed under vehicles and equipment when not in use. An Environmental Control Officer must be appointed to monitor the compliance with conditions of the Environmental Management Programmed (EMPr).
		Cumulative Impact						Description of Cumulative Impact
		Cumulative Impact	1	1	2	0.2	1 - LOW	<p>Low cumulative impact is anticipated as the residual impact is considered neglectable and the potential impact on the surrounding terrestrial and aquatic environment will be eliminated or limited to the site footprint.</p>
		Confidence	High					
Impact Description		Impact type	E	D	P	L	IR&S	Mitigation & Management Measures
Impact	Direct Impact:	Significance without Mitigation						<ul style="list-style-type: none"> Drip trays or appropriate spillage containers must be used when components that require petrochemicals or lubricating oils are installed and filled.
Impact Direction:	Negative	Existing Impact	2	4	1	0.1	1 - LOW	
Aspect:	Groundwater Management	Project Impact	2	1	1	0.2	1 - LOW	
Potential Impact:		Significance with Mitigation						

Impact Description		Impact type	Extent (E)	Duration (D)	Potential Intensity (P)	Likelihood (L)	Impact Rating & Significance (IR&S)	Mitigation & Management Measures		
Spillage of hydrocarbons or oils within the development footprint result in the indirect contamination of groundwater resources through infiltration into underlying soils.		Residual Impact	2	1	1	0.2	1 - LOW	<ul style="list-style-type: none"> The applicant must identify and capacitate a designated staff member/s to execute the containment and clean-up of any spillages that may occur during installation of infrastructure. The applicant must facilitate environmental awareness, emergency preparedness and emergency response procedures training to staff/contractors involved in the installation of plant. Any spillages that occur must be contained and cleaned up immediately by the designated trained staff. No material, substances or liquids may be placed or disposed into any watercourses or areas not designated for storage of waste at any time. 		
		Reversibility	Moderate reversibility							
		Irreplaceability	Moderate irreplaceability							
		Cumulative Impact							Description of Cumulative Impact	
		Cumulative Impact	2	2	2	0.2	1 - LOW		Low cumulative impact is anticipated as the residual impact is considered neglectable and the potential impact on the surrounding terrestrial and aquatic environment will be eliminated or limited to the site footprint.	
		Confidence	Medium							
Impact Description		Impact type	E	D	P	L	IR&S	Mitigation & Management Measures		
Impact	Direct Impact:	Significance without Mitigation								

Impact Description		Impact type	Extent (E)	Duration (D)	Potential Intensity (P)	Likelihood (L)	Impact Rating & Significance (IR&S)	Mitigation & Management Measures
Impact Direction:	Negative	Existing Impact	3	4	2	0.2	2 - LOW	<ul style="list-style-type: none"> Adequate roads signs must be put in place to indicate construction and speed limit in the area. JW must ensure all vehicles carrying material to and from the construction site is covered with a tarpaulin, as necessary. This is specifically relevant when raw material, construction sand, grit and gravel is transported to and from the site.
Aspect:	Traffic Management	Project Impact	3	1	1	0.2	1 - LOW	
<u>Potential Impact:</u>		Significance with Mitigation						
Impact on existing traffic patterns and infrastructure on local roads.	Residual Impact	3	1	1	0.2	1 - LOW		
	Reversibility	Low reversibility						
	Irreplaceability	Low irreplaceability						
Cumulative Impact		Description of Cumulative Impact						
Cumulative Impact	3	4	2	0.2	2 - LOW	The area has traffic during in weekdays and if traffic is controlled better during the construction phase, will impact major roads and cause traffic in all intersections.		
Confidence	High							
Impact Description		Impact type	E	D	P	L	IR&S	Mitigation & Management Measures
Impact	Direct Impact:	Significance without Mitigation						
Impact Direction:	Negative	Existing Impact	1	4	4	0.2	2 - LOW	<ul style="list-style-type: none"> Open trenches must be demarcated and secured to prevent animals and people from falling inside. All construction staff, workers and visitors must always comply with the full PPE requirements during the construction phase while on site. Individuals not complying with these requirements must be dealt with in terms of JW's existing compliance protocols. Open trenches must not contain water, to avoid having any animal or person drown.
Aspect:	Health and Safety	Project Impact	1	1	4	0.2	1 - LOW	
<u>Potential Impact:</u>		Significance with Mitigation						
Open trenches may pose a health hazard to residents and vehicles	Residual Impact	1	1	4	0.2	1 - LOW		
	Reversibility	High reversibility						
Irreplaceability	Moderate irreplaceability							

Impact Description		Impact type	Extent (E)	Duration (D)	Potential Intensity (P)	Likelihood (L)	Impact Rating & Significance (IR&S)	Mitigation & Management Measures
		Cumulative Impact						Description of Cumulative Impact
		Cumulative Impact	1	1	4	0.2	1 - LOW	Cumulative Impacts are anticipated to be Low as JW's existing Health and Safety protocols are strictly implemented.
		Confidence	High					
Impact Description		Impact type	E	D	P	L	IR&S	Mitigation & Management Measures
Impact	Direct Impact:	Significance without Mitigation						Leverage this through procurement policies that favor local suppliers and businesses.
Impact Direction:	Positive	Existing Impact	3	1	4	1	8 - MOD	
Aspect:	Socio-economic Aspects	Project Impact	3	1	4	1	8 - MOD	
Potential Impact:	-	Significance with Mitigation						
Increased employment opportunities and economic growth.		Residual Impact	3	1	4	1	8 - MOD	
		Reversibility	Moderate reversibility					
		Irreplaceability	Low irreplaceability					
		Cumulative Impact						Description of Cumulative Impact
		Cumulative Impact	4	4	1	0.75	7 - MOD	
		Confidence	High					
Impact Description		Impact type	E	D	P	L	IR&S	Mitigation & Management Measures
Impact	Direct Impact:	Significance without Mitigation						Leverage this through procurement policies that favor local labor.
Impact Direction:	Positive	Existing Impact	3	1	4	1	8 - MOD	
Aspect:	Socio-economic Aspects	Project Impact	3	1	4	1	8 - MOD	

Impact Description		Impact type	Extent (E)	Duration (D)	Potential Intensity (P)	Likelihood (L)	Impact Rating & Significance (IR&S)	Mitigation & Management Measures
Potential Impact:	-	Significance with Mitigation						
Creation of temporary skilled and unskilled job opportunities directly on the project	Residual Impact	3	1	4	1	8 - MOD	Description of Cumulative Impact	
	Reversibility	Moderate reversibility						
	Irreplaceability	Low irreplaceability						
	Cumulative Impact							
	Cumulative Impact	4	4	4	0.75	9 - MOD		
Confidence	High							

Impact Analysis for Operational Phase – General Impacts (preferred route)

Impact Description		Impact type	Extent (E)	Duration (D)	Potential Intensity (P)	Likelihood (L)	Impact Rating & Significance (IR&S)	Mitigation & Management Measures
Impact	Direct Impact:	Significance without Mitigation						The Competent Authority should authorize the application in the shortest period once all information required to make a decision has been received.
Impact Direction:	Positive	Existing Impact	4	4	4	1	12 - HIGH	
Aspect:	Social	Project Impact	4	4	8	1	16 - HIGH	
Potential Impact:		Significance with Mitigation						
	Residual Impact	4	4	8	1	16 - HIGH		
	Reversibility	Low reversibility						
	Irreplaceability	Resources are replaceable						
Cumulative Impact							Description of Cumulative Impact	

Distribution of water to residents and for future development and contributing to water provision goals.		Cumulative Impact	4	4	8	1	16 - HIGH	The Cumulative Impact of this positive impact is expected to be High (Positive) as authorization of the application by the Competent Authority will ensure service delivery for the present residents and future developments.
		Confidence	High					
Impact Description		Impact type	E	D	P	L	IR&S	Mitigation & Management Measures
Impact	Direct Impact:	Significance without Mitigation						<ul style="list-style-type: none"> Construction methods should be carefully reviewed to ensure the least impact to the watercourse is ensured. High energy stormwater input into the watercourses should be prevented at all costs.
Impact Direction:	Negative	Existing Impact	2	3	2	0.5	4 - MOD	
Aspect:	Wetlands	Project Impact	2	3	2	0.5	4 - MOD	
<u>Potential Impact:</u>		Significance with Mitigation						
Impacts on water quality within wetland	Residual Impact	2	3	2	0.2	1 - LOW		
	Reversibility	Low reversibility						
	Irreplaceability	Moderate irreplaceability						
	Cumulative Impact						Description of Cumulative Impact	
Cumulative Impact	2	2	2	0.2	1 - LOW	Low Cumulative Impact is anticipated if the mitigation measures proposed are effectively implemented. This will further ensure potential existing impacts from runoff is avoided or minimized.		
Confidence	High							

No Go Alternative

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
<p>This option assumes that a conservative approach would ensure that the environment is not impacted upon any more than is currently the case. It is important to state that this assessment is informed by the current condition of the area. Should the GDARD decline the application, the 'No-Go' option will be followed, and the status quo of the site will remain.</p> <p>The biophysical and social impacts as per the construction phase listed above will not occur and the status quo of the site will remain.</p> <p>If the proposed water pipeline upgrade is not implemented, there would be regular disruptions to water supply and new development in Carlswald would not materialize, despite the demand for new housing establishment in the area.</p> <p>Based on the above motivation, the no-go alternative is not considered to be feasible or reasonable.</p>				

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

- Annexure G2: Terrestrial Biodiversity & Surface Water Ecosystems Ecological and Impact Surveys
- Annexure G3: Exemption Letter for Heritage Impact Assessment

Describe any gaps in knowledge or assumptions made in the assessment of the environment and the impacts associated with the proposed development.

- The following assumptions and limitations were applicable to the studies undertaken within this BA Process:
- All information provided by the developer and I&APs to the environmental team was correct and valid at the time it was provided.
 - It is assumed that the development site identified by the design engineers represents a suitable site for the proposed development.
 - Studies assume that any potential impacts on the environment associated with the proposed development will be avoided, minimized, or mitigated.
 - This report and its investigations are project specific.
 - This report was informed by the information provided by the Applicant, project engineers and findings of various specialist studies and site investigations undertaken at the time of compilation of this report.
 - The specialist studies conducted meet the minimum requirements, and as such, no additional studies were undertaken.
 - All spatial data available to the EAP was utilized in the assessment of the proposed development. It was not deemed necessary for additional spatial data to be obtained.

3. IMPACTS THAT MAY RESULT FROM THE DECOMMISSIONING AND CLOSURE PHASE

Briefly describe and compare the potential impacts (as appropriate), significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the decommissioning and closure phase for the various alternatives of the proposed development. This must include an assessment of the significance of all impacts.

Proposal

Potential impacts:	Significance rating of impacts(positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented
The proposed water infrastructure will be permanent. The decommissioning phase is not applicable and as decommissioning is therefore not anticipated for this project				

Alternative 1

Potential impacts:	Significance rating of impacts(positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented

Alternative 2

Potential impacts:	Significance rating of impacts (positive or negative):	Proposed mitigation:	Significance rating of impacts after mitigation:	Risk of the impact and mitigation not being implemented

List any specialist reports that were used to fill in the above tables. Such reports are to be attached in the appropriate Appendix.

Due to the nature of the proposed development, decommissioning phase is not envisioned. As a result, impact assessments for the decommissioning activities are not considered in this assessment.

Where applicable indicate the detailed financial provisions for rehabilitation, closure and ongoing post decommissioning management for the negative environmental impacts.

N/A – explanation provided above.

4. CUMULATIVE IMPACTS

Describe potential impacts that, on their own may not be significant, but is significant when added to the impact of other activities or existing impacts in the environment. Substantiate response:

Cumulative impacts include some changes in wetland characteristics that could occur due to ineffective sediment control during the construction phase. Where mitigation measures are not implemented, there could be an increase in impacts on site and around the area. In case where there is infestation of alien plants, monitoring and rehabilitation should be implemented during construction and the operation phase. Implementation of the mitigation measures will ensure low cumulative impacts.

5. ENVIRONMENTAL IMPACT STATEMENT

Taking the assessment of potential impacts into account, please provide an environmental impact statement that sums up the impact that the proposal and its alternatives may have on the environment after the management and mitigation of impacts have been taken into account with specific reference to types of impact, duration of impacts, likelihood of potential impacts actually occurring and the significance of impacts.

Proposal

There were three pipeline route alignment alternatives Networks that were presented for analysis for the proposed pipeline upgrade. Although all the proposed pipeline route alternatives align within existing road reserves and pavements, which will result in similar levels of impacts to terrestrial habitat units, there are alignments that have a greater association with wetland habitat units.

No alternative to the proposed reservoir site was presented for analysis at the time of the survey. Following the survey, it was noted that there are no environmental sensitivities associated with the reservoir site. The need to source an alternative site for the proposed reservoir is not required.

As explained in Section E.2, Network 1 and 3 are not feasible routes, due to the following reasons:

- ALTERNATIVE PIPELINE NETWORK 1:** This route is not feasible for construction, due to the various challenges in construction. There are many sections along the route that has several existing services and constraints, which would render the installation of the pipeline very challenging. Also, a large section of this pipeline route alignment is highly trafficked throughout the day, which would make the accommodation of traffic very challenging.
- ALTERNATIVE PIPELINE NETWORK 3:** This route is fatally flawed as the proposed pipeline alignment does not enable flow to gravitate to the required standpoints. This makes the achievement of the required pressures (2 bar) difficult to achieve and it is therefore not in accordance with Johannesburg Water (JW's) design guidelines.

Network 2 was taken through for the impact assessment. Table 8 below provides the environmental impact statement:

Table 8: Summary of the significance of identified impacts without and with mitigation measures.

Impact	Significance	
	Without Mitigation	With Mitigation
Construction Phase		
<i>Biophysical Environment</i>		
Destruction of sensitive habitat within areas designated as high ecological sensitivity.	Low (negative)	Low (negative)
Loss of topsoil due to poor topsoil management and site management.	Low (negative)	Low (negative)
Spillage of hydrocarbons or oils within the development footprint result in the indirect contamination of surrounding terrestrial and/or aquatic environment via existing stormwater infrastructure.	Low (negative)	Low (negative)

Soil erosion will take affect any unprotected soils that have suffered disturbances, including unprotected stockpiles of stored topsoil. Stormwater drainage features will also induce erosion impacts. Soil stripping, soil compaction and vegetation removal will increase rates of erosion and entry of sediment into the general environment and surrounding watercourses.	Moderate (negative)	Low (negative)
Spillage of hydrocarbons or oils within the development footprint result in the indirect contamination of groundwater resources through infiltration into underlying soils.	Low (negative)	Low (negative)
Socio-economic Environment		
Impact on existing traffic patterns and infrastructure on local roads.	Low (negative)	Low (negative)
Open trenches may pose a health hazard to residents and vehicles	Low (negative)	Low (negative)
Increased employment opportunities and economic growth.	Moderate (Positive)	Moderate (Positive)
Creation of temporary skilled and unskilled job opportunities directly on the project	Moderate (Positive)	Moderate (Positive)
Operational Phase		
Biophysical Environment		
As Above		
Impacts on water quality within wetland	Moderate (negative)	Low (negative)
Socio-economic Environment		
Distribution of water to residents and for future development and contributing to water provision goals.	High (Positive)	High (Positive)
<p>Ecological Survey The proposed activity will have impacts on the ecology on the area and watercourses, however, the impacts will be low with the implementation of the proposed mitigations outlined in the EMPr.</p> <ul style="list-style-type: none"> The Screening Tool analysis indicated that the project area had limited ecologically sensitive features for the various themes. The ecologically sensitive areas were limited to the wetland units that intersect the survey area and the various pipeline alignment alternatives. The field survey reiterated much of the data ascertained through the Screening Tool analysis. Evaluation of the provincial ecological conservation data (GDARD C-Plan vers 3.3) indicated similar results, with the linear wetland units being included as Ecological Support Areas (ESAs), largely due to these linear units promoting ecological connectivity for migratory species. 		

- The infrastructure associated with the proposed development all aligns with areas of historical degradation and habitat transformation. It is therefore regarded as a generally ecologically transformed habitat type that the infrastructure footprints will impact upon.
- There are wetland crossing points identified that are associated with the various pipeline alternatives. These units have been delineated and the mandatory 30 m conservation buffer zones have been presented in Figure 8 and 9.
- The wetland unit associated with the Network 3 alternative was shown to be poorly developed and had suffered considerable transformation through pressures and drivers of ecological change at both the local and catchment scales. The overall significance of the ecological impacts to these units is low.
- The wetland unit associated with Network 2 (mostly) tended to be well developed, but also supplemented by water from an artificial source. The risk profile to development through this wetland area was shown to be moderate to low.
- The Risk Assessment Matrix showed a moderate to low risk to surface water ecosystem habitat units. Moderate risk ratings occur where construction activities fall within wetland zones. Risk ratings reduce with distance from these surface water habitat units. All risk ratings can be reduced to low with the implementation of suitable mitigation measures that have been presented.
- There were individuals of a protected floral species (Orange listed – declining) *Hypoxis hemerocallidea* within the part of the pipelines of Network 3 and Network 2 that deviate from the road reserves. Individuals should be rescued prior to the onset of the construction phase and either relocated to an adjacent area or stored at a suitable facility until they can be replaced at the site once the construction phase is completed.
- The general impact significance of the potential impacting features to both surface water and terrestrial ecosystems showed low overall significance, with impacts rendered generally insignificant with the application of the proposed mitigation measures.
- The preferred pipeline alignment alternative is proposed as the Network 1 as it has the least association with wetland units relative to the other two alternatives. It is also the most direct and shortest route relative to the other presented alternatives. Network 3 is also not regarded as problematic. Network 2 is the least preferred alignment alternative due to its extensive association with wetland areas.
- Although Network 2 is the least preferred the impacts with mitigation are rated as low. The alternative is therefore not fatally flawed and can be developed.
- It is recommended that the pipeline be coupled to the existing bridge/culvert infrastructure at the downstream side at any wetland/watercourse crossing point, meaning that excavations through the wetland zone would be avoided altogether. If that is not feasible, then it is recommended that excavations take place at the upstream side of the crossing point to abate the impacts of erosion that normally manifest at the downstream side.
- The most pertinent mitigation measures relevant to the project is the active management of erosion and alien vegetation control throughout all phases of the proposed development.
- Mitigation measures to reduce the overall significance of the proposed development activities have been proposed and have been shown to significantly reduce the long-term ecological impacts. Limited residual impacts should remain

following correct site rehabilitation, as limited surface infrastructure will remain following completion of the construction phase.

- A monitoring programme should be implemented to assess the long-term success of the implemented mitigation measures pertaining to erosion management and potential emergence of exotic vegetation recruitment within disturbed areas.
- The overall impact significance of the proposed project is thought to be minor, with limited residual impacts expected to remain. Therefore, the project would be supported if mitigation measures are adhered to.

It should be noted that, to conserve the ecological structures within the region, a holistic habitat conservation approach should be adopted. This includes keeping general habitat destruction and construction footprints to an absolute minimum within the terrestrial habitat. Conserving the habitat units will ultimately conserve the species communities that depend on it for survival.

Heritage and Palaeontology Assessment:

The project area is completely transformed through the establishment of existing water pipelines as well as residential suburbs. Based on Topographic maps, the area was undeveloped and used for agricultural activities until 1957 with the establishment of roads and then the subsequent establishment of structures from 1964. The study area was completely transformed into various residential suburbs around the project area throughout the years. No heritage indicators appear on historical maps prior to the establishment of the residential suburbs, and previous agricultural activities are visible, indicating that the study area is of low heritage potential. This was confirmed during the site visit, and no evidence of heritage resources was noted. According to the SAHRA paleontological map, the palaeontological sensitivity is determined as zero/ insignificant, and no further studies are required for this aspect.

Alternative 1, Network 1

N/A

Alternative 2, Network 3

N/A

No-go (compulsory)

This option assumes that a conservative approach would ensure that the environment is not impacted upon any more than is currently the case. It is important to state that this assessment is informed by the current condition of the area. Should the GDARD decline the application, the 'No-Go' option will be followed, and the status quo of the site will remain.

6. IMPACT SUMMARY OF THE PROPOSAL OR PREFERRED ALTERNATIVE

For proposal:

N/A

For alternative:

The impacts have been identified and assessed during the BA process. Based on the impact assessment, impacts will be predominantly limited to the site and study area. The impacts will mostly occur during the construction phase, which will take approximately 1 year. All the impacts identified during the construction phase can be mitigated to acceptable levels and most of the impacts indicated as **MODERATE-LOW** significance before mitigation will be reduced to a **LOW** significance rating after the implementation of mitigation measures. The proposed pipeline upgrade is therefore unlikely to significantly impact on the surrounding environment.

Having assessed the significance of impacts of the proposal and alternative(s), please provide an overall summary and reasons for selecting the proposal or preferred alternative.

Based on the findings from the specialist assessments and engineering feasibility, which have been undertaken for the three sites, it is concluded that the preferred alternative is Network 2. It was found that Network 1 and Network 3 are not feasible for construction as identified by the Engineering team stating the items below:

Network 1: is not feasible route due to the following:

- There are many constraints including large trees, existing pipework, as well as telecom cables and poles that this route encounters.
- There is insufficient working space within the sidewalks of the road.
- The pipeline runs through guard house of Beaulieu Country Estate.
- The costs are high for construction – the pipeline would need to employ trenchless technologies along large sections of the pipeline route.
- The route is highly trafficked and may cause major disturbances to commuters during implementation phase.

Network 3: is not feasible route due to the following:

- There are constraints including large trees, existing pipework, as well as telecom cables and poles that this route encounters.
- The pipeline continues past several driveways of residential (private and security estates) and commercial properties.
- 550m of the pipeline runs along the very busy R55 (Main Road).
- Hydraulically – this route is not feasible as a gravity pipeline network, this makes the achievement of the required pressures (2 bar) difficult, and it is therefore not in accordance with Johannesburg Water (JW's) design guidelines.

The Terrestrial Ecologist, the Wetland Ecologist and Heritage Specialist has assessed all three route alignments. From a heritage / archaeological point of view, the study area is of low heritage potential and there is no preference for a pipeline route alignment.

The terrestrial and wetland ecological specialist findings, although all the pipeline route alternatives align within existing road reserves and pavements and pose a medium to low impact with mitigations, however there are alignments that have a greater association with wetland habitat units impacts.

Network 1 is the shortest route with least disruptive impact and would present the lowest ecological impact however it is not feasible given the reasons mentioned above.

Network 2 would impact on a relatively small and poorly developed wetland unit, and it would not be regarded as problematic as the impact is temporary and the wetland should be able to regenerate.

Network 2: is the preferred and most feasible route due to the following

- Hydraulically – it meets the minimum JW Design Guidelines
- There is sufficient working space on both sides of the road to manoeuvre past some of the identified constraints.
- There are minimal road crossings of the pipeline – minimal disturbances to traffic.
- The usage of trenchless technologies is limited to small sections along the pipeline.
- The impact on the wetland will be temporary and the system should rejuvenate after the construction phase.

A mandatory 30m conservation buffer is presented in (Figure 8) and (Figure 9) for the three pipeline route alignments. The Risk Assessment Matrix showed a moderate to low risk to surface water ecosystem habitat units. Moderate risk ratings occur where construction activities fall within wetland zones. Risk ratings reduce with distance from these surface water habitat units. All risk ratings can be reduced to low with the implementation of suitable mitigation measures that have been presented.

The general impact significance of the potential impacting features to both surface water and terrestrial ecosystems showed a low overall significance, with impacts rendered generally insignificant with the application of the proposed mitigation measures.

Network 2 is the least preferred alignment from a wetland point of view, due to its extensive association with the wetland areas. A recommendation has been made by the Wetland Ecologist that the pipeline be coupled to the existing bridge / culvert to avoid excavations through the wetland zone if feasible, should this not be feasible, it is recommended that excavations take place upstream of the crossing point to able and manage the impacts of erosion that normally manifests downstream.

The most pertinent mitigation measures relevant to the project is the active management of erosion and alien vegetation control throughout all phases of the proposed development.

Mitigation measures to reduce the overall significance of the proposed development activities have been proposed and have been shown to significantly reduce the long-term ecological impacts. Limited residual impacts should remain following correct site rehabilitation, as limited surface infrastructure will remain following completion of the construction phase.

A monitoring programme should be implemented to assess the long-term success of the implemented mitigation measures pertaining to erosion management and potential emergence of exotic vegetation recruitment within disturbed areas.

The overall impact significance of the proposed project is thought to be minor, with limited residual impacts expected to remain. Therefore, the project would be supported if mitigation measures are adhered to.

There are individuals of a protected floral species (Orange listed – declining) *Hypoxis hemerocallidea* within the part of the pipelines of Network 2 and 3 that deviate from the road reserves. Individuals should be rescued prior to the onset of the construction phase and either relocated to an adjacent area or stored at a suitable facility until they can be replaced at the site once the construction phase is completed.

To conserve the ecological structures within the region, a holistic habitat conservation approach should be adopted. This includes keeping general habitat destruction and construction footprints to an absolute minimum within the terrestrial habitat. Conserving the habitat units will ultimately conserve the species communities that depend on it for survival. This can only be achieved by the efforts of the contractor during the various processes of the construction phase.

It is recommended that Network 2 be approved by the GDARD.

7. SPATIAL DEVELOPMENT TOOLS

Indicate the application of any spatial development tool protocols on the proposed development and the outcome thereof.

The following was undertaken:

- The DFFE Screening Report was generated from the web-based DFFE Screening Tool and a site visit by the EAP was undertaken to determine the applicability of Specialist Studies relevant for the study area.
- A site visit was conducted with the EAP, Consulting Engineers, GDARD and the Environmental Officer from Johannesburg Water (JW) on 12 September 2022 (*the minutes of the meeting is provided in Appendix 12*).
- The Specialists were appointed and were tasked to follow the gazetted assessment protocols for their respective assessments.
- Consultation with and obtaining approvals of the development from the city council (municipality); and
- Use of GIS tool for mapping (using data from GDARD such as EMF, GAPA, the Biodiversity Sector Plan, and GIDSv10, and other data), refer to attached maps in **Appendix A**.

8. RECOMMENDATION OF THE PRACTITIONER

Is the information contained in this report and the documentation attached hereto sufficient to make a decision in respect of the activity applied for (in the view of the Environmental Assessment Practitioner as bound by professional ethical standards and the code of conduct of EAPASA).

YES

If "NO", indicate the aspects that require further assessment before a decision can be made (list the aspects that require further assessment):

N/A

If "YES", please list any recommended conditions, including mitigation measures that should be considered for inclusion in any authorisation that may be granted by the competent authority in respect of the application:

Network 1: is not feasible route due to the following:

- There are many constraints including large trees, existing pipework, as well as telecom cables and poles that this route encounters.
- There is insufficient working space within the sidewalks of the road.
- The pipeline runs through guard house of Beaulieu Country Estate.
- The costs are high for construction – the pipeline would need to employ trenchless technologies along large sections of the pipeline route.
- The route is highly trafficked and may cause major disturbances to commuters during implementation phase.

Network 2: is the preferred and most feasible route due to the following:

- Hydraulically – it meets the minimum JW Design Guidelines
- There is sufficient working space on both sides of the road to manoeuvre past some of the identified constraints.
- There are minimal road crossings of the pipeline – minimal disturbances to traffic.
- The usage of trenchless technologies is limited to small sections along the pipeline.
- The impact on the wetland will be temporary and the system should rejuvenate after the construction phase.

It is recommended that GDARD approve Network 2 for the proposed development.

Network 3: is not feasible route due to the following:

- There are constraints including large trees, existing pipework, as well as telecom cables and poles that this route encounters.
- The pipeline continues past several driveways of residential (private and security estates) and commercial properties.
- 550m of the pipeline runs along the very busy R55 (Main Road).
- Hydraulically – this route is not feasible as a gravity pipeline network.

To ensure that the identified negative impacts are minimised, and the positive impacts are enhanced, the following clauses are recommended as conditions of the Environmental Authorisation:

- The EMPr is a legally binding document and the mitigation measures stipulated within the document and Basic Assessment Report must be implemented.
- An independent Environmental Control Officer (ECO) must be appointed to manage the implementation of the EMPr during the construction phase. Environmental Audit Reports must be compiled and made available for inspection.
- There were individuals of a protected floral species (Orange listed – declining) *Hypoxis hemerocallidea* within the part of the pipelines of Network 3 and Network 2 that deviate from the road reserves. Individuals should be rescued prior to the onset of the construction phase and either relocated to an adjacent area or stored at a suitable facility until they can be replaced at the site once the construction phase is completed.
- A monitoring programme should be implemented to assess the long-term success of the implemented mitigation measures pertaining to erosion management and potential emergence of exotic vegetation recruitment within disturbed areas.
- Rehabilitation of the construction areas must take place soon after construction is completed.
- The environment must be protected during the construction operations, and any disturbed areas must be revegetated with indigenous vegetation to prevent the establishment of invasive vegetation.
- As part of the construction team's rehabilitation strategy/plan, it is advised to ensure that a "clean up" strategy is implemented after construction. A Wetland and Riparian Rehabilitation Plan must be formulated and implemented by the Developer for implementation during post-construction.
- It is recommended that Aquatic Ecological Assessments continue during the construction phase, post-construction and preferably one year after completion of the construction activities.
- Sufficient water quality monitoring should continue, as construction progresses at the relevant monitoring stations and immediately after the occurrence of a pollution spill and after the remediation thereof.
- Due to the manner of the project, no further impacts are foreseen after construction, therefore it is recommended that only one Aquatic Ecological Assessment be done after construction. Should there be a deterioration in the PES and EIS of this assessment after construction, a formal Bio-Monitoring Programme and Rehabilitation Strategy should be compiled.
- If during construction, any possible finds such as stone tool scatters, artefacts or bone and fossil remains are made, the operations must be stopped, and a qualified archaeologist must be contacted for an assessment of the find and therefore the Chance Find Procedures should be put in place as part of the EMPr.
- Areas that have been disturbed during construction must be rehabilitated with species naturally occurring in the study area, and the disturbed areas should be monitored to detect any alien plant species and measures must be taken immediately to eradicate it from spreading.

9. THE NEEDS AND DESIREBILITY OF THE PROPOSED DEVELOPMENT (AS PER NOTICE 792 OF 2012, OR THE UPDATED VERSION OF THIS GUIDELINE)

The Carlswald area is currently supplied with water from the Erand Reservoir which has a capacity of 27 hours x Average Annual Daily Demand (AADD) for the present, and 25 hours x AADD in the future. JW’s Design Guidelines stipulate 36 hours x AADD as the design requirement, which means that the Erand Reservoir does not have the capacity to supply water for both the present and future scenarios.

The proposed development involves the construction of a new 20ML Carlswald Reservoir to service the surrounding areas and the upgrade of the water pipeline network upgrade. The project entails the installation of a new water pipeline with an approximate length of 5.1 kilometres.

The proposed development is intended to improve and ensure an uninterrupted supply of water in the areas that experience shortages due to new and future developments.

10. THE PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED *(CONSIDER WHEN THE ACITIVTY IS EXPECTED TO BE CONCLUDED)*

Environmental Authorization is required from November 2023 and the construction phase will take approximately 2 years.

11. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) (must include post construction monitoring requirements and when these will be concluded.)

If the EAP answers “Yes” to Point 7 above, then an EMP is to be attached to this report as an Appendix

Refer to the EMPr in Appendix H.

EMPr attached

YES

SECTION F: APPENDICES

The following appendixes must be attached as appropriate (this list is inclusive, but not exhaustive):

It is required that if more than one item is enclosed that a table of contents is included in the appendix.

Appendix A: Site plan(s) – *(must include a scaled layout plan of the proposed activities overlain on the site sensitivities indicating areas to be avoided including buffers)*

Appendix B: Photographs

Appendix C: Facility illustration(s)

Appendix D: Route position information

Appendix E: Public participation information

Appendix E1 – Proof of site notice

Appendix E2 – Written notices issued as required in terms of the regulations.

Appendix E3 – Proof of newspaper advertisements

Appendix E4 – Communications to and from interested and affected parties during project announcement

Appendix E5 – Minutes of any public and/or stakeholder meetings

Appendix E6 - Comments and Responses Report *(to be provided with Final BAR)*

Appendix E7 –Comments from I&APs on Basic Assessment (BA) Report *(to be provided with Final BAR)*

Appendix E8 –Comments from I&APs on amendments to the BA Report *(to be provided with Final BAR)*

Appendix E9 – Copy of the register of I&APs

Appendix F: Water use license(s) authorisation (refer to General Authorisation in Appendix F)

SAHRA information, service letters from municipalities, water supply information (n/a)

Appendix G: Specialist reports

Appendix G1: Geotechnical Assessment

Appendix G2: Terrestrial Biodiversity & Surface Water Ecosystems Ecological and Impact Surveys Assessment

Appendix G3: Exemption for a Heritage Impact Assessment

Appendix H: EMPr

Appendix I1: Project Team CV

Appendix I2: Minutes of Pre-Application Meeting with GDARD

Appendix I3: Application for Environmental Authorisation Form

Appendix I4: Screening Tool Report

CHECKLIST

To ensure that all information that the Department needs to be able to process this application, please check that:

- Where requested, supporting documentation has been attached;
- All relevant sections of the form have been completed.

