

APPLICATION FOR ENVIRONMENTAL
AUTHORISATION FOR PROPOSED
CONSTRUCTION OF KEATES DRIFT
BULKWATER SUPPLY PIPELINE
PROJECT – REF. NUMBER:

**DC24/0001/2015_KZN/EIA/0000
012/2015**



UMZINYATHI DISTRICT MUNICIPALITY



BASIC ASSESSMENT REPORT

SUBMITTED TO:
PROVINCE OF KWAZULU NATAL
DEPARTMENT OF ECONOMIC
DEVELOPMENT, TOURISM AND
ENVIRONMENTAL AFFAIRS



edtea

Department :
Economic Development, Tourism and
Environmental Affairs

PROVINCE OF KWAZULU-NATAL

Private Bag X1048
Richardsbay
3900

SUBMITTED BY:

Magalela and Associates
Tel: 031 535 7094
Fax: 086 556 5646
E-Mail: info@magalelas.co.za
Mobile: 071 307 2675
Contact Person: Simphiwe Mtshali



01 APRIL 2015

Project Title: **CONSTRUCTION OF KEATES DRIFT BULKWATER SUPPLY PIPELINE PROJECT**

Report Title **APPLICATION FOR ENVIRONMENTAL AUTHORISATION FOR PROPOSED CONSTRUCTION OF KEATES DRIFT BULKWATER SUPPLY PIPELINE PROJECT – REF. NUMBER:**

DETEA REFERENCE NUMBER **DC24/0001/2015_KZN/EIA/0000012/2015**

EAP Author K Motsepe, Pr. Nat.Sci

| Revision | Date | Report Status |
|-----------------|-------------|--|
| Draft 1 | 08/05/15 | First draft for comments by stakeholders |

Consultants: Magalela & Associates

Approved for Consultants by:

.....
Mr. S Mtshali, Pr. Nat. Sci.
Technical Study Specialist

Client: Hatch Goba Consulting Engineers and Project Managers (Pty) Ltd

Approved for
HATCH GOBA:

Approved for
Umzinyathi District Municipality:

.....
Mr. T Hardon

.....
Mr. T Mnyandu

DRAFT BASIC ASSESSMENT REPORT FOR COMMENTS BY STAKEHOLDERS

Submitted in requirements of the Environmental Impact Assessment Regulations, December 2014 promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998)

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SUPPLY FOR PHASE 3 AND PHASE 4 SCHEME.**

A. Details and Expertise of Environmental Assessment Practitioner (EAP)

PERSONAL PARTICULARS (EAP)

Name and Surname: Mr. Kgomotso Motsepe

Years of experience: 17 of working experience environmental sector and 9 years as independent water and environmental resources consultant

EDUCATION

- Management Development Programme, University of South Africa, 2006,
 - Certificate in Business Management, University of South Africa , 2004,
 - B Tech Chemistry, Pretoria Technikon 2003,
 - N Diploma: Analytical Chemistry, Pretoria Technikon 1998
-

MEMBERSHIP OF PROFESSIONAL INSTITUTIONS

- South African Council for Scientific Professions – Pr.Sci.Nat.
 - International Association of Impact Assessments – MIAIA.
 - Water Institute of South Africa – MWISA
 - Institute of Waste Management in South Africa – MIWMSA
-

KEY RELEVANT EXPERIENCE

- 2014, Environmental Impact Assessment for continuation of mining through wetlands for Optimum Colliery in Hendrina
 - 2014, Environmental Impact Assessment for Construction of Bridges in Edenvale for Ekurhuleni Metropolitan Municipality
 - 2014, Environmental Impact Assessment for construction of bulkwater pipeline in Garankua and Mabopane Township for Tshwane Metropolitan Municipality
 - 2014, Application for Water Use Licence Application for Wescoal – Elandspruit Colliery Project
 - 2013, Application for Water Use License Application for Optimum – Kwagga North and Tweefontein
-

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this data correctly describes me, my qualifications, and my experience. I hereby confirm my involvement in the proposed project.

Kgomotso Motsepe

Date: _____

B. The Location Description and Locality Map of Keates Drift Bulkwater Pipeline Phase 3 and 4

The site is located in the Keates Drift area and falls under the jurisdiction of the Msinga Local Municipality and Umzinyathi District Municipality. The map showing the Keates Drift Area within Msinga Local Municipality and Umzinyathi District Municipality is attached herewith in **Appendix 1**.

The development of bulkwater supply pipeline scheme occurs on the following properties as tabulated in **Table 1**:

Table 1: Farm Names of Proposed Development

| Farm Name | ERF | Portion |
|------------------|------|--------------------|
| ETEMBENI MISSION | 8312 | 0 |
| | 4674 | 0 |
| AANGELEGEN | 1201 | 2, 7, 8, 9, 10, 11 |
| DUIKER HOEK | 3283 | 0, 5, 6, 7, 8, 9 |

Table 2 contains the Surveyor-General 21 digit site reference numbers for the farms shown in **Table 1**.

Table 2: Surveyor-General 21 digit of Farm Portions

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N | O | G | T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 3 | 1 | 2 | 0 | 0 | 0 | 0 |
| N | O | G | T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 6 | 7 | 4 | 0 | 0 | 0 | 0 |
| N | O | G | T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 2 |
| N | O | G | T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 7 |
| N | O | G | T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 8 |
| N | O | G | T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 9 |
| N | O | G | T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 |
| N | O | G | T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 1 |
| N | O | G | T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 8 | 3 | 0 | 0 | 0 | 0 |
| N | O | G | T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 8 | 3 | 0 | 0 | 0 | 5 |
| N | O | G | T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 8 | 3 | 0 | 0 | 0 | 6 |
| N | O | G | T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 8 | 3 | 0 | 0 | 0 | 7 |
| N | O | G | T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 8 | 3 | 0 | 0 | 0 | 8 |
| N | O | G | T | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 8 | 3 | 0 | 0 | 0 | 9 |

The farms are shown on map in **Appendix 2**.

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The start and end of each of the phases of the pipeline is shown in **Table 3**.

Table 3: Coordinates of Phase 3 and 4 pipeline

| Phase | Starting Point | Ending Point |
|----------------|---------------------------------------|---------------------------------------|
| Phase 3 | X: -28,8368304711 Y: 30,5708464967 | X: -28,7848180769 Y: 30,5754919418 |
| Phase 4 | | |
| 4a | X: -28,8665281379 Y: 30,5298670346 | X: -28,8868612147 Y: 30,5469398336 |
| 4b | X: -28,8868612147 Y: 30,5469398336 | X: -28,9128698028 Y: 30,5517254138 |
| 4c | X: -28,8832019677 Y: 30,5452135942 | X: -28,9197018934 Y: 30,5654544622 |
| 4d | X: -28,9197018934 Y: 30,5654544622 | X: -28,9491506972 Y: 30,5740817173 |
| 4e | X: -28,9491506972 Y: 30,5740817173 | X: -28,9191118639 Y: 30,5667063605 |
| 4f | X: -28,9491506972 Y: 30,5740817173 | X: -28,9720653493 Y: 30,5785662767 |
| 4g | X: -28,9544597773 Y: 30,577316938 | X: -28,9548996811 Y: 30,5781501393 |

C. Layout Plan of the Bulkwater Pipeline for Phase 3 and Phase 4

The layout plan for the proposed bulkwater pipeline for phase 3 and phase 4 is shown in **Appendix 3**.

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D. Description of the scope of the proposed construction of Bulkwater Pipeline for Phase 3 and Phase 4

In 2005, GOBA (Pty) Ltd. were appointed to research alternative water sources for the existing Keates Drift WTW. Based on prevailing problems at the existing raw water intake on the Mooi River and operational problems at the existing 0.5MI/d Keates Drift Water Treatment Works (WTW), Goba (Pty) Ltd. was appointed to undertake a feasibility study of upgrading the current river abstraction and package plant to a maximum output of 2.0 MI/d.

The feasibility report was submitted to DWAF in January 2006 with the recommendation that a groundwater supply option be investigated for low season backup and to supply increased demand. The MIG application for this phase of the project was submitted and approved by DWAF in February 2006.

Notwithstanding the above, in November 2007 Goba (Pty) Ltd were instructed to consider an alternative regional water supply source.

This option entailed sourcing water from the existing Muden irrigation canal to supply both the Ndaya and Keates Drift communities as identified in the Business Plan. This would entail upgrading the current Water Treatment Works at Muden and constructing all necessary bulk infrastructures to serve the Ndaya and Keates Drift communities.

From all options considered it became apparent the most appropriate solution is to obtain water from an upgraded Muden Water Treatment Works and to construct all necessary bulk infrastructures to serve the Ndaya, Ngome and Keates Drift communities.

Based on the above conclusions, GOBA (Pty) Ltd, were further appointed to undertake design and implementation of a portion of the bulk infrastructure

and reticulation. The boundary of the appointment included the Keates Drift WTW, bulk supply to Ndaya and bulk supply including reticulation to the Ngome areas.

The description of Phase 1 to Phase 4 are as follows:

- a) **Phase 1** consists of the construction of two 1Ml Reservoirs - One at the existing Keates Drift Water Treatment Works and the second at the end of the water main, decommissioning of the existing Water Treatment Works and the construction of a 315mm diameter uPVC pipeline approximately 4.6km in length.
- b) **Phase 2** consists of the construction of a booster pump station, a 250mm Klambon steel rising main line approximately 6km in length and a 3Ml Reservoir located at a crest point along the D1268 district road.
- c) **Phase 3** consists of the construction of a 315mm diameter gravity uPVC pipeline, approximately 12km in length, two (2) storage 1Ml reservoirs, a booster pumpstation, and a 250mm diameter steel rising main, approximately 7km in length which terminates at a proposed reservoir at Ndaya village. This reservoir does not form part of this scope of work.
- d) **Phase 4** consist of 7 sub-phases described as follows:
 - o Phase 4a consists of the construction of a 250mm diameter uPVC pipeline, 3.6km in length as well as a 200kl break pressure tank.
 - o Phase 4b consists of the construction of a booster pump station, a 160mm diameter Klambon steel rising main pipeline approximately 3.3km in length and a 1Ml storage reservoir located 300m from the "Bhambhata Rock" monument.
 - o Phase 4c consists of approximately 28Km of reticulation and 69 standpipes for the Mpanza area within Ngome.
 - o Phase 4d consists of the construction of a booster pump station, a 125mm diameter Klambon steel rising main line approximately 4.8km in length.

Basic Assessment Report for Proposed Construction of Keates Drift Bulkwater Supply Scheme for Phase 3 and 4

- Phase 4e consists of a 400kl storage reservoir as well as approximately 18Km of reticulation and 35 standpipes for the greater Ngome area.
- Phase 4f consists of the construction of a booster pump station, a 90mm diameter Klambon steel rising main line approximately 3.5km in length.
- Phase 4g consists of a 200kl elevated steel tank (20m high) and approximately 7Km of reticulation and 13 standpipes for the outer Ngome area.

This report is compiled for **Phase 3 and Phase 4** of this project development. The scope of work is also shown in the map attached herewith in **Appendix 3**. The above activities triggered environmental authorization in terms of the Environmental Impact Assessment Regulations, December 2014 promulgated in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), hence the compilation of this Basic Assessment Report. The listed activity and its description is described in **Table 4**.

Table 4: Proposed Activity Listing interms 2014 EIA Regulations

| Government Notice R983 Activity No: | Describe the relevant Scoping and EIA Activity(ies) in writing as per Listing Notice 1 (GN No. R983) | Describe the portion of the development as per the project description that relates to the applicable listed activity |
|-------------------------------------|--|---|
| 9 | <p>The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water -</p> <p>i) With an internal diameter of 0.36 metres or more; or</p> <p>ii) With a peak throughput of 120 litres per second or more, excluding where:</p> <p>a) Such facilities or infrastructure are for bulk transportation of water or storm water or storm water drainage inside a road reserve; or</p> <p>b) Where such construction will</p> | <p>Phase 3 consists of:</p> <ul style="list-style-type: none"> • the construction of a 315mm diameter gravity uPVC pipeline, approximately 12km in length, • two storage 1Ml reservoirs, a booster pumpstation, and a 250mm diameter steel rising main, approximately 7km, in length which terminates at a proposed reservoir at Ndaya <p>Phase 4 consist of 7 sub-phases described as follows:</p> <ul style="list-style-type: none"> • Phase 4a consists of the construction of a 250mm diameter uPVC pipeline, |

| Government Notice R983 Activity No: | Describe the relevant Scoping and EIA Activity(ies) in writing as per Listing Notice 1 (GN No. R983) | Describe the portion of the development as per the project description that relates to the applicable listed activity |
|-------------------------------------|--|--|
| | occur within urban area | <p>3.6km in length as well as a 200kl break pressure tank.</p> <ul style="list-style-type: none"> • Phase 4b consists of the construction of a booster pump station, a 160mm diameter Klambon steel rising main pipeline approximately 3.3km in length and a 1Ml storage reservoir located 300m from the "Bhambhata Rock" monument. • Phase 4c consists of approximately 28Km of reticulation and 69 standpipes for the Mpanza area within Ngome. • Phase 4d consists of the construction of a booster pump station, a 125mm diameter Klambon steel rising main line approximately 4.8km in length. • Phase 4e consists of a 400kl storage reservoir as well as approximately 18Km of reticulation and 35 standpipes for the greater Ngome area. • Phase 4f consists of the construction of a booster pump station, a 90mm diameter Klambon steel rising main line approximately 3.5km in length. • Phase 4g consists of a 200kl elevated steel tank (20m high) and approximately 7Km of reticulation and 13 standpipes for the outer Ngome area |

E. Description of the policy and legislative context within which Bulkwater Pipeline for Phase 3 and Phase 4

The list all legislation, policies and/or guidelines of any sphere of government that are relevant to the application as contemplated in the EIA regulations, where applicable are contained in the following **Table 5**:

Table 5: List of Legislation relevant to application

| Title of legislation, policy or guideline | Administering authority | Date of Promulgation |
|--|--|-----------------------------|
| The Constitution of the Republic of South Africa | The 3 spheres of National Government | 1996 August |
| The National Water Act | Department of Water and Sanitation | 1998 |
| Water Services Act | The municipalities | 1997 |
| The National Environmental Management Act | National and Provincial Environmental Affairs Department | 1998 |
| Environmental Impact Assessment Regulations | National and Provincial Environmental Affairs Department | 2014 |
| The National Health Act | Department of Health | 2004 |
| National Heritage Resources Act | Amafa and Dept. of Arts and Culture | 1999 |
| Conservation of Agricultural Resources Act | Department of Agriculture | 1983 |
| KwaZulu Land Affairs Act | Department of Local Government and Traditional Affairs | 1992 |
| Department of Transport | National Road Traffic Act | 1996 |

In the context of the above legislations having direct or indirect impact on the development, the following state departments in **Table 6** are listed as interest and affected parties. This basic assessment report has been circulated to the respective department to solicit comments and inputs in terms of the report. The records of submission is contained in **Appendix 4**. The comments or response received from the interest and affected state department is included in the issues and response report under **Section H** of this report. The proof written comments or report is attached in **Appendix 5**.

Table 6: List of State Department Stakeholders

| Name of Contact Department | Contact person | Address | Document Submitted for Comments (Yes/No) | Comments (Yes/No) |
|--|---------------------------------------|---|---|--------------------------|
| Ezemvelo KZN Wildlife | Dominic Wiener | 1 Peter Brown Drive Pietermaritzburg, 3201 | | |
| Amafa | Annie van de Venter | P.O. Box 2685, Pietermaritzburg, 3200 Tel: 0333 946543 Fax: 0333 426097 | | |
| Department of Water and Sanitation | Lindiwe Dladla | P O Box 1018 Durban, 4000 Tel: 031 336 2700 | | |
| Department of Agriculture, Forestry and Fisheries | Hlengiwe Gumede | P O Box 345 Pietermarisburg, 3200 Tel: 033 345 3515 | | |
| Department of Cooperative Governance and Traditional Affairs | Inkosi PJ Ngubane | P O Box 7034 Tugela Ferry 3010 Tel: 072 925 7814 | | |
| | Induna M Dumakude | P O Box 2379 Tugela Ferry Tel: 079 428 4719 | | |
| | Cllr. S Ximba | P O Box 2555 Tugela Ferry Tel: 072 7437084 | | |
| Department of Transport | Mr Siboniso Mbhele | Private Bag X9063 Pinetown 3600 Tel: 031 700 2222 | | |
| Department of Health | Mr CM Ndaba (Acting District Manager) | P/bag X10620 Stanger 4450 | | |

F. Motivation for the need and desirability for the proposed construction of Bulkwater Pipeline for Phase 3 and Phase 4 including the need and desirability of the activity in the context of the preferred location

Water is an essential resource to the survival of human kind. The water backlog is being experienced in almost all areas within the municipality. According to STATSSA, 2011 and Intergrated Development Plan 2013 - 2014 (IDP 2013/2014) indicates the number of households with access to water at an acceptable RDP level, i.e. water inside the dwelling is about 23% (served at the rate of 25l/cap/day within 200m walking distance). The water backlog is still high, however the district has invested a considerable amount towards the eradication of this backlog, to this end water schemes are still being implemented in the areas.

F.1 Provision of basic water services

This particular scheme serves the primary aim of the Umzinyathi District Municipality as the Water Service Authority to deliver the basic water services to the community within its jurisdiction.

About 40% of the population still obtain water from rivers and streams and rural areas either have no sanitation or rely on pit latrines. Other existing water sources are boreholes which are not reliable, and carting of water by water tankers. Hence the communities will benefit from having safe portable water for consumption and the provision of water unlocks socio-economic development. With this proposed bulk water supply pipelines, it can transfer water quickly and effectively, avoiding evaporation which can occur in an open water transfer or diversion.

F.2 Benefits that the activity will have for society in general

The project development will bring along the following societal benefits in general:-

- The Keates Drift bulk water supply pipelines will ensure a sustainable supply of potable water
- Business opportunities due to increased reliability of water supply will be improved
- Improved property values of residents will be achieved as the area becomes more attractive to its citizens
- Development of Keates Drift area will discourage rural to urban migration of people
- An investment in the infrastructure through which levies can be collected will increase tax base for the municipality
- The construction and operationalization of this infrastructure will generate employment and improve community skills in the Keates Drift area
- Local businesses will benefit from the construction and operationalization of the infrastructure by supplying labour, skills, and materials required
- More investment opportunities will be realised due to the security of supply of water in the area

F.3 Benefits that the activity will have for local community in general

The project development will bring along the following local community benefits in general:-

- The proposed Keates Drift development will provide employment opportunities to the local community both during the construction and operational phases
- It will further contribute to the upliftment of the community through the provision of infrastructure and services in the form of bulk water services in the area
- There will be financial savings to the community by eliminating need for fetching water from long distances
- The construction and operationalisation of this infrastructure will generate employment and improve community skills in the Keates Drift area.

- Supply to schools will improve children's learning experiences and decrease drop-outs
- More hygiene conditions will prevail and eliminate health and environmental risks to people

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G. Motivation for the preferred site, activity and technology alternative

PLEASE NOTE THAT THERE ARE NO SITE ALTERNATIVES FOR THE PROPOSED DEVELOPMENT

There are no site alternatives as the purpose of this development is to provide water to the local community, therefore the region under consideration is the target delivery for the piped water supply and an alternate site is counterproductive. In addition there are no significant route alternatives as the linear development will be aligned adjacent to existing road reserves for the majority of the route. It is also deemed most appropriate / reasonable to locate the pipeline next to the existing road servitudes and to utilise the degraded areas for any potential wetland crossings.

The “no-go” alternative is for the proposed development not go ahead, the site will continue with its current activities and the provision of piped water to the local community will not be undertaken.

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H. A full description of the process followed to reach the proposed preferred alternative within the site

H.1 Details of all the alternative considered

PLEASE NOTE THAT THERE ARE NO SITE ALTERNATIVES FOR THE PROPOSED DEVELOPMENT

There are no site alternatives as the purpose of this development is to provide water to the local community, therefore the region under consideration is the target delivery for the piped water supply and an alternate site is counterproductive. In addition there are no significant route alternatives as the linear development will be aligned adjacent to existing road reserves for the majority of the route. It is also deemed most appropriate / reasonable to locate the pipeline next to the existing road servitudes and to utilise the degraded areas for any potential wetland crossings.

The “no-go” alternative is for the proposed development not go ahead, the site will continue with its current activities and the provision of piped water to the local community will not be undertaken.

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H.2 Details of the Public Participation Process (PPP) undertaken in terms of regulation 41 including copies of the supporting documents and inputs

The public participation process for the construction of Keates Drift Bulkwater Supply Scheme for Phase 3 and 4 entailed the following:

H.2.1 Identification of stakeholders

Identification of stakeholders took place by way of contacting with local municipalities, the Tribal Authority and Induna of the communities Keates Drift, Ward Councillor and State Department that development of the pipeline will trigger their participation. The stakeholder identified are listed in **Table 6**, above

H.2.2 Announcement of the project

A Background Information Document (BID) was prepared as a basis for discussion with stakeholders about the project. The proof of distribution of the BID during the meeting with stakeholders is attached in **Appendix 6**. The BID in the main contained the following among others:

- Background to the project (who, why, where) and the motivation thereof;
- Description of the project;
- Process that will be followed (who can participate in the process, how and when);
- Information about the independent consultants (experience of technical and public participation processes and local experience in the study area).

The copy of the BID is attached herewith in **Annexure 7**.

H.2.3 Meetings

In anticipation of the desirability of the project within the community of the Keates Drift, a decision was taken to advance the cause of the project with the Triabla Authority, Induna of the Area and Ward Councillor. Therefore three meetings were held on 27 March 2015 at Msinga Local Municipality with the respective community leaders, Inkosi PJ Ngubane, Induna M Dumakude and

Councillor S Ximba. The notes or discussion points covered in the separate meetings are contained in **Annexure 8**. The comments sheet issued was discussed with the attendees in order to record issues or comments they could have with regards to the project development. The copy of the comments sheet is attached in **Annexure 9**.

H.2.4 Site Notice

A site notice was displayed on the notice board of the municipality as well as public library. The public was given 30-days to comment on the Draft Basic Assessment Report, in which they were invited to express interest if they need the copy of the report. The report was also made available for reading at the Public Library near Msingal Local Municipality Head Office. The copy of the site notice and advertisement is attached in **Annexure 10**. The proof of site notice displayed on site is contained in **Annexure 11**.

H.2.5 Newspaper Advertisement

The project was advertised in Isolweze Newspaper. The public was given 30-days to comment on the Draft Basic Assessment Report, in which they were invited to express interest if they need the copy of the report. The report was also made available for comments at the Public Libraries in Msinga Public Library in Tugela Ferry and Theodore Menne Library in Greytown. The copy of the advertisement in the Isolweze Newspaper is attached in **Annexure 12**.

H.3 Summary of Issues raised by Interested and Affected Parties (I&AP's)

The summary of issues raised during the public participation process are as follows:-

The Issues and Response Report is contained in **Annexure 13.**

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H.4 Environmental Attributes associated with Alternatives focusing on the Geographical, Physical, Biological, Social, Economic, Heritage and Cultural Aspects

Keates Drift Town is one of the towns of the Msinga Local Municipality situated in the rural area of the northern part of province of KwaZulu Natal. The other towns in the area as part of the municipality are Tugela Ferry, which host the seating of Municipal Offices and Pomeroy. The District Municipality is Umzinyathi District Municipality. The map showing the town of Keates Drift within Msinga Local Municipality in relation to Umzinyathi District Municipality is shown in **Appendix 14**.

The environmental attribute associated with the construction of the bulkwater pipeline is demonstrated and summarised in the **Table 7** below:-

Table 7: Environmental Attributes associated with construction of bulkwater pipeline

| Environmental Attribute | Description |
|--|---|
| Gradient of the site | 1.5 -1.2 m |
| Location in Landscape | Undulating plain/low hills |
| Groundwater | Water table below 1.5m deep |
| Soil | Often Dry hard soil in the area |
| Geological Stability | The geology is rocky but stable |
| Groundcover | Natural veld with heavy alien infestation |
| Land use character of surrounding area | The area is characterised by vacant land, followed by rural community settlement. The pipeline crosses streams along distribution network |
| Cultural and Historical Features | There are cultural/historical features affected by the pipeline |
| Social and Economic aspect | The project will create employment opportunities during construction phase |

H.5 The methodology used in determining and ranking the nature/severity, significance, consequence, extent, duration and probability of potential environmental impacts and risk associated with alternatives

The risk assessment methodology was used for the ranking of the impacts. The severity/intensity of the potential environmental impacts were evaluated according to their severity (how bad the impact is), duration (how long the environment will take to recover from the impact), extent (the area that is effected by the impact), probability (the probability of the impact actually happening), frequency of occurrence (how often the aspect happens) and finally the environmental significance of the impact. All the above was rated on a scale of 5 with 1 being the least impacted.

This system derives environmental significance on the basis of the consequence of the impact on the environment and the likelihood of the impact occurring. Consequence is calculated as the average of the sum of the ratings of severity, duration and extent of the environmental impact. Likelihood considers the frequency of the activity together with the probability of an environmental impact occurring. The following tables (**Table 8 to Table 15**) describe the process in detail:

A. CONSEQUENCE

Consequence (**Table 8**) is calculated as the average of the sum of the ratings of severity (**Table 9**), duration (**Table 10**) and extent (**Table 11**) of the environmental impact.

Table 8: Determination of Consequence

| | |
|---|---|
| Determination of Consequence (C) | (Severity + Duration + Extent) / 3 |
|---|---|

H.5.1 Severity

This is an appraisal of the type of effect the activity would have on the affected environment. This description including what is being affected and how is shown in **Table 9**.

Table 9: Severity Estimation

| Rating | Description |
|--------|---|
| 1 | Negligible / non-harmful / minimal deterioration (0 – 20%) |
| 2 | Minor / potentially harmful / measurable deterioration (20 – 40%) |
| 3 | Moderate / harmful / moderate deterioration (40 – 60%) |
| 4 | Significant / very harmful / substantial deterioration (60 – 80%) |
| 5 | Irreversible / permanent / death (80 – 100%) |

H.5.2 Extent

This indicates the spatial area that may be affected by the impact and further describes the possibility that adjoining areas may be impacted upon. This includes four classes that are listed as follows in **Table 10**:

Table 10: Extent of Activity Estimation

| Rating | Description |
|--------|--|
| 1 | Within immediate area of activity |
| 2 | Surrounding area within project boundary |
| 3 | Beyond project boundary |
| 4 | Regional / provincial |
| 5 | National / international |

H.5.3 Duration

This refers to the period of time that the impact may be operative for (i.e. the lifetime of the impact). This includes the following classes that are listed as follows **Table 11**:

Table 11: Duration of the Impact

| Rating | Description |
|--------|---|
| 1 | Less than 1 month / quickly reversible |
| 2 | Less than 1 year / quickly reversible |
| 3 | More than 1 year / reversible over time |
| 4 | More than 10 years / reversible over time / life of project or facility |
| 5 | Beyond life of project of facility / permanent |

B. LIKELIHOOD

Likelihood (**Table 12**) considers the frequency of the activity together with the probability of the environmental impact associated with that activity occurring.

Table 12: Determination of Likelihood

$$\text{Determination of Likelihood (L)} = \frac{(\text{Frequency} + \text{Probability})}{2}$$

H.5.4 Probability

This refers to the probability of the impact actually occurring. The following classes in **Table 13** are used to describe the probability of the impact:

Table 13: Probability of Impact

| Rating | Description |
|--------|-------------------|
| 1 | Almost impossible |
| 2 | Unlikely |
| 3 | Probable |
| 4 | Highly likely |
| 5 | Definite |

H.5.5 Frequency

This refers to the frequency of the impact actually occurring. The following classes of rating in **Table 14** are used to describe the frequency of the impact occurring:

Table 14: Frequency of the Impact

| Rating | Description |
|--------|-----------------------|
| 1 | Less than once a year |
| 2 | Once in a year |
| 3 | Quarterly |
| 4 | Weekly |
| 5 | Daily |

H.5.6 Environmental Significance

The significance of the impact (i.e. whether it will lead to a marked change in the environment or not) is determined through a synthesis of the aspects produced in terms of their severity, extent, duration, probability and frequency. Therefore, Environmental significance is the product of the consequence and likelihood values. Four classes of environmental significance are tabulated in **Table 15** as follows:

- None (the impact will not have an influence on the decision and requires no mitigation)
- Low (the impact will have a limited influence on the decision and requires mitigation to manage the environment)
- Medium (it is likely that to have an influence on the decision and requires mitigation)
- High (mitigation is required and this may not be sufficient to ensure that the environment is not detrimentally affected by the proposed development)

Table 15: Environmental Significance of Impact

| Environmental Significance (Impact) = C × L | Description |
|--|---|
| N (1 – 4.9) | None environmental significance |
| L (5 – 9.9) | Low environmental significance |
| M (10 – 14.99) | Medium environmental significance |
| H (15 – 25) | High environmental significance. Likely to be a fatal flaw. |

H.6 Impacts and Risk identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these aspects can be reversed, may cause irreplaceable loss of resources and can be avoided, managed or mitigated

Table 16 to **Table 19** shows the environmental significance of impacts and risk identified for the identified alternative (preferred option) both pre-mitigation measures and post-mitigation measures. The environmental significance rating of each aspects pre and post mitigation measures is contained in **Appendix 15**.

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**Table 16: Environmental Significance of Impacts during Design and Planning Phase
DESIGN AND PLANNING PHASE**

| Potential impacts: | Significance rating of impacts: | Proposed mitigation: | Significance rating of impacts after mitigation: |
|-----------------------------------|---------------------------------|---|--|
| Loss of vegetation | None | <ul style="list-style-type: none"> Minimize vegetation destruction to minimum area of Test pit excavations along the sampling points for geotechnical assessment. | None |
| Soil Erosion | None | <ul style="list-style-type: none"> Top soil removed during Test pit excavations along the sampling points for geotechnical assessment must be backfilled and leveled to prior natural conditions | None |
| Water pollution | None | <ul style="list-style-type: none"> Test pit excavation to be conducted outside 100m of the banks of water courses | None |
| Dust generation | None | <ul style="list-style-type: none"> TLB's to only be driven in area that is identified for sampling | None |
| Hazardous Substance contamination | None | <ul style="list-style-type: none"> The TLB's must be provided with drip trays when not in use | None |
| Noise generation | None | <ul style="list-style-type: none"> Avoid excessive revving and ignition of equipment. | None |
| Waste pollution | None | <ul style="list-style-type: none"> Dispose waste at registered waste disposal facility | None |
| Fire ignition | None | <ul style="list-style-type: none"> TLB's to always have fire extinguishers and have employees trained on their use | None |
| Loss of fauna and Flora | None | <ul style="list-style-type: none"> Test pit excavation to be conducted outside 100m of the banks of water courses Minimize vegetation destruction to minimum area of | None |

DESIGN AND PLANNING PHASE

| Potential impacts: | Significance rating of impacts: | Proposed mitigation: | Significance rating of impacts after mitigation: |
|---|---------------------------------|---|--|
| | | Test pit excavations along the sampling points for geotechnical assessment. | |
| Damage to existing infrastructure e.g. sewage lines | None | <ul style="list-style-type: none"> ▪ Infrastructure mapping and confirmation. | |
| Injury to public and animals due to falling into workings | None | <ul style="list-style-type: none"> ▪ Prevent unauthorized entry to the working area | None |
| Traffic congestion | None | <ul style="list-style-type: none"> ▪ Avoid traffic jamming e.g. move machinery and plant outside of rush hour ▪ Plan work area to minimize traffic obstruction | None |
| Traffic incidents | None | <ul style="list-style-type: none"> ▪ Install illuminating warning lights, traffic calming structures, etc. ▪ Use flagman to slow and direct traffic | None |
| Pedestrian injuries and route closures | None | <ul style="list-style-type: none"> ▪ Redirect pedestrians away from working areas ▪ Use barricades and signage ▪ Prevent unauthorized access to working areas | None |
| Stormwater Management | None | <ul style="list-style-type: none"> ▪ The contractor will be advised to implement proper storm management plan | None |
| Cultural Heritage Resources | None | <ul style="list-style-type: none"> ▪ If any cultural and heritage resources can be discovered on the proposed site the construction will have to be halted and the case be reported to SAPS. | None |

Table 17: Environmental Significance of Impacts during the Construction Phase
CONSTRUCTION PHASE

| Potential impacts: | Significance rating of impacts: | Proposed mitigation: | Significance rating of impacts after mitigation: |
|-----------------------------------|---------------------------------|--|--|
| Loss of vegetation | Low | <ul style="list-style-type: none"> Minimize vegetation destruction to minimum area where construction operations are. | None |
| Soil Erosion | Low | <ul style="list-style-type: none"> Minimize vegetation destruction to minimum area where construction operations are. Divert stormwater away from the disturbed areas and loose soils Compact well after pipe laying Cover soil heaps to prevent erosion | None |
| Water pollution | Low | <ul style="list-style-type: none"> Avoid soil erosion (see above) Avoid loss of vegetation (see above) | None |
| Dust generation | Low | <ul style="list-style-type: none"> Limit loss of vegetation (see above) Avoid over movement of plant on site Limit speed to 20km/hr. or less in the construction site Apply dust suppression regularly and as required Cover soil heaps | None |
| Hazardous Substance contamination | Medium | <ul style="list-style-type: none"> Avoid refueling onsite Refueling to occur at designated areas and with drip trays installed | None |

CONSTRUCTION PHASE

| Potential impacts: | Significance rating of impacts: | Proposed mitigation: | Significance rating of impacts after mitigation: |
|---|---------------------------------|--|--|
| | | <ul style="list-style-type: none"> Training of substance handlers for correct handling | |
| Noise generation | Low | <ul style="list-style-type: none"> Proper plant, machinery and motor maintenance Use noise reduction apparatus where applicable Avoid excessive revving and ignition of equipment. Operational hours between 07h00 and 17h00 | None |
| Waste pollution | Medium | <ul style="list-style-type: none"> Use dedicated waste bins Practice waste separation (General and Hazardous) Dispose waste at registered waste disposal facility | None |
| Fire ignition | Low | <ul style="list-style-type: none"> Avoid lighting fires on site Ban smoking near flammable substances Ensure correct handling of flammable substances Have fire extinguishers and have employees trained on their use | None |
| Loss of fauna and Flora | Low | <ul style="list-style-type: none"> Avoid vegetation loss (see above) Avoid fires (see above) Avoid hazardous substance contamination of soil and water (see above) Prevent collection/capture of fauna by employees | None |
| Damage to existing infrastructure e.g. sewage lines | Low | <ul style="list-style-type: none"> Infrastructure mapping and confirmation. Servitude applications Contingency and emergency measures | |
| Injury to public and animals due to falling into workings | Low | <ul style="list-style-type: none"> Prevent unauthorized entry to the working area Barricade all works with barricade fence NO ENTRY and DANGER signs erected and maintained Smallest lead times between trenching and pipe | None |

CONSTRUCTION PHASE

| Potential impacts: | Significance rating of impacts: | Proposed mitigation: | Significance rating of impacts after mitigation: |
|--|---------------------------------|--|--|
| | | burying. | |
| Traffic congestion | Medium | <ul style="list-style-type: none"> ▪ Close dig-up areas as soon as pipes have been laid. ▪ Avoid traffic jamming e.g. move machinery and plant outside of rush hour ▪ Move plant and machinery away from high traffic areas ▪ Plan work area to minimize traffic obstruction | None |
| Traffic incidents | Medium | <ul style="list-style-type: none"> ▪ Avoid traffic congestion (see above) ▪ Implement traffic safety measures ▪ Install illuminating warning lights, traffic calming structures, etc. ▪ Use flagman to slow and direct traffic | None |
| Pedestrian injuries and route closures | Medium | <ul style="list-style-type: none"> ▪ Redirect pedestrians away from working areas ▪ Use barricades and signage ▪ Prevent unauthorized access to working areas | None |
| Stormwater Management | Low | <ul style="list-style-type: none"> ▪ The contractor will be advised to implement proper storm management plan | None |
| Cultural Heritage Resources | Low | <ul style="list-style-type: none"> ▪ If any cultural and heritage resources can be discovered on the proposed site the construction will have to be halted and the case be reported to SAPS. | None |

Table 18: Environmental Significance of Impacts during Decommissioning Phase

| DECOMMISSIONING PHASE | | | |
|-----------------------------------|--|---|---|
| Potential impacts: | Significance rating of impacts: | Proposed rehabilitation measures | Significance rating of impacts after rehabilitation measures |
| Loss of vegetation | Medium | <ul style="list-style-type: none"> ▪ Topsoil removed must be used to level the area, in order to allow the seeds to regerminate ▪ Indigenous vegetation (if any) will need to be relocated and planted again | None |
| Soil Erosion | Low | <ul style="list-style-type: none"> ▪ Rows of straw, hay or bundles of cut vegetation may also be used. In this instance, the hay, straw or vegetation is dug into the soil in contours, in order to help slow surface wash and capture eroded soil. ▪ The spacing between rows would be dependant on slope and the specific area. | None |
| Water pollution | Low | <ul style="list-style-type: none"> ▪ Waste Materials collected on site after decommissioning the site must not be diverted into nearby water courses | None |
| Dust generation | Medium | <ul style="list-style-type: none"> ▪ Avoid over movement of plant on site ▪ Limit speed to 20km/hr. or less in the construction site | None |
| Hazardous Substance contamination | Medium | <ul style="list-style-type: none"> ▪ Refueling to occur at designated areas and with drip trays installed ▪ All waste material generated on site must be disposed off at registererd hazardous landfill site. ▪ Proof of disposal must be made available to Site Engineer | None |
| Noise generation | Low | <ul style="list-style-type: none"> ▪ Avoid excessive revving and ignition of equipment. ▪ Operational hours between 07h00 and 17h00 | None |
| Waste pollution | Medium | <ul style="list-style-type: none"> ▪ Use dedicated waste bins | None |

DECOMMISSIONING PHASE

| Potential impacts: | Significance rating of impacts: | Proposed rehabilitation measures | Significance rating of impacts after rehabilitation measures |
|---|---------------------------------|--|--|
| | | <ul style="list-style-type: none"> Practice waste separation (General and Hazardous) Dispose waste at registered waste disposal facility | |
| Fire ignition | Low | <ul style="list-style-type: none"> Avoid lighting fires on site Ban smoking near flammable substances Ensure correct handling of flammable substances Have fire extinguishers and have employees trained on their use | None |
| Loss of fauna and Flora | Low | <ul style="list-style-type: none"> Rehabilitate the area workings within the water course to allow natural flows Remove structures that can impede natural flow in the water Use Gabion baskets and Rhino mattress to stabilize river banks | None |
| Damage to existing infrastructure e.g. sewage lines | Low | <ul style="list-style-type: none"> Infrastructure mapping and confirmation. Servitude applications Contingency and emergency measures | None |
| Injury to public and animals due to falling into workings | Low | <ul style="list-style-type: none"> Prevent unauthorized entry to the working area Barricade all works with barricade fence NO ENTRY and DANGER signs erected and maintained Smallest lead times between trenching and pipe burying. Close dig-up areas as soon as pipes have been laid. | None |
| Traffic congestion | Medium | <ul style="list-style-type: none"> Avoid traffic jamming e.g. move machinery and plant | None |

DECOMMISSIONING PHASE

| Potential impacts: | Significance rating of impacts: | Proposed rehabilitation measures | Significance rating of impacts after rehabilitation measures |
|--|---------------------------------|--|--|
| | | <p>outside of rush hour</p> <ul style="list-style-type: none"> ▪ Move plant and machinery away from high traffic areas ▪ Plan work area to minimize traffic obstruction | |
| Traffic incidents | Medium | <ul style="list-style-type: none"> ▪ Avoid traffic congestion (see above) ▪ Implement traffic safety measures ▪ Install illuminating warning lights, traffic calming structures, etc. ▪ Use flagman to slow and direct traffic | None |
| Pedestrian injuries and route closures | Medium | <ul style="list-style-type: none"> ▪ Redirect pedestrians away from working areas ▪ Use barricades and signage ▪ Prevent unauthorized access to working areas | None |
| Stormwater Management | Low | <ul style="list-style-type: none"> ▪ The design of drainage and stormwater pipes should be to reduce flow velocity and avoid soil erosion. This can be achieved through the construction of water velocity dissipators below the pipe head wall. ▪ Rocks, boulders or concrete blocks may be utilised for these purposes, and they are set into the concrete pron below the headwall. Stone pitching may also be utilised. | None |

Table 19: Environmental Significance of Impacts during Operational Phase

| OPERATION PHASE | | | |
|---|---------------------------------|--|--|
| Potential impacts: | Significance rating of impacts: | Proposed mitigation measures | Significance rating of impacts after rehabilitation measures |
| Soil Erosion | Low | <ul style="list-style-type: none"> Implement the appropriate topsoil and stormwater runoff control management measures to prevent the loss of topsoil. The site should be graded well to permit drainage and to prevent ponding | None |
| Water pollution | Low | <ul style="list-style-type: none"> A comprehensive water pressure management must be adhered to prevent pressure build ups resulting in pipe burst A use pressure reducing valves must be implemented | None |
| Loss of fauna and Flora | Low | <ul style="list-style-type: none"> Trees and shrubs conserved shall be clearly introduced to the site under the supervision of the Project Enginner. This trees cannot be planted directly on the pipeline, but appropriate planting site must be negotiated well with all interest and affected parties Pipeline crossing over the stream must always be freed of debris building up | None |
| Damage to existing infrastructure e.g. sewage lines | Low | <ul style="list-style-type: none"> Infrastructure mapping and confirmation. Servitude applications Contingency and emergency measures | None |

OPERATION PHASE

| Potential impacts: | Significance rating of impacts: | Proposed mitigation measures | Significance rating of impacts after rehabilitation measures |
|--|---------------------------------|---|--|
| Traffic incidents | Medium | <ul style="list-style-type: none"> ▪ A comprehensive water pressure management must be adhered to prevent pressure build ups resulting in pipe burst ▪ A use pressure reducing valves must be implemented ▪ Implement traffic safety measures in case of pipe burst ▪ Install illuminating warning lights, traffic calming structures, etc. should flooding be the resultant impact ▪ Use flagman to slow and direct traffic | None |
| Pedestrian injuries and route closures | Medium | <ul style="list-style-type: none"> ▪ Redirect pedestrians away from pipe burst areas ▪ Use barricades and signage ▪ Prevent unauthorized access to working areas | None |
| Stormwater Management | Low | <ul style="list-style-type: none"> ▪ Ensure effective storm water management will be exercised to limit negative impacts on the environment and enhance the positive impacts ▪ All contaminated standing water should be immediately removed and treated or disposed of appropriately. ▪ Surfaces and conduits should be constructed to drain the run off more efficiently | None |

H.7 Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects

Table 20 shows the positive and negative impacts the proposed activity will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects.

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Table 20: Positive and Negative Impacts on the Environmental Attributes

| Environmental Attributes | Description | Design and Planning (Positive / Negative Impact) | During Construction – (Positive / Negative Impact) | Post Construction (Positive / Negative Impact) |
|---------------------------------|---------------------------------|--|---|--|
| Gradient of the site | 1.5 -1.2 m | Positive , no change to the gradient of the site | Positive , as the pipeline will follow the slope of the area. | Positive , as the pipeline will follow the slope of the area. |
| Location in Landscape | Undulating plain/low hills | Positive , there will be no change in Landscape | Positive , as the pipeline will be following the land scape | Positive , as the pipeline will be following the land scape |
| Groundwater | Water table below 1.5m deep | Positive , test pit excavations will not intersect the groundwater table | Positive , the pipeline excavations will not intersect the groundwater table. | Positive , the pipeline excavations will not intersect the groundwater table. |
| Soil | Often Dry hard soil in the area | Positive , test pit excavations will only be limited to the sample points | Positive , the ground will only be excavated limited along the surveyed pipeline route | Negative , the excavated portion of the pipeline will be soft and dry during backfilling process and will take longer to harden to pre-soil |

| Environmental Attributes | Description | Design and Planning (Positive / Negative Impact) | During Construction – (Positive / Negative Impact) | Post Construction (Positive / Negative Impact) |
|--------------------------|---|---|--|--|
| | | | | condition structural properties |
| Geological Stability | The geology is rocky but stable | Positive, test pit excavations will only be limited to the sample points | Positive, the ground will only be excavated limited along the surveyed pipeline route | Negative, the excavated portion of the pipeline will soft and dry during backfilling process and will take longer to harden to pre-soil condition structural properties |
| Groundcover | Natural veld with heavy alien infestation | Positive, test pit excavations will only be limited to the sample points | Negative, as the natural veld cover will be lost during the excavations | Negative, as the natural veldcover will take time to reestablish itself to pre-existing environment |
| Groundcover | Natural veld with heavy alien | | Positive, as the alien vegetation will be | Positive, as the alien vegetation will be |

| Environmental Attributes | Description | Design and Planning (Positive / Negative Impact) | During Construction – (Positive / Negative Impact) | Post Construction (Positive / Negative Impact) |
|--|---|--|---|--|
| | infestation | | cleared during the excavations | cleared during the excavations |
| Land use character of surrounding area | The area is characterised by vacant land, followed by rural community settlement. The pipeline crosses streams along distribution network | Positive, test pit excavations will only be limited to the sample points | Negative, along the pipeline route as the area will need be cordoned off as the construction progresses. The communal space will be lost where the pipeline crosses. | Negative, as the pipeline will now establish a new servitude and limited land use character of surrounding area will be minimised |
| Cultural and Historical Features | There are no cultural/historical features affected by the pipeline | Positive, as there are no cultural and historical features affected by the pipeline route | Positive, as there are no cultural and historical features affected by the pipeline route | Positive, as there are no cultural and historical features affected by the pipeline route |

| Environmental Attributes | Description | Design and Planning (Positive / Negative Impact) | During Construction – (Positive / Negative Impact) | Post Construction (Positive / Negative Impact) |
|----------------------------|--|---|---|---|
| Social and Economic aspect | The project will create employment opportunities during construction phase | <u>Positive</u> , as the project will be creating jobs and improving the lives of the community as there will now be access to basic services –water in this case | <u>Positive</u> , as the project will be creating jobs and improving the lives of the community as there will now be access to basic services –water in this case | <u>Positive</u> , as the project will be creating jobs and improving the lives of the community as there will now be access to basic services –water in this case |

H.8 The possible mitigation measures that could be applied and level of residual risk

Table 21 demonstrate mitigation measures to negate negative impacts on the environmental attributes.

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Table 21: Mitigation Measures to negate Negative Impacts on the Environmental Attributes

| Environmental Attribute | Impact | Construction Stage | Mitigation Measures |
|-------------------------|---|---------------------|---|
| Soil | Negative , the excavated portion of the pipeline will soft and dry during backfilling process and will take longer to harden to pre-soil condition structural properties | Post Construction | The backfilling and compaction of soil material must be supervised by a Professional Engineer to at best be pre-natural soil conditions |
| Geological Stability | Negative , the excavated portion of the pipeline will soft and dry during backfilling process and will take longer to harden to pre-soil condition structural properties | Post Construction | The backfilling and compaction of soil material must be supervised by a Professional Engineer to at best be pre-natural soil conditions |
| Groundcover | Negative , as the natural veld cover will be lost during the excavations | During Construction | Top soil stock piling must be well protected and cordoned off from other soil material generated on site, so as to allow natural seeds to regeminate successfully during the rehabilitation of construction |

| Environmental Attribute | Impact | Construction Stage | Mitigation Measures |
|--|--|---------------------|--|
| Groundcover | Negative , as the natural veldcover will take time to reestablish itself to pre-existing environment | Post Construction | works A Specialist Rehabilitation Specialist/ contractor must be appointed to develop rehabilitation plan prior to construction and implement it post construction. The purpose is to rehabilitate the construction footprint to closest the natural state of the site. |
| Land use character of surrounding area | Negative , along the pipeline route as the area will need be cordoned off as the construction progresses. The communal space will be lost where the pipeline crosses. | During Construction | The contractor construction schedule should only be allowed to excavate reasonable length of excavation pit to layoff pipelines, backfill and compact the area to minimise disruption or occupancy of land normally used as communal space. |

| Environmental Attribute | Impact | Construction Stage | Mitigation Measures |
|--|---|--------------------|---|
| Land use character of surrounding area | Negative , as the pipeline will now establish a new servitude and limited land use character of surrounding area will be minimised | Post Construction | The pipeline survey and positioning decision should be based on the least based execution whereby it is aligned to existing servitudes at all times |

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H.9 The outcome of the site selection matrix

PLEASE NOTE THAT THERE ARE NO SITE ALTERNATIVES FOR THE PROPOSED DEVELOPMENT

There are no site alternatives as the purpose of this development is to provide water to the local community, therefore the region under consideration is the target delivery for the piped water supply and an alternate site is counterproductive. In addition there are no significant route alternatives as the linear development will be aligned adjacent to existing road reserves for the majority of the route. It is also deemed most appropriate / reasonable to locate the pipeline next to the existing road servitudes and to utilise the degraded areas for any potential wetland crossings.

The “no-go” alternative is for the proposed development not go ahead, the site will continue with its current activities and the provision of piped water to the local community will not be undertaken.

The proposed pipeline will utilize the existing road reserve toward the target community region, of which will cause least environmental degradation to the geaogrpahy, landscape, and land use charecteristics. Therefore in deciding the least cost option of the pipeline, the environmental consideration matrix of the following was utilized:

- existing infrastructure,
- existing roads reserve,
- legal servitudes,
- access roads,
- gravity and critical water pressure points.

H.10 If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such.

PLEASE NOTE THAT THERE ARE NO SITE ALTERNATIVES FOR THE PROPOSED DEVELOPMENT

There are no site alternatives as the purpose of this development is to provide water to the local community, therefore the region under consideration is the target delivery for the piped water supply and an alternate site is counterproductive. In addition there are no significant route alternatives as the linear development will be aligned adjacent to existing road reserves for the majority of the route. It is also deemed most appropriate / reasonable to locate the pipeline next to the existing road servitudes and to utilise the degraded areas for any potential wetland crossings.

The “no-go” alternative is for the proposed development not go ahead, the site will continue with its current activities and the provision of piped water to the local community will not be undertaken.

The proposed pipeline will utilize the existing road reserve toward the target community region, of which will cause least environmental degradation to the geogrpahy, landscape, and land use charecteristics. Therefore in deciding the least cost option of the pipeline, the environmental consideration matrix of the following was utilized:

- using existing infrastructure,
- using existing roads reserve,
- following existing legal servitudes,
- using current access roads,
- gravity and critical water pressure points.

H.11 A concluding statement indicating the preferred alternatives, including preferred location of the activity

PLEASE NOTE THAT THERE ARE NO SITE ALTERNATIVES FOR THE PROPOSED DEVELOPMENT

There are no site alternatives as the purpose of this development is to provide water to the local community, therefore the region under consideration is the target delivery for the piped water supply and an alternate site is counterproductive. In addition there are no significant route alternatives as the linear development will be aligned adjacent to existing road reserves for the majority of the route. It is also deemed most appropriate / reasonable to locate the pipeline next to the existing road servitudes and to utilise the degraded areas for any potential wetland crossings.

The “no-go” alternative is for the proposed development not go ahead, the site will continue with its current activities and the provision of piped water to the local community will not be undertaken.

The proposed pipeline will utilize the existing road reserve toward the target community region, of which will cause least environmental degradation to the geogrpahy, landscape, and land use charecteristics. Therefore in deciding the least cost option of the pipeline, the environmental consideration matrix of the following was utilized:

- using existing infrastructure,
- using existing roads reserve,
- following existing legal servitudes,
- using current access roads,
- gravity and critical water pressure points.

I. Full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of activity, including

Table 22 to Table 25 shows the environmental significance of impacts and risk identified for the identified alternative (preferred option) both pre-mitigation measures and post-mitigation measures. The environmental significance rating of each aspects pre and post mitigation measures is contained in **Appendix 15**.

The cumulative impacts associated with the project life cycle is demonstrated in **Table 26 to Table 28**.

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Table 22: Environmental Significance of Impacts of Preferred Alternative during Design and Planning Phase

| DESIGN AND PLANNING PHASE | | | |
|-----------------------------------|--|---|---|
| Potential impacts: | Significance rating of impacts: | Proposed mitigation: | Significance rating of impacts after mitigation: |
| Loss of vegetation | None | <ul style="list-style-type: none"> Minimize vegetation destruction to minimum area of Test pit excations along the sampling points for geotechnical assessment. | None |
| Soil Erosion | None | <ul style="list-style-type: none"> Top soil removed during Test pit excations along the sampling points for geotechnical assessment must be backfilled and leveled to prior natural conditions | None |
| Water pollution | None | <ul style="list-style-type: none"> Test pit excavation to be conducted outside 100m of the banks of water courses | None |
| Dust generation | None | <ul style="list-style-type: none"> TLB's to only be driven in area that is identified for sampling | None |
| Hazardous Substance contamination | None | <ul style="list-style-type: none"> The TLB's must be provided with drip trays when not in use | None |
| Noise generation | None | <ul style="list-style-type: none"> Avoid excessive revving and ignition of equipment. | None |
| Waste pollution | None | <ul style="list-style-type: none"> Dispose waste at registered waste disposal facility | None |
| Fire ignition | None | <ul style="list-style-type: none"> TLB's to always have fire extinguishers and have employees trained on their use | None |
| Loss of fauna and Flora | None | <ul style="list-style-type: none"> Test pit excavation to be conducted outside 100m of the banks of water courses Minimize vegetation destruction to minimum area of Test pit excations along the sampling points for | None |

DESIGN AND PLANNING PHASE

| Potential impacts: | Significance rating of impacts: | Proposed mitigation: | Significance rating of impacts after mitigation: |
|---|---------------------------------|---|--|
| | | geotechnical assessment. | |
| Damage to existing infrastructure e.g. sewage lines | None | <ul style="list-style-type: none"> ▪ Infrastructure mapping and confirmation. | None |
| Injury to public and animals due to falling into workings | None | <ul style="list-style-type: none"> ▪ Prevent unauthorized entry to the working area | None |
| Traffic congestion | None | <ul style="list-style-type: none"> ▪ Avoid traffic jamming e.g. move machinery and plant outside of rush hour ▪ Plan work area to minimize traffic obstruction | None |
| Traffic incidents | None | <ul style="list-style-type: none"> ▪ Install illuminating warning lights, traffic calming structures, etc. ▪ Use flagman to slow and direct traffic | None |
| Pedestrian injuries and route closures | None | <ul style="list-style-type: none"> ▪ Redirect pedestrians away from working areas ▪ Use barricades and signage ▪ Prevent unauthorized access to working areas | None |
| Stormwater Management | None | <ul style="list-style-type: none"> ▪ The contractor will be advised to implement proper storm management plan | None |
| Cultural Heritage Resources | None | <ul style="list-style-type: none"> ▪ If any cultural and heritage resources can be discovered on the proposed site the construction will have to be halted and the case be reported to SAPS. | None |

Table 23: Environmental Significance of Impact of the Preferred Alternative during Construction Phase

| CONSTRUCTION PHASE | | | |
|-----------------------------------|--|--|---|
| Potential impacts: | Significance rating of impacts: | Proposed mitigation: | Significance rating of impacts after mitigation: |
| Loss of vegetation | Low | <ul style="list-style-type: none"> ▪ Minimize vegetation destruction to minimum area where construction operations are. | None |
| Soil Erosion | Low | <ul style="list-style-type: none"> ▪ Minimize vegetation destruction to minimum area where construction operations are. ▪ Divert stormwater away from the disturbed areas and loose soils ▪ Compact well after pipe laying ▪ Cover soil heaps to prevent erosion | None |
| Water pollution | Low | <ul style="list-style-type: none"> ▪ Avoid soil erosion (see above) ▪ Avoid loss of vegetation (see above) | None |
| Dust generation | Low | <ul style="list-style-type: none"> ▪ Limit loss of vegetation (see above) ▪ Avoid over movement of plant on site ▪ Limit speed to 20km/hr. or less in the construction site ▪ Apply dust suppression regularly and as required ▪ Cover soil heaps | None |
| Hazardous Substance contamination | Medium | <ul style="list-style-type: none"> ▪ Avoid refueling onsite ▪ Refueling to occur at designated areas and with drip trays installed ▪ Training of substance handlers for correct handling | None |
| Noise generation | Low | <ul style="list-style-type: none"> ▪ Proper plant, machinery and motor maintenance ▪ Use noise reduction apparatus where applicable | None |

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| | | | |
|---|---------------|--|-------------|
| | | <ul style="list-style-type: none"> ▪ Avoid excessive revving and ignition of equipment. ▪ Operational hours between 07h00 and 17h00 | |
| Waste pollution | Medium | <ul style="list-style-type: none"> ▪ Use dedicated waste bins ▪ Practice waste separation (General and Hazardous) ▪ Dispose waste at registered waste disposal facility | None |
| Fire ignition | Low | <ul style="list-style-type: none"> ▪ Avoid lighting fires on site ▪ Ban smoking near flammable substances ▪ Ensure correct handling of flammable substances ▪ Have fire extinguishers and have employees trained on their use | None |
| Loss of fauna and Flora | Low | <ul style="list-style-type: none"> ▪ Avoid vegetation loss (see above) ▪ Avoid fires (see above) ▪ Avoid hazardous substance contamination of soil and water (see above) ▪ Prevent collection/capture of fauna by employees | None |
| Damage to existing infrastructure e.g. sewage lines | Low | <ul style="list-style-type: none"> ▪ Infrastructure mapping and confirmation. ▪ Servitude applications ▪ Contingency and emergency measures | |
| Injury to public and animals due to falling into workings | Low | <ul style="list-style-type: none"> ▪ Prevent unauthorized entry to the working area ▪ Barricade all works with barricade fence ▪ NO ENTRY and DANGER signs erected and maintained ▪ Smallest lead times between trenching and pipe burying. ▪ Close dig-up areas as soon as pipes have been laid. | None |
| Traffic congestion | Medium | <ul style="list-style-type: none"> ▪ Avoid traffic jamming e.g. move machinery and plant outside of rush hour ▪ Move plant and machinery away from high traffic areas ▪ Plan work area to minimize traffic obstruction | None |

| | | | |
|--|---------------|--|-------------|
| Traffic incidents | Medium | <ul style="list-style-type: none"> ▪ Avoid traffic congestion (see above) ▪ Implement traffic safety measures ▪ Install illuminating warning lights, traffic calming structures, etc. ▪ Use flagman to slow and direct traffic | None |
| Pedestrian injuries and route closures | Medium | <ul style="list-style-type: none"> ▪ Redirect pedestrians away from working areas ▪ Use barricades and signage ▪ Prevent unauthorized access to working areas | None |
| Stormwater Management | Low | <ul style="list-style-type: none"> ▪ The contractor will be advised to implement proper storm management plan | None |
| Cultural Heritage Resources | Low | <ul style="list-style-type: none"> ▪ If any cultural and heritage resources can be discovered on the proposed site the construction will have to be halted and the case be reported to SAPS. | None |

Table 24: Environmental Significance of Impact on the Preferred Alternative during Decommissioning Phase

| DECOMMISSIONING PHASE | | | |
|-----------------------------------|---------------------------------|---|--|
| Potential impacts: | Significance rating of impacts: | Proposed rehabilitation measures | Significance rating of impacts after rehabilitation measures |
| Loss of vegetation | Medium | <ul style="list-style-type: none"> Topsoil removed must be used to level the area, in order to allow the seeds to regerminate Indigenous vegetation (if any) will need to be relocated and planted again | None |
| Soil Erosion | Low | <ul style="list-style-type: none"> Rows of straw, hay or bundles of cut vegetation may also be used. In this instance, the hay, straw or vegetation is dug into the soil in contours, in order to help slow surface wash and capture eroded soil. The spacing between rows would be dependant on slope and the specific area. | None |
| Water pollution | Low | <ul style="list-style-type: none"> Waste Materials collected on site after decommissioning the site must not be diverted into nearby water courses | None |
| Dust generation | Medium | <ul style="list-style-type: none"> Avoid over movement of plant on site Limit speed to 20km/hr. or less in the construction site | None |
| Hazardous Substance contamination | Medium | <ul style="list-style-type: none"> Refueling to occur at designated areas and with drip trays installed All waste material generated on site must be disposed off at registererd hazardous landfill site. Proof of disposal must be made available to Site Engineer | None |
| Noise generation | Low | <ul style="list-style-type: none"> Avoid excessive revving and ignition of equipment. Operational hours between 07h00 and 17h00 | None |
| Waste pollution | Medium | <ul style="list-style-type: none"> Use dedicated waste bins | None |

DECOMMISSIONING PHASE

| Potential impacts: | Significance rating of impacts: | Proposed rehabilitation measures | Significance rating of impacts after rehabilitation measures |
|---|---------------------------------|--|--|
| | | <ul style="list-style-type: none"> Practice waste separation (General and Hazardous) Dispose waste at registered waste disposal facility | |
| Fire ignition | Low | <ul style="list-style-type: none"> Avoid lighting fires on site Ban smoking near flammable substances Ensure correct handling of flammable substances Have fire extinguishers and have employees trained on their use | None |
| Loss of fauna and Flora | Low | <ul style="list-style-type: none"> Rehabilitate the area workings within the water course to allow natural flows Remove structures that can impede natural flow in the water Use Gabion baskets and Rhino mattress to stabilize river banks | None |
| Damage to existing infrastructure e.g. sewage lines | Low | <ul style="list-style-type: none"> Infrastructure mapping and confirmation. Servitude applications Contingency and emergency measures | None |
| Injury to public and animals due to falling into workings | Low | <ul style="list-style-type: none"> Prevent unauthorized entry to the working area Barricade all works with barricade fence NO ENTRY and DANGER signs erected and maintained Smallest lead times between trenching and pipe burying. Close dig-up areas as soon as pipes have been laid. | None |
| Traffic congestion | Medium | <ul style="list-style-type: none"> Avoid traffic jamming e.g. move machinery and plant outside of rush hour | None |

DECOMMISSIONING PHASE

| Potential impacts: | Significance rating of impacts: | Proposed rehabilitation measures | Significance rating of impacts after rehabilitation measures |
|--|---------------------------------|--|--|
| | | <ul style="list-style-type: none"> Move plant and machinery away from high traffic areas Plan work area to minimize traffic obstruction | |
| Traffic incidents | Medium | <ul style="list-style-type: none"> Avoid traffic congestion (see above) Implement traffic safety measures Install illuminating warning lights, traffic calming structures, etc. Use flagman to slow and direct traffic | None |
| Pedestrian injuries and route closures | Medium | <ul style="list-style-type: none"> Redirect pedestrians away from working areas Use barricades and signage Prevent unauthorized access to working areas | None |
| Stormwater Management | Low | <ul style="list-style-type: none"> The design of drainage and stormwater pipes should be to reduce flow velocity and avoid soil erosion. This can be achieved through the construction of water velocity dissipators below the pipe head wall. Rocks, boulders or concrete blocks may be utilised for these purposes, and they are set into the concrete pron below the headwall. Stone pitching may also be utilised. | None |

Table 25: Environmental Significance of Impact of Preferred Alternative during Operation Phase

| OPERATION PHASE | | | |
|---------------------------|--|--|---|
| Potential impacts: | Significance rating of impacts: | Proposed mitigation measures | Significance rating of impacts after rehabilitation measures |
| Soil Erosion | Low | <ul style="list-style-type: none"> ▪ Implement the appropriate topsoil and stormwater runoff control management measures to prevent the loss of topsoil. ▪ The site should be graded well to permit drainage and to prevent ponding | None |
| Water pollution | Low | <ul style="list-style-type: none"> ▪ A comprehensive water pressure management must be adhered to prevent pressure build ups resulting in pipe burst ▪ A use pressure reducing valves must be implemented | None |
| Loss of fauna and Flora | Low | <ul style="list-style-type: none"> ▪ Trees and shrubs conserved shall be clearly introduced to the site under the supervision of the Project Engineer. ▪ This trees cannot be planted directly on the pipeline, but appropriate planting site must be negotiated well with all interest and affected parties ▪ Pipeline crossing over the stream must always be freed of debris building up | None |

OPERATION PHASE

| Potential impacts: | Significance rating of impacts: | Proposed mitigation measures | Significance rating of impacts after rehabilitation measures |
|---|---------------------------------|---|--|
| Damage to existing infrastructure e.g. sewage lines | Low | <ul style="list-style-type: none"> ▪ Infrastructure mapping and confirmation. ▪ Servitude applications ▪ Contingency and emergency measures | None |
| Traffic incidents | Medium | <ul style="list-style-type: none"> ▪ A comprehensive water pressure management must be adhered to prevent pressure build ups resulting in pipe burst ▪ A use pressure reducing valves must be implemented ▪ Implement traffic safety measures in case of pipe burst ▪ Install illuminating warning lights, traffic calming structures, etc. should flooding be the resultant impact ▪ Use flagman to slow and direct traffic | None |
| Pedestrian injuries and route closures | Medium | <ul style="list-style-type: none"> ▪ Redirect pedestrians away from pipe burst areas ▪ Use barricades and signage ▪ Prevent unauthorized access to working areas | None |
| Stormwater Management | Low | <ul style="list-style-type: none"> ▪ Ensure effective storm water management will be exercised to limit negative impacts on the environment and enhance the positive impacts ▪ All contaminated standing water should be immediately removed and treated or disposed of appropriately. ▪ Surfaces and conduits should be constructed to drain the run off more efficiently | None |

Table 26: Cumulative Impacts of Preferred Alternative during Construction Phase
CONSTRUCTION PHASE

| Potential impacts: | Significance rating of impacts: | Proposed mitigation: | Significance rating of impacts after mitigation: | Cumulative Impact |
|-----------------------------------|---------------------------------|---|--|--|
| Hazardous Substance contamination | Medium | <ul style="list-style-type: none"> ▪ Avoid refueling onsite ▪ Refueling to occur at designated areas and with drip trays installed ▪ Training of substance handlers for correct handling | None | Loss of land capability and groundwater pollution due to Oil and Grease contamination |
| Waste pollution | Medium | <ul style="list-style-type: none"> ▪ Use dedicated waste bins ▪ Practice waste separation (General and Hazardous) ▪ Dispose waste at registered waste disposal facility | None | Creation of illegal dumping site and could cause significant health hazard to the surrounding community and living animals |
| Traffic congestion | Medium | <ul style="list-style-type: none"> ▪ Avoid traffic jamming e.g. move machinery and plant outside of rush hour ▪ Move plant and machinery away from high traffic areas ▪ Plan work area to minimize traffic obstruction | None | Traffic Congestions may lead to illegal driving and creation of alternative routes around the works leading to damage of the surrounding environments, and infrastructure. |
| Traffic incidents | Medium | <ul style="list-style-type: none"> ▪ Avoid traffic congestion (see | None | Road closures may lead to |

CONSTRUCTION PHASE

| Potential impacts: | Significance rating of impacts: | Proposed mitigation: | Significance rating of impacts after mitigation: | Cumulative Impact |
|--|---------------------------------|--|--|---|
| | | above) <ul style="list-style-type: none"> ▪ Implement traffic safety measures ▪ Install illuminating warning lights, traffic calming structures, etc. ▪ Use flagman to slow and direct traffic | | road rages by motorist to fellow motorists or pedestrians |
| Pedestrian injuries and route closures | Medium | <ul style="list-style-type: none"> ▪ Redirect pedestrians away from working areas ▪ Use barricades and signage ▪ Prevent unauthorized access to working areas | None | Public injuries may lead to negativity by the communities against the project |

Table 27: Cumulative Impact of Preferred Alternative during Decommissioning Phase

| DECOMMISSIONING PHASE | | | | |
|-----------------------------------|--|--|---|---|
| Potential impacts: | Significance rating of impacts: | Proposed rehabilitation measures | Significance rating of impacts after rehabilitation measures | Cumulative Impact |
| Loss of vegetation | Medium | <ul style="list-style-type: none"> ▪ Topsoil removed must be used to level the area, in order to allow the seeds to regeminate ▪ Indigenous vegetation (if any) will need to be relocated and planted again | None | <ul style="list-style-type: none"> ▪ Loss of indigenous vegetation through seeds not regeminating at right season |
| Dust generation | Medium | <ul style="list-style-type: none"> ▪ Avoid over movement of plant on site ▪ Limit speed to 20km/hr. or less in the construction site | None | <ul style="list-style-type: none"> ▪ Loss of vegetation post construction due to leaves suffocating under accumulated dust |
| Hazardous Substance contamination | Medium | <ul style="list-style-type: none"> ▪ Refueling to occur at designated areas and with drip trays installed ▪ All waste material generated on site must be disposed off at registererd hazardous landfill site. ▪ Proof of disposal must be made available to Site Engineer | None | <ul style="list-style-type: none"> ▪ Loss of land capability and groundwater pollution due to Oil and Grease contamination |

DECOMMISSIONING PHASE

| Potential impacts: | Significance rating of impacts: | Proposed rehabilitation measures | Significance rating of impacts after rehabilitation measures | Cumulative Impact |
|-------------------------------|---------------------------------|--|--|--|
| Waste pollution | Medium | <ul style="list-style-type: none"> Use dedicated waste bins Practice waste separation (General and Hazardous) Dispose waste at registered waste disposal facility | None | <ul style="list-style-type: none"> Creation of illegal dumping site and could cause significant health hazard to the surrounding community and living animals |
| Traffic congestion | Medium | <ul style="list-style-type: none"> Avoid traffic jamming e.g. move machinery and plant outside of rush hour Move plant and machinery away from high traffic areas Plan work area to minimize traffic obstruction | None | <ul style="list-style-type: none"> Traffic Congestions may lead to illegal driving and creation of alternative routes around the works leading to damage of the surrounding environments, and infrastructure. |
| Traffic incidents | Medium | <ul style="list-style-type: none"> Avoid traffic congestion (see above) Implement traffic safety measures Install illuminating warning lights, traffic calming structures, etc. Use flagman to slow and direct traffic | None | <ul style="list-style-type: none"> Road closures may lead to road rages by motorist to fellow motorists or pedestrians |
| Pedestrian injuries and route | Medium | <ul style="list-style-type: none"> Redirect pedestrians away from working areas | None | <ul style="list-style-type: none"> Public injuries may lead to negativity by the |

DECOMMISSIONING PHASE

| Potential impacts: | Significance rating of impacts: | Proposed rehabilitation measures | Significance rating of impacts after rehabilitation measures | Cumulative Impact |
|--------------------|---------------------------------|--|--|---------------------------------|
| closures | | <ul style="list-style-type: none"> Use barricades and signage Prevent unauthorized access to working areas | | communities against the project |

Table 28: Cumulative Impact of Preferred Alternative during the Operation Phase

OPERATION PHASE

| Potential impacts: | Significance rating of impacts: | Proposed mitigation measures | Significance rating of impacts after rehabilitation measures | Cumulative Impact |
|--------------------|---------------------------------|---|--|---|
| Traffic incidents | Medium | <ul style="list-style-type: none"> A comprehensive water pressure management must be adhered to prevent pressure build ups resulting in pipe burst A use pressure reducing valves must be implemented Implement traffic safety measures in case of pipe burst Install illuminating warning lights, traffic calming structures, etc. should flooding be the resultant impact | None | <ul style="list-style-type: none"> Background leaking of pipelines, that leads unaccounted for water in the system |

OPERATION PHASE

| Potential impacts: | Significance rating of impacts: | Proposed mitigation measures | Significance rating of impacts after rehabilitation measures | Cumulative Impact |
|--|---------------------------------|---|--|---|
| | | <ul style="list-style-type: none"> Use flagman to slow and direct traffic | | |
| Pedestrian injuries and route closures | Medium | <ul style="list-style-type: none"> Redirect pedestrians away from pipe burst areas Use barricades and signage Prevent unauthorized access to working areas | None | <ul style="list-style-type: none"> Background leaking of pipelines, that leads unaccounted for water in the system |

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J. A summary of the findings and impact management measures identified in any of specialist report complying with Appendix 6 to these regulations and a indication as to how these finding and recommendations have been included in the final report

The assessment area falls within two quaternary catchments, V20J and V60K quaternary catchment of the Thukela Water Management Area (WMA 7). The main drainage feature of the catchment is the Loza River, which is a major tributary of the Mooi River in the V20J quaternary catchment. It drains on the north-east direction onto the Thukela River. The V60K quaternary catchment constitutes a small section of the bulk pipeline and consists of the Nadi River, which flows directly onto the Thukela River.

Three wetland units were identified on site. These consisted of a floodplain, which was associated with the Mooi River where the bulk pipeline starts, and two channelled valley bottom wetlands, one associated with the Loza River along the D1268 Road and the other was associated with the Mpanza River, a tributary of the Loza River along the R33. The report is attached herewith in **Appendix 18**

The expected impacts associated with the floodplain and channelled valley bottom wetlands due to the proposed bulk pipeline construction activities are summarised as follows:

i. Loss and disturbance of wetland habitat

Mitigation:

- Avoid additional wetland loss by limiting construction activities to as small an area as possible.
- Mark wetland areas with 'No-Go' signage.
- Clearly demarcate the required servitudes in the field and limit all

activities to the demarcated areas.

- Include environmental awareness aspects into the site induction program to ensure all staff are aware of the location and importance of wetland habitats in the vicinity of the construction activities.
- Establish emergency response measures and a clearly defined chain of communication to rapidly deal with any unforeseen impacts to wetlands, e.g. spills.
- Regular cleaning up of the wetland areas should be undertaken to remove litter.

ii. **Increased sediment transport into wetlands**

Mitigation:

- Phase vegetation clearing activities as far as possible to limit the area exposed at any one time.
- Where practically possible, the major earthworks should be undertaken during the dry season (roughly from April to August) to limit erosion due to rainfall runoff.
- Install sediment barriers and/or low berms along the downslope edge of cleared areas to trap sediments on site. Design of sediment barriers should be such that expected flow velocities will not damage the barriers or impair their function. Regular cleaning and maintenance of the barriers should be undertaken.

iii. **Altered flow characteristics within wetlands**

Mitigation:

Design and implement a construction stormwater management plan that aims to minimise the concentration of flow and increase in flow velocity, as well as minimising sediment transport off site.

iv. **Water quality deterioration within wetlands**

Mitigation:

- Store and handle potentially polluting substances and waste in designated, bunded facilities.
- Waste should be regularly removed from the construction site by suitably

equipped and qualified operators and disposed of in approved facilities.

- Locate temporary waste and hazardous substance storage facilities a minimum of 100m from any wetland edge.
- Keep sufficient quantities of spill clean-up materials on site.

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K. An environmental impact statement

The impact associated with the construction of the of Keates Drift Bulkwater Supply Scheme for Phase 3 and Phase have been adequately assessed in this report at different phase of the life of activity of the project i.e planning and design phase, construction phase, decommissioning phase and operational phase.

A map is attached herewith in **Appendix 16** showing the proposed activity and its associated infrastructure in relation to environmental sensitivity of the site. The objective here is delineate where feasible the areas that are sensitive and proper care and due diligence must be activated during the construction, rehabilitation and operation of the project. **Appendix 21** details the proposed Engineering Design of the Keates Drift Water Supply for Phase 3 and Phase 4 Scheme.

There will be less environmental significance during the planning and design phase, as much of the work is designed around ground trothing and review of the information in the general public domain. However there is an aspects of surveying and geotechnical assessments asscoaited with this phase, which if not properly managed and controlled can have detrimental impact to the environment. In this case of this project, these aspects will have less environmental significance.

During the construction phase, there are aspects of construction that needs to managed accordingly to reduce the environmental significance of the impacts. The Environmental Management Programme (EMPr) to manage and monitor mitigation of this impacts by the contractor.

Although an aspect might have a rating of none or low environmental significance, that aspect might have cumulative impact if not properly

managed. In this case some of issues such as management of soil generated on site as well as loss of vegetation, noise of construction machinery and traffic management if not properly mitigated can have high environmental significance and makes the whole project undesirable to the environment.

Aspect such as, refueling at dedicated fuel storage, improper waste management practices and insufficient traffic management practice have a medium environmental significance. If the aspects are not monitored as per the recommended mitigation measures, they will also trigger high environmental significance, and thus the desirable objective of the will not be realized. This will have negative consequences as the community will continue without access to basic service guaranteed by the Constitution of the Republic of South Africa.

It is therefore desirable that the Project Manager appoint the Environmental Control Officer whom's primary responsibility is to ensure compliance by the Contractor with all the mitigation measures contained in the EMPr.

The negative environmental impact of the project on the environmental attributes are far outweighed by the sole delivery of the basic services of water provision to the people. The pipeline will only be using the current approved servitudes, road reserve and infrastructure delivery route. Therefore, although there will be such negative effect on the environment, the mitigation measures recommended must be adhered to as will be outlined in the EMPr.

It is therefore imperative that EMPr is well versed with the contractor during the construction and rehabilitation phase. Also the Rehabilitation Specialist must be appointed prior to starting with construction, so that world class rehabilitation practices are adopted before construction commences.

- L. Environmental Management Programme including where applicable impact management measures from specialist report, the recording of the proposed impact management objectives, and the impact management outcomes for the development

The Environmental Management Programme is attached herewith in **Appendix 17** of this report.

DRAFT

- M. Any aspects which were conditional to the finding of the assessment either by the EAP or specialist which are to be included as conditions of authorization

DRAFT

- N. A description of any assumptions, uncertainties, gaps in knowledge which relate to the assessment and mitigation measures proposed**

DRAFT

O. A reasoned opinion as to whether the proposed activity should or should not be authorized, and if the opinion is that it should be authorized, any conditions that should be made in respect of that authorization

Water is an essential resource to the survival of human kind. Umzinyathi District Municipality as Water Service Authority is properly legislated and mandated within the three spheres of government to provide water services to the communities within its municipal jurisdiction boundaries. The current assessment of water service provision within Msinga Local Municipality shows that, the municipality experiences water backlog. People supplement this lack of provision of water by the municipality by fetching water from rivers or flowing streams to meet their living needs amidst the water pollution experienced by our natural water resources. This is despite the non-negotiable guarantees the supreme law of the country affords every citizen whom is born in the Republic of South Africa.

It is therefore heart warming the conceptualization and intent to implement this kind of the scheme by Umzinyathi District Municipality defying the odds faced by our local authorities in the country in ensuring that community of Keates Drift realize this ideal enshrined in the constitution.

The environmental impact assessment concluded that, yes, during implementation of magnitude of this project there will be temporal loss of certain environmental attributes along the route of target delivery community. Thus, we have appreciated that and acknowledge the loss. However the profound nature of this scheme negates the temporal environmental losses we are going to lose. We still have to protect same by the way. But the mitigation measures we recommend to be put in place to manage this less environmental significance impacts, should allow us to restore the environment to its close pristine conditions albeit not equivalent.

It is against this background that, I have assessed and processed all the possible environmental impacts within my knowledge that could be associated with The Construction of Keates Drift Bulk Water Supply Scheme for Phase 3 and Phase 4 and its desirable objectives, thus:-

I can , soundly recommend to the KwaZulu Natal Department of Economic Development, Tourism and Environmental Affairs to authorize Construction of Keates Drift Bulk Water Supply Scheme for Phase 3 and Phase 4 as proposed by Umzinyathi District Municipality.

This recommendation has the following bearing on to Municipality implementing in its entirety the mitigation measures and conditions suggested elsewhere in this report, contained in the **Environmental Management Programme (EMPr) dated April 2015** and further management measures and conditions recommended by the responding Authority.

- P. Where the proposed activity does not include operational aspects, the period for which the environmental authorization is required, the date on which the activity will be concluded, and the post construction monitoring requirements

DRAFT

Q. An undertaking under oath or affirmation by the EAP in relation to:

I, **KGOMOTSO MOTSEPE** declare that I

- am the independent environmental practitioner in this application;
- will comply with the requirements for an EAP as stipulated in Regulation 13 of the EIA Regulations, 2014;
- do not have and will not have any vested interest (either business, financial, personal or other) in the undertaking of the proposed activity, other than remuneration for work performed in terms of the Environmental Impact Assessment Regulations, 2014;
- will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- declare that there are no circumstances that may compromise my objectivity in performing such work;
- have expertise in conducting environmental impact assessments, including knowledge of the National Environmental Management Act, 1998 (Act 107 of 1998), regulations and any guidelines that have relevance to the proposed activity;
- will comply with the National Environmental Management Act, 1998 (Act 107 of 1998), regulations and all other applicable legislation;
- undertake to disclose to the applicant and the KZN Department of Economic Development, Tourism & Environmental Affairs all material information in my possession that reasonably has or may have the potential of influencing its decision with respect to this application;
- will ensure that information containing all reports in respect of this application is distributed or made available to interested and affected parties and that their participation is facilitated in such a manner that they will be provided with a reasonable opportunity to participate and provide comments on the reports;
- will provide the competent authority with access to all information at my disposal regarding this application, whether such information is favourable to the applicant or not;
- declare that all the particulars furnished by me in this form are true and correct;
- I am aware that a person is guilty of an offence in terms of Regulation 48 (1) of the EIA Regulations, 2014, if that person provides incorrect or misleading information. A person who is convicted of an offence in terms of sub-regulation 48(1) (a)-(e) is liable to the penalties as contemplated in section 49B(1) of the National Environmental Management Act, 1998 (Act 107 of 1998); and

- I will comply with all the requirements as indicated in the National Environmental Management Act, 1998 (Act 107 of 1998) and Environmental Impact Assessment Regulations, 2014.

Name of the Environmental Assessment Practitioner

Signature of the Environmental Assessment Practitioner

Name of company

Date

Name of Commissioner of Oaths

Signature of Commissioner of Oaths

Date

Designation

Official stamp (below)

- R. Where applicable, details of any financial provisions for rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts

DRAFT

- S. Any specific information that may be required by the competent authority

DRAFT

- T. Any other matters required in terms of section 24(4)(a) and (b) of the Act**

DRAFT