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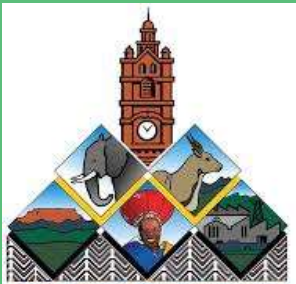


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JULY 2020
DRAFT BASIC ASSESSMENT REPORT
MPOLWENI AND THOKOZANI WATER SUPPLY
SCHEME
UMSHWATHI LOCAL MUNICIPALITY
EIA REF NO: DC22/0009/2020



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DISTRICT MUNICIPALITY
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**This report was prepared by EnviroPro Environmental Consulting in terms of
Appendix 1 to GNR 982**

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Executive Summary

The uMgungundlovu District Municipality proposes to upgrade and construct the Mpolweni and Thokozani Water Supply Scheme (WSS) within Wards 1, 9 and 10 of the uMshwathi Local Municipality. Although there is an existing bulk pipeline in place, the reticulation network does not service all the communities in each of these areas due to ongoing expansion of settlements. The project will address two specific areas namely Mpolweni and Thokozani. The Mpolweni project area is located within Wards 9 and 10 and encompasses an area measuring approximately 16.3km². The centre point of this project area is 29°25'17.65"S; 30°28'55.12"E and includes the areas of Emvundlweni, Newtown, Emseni, Ekukhuleni, Vundla Road, Ematshali Ext 1 and Kogcwabaza. The Thokozani project area is located within Ward 1 next to the Albert Falls Dam and covers an area of approximately 2.66km². The centre point of this project area is 29°25'33.95"S; 30°26'3.67"E and includes the area of Thokozani. Two Listing Notice 1 Activities have been identified for this project; these are Activities 12 and 19. Activity 12 is triggered as there will be 481.81m² of infrastructure constructed within 32m of identified drainage features. Activity 19 will also be triggered as there will be 606.21m³ of soil removed from the identified drainage features, taking an average trench depth of 1m. One Listing Notice 3 Activity has also been identified for this project, this is Activity 14. A portion of the site is located within 5km of the Albert Falls Nature Reserve and therefore there will be 177.77m² of infrastructure within 32m of the identified watercourses within this 5km buffer

The primary objectives for the project are as follows:

- To provide access to a potable water supply for the various communities in the project area.
- To reduce the water services backlog and uplift the communities' standard of living.
- To provide the communities with a uniform level of service through individual house connections.
- To construct new infrastructure that will serve to satisfy the increasing water demand within the project area.
- To provide an economically efficient solution to the current water supply problem.
- To provide a level of service that will ultimately allow for a waterborne sanitation system in the future.
- To provide employment for local labour.
- To provide and encourage skills development through intensive programmes directly involved in the planning, construction and commissioning of the scheme.

The following key impacts and mitigation measures were assessed:

- **Damage to all identified watercourses in the project area from construction activity:**
Caution must be exercised when working near and within all watercourses. Top soil must be stockpiled more than 22m from the watercourses. Heavy vehicles must be kept at least 22m away from the watercourses except where needed for pipeline construction. The construction footprint within watercourses must not be widened more than is necessary for construction.
- **Encroachment of alien vegetation into areas disturbed during construction:**
Alien vegetation within the construction footprint must not be allowed to encroach onto the site footprint area and must be continually removed during construction.
- **Damage to surrounding properties, services and businesses:**
The construction activity could disrupt access to existing services, and residential properties. All services must be identified prior to construction and all stakeholders must be notified prior to road closures and service disruption. Temporary alternative access routes for affected properties must be created where required.
- **Pipeline impeding or altering flow of the watercourses:**
The pipelines within the watercourse will be laid below the level of the river bed and encased in concrete. Concrete anchors will be used to keep the pipeline in place during high flow events.
- **Loss of riparian/wetland vegetation during excavation across watercourses:**
Vegetation clearing is to be kept to a minimum due to the small size of the pipes and associated trench. Where possible the trench must be dug by hand across the watercourses to prevent unnecessary clearance. The potential for erosion is to be monitored by the Contractor on an ongoing basis during clearing.
- **Improved services:**
The water supply scheme will improve service delivery to the area and increase the potable water supply for future expansion of the area. This is a positive impact.

These impacts can be mitigated by following the recommendations in this report and EMP. Construction activities will be monitored and controlled through the implementation of the Environmental Management Programme (EMP).

The aim of the project is to improve the supply of potable water to this area with as little environmental and infrastructural disturbance/impact as possible. The pipeline layout has been designed to reticulate water to the community with the least number of watercourse crossings. The pipeline route will predominantly occur within existing road servitudes and visible tracks, limiting the amount of vegetation to be cleared. Therefore, apart from the Site Alternative 1 no other alternative pipe routes or crossing points have been considered. The pipeline will run below the ground and within the bed of each watercourse and will be encased in concrete and attached to the bedrock. Therefore, the pipe will not block or impede the flow of water in the watercourses. This crossing technique will have a larger construction impact on the watercourses in terms of construction work within the bed and banks of each watercourse, but will have less impact in the long term, post construction.

Taking impacts and mitigation measures into consideration the Environmental Assessment Practitioner (EAP) is of the opinion that there are no significant environmental impacts associated with the proposal, which cannot be mitigated. Therefore, it is recommended that the preferred site and technology alternative be authorised for the Mpolweni and Thokozani Water Supply Scheme.

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Section 1: Scope of Work and Location of Activity

1.1 Project Title

Mpolweni and Thokozani Water Supply Scheme (WWS).

1.2 A Description of the Activities to Be Undertaken Including Associated Structures and Infrastructure As per Section 3(d) (ii)

The uMgungundlovu District Municipality proposes to upgrade and construct the Mpolweni and Thokozani Water Supply Scheme (WSS) within Wards 1, 9 and 10 of the uMshwathi Local Municipality. Although there is an existing bulk pipeline in place, the reticulation network does not service all the communities in each of these areas due to ongoing expansion of settlements. The project will address two specific areas namely Mpolweni and Thokozani. The Mpolweni project area is located within Wards 9 and 10 and encompasses an area measuring approximately 16.3km². The centre point of this project area is 29°25'17.65"S; 30°28'55.12"E and includes the areas of Emvundlweni, Newtown, Emseni, Ekukhuleni, Vundla Road, Ematshali Ext 1 and Kogcwabaza. The Thokozani project area is located within Ward 1 next to the Albert Falls Dam and covers an area of approximately 2.66km². The centre point of this project area is 29°25'33.95"S; 30°26'3.67"E and includes the area of Thokozani. Figure 1 and Figure 2 provide an overview of the project areas.

uMgungundlovu District Municipality was originally granted Environmental Authorisation in June 2013 for construction of a water supply scheme that would service the Lindokuhle – Mpolweni area (DC22/0061/2012). However, substantial modifications have now been made to the originally authorised layout for Mpolweni and the Thokozani project area has also been added to the scheme. Therefore, a new application for Environmental Authorisation is being applied for under the current process to address the significant changes and additions to the proposal. This has been discussed and agreed upon with EDTEA during the pre-application meeting held on the 17th June 2020.

There is an existing water supply scheme in place including a bulk pipeline and some reticulation, but it does not supply the entire community due to the ever-expanding nature of the settlement and the ever-growing demand. The existing water supply is a mixture of the following:

- Yard connections to a single homestead - A single metered connection is provided to a property with one homestead
- Yard connections to multiple homesteads – A metered connection is provided to a property with one homestead with multiple homesteads making use of the supply
- Community standpipes – The standpipe is not located within a property and homeowners are required to walk a distance to access the standpipe
- No water connection – There is no formal/informal water connection. Homeowners receive a supply through JoJo Tanks or from other sections with access to water.

Only the sections of the water supply scheme that will intersect identified watercourses (drainage lines and wetlands) and will fall within the regulated 32m buffer area around these watercourses require Environmental Authorisation. There are 36 different pipeline segments within 32m of the identified watercourses, Table 4 below provides the coordinates of 131 nodes associated with these segments. Therefore, this report and the attached EMP focus solely on the sections of the water supply that require Environmental Authorisation.

- Two Listing Notice 1 Activities have been identified for this project; these are Activities 12 and 19. Activity 12 is triggered as there will be 481.81m² of infrastructure constructed within 32m of identified drainage features. Activity 19 will also be triggered as there will be 606.21m³ of soil removed from the identified drainage features, taking an average trench depth of 1m.
- One Listing Notice 3 Activity has also been identified for this project, this is Activity 14. A portion of the site is located within 5km of the Albert Falls Nature Reserve and therefore there will be 177.77m² of infrastructure within 32m of the identified watercourses within this 5km buffer (please refer to Figure 3). In addition, 481.81m² of pipeline will be located within 32m of several watercourses and will be within sensitive areas as identified in the uMgungundlovu District Municipality EMF. These sensitive areas refer to drainage lines and wetlands as indicated in Figure 4 and Figure 5. All the sections of pipeline which require Environmental Authorisation i.e. are within 32m of the identified watercourses have been highlighted in Figure 9 - Figure 13.

The primary objectives for the project are as follows:

- To provide access to a potable water supply for the various communities in the project area.
- To reduce the water services backlog and uplift the communities' standard of living.
- To provide the communities with a uniform level of service through individual house connections.

- To construct new infrastructure that will serve to satisfy the increasing water demand within the project area.
- To provide an economically efficient solution to the current water supply problem.
- To provide a level of service that will ultimately allow for a waterborne sanitation system in the future.
- To provide employment for local labour.
- To provide and encourage skills development through intensive programmes directly involved in the planning, construction and commissioning of the scheme.

Therefore, the proposed Mpolweni and Thokozani Water Supply Scheme will ultimately improve the standard of living conditions in the area and improve access to potable water for all.

Taking into consideration the existing water supply, the following constraints and objectives have been identified for the two project areas:

- Mpolweni Project Area
 - This area has insufficient reticulation and does not have suitable household connections. 30% of the area has water supply by means of the existing reticulation however there are sporadic metering points which are not allocated to individual households. The network needs to be expanded and optimised against all design criteria parameters as identified in Table 1. It is noted that an existing bulk line is already servicing this area.
- Thokozani Project Area
 - This area has insufficient reticulation as there are growing numbers of illegal connections due to the high growth of the settlement. The network needs to be regularised so that it can be managed with revenue collection in mind. The reticulation also needs to be expanded and optimised against all design criteria parameters as identified in Table 1. It is noted that an existing bulk line is already servicing this area.

Table 1: Engineering Design Parameters

Description	Design Parameter
Design horizon	20 years
Population Census	Census 2011, Aerial Images, House Counts
House Occupancy	8 people per household
Growth Rate	1.5% per annum
Design Water Usage	80, 120 and 150 l/c/d
Conveyance Losses	15%
Summer Peak Factor	1.5

The uMgungundlovu District Municipality propose to incorporate the existing reticulation network into the new system. The new reticulation will include both HDPE and uPVC pipelines which will range in diameter between 25mm Ø to 250mm Ø. Steel pipes will be used for river crossings, rough terrain and where the operating pressures do not permit use of plastic pipes. The proposed reticulation pipe lengths have been tabulated in Table 2. In addition, two new reservoirs with a capacity of 200kl and 150kl respectively will be constructed in the Mpolweni project area. These reservoirs will aid in maintaining pressure within the system.

Table 2: Proposed Reticulation Lengths

Project Area	Reticulation Pipe Length (m)
Mpolweni	203 770
Thokozani	48 260
Total	252 030

The existing reticulation network supply varies from “no access” to “metered yard connections”, therefore a uniform level of service will be provided throughout the project which will consist of “metered house connections”. Saddle valves will be used as the take-off from all reticulation pipelines and all house connections will have a new 25mm water meter assembly installed thereon. Figure 4 and Figure 5 below provide an overview of the proposed new pipe reticulation that will be constructed within the two project areas.

Pipelines will be buried below ground when crossing watercourses to avoid the obstruction of the natural stream flow. Where feasible, the pipeline will be placed along the existing roads and on visible tracks. There are however two major watercourses which will need to be crossed along the proposed pipeline route. Both crossing points are along the a Mpolweni River. At these points the pipeline will be strapped to the existing bridge structures. In these two instances where the pipeline crosses a watercourse above ground, HDPE/uPVC pipes will be changed to steel pipes for the crossing and will then be changed back to HDPE/uPVC after crossing the watercourse. Please refer to Figure 11 and Figure 12 for the location of these two watercourse crossings.

Figure 1: Locality Map of The Project Areas

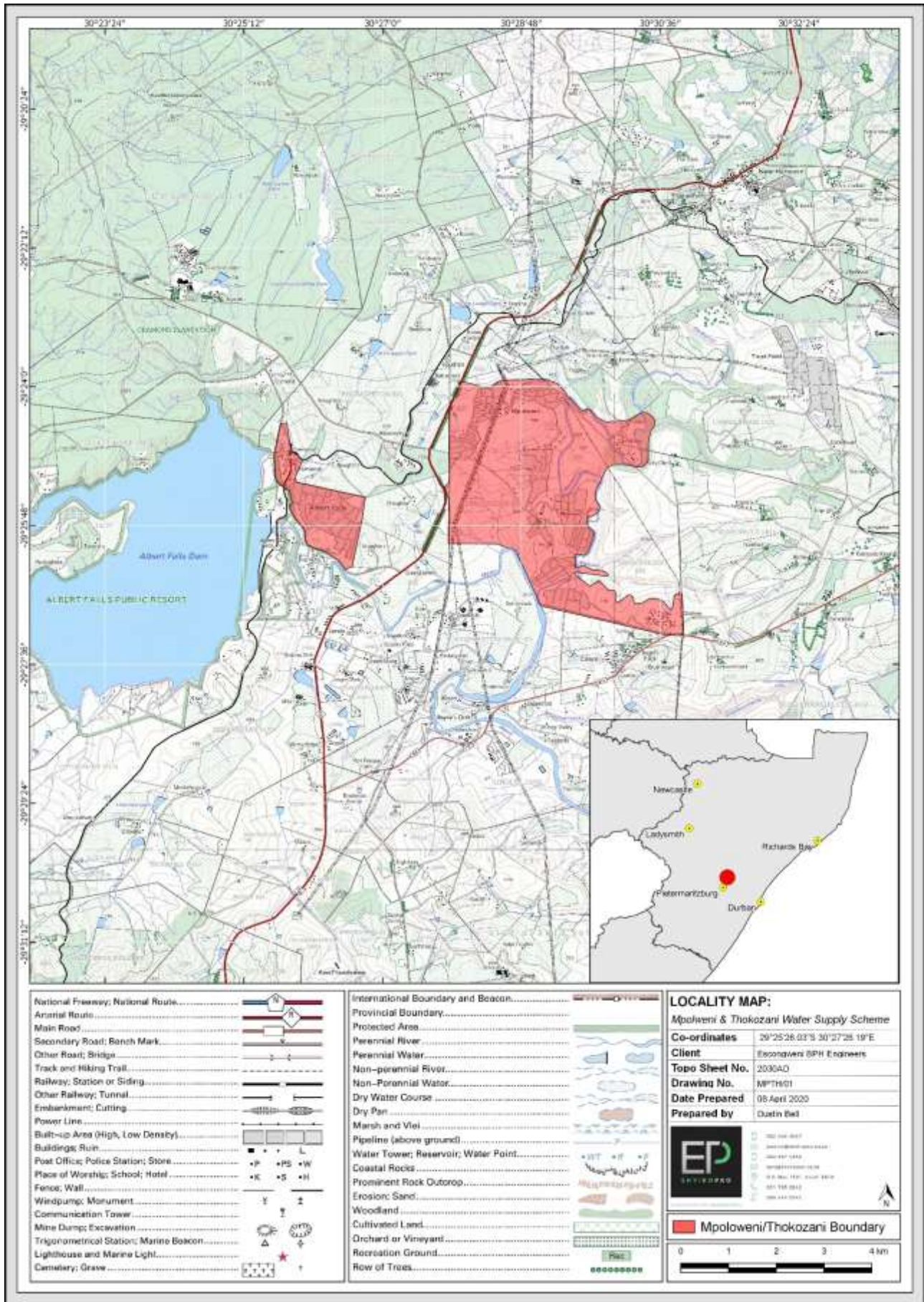


Figure 2: Aerial Photograph Showing the Two Project Areas

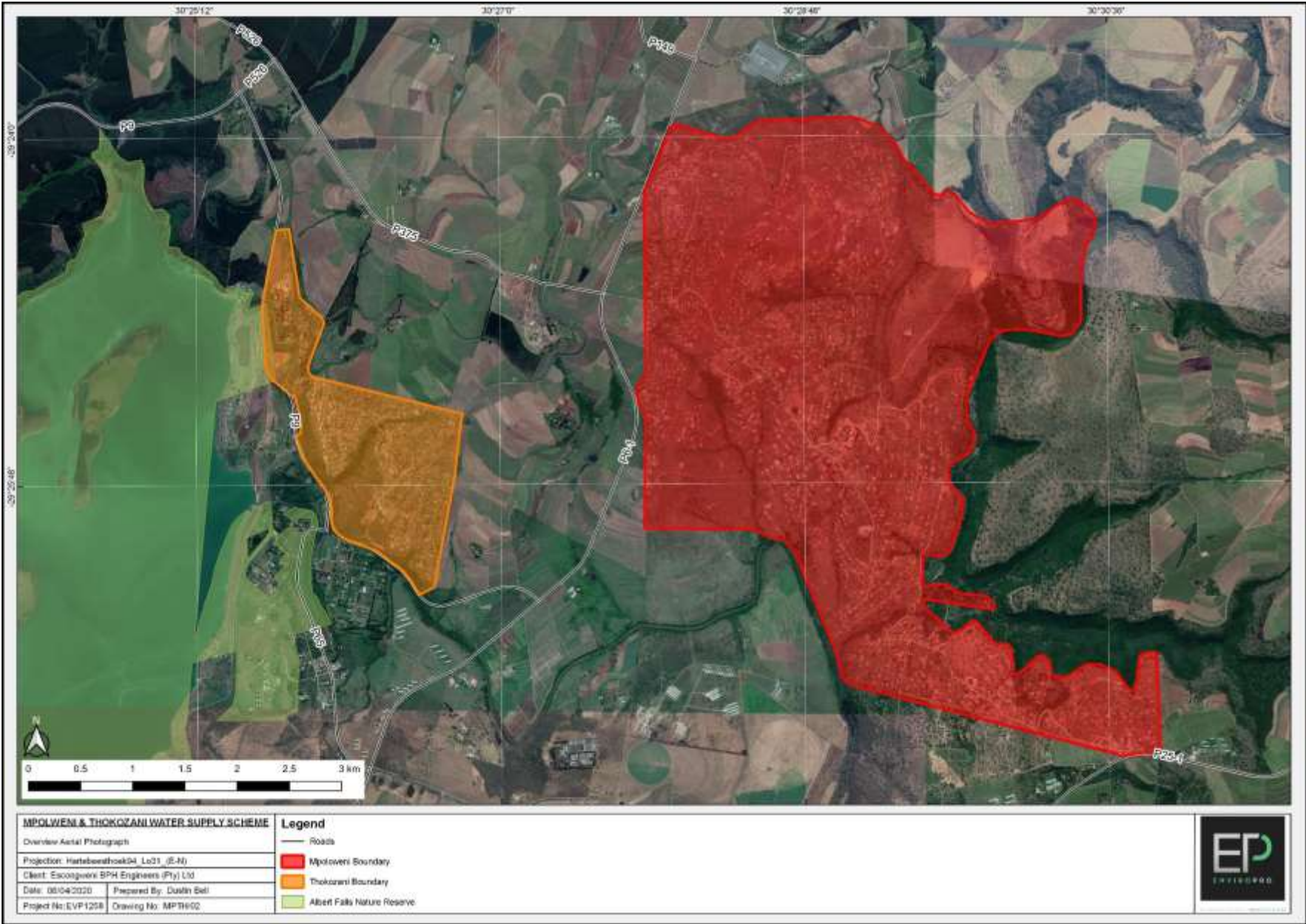


Figure 3: Aerial Photograph Showing the Area of the Two Project Areas Within the Albert Falls Nature Reserve 5km Buffer

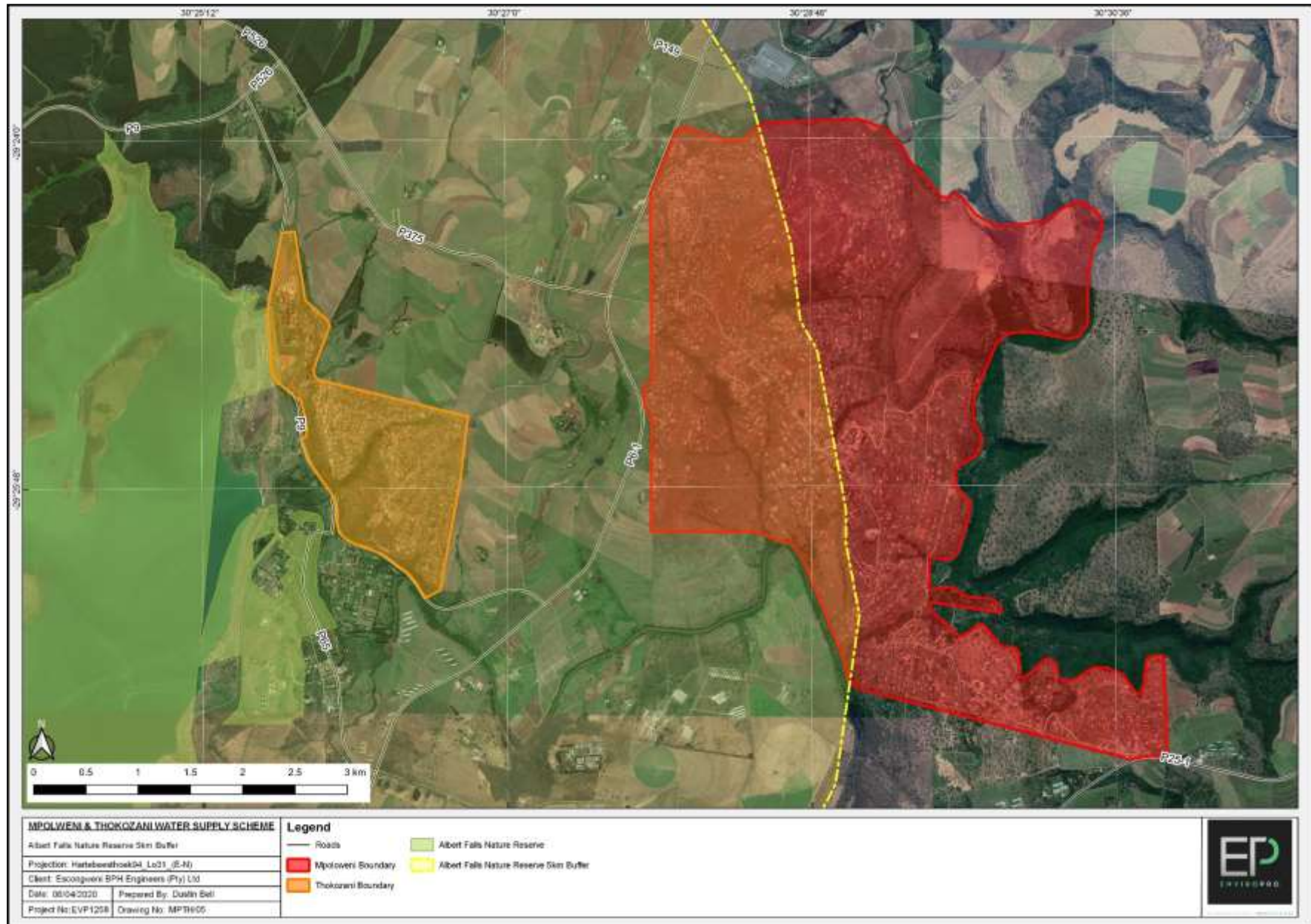


Figure 4: Aerial Photograph Showing the Mpolweni Project Area with The Proposed Reticulation. Areas Indicated by Yellow Squares Have Been Represented in Figures 7-11.

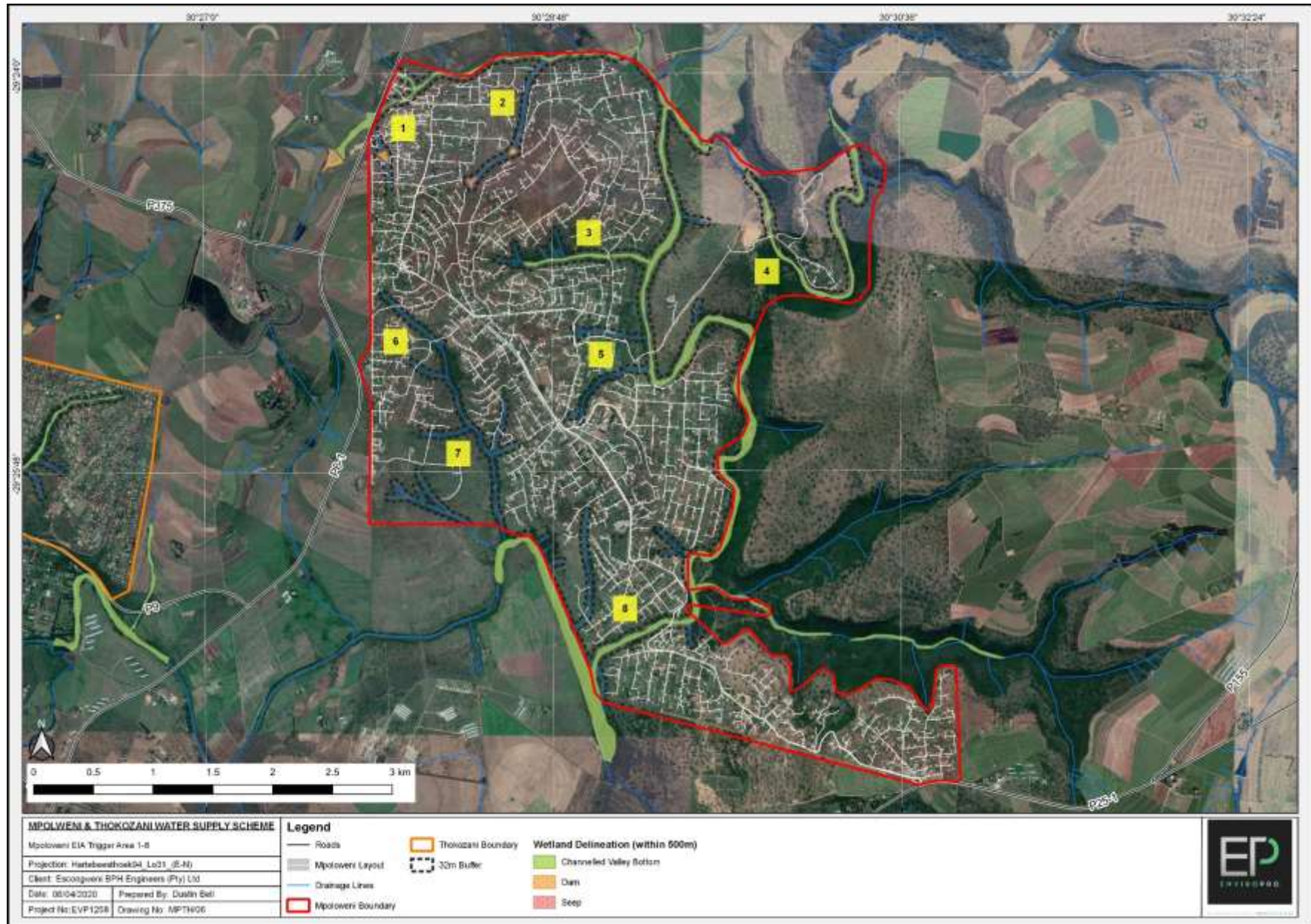


Figure 5: Aerial Photograph Showing the Thokozani Project Area with The Proposed Reticulation. Areas Indicated by Yellow Squares Have Been Represented in Figures 6-10.



Figure 6: Extract from The Umgungundlovu District Municipality EMF For the Mpolweni Project Area

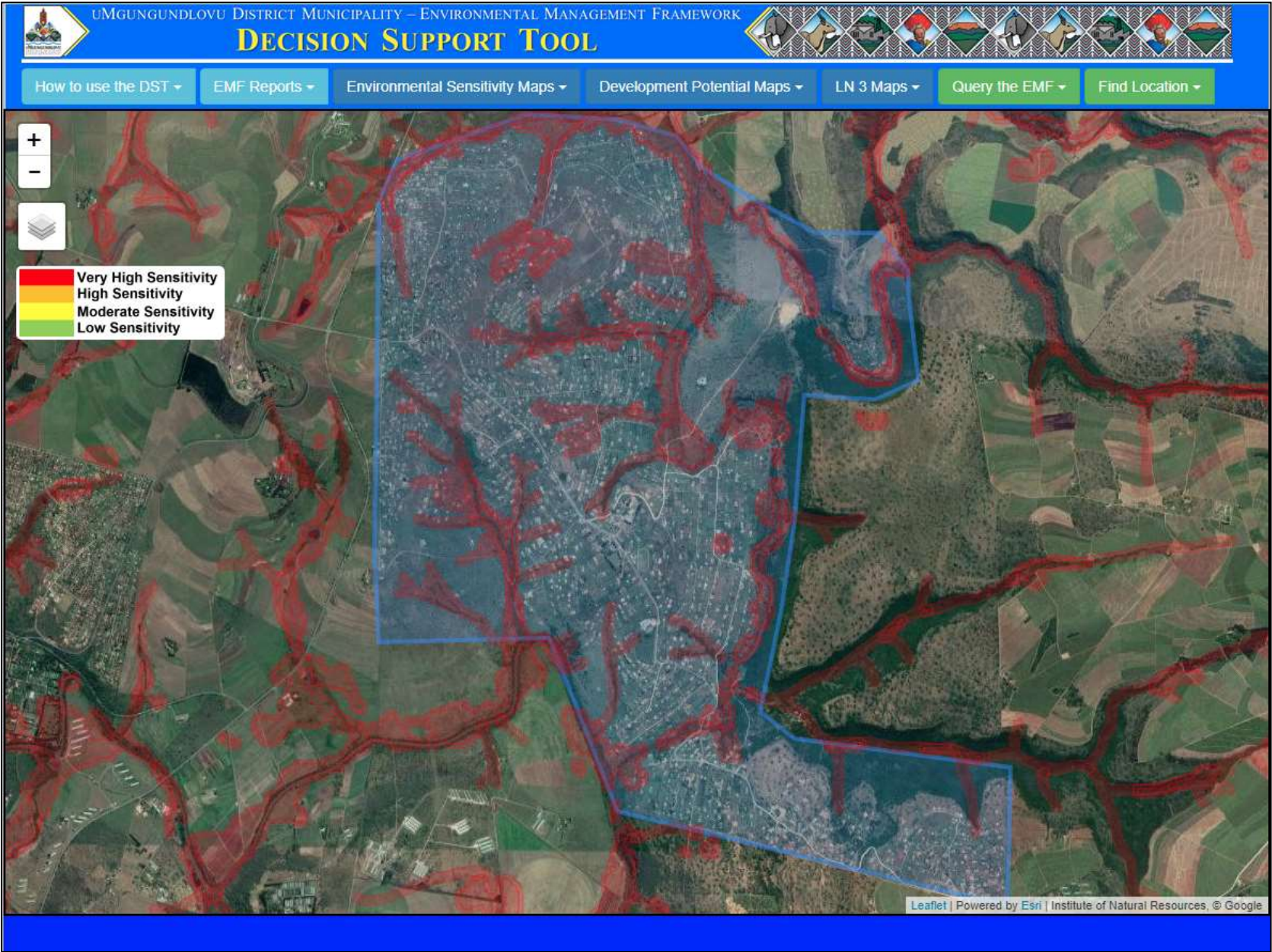
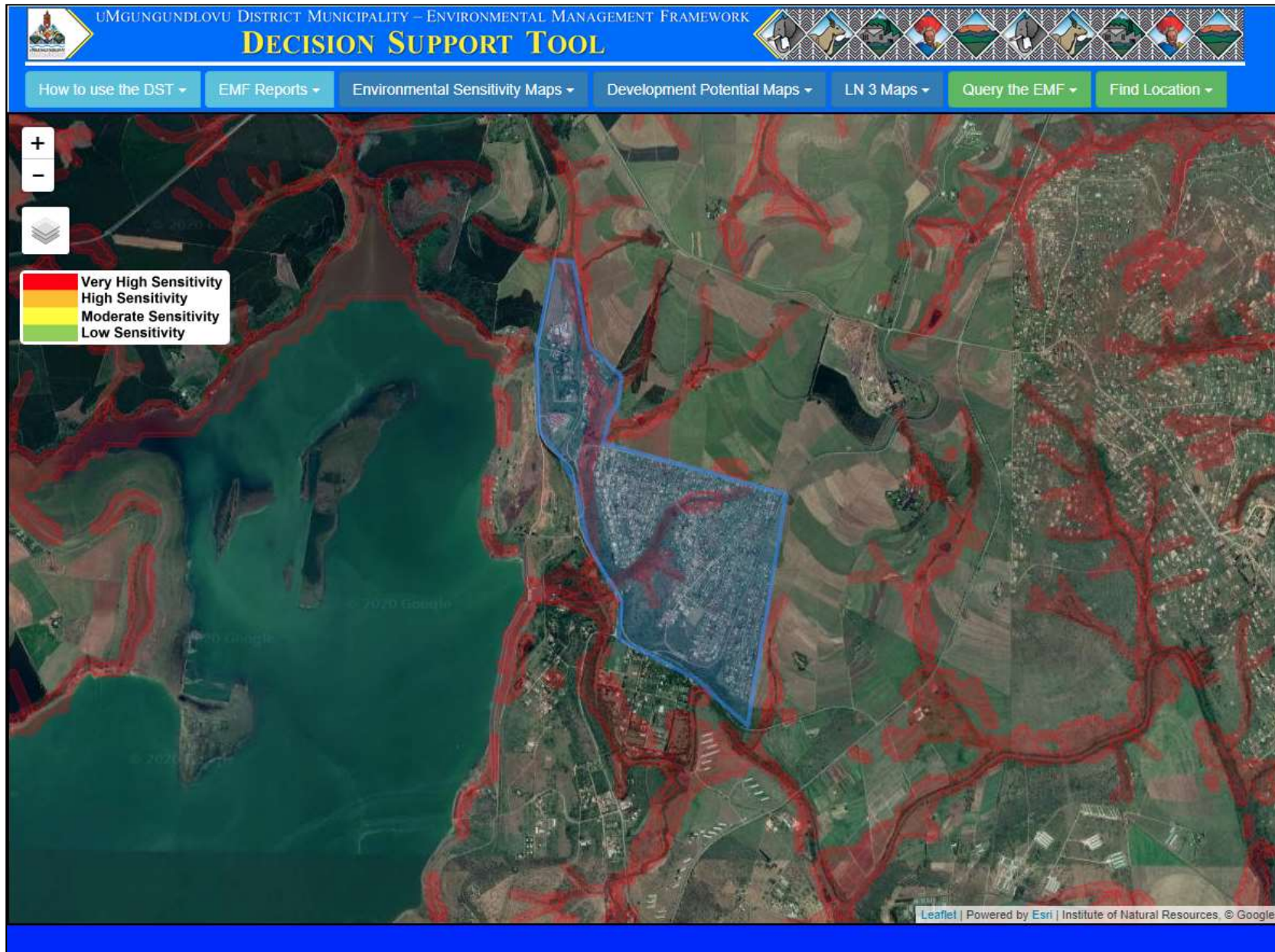


Figure 7: Extract from The Umgungundlovu District Municipality EMF For the Thokozani Project Area



1.3 Construction Methodology

Trench excavations will be carried out in accordance with SABS 1200, DB Earthworks (pipe trenches) and pipe bedding in accordance with SABS 1200, LB Bedding (pipes). The topsoil will be removed along the proposed pipeline route and stockpiled separately from the other excavated material. The trench width will be the outside diameter of the pipe plus 150mm either side. The minimum trench width will be 450mm. The minimum trench width and depth will be reduced for smaller diameter pipes i.e. house connections, in line with the EPWP programme. The trench depths, as per the Red Book will be as follows:

- Road Crossings: Pipe diameter + Bedding + 0.8m
- Otherwise: Pipe diameter + Bedding + 0.6m

The pipe bedding will consist of selected granular bedding material of a thickness at least 100mm beneath and on top of the pipe, with a 200mm layer of selected fill material on top of the granular material and beneath the trench backfill material. This is in accordance with Drawing LB – 2 in SABS 1200, LB. The trench will be excavated by hand to grade out all local high and low points to minimise the need for air and scour valves.

After pipe laying, backfilling and compacting of the trench material, the topsoil will be reinstated and lightly compacted. On downhill slopes the trench will also be backfilled so that the backfill material forms cut off berms at regular intervals. These will need to be at least 150mm higher than the ground either side of the trench to prevent surface water from running along the trench and eroding the backfilled material.

Finally, rehabilitation / re-vegetation will be undertaken in all areas affected by the construction activities using intensive grass sod planting or hydroseeding with a suitable indigenous grass seed mix. The indigenous grass seed mix will be approved by the ECO.

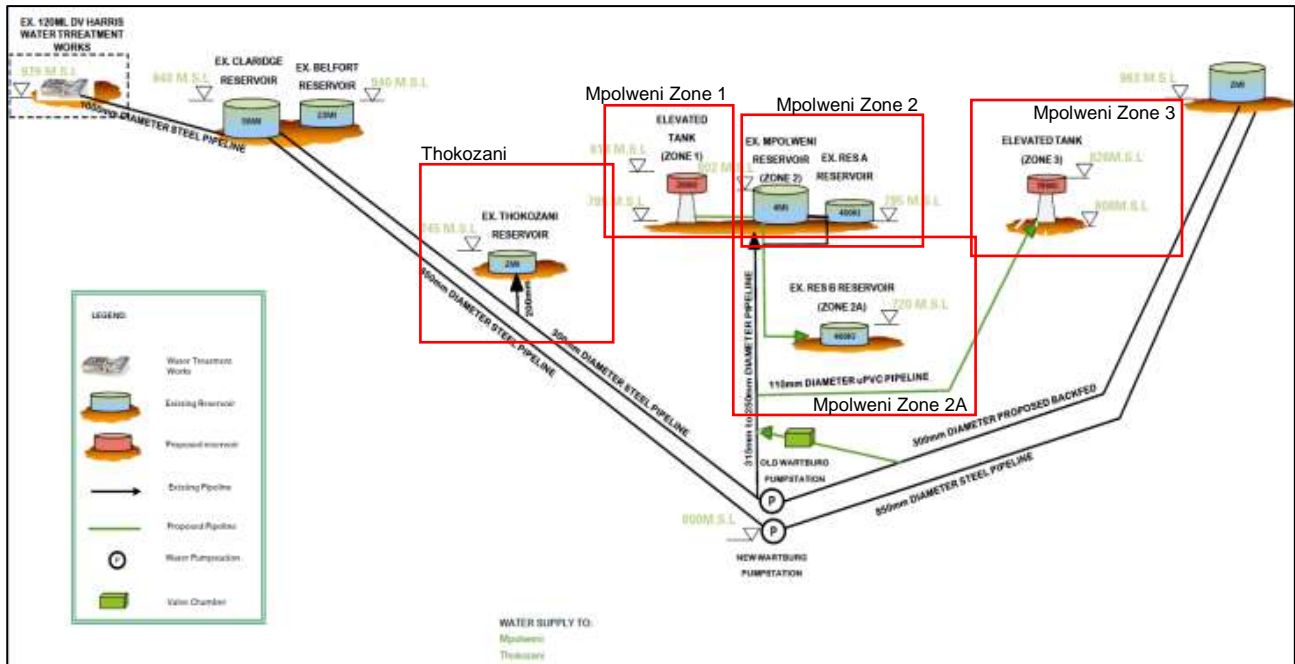
1.4 Description of Feasible Alternatives as Per Section 3(h)(i)

Site Alternatives

Site Alternative 1 (Preferred Alternative)

The aim of the project is to improve the supply of potable water to this area with as little environmental and infrastructural disturbance/impact as possible. The pipeline layout has been designed to reticulate water to the community with the least number of watercourse crossings. The pipeline route will predominantly follow existing road servitudes and visible tracks, limiting the amount of vegetation to be cleared.

Please note the engineer investigated the route and undertook to avoid watercourses wherever possible. As the proposed WSS will be gravity fed water pressure within the system and at all outlets must remain within acceptable limits. Therefore, the layout of the pipeline in relation to the topography must be considered carefully in order to maintain the water pressure. Therefore, the project area has been divided into 5 hydraulic water supply zones. These zones will work independently of one another, utilising different reservoirs, which will ultimately aid in reducing the linkages between different areas, thereby limiting the number of watercourse crossings. Figure 8 below provides a graphical representation of the 5 different hydraulic water supply zones, each highlighted in the red squares. A number of homesteads within the project area are completely closed off and in such cases a watercourse crossing was necessary in order to gain access to the homestead. Therefore, no other alternative pipe routes or crossing points have been considered as Site Alternative 1 represents the route with the least impact and has already ensured the minimal number of watercourse crossings.

Figure 8: Visualisation of the Mpolweni and Thokozani WSS hydraulic water supply zones.¹

Technology Alternatives

Technology Alternative 1 (Preferred Alternative)

Where the pipeline route is required to cross a watercourse, the pipeline will be placed in a concrete casing in the bed of the watercourse. The pipeline will therefore be below the ground, attached to the bedrock, below the water surface. The pipe will not block or impede the flow of water in the watercourses. This crossing technique will have a larger construction impact on the watercourses, in terms of construction work in the bed and banks, but will have less impact in the long term, post construction. Please note there will be two points that the pipeline will be strapped to the existing bridge structures above the watercourses.

Alternative 2

The alternative water crossing technology would be to construct pipeline bridges at each watercourse. This would entail building pier structures into the watercourse beds to support the pipes above ground as they cross the watercourse. This approach will have a larger environmental and visual impact with the above-ground pipes being very visible. Constructing pier bridges across the watercourses would potentially create long term water flow impedance as a result of the piers located in the watercourse beds and banks. This technique would make the pipe susceptible to damage during flood events when the water levels rise, which would demand more infrastructural maintenance and repair for the uMgungundlovu District Municipality and will threaten the consistent supply of potable water for all users in this area.

The No Go Alternative

As per the Preliminary Design Report¹ the project objectives which are listed below will not be achieved and as such the current water supply network will remain in place.

- To reduce the water services backlog and uplift the community's standards of living
- To provide the community with a uniform level of service through a house connection.
- To construct new infrastructure that will serve to satisfy the increasing water demand within the project area.
- To provide an economically efficient solution to the current water supply problem.
- To provide a level of service that will ultimately allow for a waterborne sanitation system in future.
- To provide employment for local labour.
- To provide and encourage skills development through intensive programmes directly involved in the planning, construction and commissioning of the scheme.

¹ Escongweni BPH Engineers (Pty) Ltd (2019) Mpolweni Water Supply Scheme Preliminary Design Report

1.5 All Listed and Specific Activities to Be Triggered and Being Applied for As Per Section 3(d) (i)

Table 3: All Listed and Specific Activities to Be Triggered and Being Applied For.

GNR	Activity Number	Activity as per the legislation	Activity as it applies to the proposal
Listing Notice 1 of 2014 EIA Regs as amended	12	<p><i>The development of—</i></p> <p><i>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or</i></p> <p><i>(ii) infrastructure or structures with a physical footprint of 100 square metres or more;</i></p> <p><i>where such development occurs—</i></p> <p><i>(a) within a watercourse;</i></p> <p><i>(b) in front of a development setback; or</i></p> <p><i>(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; —</i></p> <p><i>excluding—</i></p> <p><i>(aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour;</i></p> <p><i>(bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies;</i></p> <p><i>(cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing Notice 3 of 2014, in which case that activity applies;</i></p> <p><i>(dd) where such development occurs within an urban area;</i></p> <p><i>(ee) where such development occurs within existing roads, road reserves or railway line reserves; or</i></p> <p><i>(ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.</i></p>	The construction of the Mpolweni Thokozani WSS will result in 481.81m ² of infrastructure being constructed either within the identified watercourses or within 32m of such watercourses.
Listing Notice 1 of 2014 EIA Regs as amended	19	<p><i>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;</i></p> <p><i>but excluding where such infilling, depositing, dredging, excavation, removal or moving—</i></p> <p>a) will occur behind a development setback;</p> <p>b) is for maintenance purposes undertaken in accordance with a maintenance management plan;</p> <p>c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;</p> <p>d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or</p> <p>e) where such development is related to the development of a port or harbour, in</p>	The construction of the Mpolweni Thokozani WSS will result in water infrastructure being constructed within the identified watercourses. This will result in the infilling and removal of 606.21m ³ of material into and from the watercourses.

		which case activity 26 in Listing Notice 2 of 2014 applies.	
Listing Notice 3 of 2014 EIA Regs as amended	14	<p>The development of—</p> <p>(i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeds 10 square metres; or</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more;</p> <p>where such development occurs—</p> <p>(a) within a watercourse;</p> <p>(b) in front of a development setback; or</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</p> <p>excluding the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour.</p> <p>d. KwaZulu-Natal</p> <p>viii. Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority;</p> <p>x. Outside urban areas</p> <p>(aa) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any terrestrial protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</p>	<p>The construction of the Mpolweni Thokozani WSS will result in 177.77m² of infrastructure being constructed either within the identified watercourses or within 32m of watercourses within 5km of the Albert Falls Nature Reserve. The construction of the Mpolweni Thokozani WSS will also result in approximately 481.81m² of infrastructure being constructed either within the identified watercourses or within 32m of such watercourses located within sensitive areas as identified in the uMgungundlovu District Municipality EMF.</p>

1.6 Location of Activity as per Section 3 (b)(i)-(iii)

Table 4: Location Information

District Municipality	uMgungundlovu District Municipality				
Local Municipality	uMshwathi Local Municipality				
Wards	Ward 1,9 and 10				
Area / Town / Village	Near Albert Fall town				
Co-ordinates for the 131 nodes associated with the 36 pipeline segments within 32m of the identified watercourses.					
(Please refer to Figure 9 - Figure 13 for the visualisation of areas as below)					
Point	Latitude	Longitude	Point	Latitude	Longitude
Area 1			Area 6		
26	29°24'1"S	30°28'0"E	101	29°25'19"S	30°28'7"E
27	29°24'1"S	30°28'2"E	102	29°25'20"S	30°28'5"E
28	29°24'0"S	30°28'3"E	103	29°25'12"S	30°28'10"E
29	29°23'59"S	30°28'3"E	104	29°25'13"S	30°28'10"E
30	29°24'4"S	30°28'4"E	105	29°25'12"S	30°28'14"E
31	29°24'4"S	30°28'5"E	106	29°25'3"S	30°28'1"E
32	29°24'7"S	30°28'4"E	107	29°25'3"S	30°28'0"E
33	29°24'8"S	30°28'4"E	108	29°25'3"S	30°27'58"E
34	29°24'8"S	30°28'1"E	Area 7		
35	29°24'6"S	30°28'2"E	99	29°25'39"S	30°28'10"E
36	29°24'6"S	30°28'3"E	100	29°25'37"S	30°28'10"E
37	29°24'6"S	30°28'2"E	109	29°25'42"S	30°28'29"E
38	29°24'7"S	30°27'58"E	110	29°25'38"S	30°28'30"E
39	29°24'7"S	30°27'58"E	111	29°25'37"S	30°28'30"E
40	29°24'29"S	30°27'56"E	112	29°25'37"S	30°28'33"E
41	29°24'29"S	30°27'59"E	113	29°25'34"S	30°28'32"E
42	29°24'27"S	30°27'57"E	114	29°25'32"S	30°28'32"E
43	29°24'27"S	30°27'56"E	115	29°25'29"S	30°28'32"E
44	29°24'25"S	30°27'56"E	Area 8		
45	29°24'24"S	30°27'55"E	120	29°26'21"S	30°29'29"E
46	29°24'23"S	30°27'54"E	121	29°26'21"S	30°29'30"E
47	29°24'23"S	30°27'54"E	122	29°26'30"S	30°29'23"E
48	29°24'23"S	30°27'54"E	123	29°26'30"S	30°29'23"E
49	29°24'24"S	30°27'58"E	124	29°26'31"S	30°29'25"E
50	29°24'22"S	30°27'59"E	125	29°26'27"S	30°29'25"E
51	29°24'20"S	30°27'54"E	126	29°26'27"S	30°29'25"E
52	29°24'20"S	30°27'54"E	127	29°26'20"S	30°28'59"E
53	29°24'20"S	30°27'54"E	128	29°26'19"S	30°28'59"E
54	29°24'16"S	30°27'55"E	129	29°26'25"S	30°28'59"E
55	29°24'16"S	30°27'54"E	130	29°26'29"S	30°28'59"E
56	29°24'17"S	30°27'52"E	131	29°26'27"S	30°28'58"E
Area 2			Area 9		
57	29°24'4"S	30°28'40"E	1	29°24'53"S	30°25'49"E
58	29°24'5"S	30°28'39"E	2	29°24'54"S	30°25'50"E
Area 3			3	29°24'54"S	30°25'51"E
68	29°24'48"S	30°29'5"E	4	29°24'54"S	30°25'52"E
69	29°24'48"S	30°29'6"E	5	29°24'55"S	30°25'52"E

70	29°24'51"S	30°29'6"E	6	29°24'56"S	30°25'53"E
Area 4			7	29°24'57"S	30°25'54"E
59	29°24'45"S	30°29'55"E	8	29°24'58"S	30°25'54"E
60	29°24'46"S	30°29'59"E	9	29°24'57"S	30°25'52"E
61	29°24'44"S	30°29'58"E	10	29°24'57"S	30°25'51"E
62	29°24'51"S	30°30'5"E	11	29°25'0"S	30°25'51"E
63	29°24'53"S	30°30'6"E	12	29°24'59"S	30°25'52"E
64	29°24'56"S	30°30'8"E	13	29°25'15"S	30°25'52"E
65	29°24'58"S	30°30'9"E	14	29°25'15"S	30°25'49"E
66	29°24'58"S	30°30'10"E	15	29°25'18"S	30°25'49"E
67	29°24'59"S	30°30'12"E	16	29°25'18"S	30°25'50"E
Area 5			17	29°25'18"S	30°25'53"E
71	29°25'9"S	30°29'5"E	Area 10		
72	29°25'11"S	30°29'4"E	18	29°25'30"S	30°26'22"E
73	29°25'10"S	30°29'6"E	19	29°25'29"S	30°26'22"E
74	29°25'10"S	30°29'7"E	20	29°25'30"S	30°26'20"E
75	29°25'13"S	30°28'55"E	21	29°25'30"S	30°26'20"E
76	29°25'11"S	30°28'54"E	22	29°25'28"S	30°26'18"E
77	29°25'13"S	30°28'55"E	23	29°25'28"S	30°26'18"E
78	29°25'13"S	30°28'55"E	24	29°25'28"S	30°26'18"E
79	29°25'11"S	30°28'55"E	25	29°25'27"S	30°26'19"E
80	29°25'11"S	30°28'55"E			
81	29°25'10"S	30°28'55"E			
82	29°25'10"S	30°28'55"E			
83	29°25'8"S	30°28'55"E			
84	29°25'8"S	30°28'55"E			
85	29°25'8"S	30°28'55"E			
86	29°25'9"S	30°28'55"E			
87	29°25'22"S	30°29'10"E			
88	29°25'22"S	30°29'11"E			
89	29°25'24"S	30°29'19"E			
90	29°25'25"S	30°29'20"E			
91	29°25'25"S	30°29'19"E			
92	29°25'26"S	30°29'22"E			
93	29°25'25"S	30°29'24"E			
94	29°25'16"S	30°29'17"E			
95	29°25'15"S	30°29'20"E			
96	29°25'35"S	30°28'56"E			
97	29°25'34"S	30°28'57"E			
98	29°25'33"S	30°28'58"E			
Property Description:		Erf 298 Albert Falls Erf 328 Albert Falls Erf 329 Albert Falls Erf 330 Albert Falls Erf 371 Albert Falls Erf 781 Albert Falls Erf 1087 Albert Falls Erf 1088 Albert Falls Portion 59 of Farm Broughton No. 925 Portion 7 of Farm Koperbult No. 1407 Remainder of Farm Groothoek No. 920			

21 Digit Surveyor General no.	N	0	F	T	0	0	0	1	0	0	0	0	0	2	9	8	0	0	0	0	0
	N	0	F	T	0	0	0	1	0	0	0	0	0	3	2	8	0	0	0	0	0
	N	0	F	T	0	0	0	1	0	0	0	0	0	3	2	9	0	0	0	0	0
	N	0	F	T	0	0	0	1	0	0	0	0	0	3	3	0	0	0	0	0	0
	N	0	F	T	0	0	0	1	0	0	0	0	0	3	7	1	0	0	0	0	0
	N	0	F	T	0	0	0	1	0	0	0	0	0	7	8	1	0	0	0	0	0
	N	0	F	T	0	0	0	1	0	0	0	0	1	0	8	7	0	0	0	0	0
	N	0	F	T	0	0	0	1	0	0	0	0	1	0	8	8	0	0	0	0	0
	N	0	F	T	0	0	0	0	0	0	0	0	0	9	2	5	0	0	0	5	9
	N	0	F	T	0	0	0	0	0	0	0	0	1	4	0	7	0	0	0	0	7
	N	0	F	T	0	0	0	0	0	0	0	0	0	9	2	0	0	0	0	0	0

Figure 9: Aerial Photograph Showing Pipelines Within 32m of Identified Watercourses – Areas 1 and 2

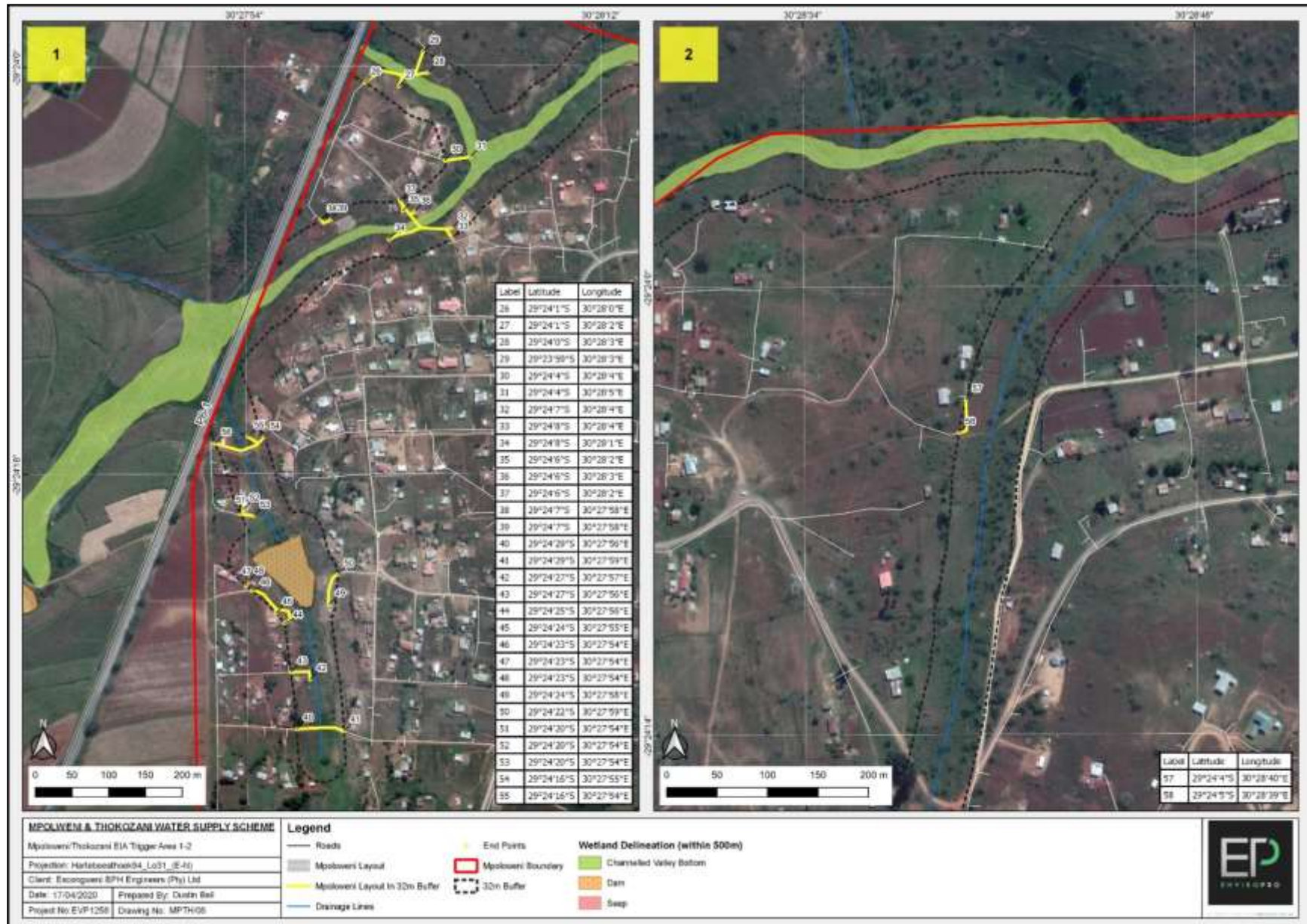


Figure 10: Aerial Photograph Showing Pipelines Within 32m of Identified Watercourses – Areas 3 and 4

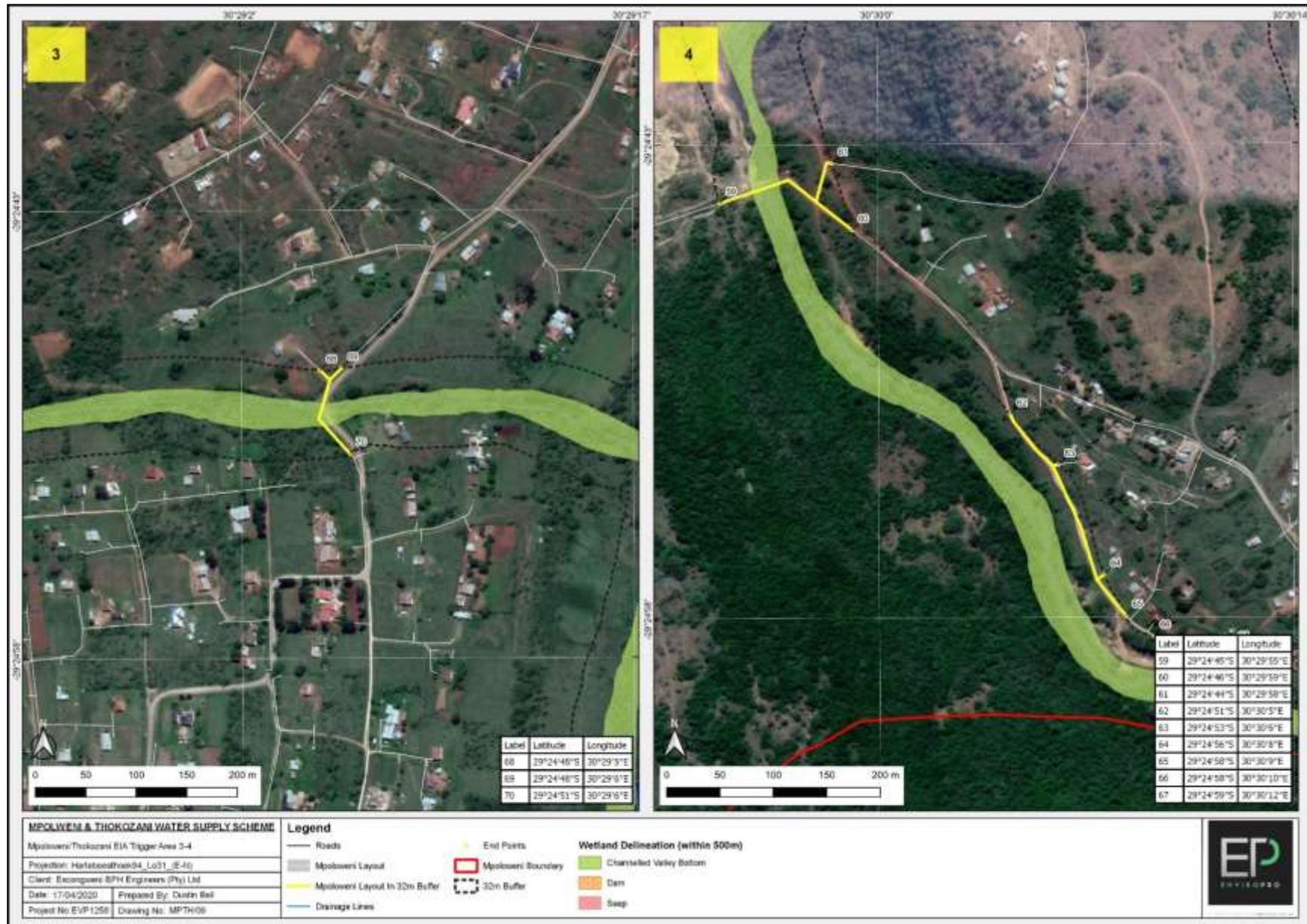


Figure 11: Aerial Photograph Showing Pipelines Within 32m of Identified Watercourses – Areas 5 and 6

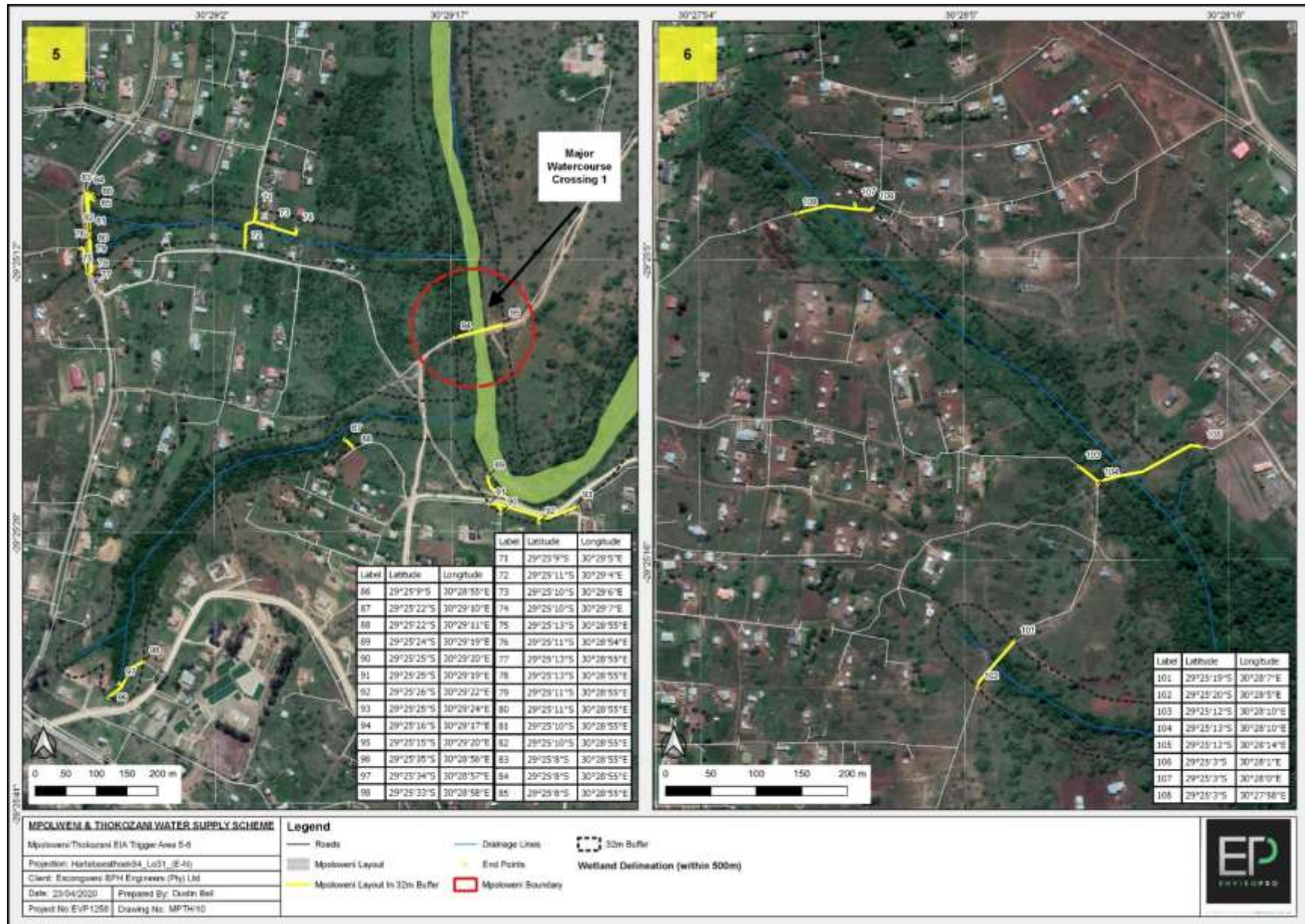


Figure 12: Aerial Photograph Showing Pipelines Within 32m of Identified Watercourses – Areas 7 and 8

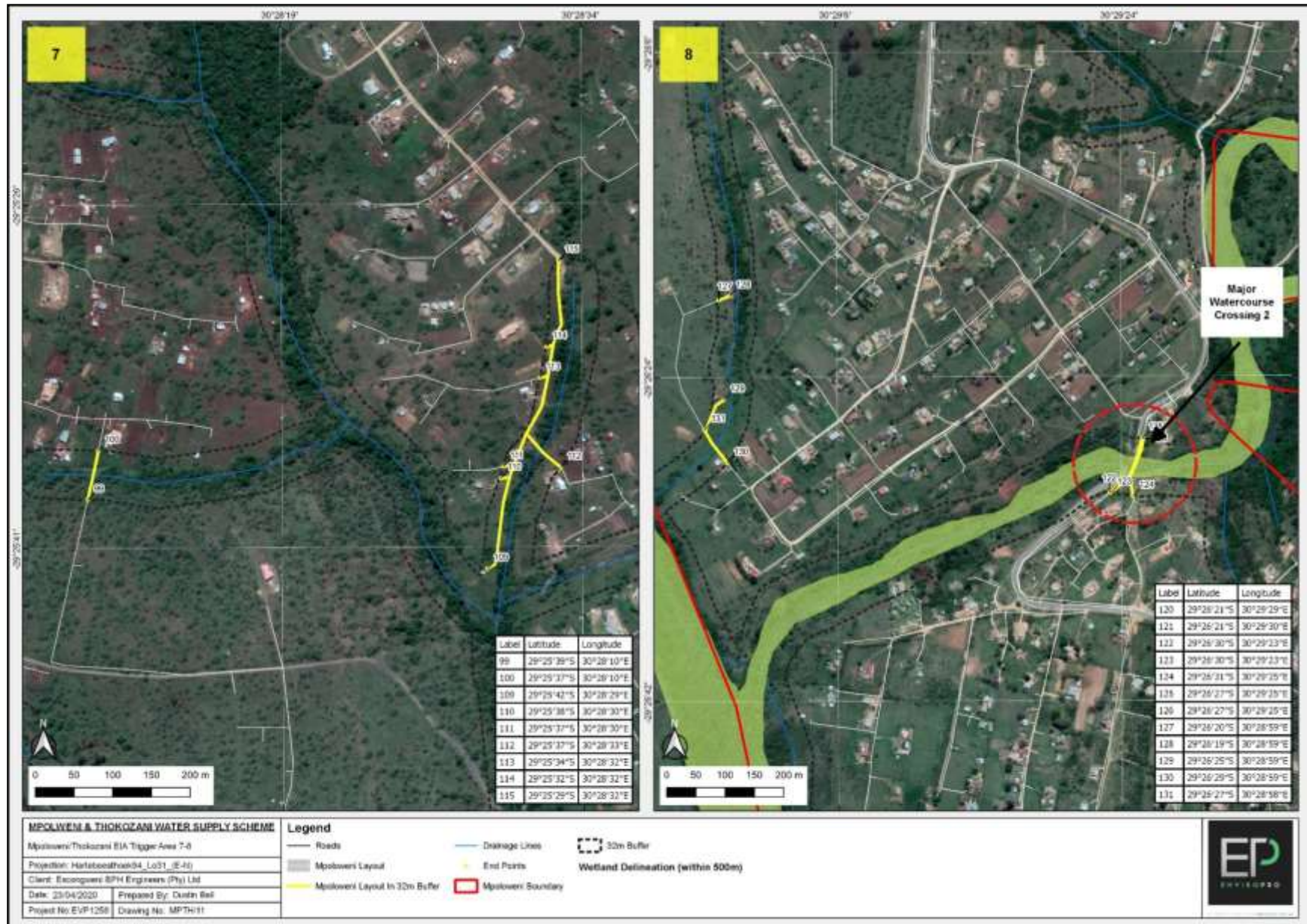


Figure 13: Aerial Photograph Showing Pipelines Within 32m of Identified Watercourses – Areas 9 and 10



Section 2: Site Description and Surrounding Land Use as per section 3(h)(iv) and (k)

2.1 DEFF Screening Report

A Screening Report was generated via the DEFF Screening Tool (please refer to Appendix B for the full DEFF report) which details potential specialist reports that may be required based on a desktop level assessment conducted by the screening tool. Table 5 below summarises the screening tool recommendations. It indicates whether they are applicable to the specifics of the project and site and shows the sections of the BAR where these have been addressed. As per the Screening Tool Guidelines, it is the responsibility of the EAP to confirm this list and to motivate in the BAR the reason for not including any of the identified specialist studies by providing photographic evidence of the site situation.

Table 5: National Screening Tool Specialist Requirements and Comments

Specialist Assessment	Conducted	Reason
Landscape/Visual Impact Assessment	No	As all pipelines will be buried underground it was agreed with EDTEA that there will be no impact on any visual aspects and as such a Landscape/Visual Impact Assessment was not required.
Archaeological and Cultural Heritage Impact Assessment	Yes	Please refer to <i>Heritage and Cultural Aspects</i> under Section 2.6.
Paleontology Impact Assessment	Yes	Please refer to <i>Paleontological Environment</i> under Section 2.5.
Terrestrial Biodiversity Impact Assessment	No	As the project is located in an existing settlement, with all pipes being aligned along existing roads and on visible tracks (Figures 14ab, 16a, 17abc, 18ab, 19c, 20a) it was agreed with EDTEA that a Terrestrial Biodiversity Impact Assessment was not required. In addition, the triggered Listed Activities relate to the identified watercourses and not clearance of terrestrial vegetation.
Aquatic Biodiversity Impact Assessment	Yes	Please refer to <i>Surface Water</i> under Section 2.3.
Hydrology Assessment	No	As there will be no abstraction and discharge into any watercourse and all pipelines will be buried below the watercourses, it was agreed with EDTEA that a Hydrology Assessment was not required.
Plant Species Assessment	Yes	<i>The Surface Water</i> under Section 2.3 covers a vegetation component related to all wetlands on site which are to be impacted. A Plant Species Assessment was not conducted on the remainder of the project area as it is located in an existing settlement with all pipes being aligned along existing roads and on visible tracks (Figures 14ab, 16a, 17abc, 18ab, 19c, 20a).
Animal Species Assessment	No	An Animal Species Assessment was not considered necessary to inform this assessment due to the nature of the project. No sensitive fauna areas were observed by the EAP or by the Water Resources Specialist site assessment. Given the nature of the project i.e. located in existing settlements with all pipes being aligned along existing roads and on visible tracks (Figures 14ab, 16a, 17abc, 18ab, 19c, 20a) no faunal studies were deemed necessary. This was agreed with EDTEA during the pre-application meeting.

2.2 Topography and Physical Characteristics of Site

The following applies to the project area as indicated on Figure 1 and Figure 2.

The general gradient of the project area is as follows:

Table 6: The Gradient of The Site

Gradient	Description
Flat	N/A
1:50 – 1:20	The project area varies from gentle gradient to moderate slopes
1:20 – 1:15	
1:15 – 1:10	
1:10 – 1:7,5	
1:7,5 – 1:5	N/A
Steeper than 1:5	N/A

The topographical features and landforms of the site and surrounding area are as follows:

Table 7: The Topographical Features and Landforms of The Site

Topographical Feature	Description
Ridgeline	N/A
Plateau	N/A
Side slope of hill/mountain	N/A
Closed valley	N/A
Open valley	The project area is located in an open valley
Plain	N/A
Undulating plain/low hills	N/A
Dune	N/A
Sea-front	N/A

2.3 Surface Water

The following information has been obtained from the Water Resources Assessment for The Bulk Water Supply Scheme at Thokozani & Mpolweni compiled by The Biodiversity Company (2020)². Additional information has also been sourced from the Baseline Aquatic Assessment for The Proposed Mpolweni River Bridge Upgrade compiled by The Biodiversity Company (2020)³. The results from this report have been utilised as the Mpolweni River Bridge upgrade site falls within the project area and focuses on the main riverine system being directly crossed i.e. Mpolweni River tributary. Please note this section not only describes the receiving environment with regards to the watercourses on site it also provides an onsite description regarding the sensitive areas as identified by the uMgungundlovu District Municipality EMF.

² The Biodiversity Company (2020) Water Resources Assessment for The Bulk Water Supply Scheme at Thokozani & Mpolweni – Appendix B

³ The Biodiversity Company (2016) Baseline Aquatic Assessment for The Proposed Mpolweni River Bridge Upgrade

2.3.1 Drainage Lines⁴

The project area is located within the Pongola - Mtamvuna Water Management Area (WMA 4). The region has a mean annual precipitation rate of 800 to 1 500 mm and is considered humid. The Thokozani & Mpolweni WSS project area is located across 3 quaternary catchments:

- U20F;
- U20J; and
- U20G.

Watercourses within the above presented quaternary catchments form tributaries or are the mainstem of the larger uMngeni River system. The Sub Quaternary Reaches (SQR's) associated with the project area were the following:

- U20F-4224;
- U20F-4204;
- U20G-4240;
- U20G-4259; and
- U20G-4215;

The Thokozani & Mpolweni WSS will result in several direct crossing points, and indirect impacts in the above mentioned SQR's. A summary of the ecological classifications and impact on nature are presented below in Table 8.

Table 8: Details of Relevant Sub Quaternary Reaches

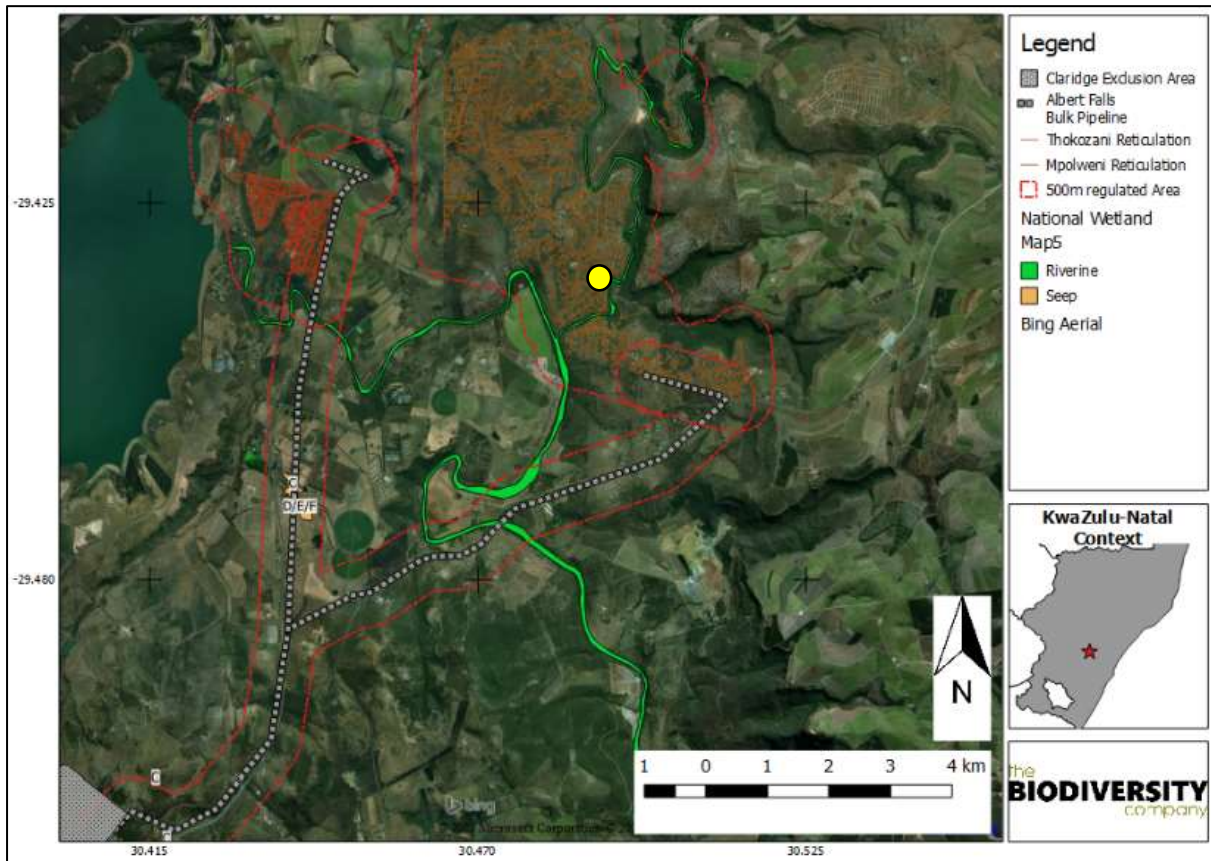
SQR	Name	Present Ecological State	Default Ecological Category	Ecological Importance	Ecological Sensitivity	Impact of Proposed Project
U20F-4224	Mpolweni	C	B	High	High	Direct crossing
U20F-4204	Sterkspruit	C	B	High	High	Direct crossing
U20G-4240	uMngeni	C	A	High	Very High	Direct crossing
U20G-4259	uMngeni	C	A	High	Very High	Indirect
U20G-4215	uMngeni	C	A	High	Very High	Direct crossing

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was used to identify any inland aquatic ecosystems within the project area. The Mpolweni and Thokozani WSS only had riverine systems associated with them, refer to Figure 14. Please note, these systems do not fall within the wetland assessment ecological health categorisation.

As per the National Freshwater Ecosystem Priority Areas (NFEPA) database, no freshwater priority areas (river ecosystem types) are designated to the Sub Quaternary Reaches (SQRs) associated with the project area.

⁴ The Biodiversity Company (2020) Water Resources Assessment for The Bulk Water Supply Scheme at Thokozani & Mpolweni – Appendix B

Figure 14: The SAIIAE Within the Project Area. Yellow Dot Indicates the Sampling Site for The Mpolweni River Bridge Upgrade.



2.3.2 EcoStatus of the Mpolweni River (2016)⁵

An aquatic assessment was conducted on the Mpolweni River in 2016 for the Mpolweni River Bridge upgrade. A number of aquatic assessments were conducted which included, *in-situ* water quality, habitat assessment, aquatic macroinvertebrates, biotic integrity based on SASS5 results and fish assemblage. However, in order to determine the overall status of the Mpolweni River an EcoStatus assessment was conducted. The EcoStatus results from the January 2016 survey are presented in Table 9 below. The PES result is shown for each of the assessment components. Based on this assessment, the EcoStatus of the reach was considered to be largely modified (Class B).

Table 9: Ecstatus Assessment Based on The PES of The Various Assessment Components

Assessment Components	PES Score
Instream Habitat	C
Riparian Habitat	C
Macroinvertebrate	C
Fish	D
EcoStatus	C

⁵ The Biodiversity Company (2016) Baseline Aquatic Assessment for The Proposed Mpolweni River Bridge Upgrade

2.3.3 Wetlands⁶

Four wetland types were identified during the field assessment conducted by the specialist. These include, (please note the dams are artificial systems and were not assessed for wetland health conditions):

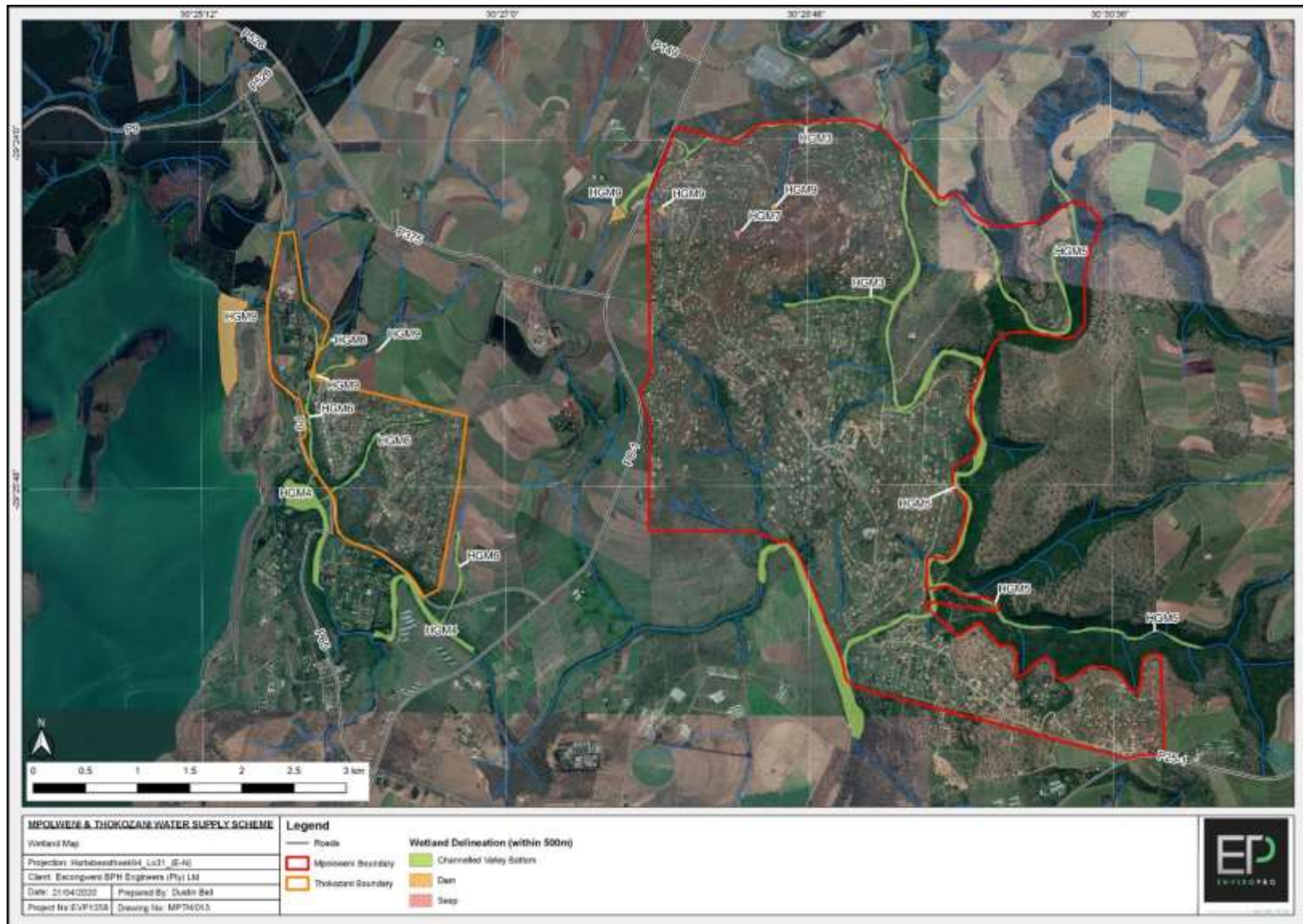
- Channelled valley bottom;
- Hillslope seep;
- Unchanneled valley bottom; and
- Artificial dams.

The dominant wetland vegetation identified within the project area includes; *Typha capensis*, *Juncus effuses*, *Pycreus nitidus*, *Cyperus digitatus*, *Cyperus dives*, *Cyperus longus*, *Imperata cylindrica*, *Chloris gayana*, *Leersia Hexandra* and *Phragmites australis*. The dominant soils in the wetland areas are the Katspruit and Westleigh soil forms. The river banks are comprised of Dundee soil forms with the dominant soils in the midslope landscape positions being the Hutton soil form.

Please note the HGM unit allocation, as per the specialist, is from HGM 3 to HGM 9. HGM 1 and HGM 2 were classified on the existing bulk water pipeline area and do not form part of this assessment. Please refer to Figure 15 below for the wetland HGM unit allocation.

⁶ The Biodiversity Company (2020) Water Resources Assessment for The Bulk Water Supply Scheme at Thokozani & Mpolweni – Appendix B

Figure 15: Wetland HGM Unit Allocation



2.2.1.1. Present Ecological State (PES)⁷

The PES ratings for the assessed HGM units are presented in Table 10. The overall wetland health for HGM 3 to HGM 5 was determined to be that of Moderately Modified (class C) systems and HGM 6 to HGM 8 was determined to be Largely Modified (class D). Although the wetlands are impacted upon, the wetlands maintain their habitat structure and functioning.

Table 10: Summary of The Scores for The Wetland PES

Component	PES Rating	Description
HGM3		
Overall	C	Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact.
HGM4		
Overall	C	Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact.
HGM5		
Overall	C	Moderately Modified. A moderate change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains predominantly intact.
HGM6		
Overall	D	Largely Modified. A large change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains intact.
HGM7		
Overall	D	Largely Modified. A large change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains intact.
HGM8		
Overall	D	Largely Modified. A large change in ecosystem processes and loss of natural habitats has taken place, but the natural habitat remains intact.

2.2.1.2. Ecosystem Service Assessment⁴

The two channelled valley bottoms (HGM 4 & HGM 5) associated with the main river systems are rated as providing the highest levels of service to the project area. The service that rated as moderately-high were associated with the indirect benefits of:

- flood attenuation;
- assimilation of toxicants and nutrients; and
- the control of erosion.

These two HGM units also provided the highest benefit to the maintenance of biodiversity.

The remaining channelled valley bottom wetlands (HGM 3 and HGM 6) were associated with smaller systems which have been altered by urban development or farming practices. The levels of services were lower, with flood attenuation being the main benefit. HGM 3 aided in erosion control as well.

The hillslope seep and unchanneled valley bottoms were altered by farming and urban development and no moderate-high benefits were identified.

⁷ The Biodiversity Company (2020) Water Resources Assessment for The Bulk Water Supply Scheme at Thokozani & Mpolweni – Appendix B

2.2.1.3. Ecological Importance & Sensitivity (EIS)⁸

The EIS for the assessed HGM units are presented in Table 11 below:

Table 11: Wetland Recommended Ecological Categories Based on The PES and EIS Results

Wetland Importance and Sensitivity	HGM 3	HGM 4	HGM 5	HGM 6	HGM 7	HGM 8
Ecological Importance & Sensitivity	C	B	B	C	C	C
Hydrological/Functional Importance	C	C	B	C	C	C
Direct Human Benefits	D	D	D	D	D	D

2.2.1.4. Recommended Ecological Category⁵

The REC is established based on the combination of the PES and EIS values and is designed to set targets for the ecological state of the identified wetlands during and after the project has occurred. Table 12 shows the PES, EIS as well as the determined REC for the project area.

Table 12: Wetland Recommended Ecological Categories Based on The PES and EIS Results

HGM	Wetland Type	Overall PES	Overall EIS	REC
3	Channelled valley bottom	C	C	C
4	Channelled valley bottom	C	B	C
5	Channelled valley bottom	C	B	C
6	Channelled valley bottom	D	C	C
7	Seep	D	C	C
8	Unchanneled valley bottom	D	C	C

2.3.4 Buffer Zones⁵

According to Ezemvelo KZN Wildlife,⁹ a minimum recommended buffer zone of 30m is required for wetlands within the province. The wetland buffer zone tool was used to calculate the appropriate buffer required for the construction of the pipelines. The model shows that the largest threat (High) posed during the construction phase is that of "increased sediment inputs and turbidity". The operational phase will not pose any significant risks due to this being a water pipeline.

According to the buffer guideline,¹⁰ a high-risk activity would require a buffer that is 95% effective to reduce the risk of the impact to a low-level threat. The risks were then reduced to low with the prescribed mitigation measures and therefore the recommended buffer was calculated to be 22m and 15m for the construction and operational phases respectively, please refer to Table 13.

Table 13: Post-Mitigation Buffer Requirement.

Required Buffer after mitigation measures have been applied	
Construction Phase	22 m
Operational Phase	15 m

The buffer zone is not applicable for areas of the project that traverse wetland areas, however, for all secondary activities such as laydown yards, storage areas and camp sites, the buffer zone must be implemented.

⁸ The Biodiversity Company (2020) Water Resources Assessment for The Bulk Water Supply Scheme at Thokozani & Mpolweni – Appendix B

⁹ Ezemvelo KZN Wildlife. (2013). Guideline: Biodiversity Impact Assessments in KwaZulu-Natal, Version 2.

¹⁰ Macfarlane, D.M., Bredin, I.P., Adams, J.B., Zungu, M.M., Bate, G.C. and Dickens, C.W.S. 2014. Preliminary guideline for the determination of buffer zones for rivers, wetlands and estuaries. Final Consolidated Report. WRC Report No TT 610/14, Water Research Commission, Pretoria.

2.3.5 Specialist Risk Assessment and Recommendations¹¹

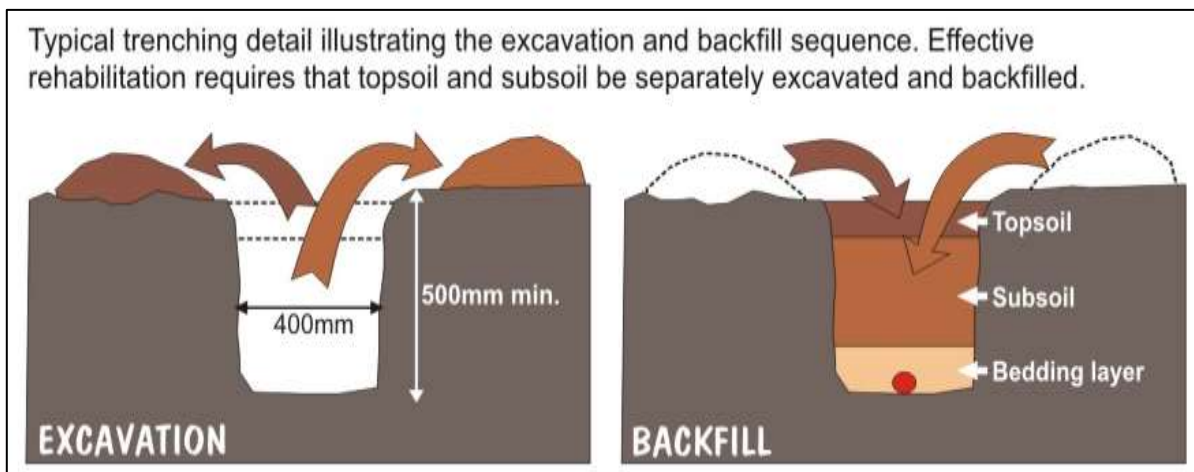
As per the specialist, the construction of the water pipeline will pose risks to the identified wetlands, with the level of risk determined to vary from low to moderate. The moderate risks determined for the study are associated with the cutting/reshaping of embankments, digging works, soil stockpile management and operation of equipment and machinery. Notable expected risks include the potential for erosion and increased sedimentation of the wetlands. This is due to the soils in the area being susceptible to dispersion and the impairment of water quality during the attachment of the pipeline to existing crossing structures. The moderate risk ratings were re-allocated a low status due to implementation of additional mitigation methodologies.

The operation of the pipeline does pose a low risk to the identified wetlands. The low risks are largely attributed to the study being aligned with existing disturbed routes. Taking into consideration that the project is for bulk water supply, and that pipelines are generally aligned in road reserves, the risks posed to wetlands are considered to be low. This is supported by the fact that the proposed pipeline will also tie into existing structures.

The specialist concluded that as long as the mitigation measures are followed which include the recommended 22m buffer, as per Section 2.2.3, the risk to the wetlands is expected to be low. No fatal flaws were identified by the specialist and all mitigation measures have been included into the EMP. In addition to these mitigation measures the following recommendations have been proposed by the specialist:

- A soil management strategy must be compiled and implemented for the excavation and backfilling of trenches. A proposed soil handling sequence is presented in Figure 16 below.
- An infrastructure monitoring and service plan must be compiled and implemented during the operational phase.
- An Environmental Control Officer (ECO) must oversee the construction phase of the project, with wetland areas as a priority.

Figure 16: The Proposed Excavation and Back-Filling Handling of Soil⁸



2.4 Fauna and Flora

The site is located within a rural area, which is densely populated. The fauna and flora found within the area can be described as follows:

- Ecosystem Type: Ngongoni Veld (Svs4).
- Vegetation Types¹²:
 - KwaZulu-Natal Hinterland Thornveld (SVs3) vegetation type:
 - Vegetation & Landscape Features:
 - Vegetation is open thornveld dominated by Acacia species on undulating plains found on upper margins of river valleys.
 - Ngongoni Veld (Svs4) vegetation type:

¹¹ The Biodiversity Company (2020) Water Resources Assessment for The Bulk Water Supply Scheme at Thokozani & Mpolweni – Appendix B

¹² Mucina, L. & Rutherford, M.C. (eds) 2006. The vegetation of South Africa, Lesotho and Swaziland. Strelitzia 19. South African National Biodiversity Institute, Pretoria.

- Vegetation & Landscape Features:
 - Dense, tall grassland overwhelmingly dominated by unpalatable, wiry Ngongoni grass (*Aristida junciformis*), with this monodominance associated with low species diversity. Wooded areas (thornveld) are found in valleys at lower altitudes, where this ecosystem grades into KwaZulu-Natal Hinterland Thornveld and Bisho Thornveld. Termitaria support bush clumps with, for example, *Acacia species*, *Cussonia spicata*, *Ziziphus mucronata*, *Coddia rudis* and *Ehretia rigida*.
- Vegetation noted on site:
 - Although the area historically would have represented the KwaZulu-Natal Hinterland Thornveld and Ngongoni Veld vegetation types, the current vegetation along the majority of the pipeline route is in a degraded state due to the previous clearing for the project area roads as well as subsistence agricultural and residential activities.
 - The dominant wetland vegetation identified within the project area includes; *Typha capensis*, *Juncus effuses*, *Pycneus nitidus*, *Cyperus digitatus*, *Cyperus dives*, *Cyperus longus*, *Imperata cylindrica*, *Chloris gayana*, *Leersia Hexandra* and *Phragmites australis*
- Fauna
 - No fauna was evident around the site beside domestic livestock.

All existing roads have previously been cleared and all existing foot tracks have been heavily disturbed, therefore very little vegetation would require clearing for this project in these areas. The only areas of the site that will require some form of new vegetation clearing are those related to the watercourse crossings. This impact has been assessed by the specialist with all risks coming out as low. Only trees that are in the direct route of the pipeline will be removed, before any tree is removed the engineer and ECO must agree that no other possible route is available. A number of alien plant species with no vegetation of conservation significance are present on-site, therefore, the clearing of these species will have a positive impact on the area.

2.5 Paleontological Environment¹³

To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the proposed project.

The Thokozani area is entirely on rocks of the Pietermaritzburg Formation while Mpolweni lies on the same rocks in the west but on rocks of the Dwyka Group in the south-eastern section. Fossils are rare in the Pietermaritzburg Formation because they are mainly deep-water sediments so may have a few terrestrial fragments of plants (*Glossopteris* flora leaf impressions, wood fragments) or, along the shoreline settings, micobioturbated traces of worm and invertebrate fossils (Johnson et al., 2006¹⁴). Dwyka Group sediments are widespread around the Karoo margin but fossils are very rare. The Dwyka Group is made up of seven facies that were deposited in a marine basin under differing environmental settings of glacial formation and retreat (Visser, 1986¹⁵, 1989¹⁶; Johnson et al., 2006¹⁴). In the north these are called the Mbizane Formation, and the Elandsvlei Formation in the south.

Based on experience of the specialist and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the urban developments of Thokozani or Mpolweni. There is only a very small chance that fragmentary fossils may occur in the Dwyka mudrock facies only, or in the deep water Pietermaritzburg dark shales so a Fossil Chance Find Protocol should be added to the EMP: if fossils are found once excavations for water pipes and associated infrastructure has commenced then they should be rescued and a palaeontologist called to assess and collect a representative sample.

¹³ Prof Marion Bamford (2020) Palaeontological Impact Assessment for the proposed Mpolweni and Thokozani Water Supply, near Albert Falls, KwaZulu Natal Province – Appendix B

¹⁴ Johnson, M.R., van Vuuren, C.J., Visser, J.N.J., Cole, D.I., Wickens, H.deV., Christie, A.D.M., Roberts, D.L., Brandl, G., 2006. Sedimentary rocks of the Karoo Supergroup. In: Johnson, M.R., Anhaeusser, C.R. and Thomas, R.J., (Eds). The Geology of South Africa. Geological Society of South Africa, Johannesburg / Council for Geoscience, Pretoria. Pp 461 – 499.

¹⁵ Visser, J.N.J., 1986. Lateral lithofacies relationships in the glaciogene Dwyka Formation in the western and central parts of the Karoo Basin. Transactions of the Geological Society of South Africa 89, 373-383.

¹⁶ Visser, J.N.J., 1989. The Permo-Carboniferous Dwyka Formation of southern Africa: deposition by a predominantly subpolar marine icesheet. Palaeogeography, Palaeoclimatology, Palaeoecology 70, 377-391.

2.6 Heritage and Cultural Aspects¹⁷

A Cultural Heritage Impact Assessment was conducted by Active Heritage cc the findings of the report are presented below:

Large portions of the project area have been disturbed by recent building activities associated with peri-urban expansion as well as small-scale farming. However, large portions of the footprint are still covered in indigenous grass and bushveld trees. Although the greater Albert Falls area is rich in archaeological sites no heritage sites or other relevant features have been observed on the actual footprint during the survey. Some buildings older than 60 years do occur at Mpolweni and these are most probably associated with the early mission activities in the area. However, none of these buildings occur closer than 200m from the proposed pipelines and they are not threatened by the development. Archaeological sites do occur on the adjacent properties. These, however, are situated more than 500m from the proposed development and again there is no need for mitigation. The area is also not part of any known cultural landscape. A large cemetery is roughly situated in the centre of the northern part of Mpolweni.

The specialist concluded that proposed Mpolweni and Thokozani WSS may proceed from a general heritage perspective, however the following recommendation have been proposed:

- The developers must ensure that the Mpolweni cemetery is not altered or damaged in any way. A buffer zone of 30m must be maintained around this site at all times. There is no need for the developers to erect a fence around the cemetery as one already exists.
- Should construction expose any archaeological and historical residues, as well as fossils, construction activities must cease immediately pending an evaluation by the heritage authorities.

2.7 Socio-Economic Environment

The environment and surrounding land use within and adjacent to the pipeline are described as follows:

- Located within a rural area near of Albert Falls town, refer to Figure 1.
- The land is predominately used for residential purposes, with small subsistence farms spread throughout the project area.
- The land that the pipeline passes through has multiple land owners.
- It is highly unlikely that the pipeline and WSS infrastructure will affect any future development within the area due to the pipeline's proximity to the existing road reserve and foot paths. The majority of the pipeline falls within areas that are not conducive for development.

The proposed water supply scheme will provide a number of rural households in this area with access to clean, potable water. The majority of homesteads along the route appear to be outside the planned pipeline route and will therefore not be directly impacted by the proposed activity. Few fences and homestead access roads should require relocation, however, should there be a need for the relocation of infrastructure, an agreement must be made with the contractor and community member. Ultimately, residents will have an improved quality of life as a result of the proposed project.

2.8 Surrounding Environment and Land Uses

The environment and land uses surrounding the pipeline are as follows:

- Located within a rural area.
- The land surrounding the pipeline consists of:
 - Open indigenous bushveld;
 - Subsistence farming;
 - Grazing land;
 - Residential; and
 - Road infrastructure.

The area the pipeline will run through is predominantly used for residential housing.

The figures below provide photographs of the site:

¹⁷ Active Heritage cc (2020) Cultural Heritage Impact Assessment of the proposed Thokozani Mpolweni Water Supply Scheme, within the uMshwathi Local and uMgungundlovu District Municipalities, KwaZulu-Natal – Appendix B.



Figure 17: (a) View of an existing formal gravel road within the Thokozani project area where the pipeline will be placed adjacent/within; (b) View of an existing informal gravel road within the Thokozani project area where the pipeline will be placed adjacent; (c) A typical drainage line on site which the pipeline will either be within 32m or cross.



Figure 18: (a) The southern delineated wetland within the Thokozani project area with the P9 road in the background; (b) Evidence of the existing water supply reticulation in the Thokozani project area; (c) A proposed watercourse crossing point within the Thokozani project area along a footpath.



Figure 19: (a) A footpath within the Thokozani project area where the pipeline will be placed; (b) Upstream view of a proposed watercourse crossing along the main road running through the Thokozani project area, the delineated wetland is also in view; (c) Downstream view of a proposed watercourse crossing along the main road running through the Thokozani project area, the delineated wetland is also in view



Figure 20: (a) View of one of the existing reservoirs within the Mpolweni project area; (b) A typical formal asphalt road within the Mpolweni project area where the pipeline will be placed adjacent; (c) A watercourse crossing within the Mpolweni project area along an existing footpath.



Figure 21: (a) A footpath within the Mpolweni project area where the pipeline will be placed; (b) A typical formal gravel road within the Mpolweni project area where the pipeline will be placed adjacent; (c) A watercourse which is within 32m of the proposed pipeline.



Figure 22: (a) A heavily disturbed watercourse which will be used as a crossing point for the pipeline within the Mpolweni project area; (b) A heavily invaded watercourse, Bugweed in view, within the Mpolweni project area; (c) The existing causeway at the main crossing point along the Mpolweni River.



Figure 23: (a) View of the construction status of the new structure along the Mpolweni River; (b) A watercourse crossing point following an existing footpath within the southern portion of the Mpolweni project area; (c) A watercourse crossing point following an existing footpath within the western portion of the Mpolweni project area.

Section 3: Policy and Legislative Context

3.1 Identification of All Legislation, Policies, Plans, Guidelines, Spatial Tools, Municipal Development Planning Frameworks and Instruments as Per Section 3(e) (i) And Compliance of Proposed Activity with Legislation and Policy 3(e) (ii)

Table 14: All identify legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments

Legislation	Compliance of Activity
The Constitution of South Africa (No. 108 of 1996)	The Constitution cannot manage environmental resources as a standalone piece of legislation, hence additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld on an on-going basis throughout the country. In terms of Section 24, the constitution gives every person the right to an environment that is not harmful to their health and wellbeing.
National Environmental Management Act (Act 107 of 1998)	<p>This Act is South Africa's overarching environmental legislation. It includes a set of principles that govern environmental management and against which all Environmental Management Programmes (EMPr) and actions are measured. These principles include and relate to sustainable development, protection of the natural environment, waste minimisation, public consultation, the right to an environment that is not harmful to one's health or wellbeing, and a general duty of care.</p> <p>The Environmental Impact Assessment (EIA) Regulations, 2014: GNR.982, R.983, and R.985 under Section 24 of the NEMA define the activities that require Environmental Authorisation and the processes to be followed to assess environmental impacts and obtain Environmental Authorisation.</p> <p>The proposed development triggers Activities 12 and 19 of Listing Notice 1 and Activity 14 of Listing Notice 3. The proposed development thus requires EA in the form of a BA process. The associated EMPr will include mitigation measures, recommended by specialists, that are required to be implemented to ensure that environmental resources are protected.</p>
National Water Act (Act 36 of 1998)	<p>The purpose of this Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways which take into account amongst other factors: promoting equitable access to water; redressing the results of past racial and gender discrimination; promoting the efficient, sustainable and beneficial use of water in the public interest; facilitating social and economic development; protecting aquatic and associated ecosystems and their biological diver.</p> <p>There will be alterations to the bed and banks of a watercourse. Therefore, Water Use Authorisation will be required as per Section 21 (c) and (i) of the National Water Act.</p>
National Environmental Management: Waste Act (Act 59 of 2008)	This Act makes provision with respect to measures to improve waste management practices, including: (a) minimizing the consumption of natural resources; (b) prevention and minimizing the generation of waste; (c) reducing, re-using, recycling and recovering waste; (d) treating and safely disposing of waste as a last resort; (e) preventing pollution and ecological degradation; (f) promoting and ensuring the effective delivery of waste services; (g)

	<p>rehabilitating land where contamination presents. Section 19 allows the Minister to publish a list of activities, which require a Waste Management License. The most recent list is published in Government Gazette 37083 Notice No. 921 dated 29 November 2013.</p> <p>It is unlikely that any activities carried out by the development will trigger a Waste Management Activity.</p>
National Environmental Management: Air Quality Act (Act 39 of 2004)	<p>This Act governs the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto.</p> <p>It is unlikely that any activities carried out by the development will impact on the local and regional air quality.</p>
National Environmental Management: Protected Areas Act (Act 57 of 2003)	<p>This Act make provision for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes, for the establishment of a national register of all national, provincial and local protected areas, for the management of those areas in accordance with national norms and standards, for intergovernmental co-operation and public consultation in matters concerning protected areas, and for matters in connection therewith.</p> <p>The proposed development triggers Activity 14 of Listing Notice 3 due to its proximity to the Albert Falls Nature Reserve. The proposed development thus requires EA in the form of a BA process.</p>
National Environmental Management: Integrated Coastal Management Act (Act 24 of 2008)	<p>This Act make provision to establish a system of integrated coastal and estuarine management in the Republic, including norms, standards and policies, in order to promote the conservation of the coastal environment, and maintain the natural attributes of coastal landscapes and seascapes, and to ensure that development and the use of natural resources within the coastal zone is socially and economically justifiable and ecologically sustainable, to define rights and duties in relation to coastal areas, to determine the responsibilities of organs of state in relation to coastal areas, to prohibit incineration at sea, to control dumping at sea, pollution in the coastal zone, inappropriate development of the coastal environment and other adverse effects on the coastal environment, to give effect to South Africa's international obligations in relation to coastal matters and to provide for matters connected therewith.</p> <p>The proposed development will not have an impact on any coastal areas.</p>
National Forest Act (Act 84 of 1998)	<p>This Act governs the protection of forests as the government recognises that everyone has the constitutional right to have the environment protected for the benefit of present and future generations. Natural forests and woodlands form an important part of that environment and need to be conserved and developed according to the principles of sustainable management; plantation forests play an important role in the economy; plantation forests have an impact on the environment and need to be managed appropriately, the State's role in forestry needs to change; and the</p>

	<p>economic, social and environmental benefits of forests have been distributed unfairly in the past.</p> <p>The proposed development will not have an impact on any forest areas.</p>
Environmental Conservation Act (Act 43 of 1996)	This Act makes provisions for the application of general environmental principles for the protection of ecological processes, promotion of sustainable development and the protection of the environment. This Act has mostly been repealed by NEMA.
National Environmental Management: Biodiversity Act (Act 10 of 2004)	<p>This Act governs the management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act, 1998, the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources, the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources, the establishment and functions of a South African National Biodiversity Institute and for matters connected therewith.</p> <p>The site is not located within an endangered or critically endangered ecosystem.</p>
National Heritage Resources Act (Act 25 of 1999) KwaZulu-Natal Heritage Act (Act 4 of 2008)	<p>This Act aims to promote good management of the national estate in order to preserve the country's unique heritage for current and future generations. The KwaZulu-Natal Heritage Act (Act No. 4 of 2008) provides for the conservation and preservation of the physical and intangible heritage resources of the KwaZulu-Natal province.</p> <p>No significant archaeological artefacts will be disturbed during this project; therefore; no permits will be required from the provincial heritage authority, AMAFA.</p>
Mineral & Petroleum Resources Development (Act 28 of 2002)	<p>This Act governs the sustainable development of the nation's mineral and petroleum resources which includes activities carried out for the winning of any mineral on, in or under the earth (i.e. the use of borrow pits).</p> <p>Mined material used for the construction of the pipeline must be obtained from licensed sources.</p>
Occupational Health and Safety Act (Act 181 of 1993)	<p>This Act governs the health and safety of persons at work, including aspects which are hazardous to health and safety. In terms of major hazardous installations, the regulations shall apply to employers, self-employed persons and users, who have on their premises, either permanently or temporarily, a major hazard installation or a quantity of a substance which may pose a risk that could affect the health and safety of employees and the public.</p> <p>During both construction and operational phases of this development all the requirements of Occupational Health and Safety Act 1993 will need to be adhered to.</p>
Hazardous Substances Act (Act No. 15 of 1973)	This Act governs the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitising or flammable nature or the generation of pressure thereby in certain circumstances, and for the control of certain electronic products, to provide for the division of such substances or products into groups in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products and to provide for matters connected therewith.

	A Spill Contingency Plan will be compiled for managing spills during the construction of the proposed development.
National Building Regulations and Building Standards Act (Act 103 of 1977)	This Act aims to provide for the promotion of uniformity in the law relating to the erection of buildings in the areas of jurisdiction of local authorities and for the prescribing of building standards.
Guideline on Need and Desirability (2017)	This Guideline considers the need and desirability of proposed development.
Municipal Planning Framework	
uMgungundlovu District Municipality Integrated Development Plan 2020/2022 Review.	This project falls in line with the uMgungundlovu District Municipality's goal to promote sustainable development and provide better services in the district municipality.

Section 4: Motivation, Need and Desirability

4.1 Need and Desirability as Per Section 3(F)

The following table has been prepared as per the 2017 Integrated Environmental Management Guideline: Guideline on Need and Desirability compiled by the Department of Environmental Affairs.

Table 15: Need and Desirability as Per The 2017 Guideline on Need and Desirability

"Securing ecological sustainable development and use of natural resources"	
<i>How will this development (and its separate elements/aspects) impact on the ecological integrity of the area?</i>	The construction of the water supply scheme will require cutting/reshaping of embankments, digging works, soil stockpile management and operation of equipment and machinery. It will also result in the infill of 606.21m ³ of material into multiple watercourses where the pipeline is required to cross these in order to access various homesteads. There will be minimal indigenous vegetation clearing. Therefore, the impact on the ecological integrity of the area has been rated as low during both the construction and operational phases due to the nature of the development and measures implemented to reduce impact by choosing the route with the least impact.
<i>How will this development disturb or enhance ecosystems and/or result in the loss or protection of biological diversity?</i> <i>What measures were explored to firstly avoid these negative impacts, and where these negative impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts?</i> <i>What measures were explored to enhance positive impacts?</i>	The proposal will result in the infilling of 606.21m ³ within multiple watercourses and will result in some clearance and disturbance of the landscape and vegetation. Route options were investigated and wherever possible watercourses were avoided and the route was selected based on existing roads and areas of disturbance. In some areas water crossings were unavoidable as there was no other way to access the homestead and in some cases the need to maintain the correct pressure within the gravity fed system meant that the topography dictated the route. The pipeline doesn't offer much opportunity to enhance biological diversity but the proposed route does seek to avoid areas where construction would have the highest impact.
<i>How will this development pollute and/or degrade the biophysical environment?</i>	Apart from risk of spills etc during construction which can be managed and mitigated, the development will not pollute and/or degrade the

<p><i>What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts?</i></p> <p><i>What measures were explored to enhance positive impacts?</i></p>	<p>biophysical environment as the reticulation network will supply potable water during operation.</p> <p>The EMPr details measures to manage hazardous materials and fuels used on site during construction and details measures to put in place to ensure that pollution is prevented. Any potential leakages from the pipeline during operation will only result in clean water entering the environment.</p> <p>By providing homesteads with access to potable drinking water at their homes, the project could reduce the pedestrian traffic in and around water courses and also reduce the need for people to wash clothing, vehicles and dishes in the watercourses, thereby reducing impacts on water quality.</p>
<p><i>What waste will be generated by this development?</i></p> <p><i>What measures were explored to firstly avoid waste, and where waste could not be avoided altogether, what measures were explored to minimise, reuse and/or recycle the waste?</i></p> <p><i>What measures have been explored to safely treat and/or dispose of unavoidable waste?</i></p>	<p>Small volumes of general waste and a small amount of hazardous waste, such as oil spills, will be generated during construction. This will be temporary.</p> <p>No waste will be generated during operation.</p> <p>An EMPr has been provided to ensure waste is properly stored and managed site and the appropriate disposal of waste is also addressed. Measures for the separation and recycling of waste are addressed in the EMPr.</p>
<p><i>How will this development disturb or enhance landscapes and/or sites that constitute the nation's cultural heritage?</i></p> <p><i>What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts?</i></p> <p><i>What measures were explored to enhance positive impacts?</i></p>	<p>There are no negative or positive impacts on any cultural heritage sites.</p> <p>Heritage and palaeontological studies were carried out.</p> <p>The pipeline doesn't offer much opportunity to enhance cultural diversity but does not negatively impact it any way.</p>
<p><i>How will this development use and/or impact on non-renewable natural resources?</i></p> <p><i>What measures were explored to ensure responsible and equitable use of the resources?</i></p> <p><i>How have the consequences of the depletion of the non-renewable natural resources been considered?</i></p> <p><i>What measures were explored to firstly avoid these impacts, and where impacts could not be avoided altogether, what measures were explored to minimise and remedy (including offsetting) the impacts?</i></p> <p><i>What measures were explored to enhance positive impacts?</i></p>	<p>The construction process will make use of quarried materials to produce cement and fuels to operate the vehicles.</p> <p>The EMPr addresses the responsible sourcing of materials and use of permitted sites only.</p> <p>The project will not significantly deplete non-renewable natural resources.</p> <p>These impacts cannot be completely avoided but the EMPr addresses appropriate measures to ensure sustainable sourcing.</p> <p>The pipeline doesn't offer much opportunity to enhance positive impacts related to non-renewable resources.</p>

<p><i>How will this development use and/or impact on renewable natural resources and the ecosystem of which they are part?</i></p> <p><i>Will the use of the resources and/or impact on the ecosystem jeopardise the integrity of the resource and/or system taking into account carrying capacity restrictions, limits of acceptable change, and thresholds?</i></p> <p><i>What measures were explored to firstly avoid the use of resources, or if avoidance is not possible, to minimise the use of resources? What measures were taken to ensure responsible and equitable use of the resources?</i></p> <p><i>What measures were explored to enhance positive impacts?</i></p> <ul style="list-style-type: none"> • <i>Does the proposed development exacerbate the increased dependency on increased use of resources to maintain economic growth or does it reduce resource dependency (i.e. dematerialised growth)? (note: sustainability requires that settlements reduce their ecological footprint by using less material and energy demands and reduce the amount of waste they generate, without compromising their quest to improve their quality of life)</i> • <i>Does the proposed use of natural resources constitute the best use thereof? Is the use justifiable when considering intra- and intergenerational equity, and are there more important priorities for which the resources should be used (i.e. what are the opportunity costs of using these resources this the proposed development alternative?)</i> • <i>Do the proposed location, type and scale of development promote a reduced dependency on resources</i> 	<p>The development is not expected to impact on any renewable natural resources on site. The project will however, increase the demand for potable water in the region. Raw water is collected at Midmar Dam which is the source water to the Upper Mgeni System. The raw water is treated at DV Harris Wastewater Treatment Works then distributed to the project area. Umgeni Water, who are the custodians of Midmar Dam, are responsible for the distribution and conservation of this water and have committed the bulk water supply to Mpolweni and Thokozani for the next 20 years. This commitment is in line with Umgeni Water’s long-term planning to ensure sustainable use of water.</p> <p>Water supply is a basic human need and therefore use of the resource cannot be avoided, however implementation of a formal scheme does allow proper management and monitoring of water use and can ensure that impacts are mitigated through formal management as opposed to the impacts caused by local communities accessing local water resources in an informal and uncontrolled manner.</p>
<p><i>How were a risk-averse and cautious approach applied in terms of ecological impacts?</i></p> <ul style="list-style-type: none"> • <i>What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)</i> • <i>What is the level of risk associated with the limits of current knowledge</i> • <i>Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</i> 	<p>The route with the least impact on the environment was selected by choosing an option with the fewest watercourse crossings and that follows existing road reserves and disturbed areas. Therefore, unnecessary impacts on vegetated areas have been avoided.</p> <p>There are very few if any gaps in knowledge.</p> <p>A risk averse and cautious approach has been followed by avoiding disturbance to pristine areas where possible and reducing the number of water course crossings. The impact on the ecological integrity of the area has therefore been rated as low during the construction phase. During operation, there will be very little impact.</p>

<p><i>How will the ecological impacts resulting from this development impact on people's environmental right in terms following</i></p> <ul style="list-style-type: none"> • <i>Negative impacts: e.g. access to resources, opportunity costs, loss of amenity (e.g. open space), air and water quality impacts, nuisance (noise, odour, etc.), health impacts, visual impacts, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</i> • <i>Positive impacts: e.g. improved access to resources, improved amenity, improved air or water quality, etc. What measures were taken to enhance positive impacts?</i> 	<p>The proposed development will have very little negative impact on the community's environmental rights. There may be some nuisance and disturbance and access constraints during construction as well as associated noise and dust.</p> <p>The long-term impacts will be positive as the WSS will improve access to potable water which is a natural resource and will allow better management and monitoring of water use.</p>
<p><i>Describe the linkages and dependencies between human wellbeing, livelihoods and ecosystem services applicable to the area in question and how the development's ecological impacts will result in socio-economic impacts (e.g. on livelihoods, loss of heritage site, opportunity costs, etc.)?</i></p>	<p>As this is a rural area the local community relies on the open spaces around them for a number of services including grazing for cattle and goats; subsistence agriculture; in some cases, wood gathering for fires and cooking and where water access is limited the community use the local watercourses for water provision and cleaning.</p> <p>The proposed development will have a limited ecological impact and will have a positive impact on the community by providing a long-term potable water supply. This supply of potable water will also aid in the provision of other basic services such as waterborne sanitation. The development will have limited to no impact on the other ecological services provided during construction and no impact during operation.</p>
<p><i>Based on all of the above, how will this development positively or negatively impact on ecological integrity objectives/targets/considerations of the area?</i></p>	<p>The development should have no significant negative impact on ecological integrity based on the understanding that the Municipality will construct and operate the WSS as per the conditions of the EMPr.</p>
<p><i>Considering the need to secure ecological integrity and a healthy biophysical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the "best practicable environmental option" in terms of ecological considerations?</i></p>	<p>Due to the nature of the development, no other feasible site alternatives could be considered, please refer to Section 1.4 and 4.2. In terms of technology alternatives, the preferred alternative will have a larger construction impact on the watercourses in terms of construction work in the bed and banks but will have less impact in the long term, post-construction. Due to post-construction impacts being permanent this technology is seen as much more favourable when considering ecological impacts.</p>
<p><i>Describe the positive and negative cumulative ecological/biophysical impacts bearing in mind the size, scale, scope and nature of the project in relation to its location and existing and other planned developments in the area?</i></p>	<p>The construction of the WSS will increase sedimentation within the catchment during construction. This will ultimately impact on downstream users. It can however be mitigated by following the measures indicated in the EMPr. The increased use of potable water will put pressure on the Umgeni catchment Due to the nature of the</p>

	project, there are no identified positive cumulative ecological/biophysical impacts.
“Promoting justifiable economic and social development”	
<p><i>What is the socio-economic context of the area, based on, amongst other considerations, the following considerations:</i></p> <ul style="list-style-type: none"> • <i>The IDP (and its sector plans’ vision, objectives, strategies, indicators and targets) and any other strategic plans, frameworks of policies applicable to the area,</i> • <i>Spatial priorities and desired spatial patterns (e.g. need for integrated of segregated communities, need to upgrade informal settlements, need for densification, etc.),</i> • <i>Spatial characteristics (e.g. existing land uses, planned land uses, cultural landscapes, etc.), and</i> • <i>Municipal Economic Development Strategy (“LED Strategy”).</i> 	<p>The project is located in a rural area characterised by open indigenous bushveld; subsistence farming; grazing land; low income and informal residences and road infrastructure. The area is therefore targeted for development and provision of services in order to improve quality of life, health and access to services.</p>
<p><i>Considering the socio-economic context, what will the socio-economic impacts be of the development (and its separate elements/aspects), and specifically also on the socio-economic objectives of the area?</i></p>	<p>The identified positive socio-economic impacts are as follows:</p> <ul style="list-style-type: none"> • Improved access to a potable water supply to the various communities in the project • Provision of a uniform level of service via a house connection. • Infrastructure that will serve to satisfy the increasing water demand within the project area. • Provision of an economically efficient solution to the water supply problem. • Provision of a level of service that will ultimately allow for a waterborne sanitation system in future. • Reduced water services backlog and uplifted standards of living to the communities in question • Provision of employment for local labour. • Skills development through intensive programmes directly involved in the planning, construction and commissioning of the scheme.
<p><i>How will this development address the specific physical, psychological, developmental, cultural and social needs and interests of the relevant communities?</i></p>	<p>The new WSS infrastructure will aid in improving potable water supply for the community of Mpolweni and Thokozani. This will have a direct positive impact on sanitation and health.</p>
<p><i>Will the development result inequitable (intra- and inter-generational) impact distribution, in the short- and long-term?</i></p>	<p>No, as the proposed development is a municipal water provision project, it will benefit the public in general and will not result in inequitable (intra- and inter-generational) impact distribution.</p>
<p><i>Will the impact be socially and economically sustainable in the short- and long-term?</i></p>	<p>Yes, the development will be socially and economically sustainable as there have not been any significant negative socio-economic impacts identified. The WSS will have a positive long-term social impact on all residents in the Mpolweni and Thokozani areas.</p>

In terms of location, describe how the placement of the proposed development will:

- *result in the creation of residential and employment opportunities in close proximity to or integrated with each other,*
- *reduce the need for transport of people and goods,*
- *result in access to public transport or enable non-motorised and pedestrian transport (e.g. will the development result in densification and the achievement of thresholds in terms public transport),*
- *compliment other uses in the area,*
- *be in line with the planning for the area,*
- *for urban related development, make use of underutilised land available with the urban edge,*
- *optimise the use of existing resources and infrastructure,*
- *opportunity costs in terms of bulk infrastructure expansions in non-priority areas (e.g. not aligned with the bulk infrastructure planning for the settlement that reflects the spatial reconstruction priorities of the settlement),*
- *discourage "urban sprawl" and contribute to compaction/densification,*
 - *contribute to the correction of the historically distorted spatial patterns of settlements and to the optimum use of existing infrastructure in excess of current needs,*
 - *encourage environmentally sustainable land development practices and processes,*
 - *take into account special locational factors that might favour the specific location (e.g. the location of a strategic mineral resource, access to the port, access to rail, etc.),*
 - *the investment in the settlement or area in question will generate the highest socio-economic returns (i.e. an area with high economic potential),*
 - *impact on the sense of history, sense of place and heritage of the area and the socio-cultural and cultural-historic characteristics and sensitivities of the area, and*
 - *in terms of the nature, scale and location of the development promote or act as a catalyst to create a more integrated settlement?*

The Municipality has also listed these identified positive socio-economic outcomes as project objectives.

- Improved access to a potable water supply to the various communities in the project
- Reduced water services backlog and uplifted standards of living for the communities in question
- Provision of a uniform level of service via a house connection.
- Infrastructure that will serve to satisfy the increasing water demand within the project area.
- Provision of an economically efficient solution to the water supply problem.
- Provision of a level of service that will ultimately allow for a waterborne sanitation system in future.
- Provision of employment for local labour.
- Skills development through intensive programmes directly involved in the planning, construction and commissioning of the scheme.

<p><i>How were a risk-averse and cautious approach applied in terms of socio-economic impacts?:</i></p> <ul style="list-style-type: none"> • <i>What are the limits of current knowledge (note: the gaps, uncertainties and assumptions must be clearly stated)?</i> • <i>What is the level of risk (note: related to inequality, social fabric, livelihoods, vulnerable communities, critical resources, economic vulnerability and sustainability) associated with the limits of current knowledge?</i> • <i>Based on the limits of knowledge and the level of risk, how and to what extent was a risk-averse and cautious approach applied to the development?</i> 	<p>As the project is for the provision of basic services i.e. water supply, there are no negative socio-economic risks associated with the proposed development. Therefore, a risk-averse and cautious approach was not required.</p>
<p><i>How will the socio-economic impacts resulting from this development impact on people's environmental right in terms following</i></p> <ul style="list-style-type: none"> • <i>Negative impacts: e.g. health (e.g. HIV-Aids), safety, social ills, etc. What measures were taken to firstly avoid negative impacts, but if avoidance is not possible, to minimise, manage and remedy negative impacts?</i> • <i>Positive impacts. What measures were taken to enhance positive impacts?</i> 	<p>The proposed development will not negatively impact on people's environmental rights. In fact, the development will have a positive impact, the improved supply of potable water to households and will aid in improving the standard of living for all in the project area.</p>
<p><i>Considering the linkages and dependencies between human wellbeing, livelihoods and ecosystem services, describe the linkages and dependencies applicable to the area in question and how the development's socio-economic impacts will result in ecological impacts (e.g. over utilisation of natural resources, etc.)?</i></p>	<p>As this is a rural area the local community relies on the open spaces around them for a number of services including grazing for cattle and goats; subsistence agriculture; in some cases wood gathering for fires and cooking and where water access is limited the community use the local watercourses for water provision and cleaning.</p> <p>The proposed development will have a limited ecological impact and will have a positive impact on the community by providing a long-term potable water supply. This supply of potable water will also aid in the provision of other basic services such as waterborne sanitation. the development will have limited to no impact on the other ecological services provided during construction and no impact during operation. There will be an unavoidable increase in use of water from the supply catchment.</p>
<p><i>What measures were taken to pursue the selection of the "best practicable environmental option" in terms of socio-economic considerations?</i></p>	<p>As the development is for the improved provision of potable water, no other alternatives were considered from a socio-economic point of view. The proposal of constructing the WSS is the "best practicable environmental option"</p>
<p><i>What measures were taken to pursue environmental justice so that adverse environmental impacts shall not be distributed in such a manner as to unfairly discriminate against any person, particularly vulnerable and disadvantaged persons (who are the beneficiaries and is the development located appropriately)?</i></p>	<p>There have been no identified impacts which will adversely affect vulnerable and/or disadvantaged persons. The project will in fact have a positive impact by addressing the lack of basic services in the Mpolweni and Thokozani community.</p>
<p><i>Considering the need for social equity and justice, do the alternatives identified, allow the "best practicable environmental option" to be</i></p>	<p>Yes, the best practicable environmental option is selected.</p>

<i>selected, or is there a need for other alternatives to be considered?</i>	
<i>What measures were taken to pursue equitable access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing, and what special measures were taken to ensure access thereto by categories of persons disadvantaged by unfair discrimination?</i>	The development will not impact on anyone's access to environmental resources, benefits and services to meet basic human needs and ensure human wellbeing. It will, in fact, improve water supply into the area.
<i>What measures were taken to ensure that the responsibility for the environmental health and safety consequences of the development has been addressed throughout the development's life cycle?</i>	The EMPr includes conditions which have been developed to manage operational impacts. Upon receipt of the EA the EMPr will become legally binding. Therefore, the Municipality will be bound to the conditions of the EMPr throughout the life cycle of the WSS.
<p><i>What measures were taken to:</i></p> <ul style="list-style-type: none"> • <i>ensure the participation of all interested and affected parties,</i> • <i>provide all people with an opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation,</i> • <i>ensure participation by vulnerable and disadvantaged persons,</i> • <i>promote community wellbeing and empowerment through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means,</i> • <i>ensure openness and transparency, and access to information in terms of the process,</i> • <i>ensure that the interests, needs and values of all interested and affected parties were taken into account, and that adequate recognition were given to all forms of knowledge, including traditional and ordinary knowledge</i> • <i>ensure that the vital role of women and youth in environmental management and development were recognised and their full participation therein would be promoted?</i> 	<p>The following steps were followed during the public participation process.</p> <ul style="list-style-type: none"> • The Ward Councilors were notified on the 7th July and 25th July 2020. • The Ward Councilor indicated a willingness to engage with the local community, agreeing that this was the best procedure for notification as detailed in the signed letters. • The Ward Councilor was provided with information, which included details about the proposed project. • Noticeboards detailing the proposed development was erected on the site on the 16th July 2020. • An English and IsiZulu advert was placed in the Ilanga Newspaper on the 26th July 2020. • All relevant authorities and other stakeholders including adjacent landowners have been notified of the application.
<i>Considering the interests, needs and values of all the interested and affected parties, describe how the development will allow for opportunities for all the segments of the community (e.g.. a mixture of low-, middle- and high-income housing opportunities) that is consistent with the priority needs of the local area (or that is proportional to the needs of an area)?</i>	As the proposed development is a municipal water supply project, it will benefit the public in general and will not result in inequitable impact distribution.
<i>What measures have been taken to ensure that current and/or future workers will be informed of work that potentially might be harmful to human health or the environment or of dangers associated with the work, and what measures have been taken to ensure that the</i>	During construction and operation, a full health, safety and environmental induction will be conducted with all employees. This induction brings to the attention of the employees all potential human health hazards and environmental dangers associated with the workings of the site. Inductions

<i>right of workers to refuse such work will be respected and protected?</i>	also indicate that all employees have a right to work in a clean and safe environment.
<p><i>Describe how the development will impact on job creation in terms of, amongst other aspects:</i></p> <ul style="list-style-type: none"> • <i>the number of temporary versus permanent jobs that will be created,</i> • <i>whether the labour available in the area will be able to take up the job opportunities (i.e. do the required skills match the skills available in the area),</i> • <i>the distance from where labourers will have to travel,</i> • <i>the location of jobs opportunities versus the location of impacts (i.e. equitable distribution of costs and benefits), and</i> • <i>the opportunity costs in terms of job creation (e.g. a mine might create 100 jobs, but impact on 1000 agricultural jobs, etc.).</i> 	There will be the provision of temporary jobs during construction. However, there will only be a limited amount of new employment opportunities created during the operational phase. This is due to the nature of the development being a WSS which is mostly automatic.
<p><i>What measures were taken to ensure:</i></p> <ul style="list-style-type: none"> • <i>that there were intergovernmental coordination and harmonisation of policies, legislation and actions relating to the environment, and</i> • <i>that actual or potential conflicts of interest between organs of state were resolved through conflict resolution procedures?</i> 	The proposed project falls under the jurisdiction of the uMgungundlovu District Municipality and as such there was no inter-governmental coordination required.
<p><i>What measures were taken to ensure that the environment will be held in public trust for the people, that the beneficial use of environmental resources will serve the public interest, and that the environment will be protected as the people's common heritage?</i></p>	The proposed development is to take place on a mixture of public and privately owned land; however, it will not negatively impact on people's common heritage with respect to the environment.
<p><i>Are the mitigation measures proposed realistic and what long-term environmental legacy and managed burden will be left?</i></p>	All of the mitigations proposed by the EAP and specialists are realistic and practical.
<p><i>What measures were taken to ensure that the costs of remedying pollution, environmental degradation and consequent adverse health effects and of preventing, controlling or minimising further pollution, environmental damage or adverse health effects will be paid for by those responsible for harming the environment?</i></p>	The EMPr will designate responsibility for all conditions. This document will be legally binding and as such any non-compliances with the conditions of the EMPr will effectively be breaking the law, therefore, the uMgungundlovu District Municipality will prioritise these items.
<p><i>Considering the need to secure ecological integrity and a healthy bio-physical environment, describe how the alternatives identified (in terms of all the different elements of the development and all the different impacts being proposed), resulted in the selection of the best practicable environmental option in terms of socio-economic considerations?</i></p>	Due to the nature of the development, no other feasible site alternatives could be considered, please refer to Section 1.4 and 4.2. In terms of technology alternatives, the preferred alternative will have a larger construction impact on the watercourses in terms of construction work in the bed and banks but will have less impact in the long term, post-construction. Due to post-construction impacts being permanent this technology is seen as much for favourable when considering ecological impacts.
<p><i>Describe the positive and negative cumulative socio-economic impacts bearing in mind the</i></p>	The proposed project will have a positive cumulative socio-economic impact. An improved

<i>size, scale, scope and nature of the project in relation to its location and other planned developments in the area?</i>	water supply network will ultimately allow for the construction of a waterborne sewer network within the project area.
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4.1.1 Preferred Site Alternative

Alternative 1 (Preferred Alternative)

The aim of the project is to improve the supply of potable water to this area with as little environmental and infrastructural disturbance/impact as possible. The pipeline layout has been designed to reticulate water to the community, with the least number of watercourse crossings. The pipeline route will predominantly occur within existing road servitudes and visible tracks, limiting the amount of vegetation to be cleared.

Please note the engineer investigated the route and undertook to avoid watercourses wherever possible. As the proposed WSS will be gravity fed water pressure within the system and at all outlets must remain within acceptable limits. Therefore, the layout of the pipeline in relation to the topography must be considered carefully in order to maintain the water pressure. Therefore, the project area has been divided into 5 hydraulic water supply zones. These zones will work independently of one another, utilising different reservoirs, which will ultimately aid in reducing the linkages between different areas, thereby limiting the number of watercourse crossings. Figure 8 above provides a graphical representation of the 5 different hydraulic water supply zones, each highlighted in the red squares. A number of homesteads within the project area are completely closed off and in such cases a watercourse crossing was necessary in order to gain access to the homestead. Therefore, no other alternative pipe routes or crossing points have been considered as Site Alternative 1 represents the route with the least impact and has already ensured the minimal number of watercourse crossings.

4.1.2 Technology Alternative 1

Where the pipeline route is required to cross a watercourse, the pipeline will be placed in a concrete casing in the bed of the watercourse. The pipeline will therefore be below the ground, attached to the bedrock, below the water surface. The pipe will not block or impede the flow of water in the watercourses. This crossing technique will have a larger construction impact on the watercourses, in terms of construction work in the bed and banks, but will have less impact in the long term, post construction. Please note there will be two points that the pipeline will be strapped to the existing bridge structures above the watercourses.

4.1.3 Technology Alternative 2

The alternative water crossing technology would be to construct pipeline bridges at each watercourse. This would entail building pier structures into the watercourse beds to support the pipes above ground as they cross the watercourse. This approach will have a larger environmental and visual impact at the watercourse crossing. Constructing pier bridges across the watercourses would potentially create long term water flow impedance as a result of the piers located in the watercourse beds and banks. The above-ground pipes will be very visible at each watercourse crossing. This technique would make the pipe susceptible to damage during flood events when the water levels rise, which would demand more infrastructural maintenance and repair for the uMgungundlovu District Municipality and will threaten the consistent supply of potable water for all users in this area.

Section 5: Public Participation

5.1 Notification of Interested and Affected Parties

- 1) *fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of-*
 - i. *the site where the activity to which the application or proposed application relates is or is to be undertaken; and*
 - ii. *any alternative site;*

A noticeboard (isiZulu and English) was placed on-site on the 16th July 2020. The noticeboard detailed the uMgungundlovu District Municipality's proposed plan to construct the Mpolweni and Thokozani WSS subject to a basic assessment. See Appendix C – Proof of Placement of Notice Board.

- 2) *giving written notice, in any of the manners provided for in section 47D of the Act, to-*

- i. *the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;*
- ii. *the municipal councillor of the ward in which the site or alternative site is situated and any organisation of ratepayers that represent the community in the area;*
- iii. *the municipality which has jurisdiction in the area;*
- iv. *any organ of state having jurisdiction in respect of any aspect of the activity, and;*
- v. *any other party as required by the competent authority;*

The following steps were followed during the public participation process.

- The Ward Councilors were notified on the 7th July and 25th July 2020.
- The Ward Councilor indicated a willingness to engage with the local community, agreeing that this was the best procedure for notification as detailed in the signed letters.
- The Ward Councilor was provided with information, which included details about the proposed project.
- Noticeboards detailing the proposed development was erected on the site on the 16th July 2020.
- An English and IsiZulu advert was placed in the Ilanga Newspaper on the 26th July 2020.
- All relevant authorities and other stakeholders including adjacent landowners have been notified of the application.

See Appendix D – Proof of Notification.

- i. *owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken or to any alternative site where the activity is to be undertaken;*

Email notifications to all I&APs were sent out on the 28th July 2020. See Appendix D – Proof of Notification.

- 3) *placing an advertisement in-*
 - i. *one local newspaper; or*
 - ii. *any official Gazette that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;*
- 4) *placing an advertisement in at least one provincial newspaper or national newspaper, if the activity has or may have an impact that extends beyond the boundaries of the metropolitan or district municipality in which it is or will be undertaken: Provided that this paragraph need not be complied with if an advertisement has been placed in an official Gazette referred to in paragraph (c)(ii);*

An English and IsiZulu advert was placed in the Ilanga Newspaper on the 26th July 2020. The advert detailed the proposed project, Basic Assessment and to provide contact details of EnviroPro should anyone wish to register as an I&AP. See Appendix E – Proof of Advert Placement.

5.2 Registered Interested and Affected Parties

42. *A proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details and addresses of-*
 - (a) *all persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP;*
 - (b) *all persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and*
 - (c) *all organs of state which have jurisdiction in respect of the activity to which the application relates.*

The contact details of all I&APs that have registered have been provided in the Registered I&AP list in Appendix F.

5.3 Comments

Comments of interested and affected parties to be recorded in reports and plans 44.

- 1) *The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.*
- 2) *Where a person desires but is unable to access written comments as contemplated in subregulation (1) due to-*
 - i. a lack of skills to read or write;*
 - ii. disability; or*
 - iii. any other disadvantage;*
 - iv. reasonable alternative methods of recording comments must be provided for.*

All comments received from I&APs have been recorded in the comments and response table. This report has been provided to the uMshwathi Local Municipality and uMgungundlovu District Municipality for comment. See Appendix G – Comments and Response table and Comments Received.

Section 6: Impact Assessment

6.1 Methodology to Determine and Rank Significance and Consequences of Impacts Associated with All Alternative as Per Section 3(h) (vi)

Impacts are assessed qualitatively and quantitatively, looking at the duration/frequency of the activity and likely impacts associated with that activity during both construction and operation. If the activity happens frequently, the risk of the associated impact occurring is much higher than if the activity happens less frequently. The geographical extent of the impact is assessed i.e. will the impact be restricted to the point of occurrence or will have it have a local or regional effect. Impacts are also reviewed looking at severity levels and consequences, should the impact occur i.e. will the severity be low, medium or high and then the probability of the impact occurring is taken into account.

Whether or not the impact can be mitigated and the extent to which it can be avoided, managed, mitigated, or reversed is assessed i.e. the probability of occurrence after mitigation has been applied. This also takes into account likelihood of human error based on construction and operational auditing experience i.e. even though spills can be completely mitigated against and prevented, there is always a small chance that spills will still occur (residual risk). Based on all of these factors, the impact is then rated to determine its significance. For example, an impact can have a regional effect with severe environmental implications, however, the probability of it occurring is very low, and the implementation of the proposed mitigation measures means that the ultimate rating is medium or low.

Please see below a description of the scoring. The full impact scoring tables detailing how the significance rating was calculated can be found in Appendix H.

Scoring of Impacts	
Duration / Frequency of activity likely to cause impact	0 = No impact 1 = short term / once off 2 = medium term / during operation 3 = long term / permanent
Geographical Extent	0 = No impact 1 = point of impact / restricted to site 2 = local / surrounding area 3 = regional
Severity (level of damage caused) if impact were to occur	0 = No impact 1 = minor 3 = medium 5 = major
Probability of impact without mitigation	1 - 5 = low. 6 -10 = medium. 11 -14 = high.
Significance before application of Mitigation Measures	A score of between 1 and 5 is rated as low. A score of between 6 and 10 is rated as medium. A score of between 11 and 14 is rated as high.
Will activity cause irreplaceable loss of resources?	10 = Yes 0 = No
Mitigation measures	0 = No impact - 5 = can be fully mitigated - 3 = can be partially mitigated -1 = unable to be mitigated
Probability of impact after mitigation	0 = No impact 1 = Low 2 = Medium 3 = High
Significance after application of Mitigation Measures	A score of between 1 and 5 is rated as low. A score of between 6 and 10 is rated as medium. A score of between 11 and 14 is rated as high.

6.2 Preferred Site and Technology Alternative

Mpolweni and Thokozani WSS (Site-specific)

See Appendix H for the full impacts scoring matrix, which assesses the impacts on the above system. The below impacts relate to the site-specific preferred site and technology alternatives.

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁸ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
Construction				
Direct Impacts				
1.	<p><i>Activity:</i> Clearing of vegetation</p> <p><i>Impact:</i> Resulting in erosion in and around the Mpolweni and Thokozani WSS construction footprint causing sedimentation within the delineated wetlands, drainage lines and the associated buffers thereby decreasing functionality.</p>	8 (Medium)	<p>The following measures must be carried out to mitigate against erosion on the site:</p> <ul style="list-style-type: none"> The footprint area of the pipeline must be kept to a minimum and must be demarcated to avoid unnecessary disturbances to adjacent areas. The areas outside the construction footprint must be demarcated as 'no-go' areas. The 22m watercourse buffer must be strictly adhered to. Areas exposed to erosion must be protected through the use of sandbags, berms and efficient construction processes i.e.: limiting the extent (footprint) and duration period that areas are exposed. No excavated material or fill material may be stored within the 22m watercourse buffer. The footprint area must be aligned in existing road reserves wherever possible. Disturbed areas must be sought as the preferred alignment area. When a pipeline spans a drainage line or wetland, it should be attached to any existing crossing or bridge structures. This will limit the need to disturb new areas of the system with the construction of new structures. During the excavation of trenches, flows should be diverted around active work areas where required. Water diversion must be temporary and re-directed flow must not be diverted towards any stream banks that could cause erosion. <p>This impact can be avoided and mitigated.</p>	5 (Low)
2.	<p><i>Activity:</i> Construction activities for the placement of the water pipeline within the delineated wetlands, drainage lines and associated buffer areas.</p> <p><i>Impact:</i> Causing degradation and destruction of indigenous vegetation within the identified watercourse and buffers.</p>	7 (Medium)	<p>The following measures must be carried out to mitigate against excessive vegetation clearing/damage:</p> <ul style="list-style-type: none"> No construction activity and/or construction-related activity may be undertaken within a 22m buffer area. The sensitive watercourse habitats must be clearly demarcated and regarded as a 'no-go' area i.e. construction staff must not be permitted access to these areas. Areas to be developed must be specifically demarcated during the construction phase, preventing 	4 (Low)

¹⁸ See Appendix H for more details.

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁸ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<p>movement of workers into sensitive surrounding environments. Only the demarcated areas must be impacted upon.</p> <ul style="list-style-type: none"> • Areas must be cleared and excavated on a need basis only, limiting the overall extent of the disturbed area. Areas must be cleared and excavated only as the project progresses. • All lay down, storage areas etc must be restricted to within the construction footprint area. • Rehabilitation of the disturbed areas existing in the project area must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type. • Progressive rehabilitation will enable topsoil to be returned more rapidly, thus ensuring more recruitment from the existing seed bank. Any woody material removed can be shredded and used in conjunction with the topsoil to augment soil moisture and prevent further erosion. • If woody material does not meet the quality requirements for other works, the material must be disposed of at a relevant waste disposal site. • Once a rehabilitation method statement has been established and undertaken, monitoring activities must be put in place to verify the progress made on the rehabilitation objectives and targets. • An Invasive Alien Plant Control included in the EMPr must be implemented. <p>This impact can be mitigated.</p>	
3.	<p><i>Activity:</i> Construction of the Mpolweni and Thokozani WSS across wetlands.</p> <p><i>Impact:</i> Temporary loss of wetland areas during excavation for pipework crossings.</p>	10 (Medium)	<p>The following measures must be carried out to mitigate against excessive temporary loss of wetland:</p> <ul style="list-style-type: none"> • All areas outside the construction footprint must be demarcated as no-go areas; • Heavy vehicles are not permitted in the 22m watercourse buffer unless required for construction activities. • The recommended buffer must also be imposed for all other construction activities. <p>This impact can be mitigated.</p>	8 (Medium)
4.	<p><i>Activity:</i> Operation of vehicles and machinery around the construction site</p> <p><i>Impacts:</i> Damage to the delineated wetlands and drainage lines which will decrease biodiversity and functionality.</p>	9 (Medium)	<p>The following measures must be carried out to mitigate against careless damage to the surrounding habitats:</p> <ul style="list-style-type: none"> • All areas outside the construction footprint must be demarcated as no-go areas; 	5 (Low)

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁸ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<ul style="list-style-type: none"> • Heavy vehicles are not permitted in the 22m watercourse buffer unless required for construction activities. • The recommended buffer must also be imposed for all other construction activities. <p>This impact can be avoided and mitigated.</p>	
5.	<p><i>Activity:</i> Construction disturbances i.e. noise, dust and vibration associated with the Mpolweni and Thokozani WSS.</p> <p><i>Impact:</i> Displacement of the faunal community and/or direct mortalities.</p>	7 (Medium)	<p>The following measures must be carried out to mitigate against the excessive impact on fauna:</p> <ul style="list-style-type: none"> • If any indigenous faunal species are recorded during construction, activities must temporarily cease to allow fauna to move off. In the event that fauna does not voluntarily move away, an appropriate specialist must be consulted to identify the correct course of action. • Fauna species such as frogs and reptiles that have not moved away must be carefully and safely removed to a suitable location beyond the extent of the development footprint by a suitably qualified ECO, trained in the handling and relocation of animals. • The duration of the construction must be minimised to as short-term as possible, in order to reduce the period of disturbance on fauna. • Any open trenches that are left open for more than two hours, must have at least one end that is sloped/tapered, in order to allow animals that fall in, to escape. If this is not possible, then branches must be placed inside the trenches allowing small animals to climb out. • Prior and during vegetation clearance, any larger fauna species noted must be given the opportunity to move away from the construction machinery. • No trapping, killing or poisoning of any wildlife is to be allowed on-site, including snakes, birds, lizards, frogs, insects or mammals. • During the construction phase, noise and vibrations must be kept to a minimum to reduce the impact on the fauna. • During the construction phase, no construction is to occur at night to minimise all possible disturbances to amphibian species possibly inhabiting the wetland. • Staff must be educated about the sensitivity of faunal species and measures must be put in place to deal with any species that are encountered during the construction process. <p>This impact can be avoided and mitigated.</p>	4 (Low)

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁸ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
6.	<p><i>Activity:</i> Incorrect filling of trenches on completion.</p> <p><i>Impact:</i> The creation of points of erosion, especially on slopes and near watercourses.</p>	6 (Medium)	<p>The following measures must be carried out to mitigate against incorrect filling of trenches:</p> <ul style="list-style-type: none"> • Care must be taken to ensure that when closing trenches, soil is compacted sufficiently and left so that the level of the trench is slightly higher than the surrounding land, to allow for settling. Should soil settle below the level of the surrounding land, it will leave a depression along which water will travel and this could create a focal point for erosion. This can often occur on sloped sections where water will follow the depression along the pipeline route, building up speed down steeper sections and creating furrows. If this occurs near watercourses, it will erode the river banks and cause them to collapse. • Rehabilitation through replanting of indigenous grass species soon after closure will aid in stabilising soil, preventing erosion and will also assist in dust control. <p>This impact can be avoided and mitigated.</p>	2 (Low)
7.	<p><i>Activity:</i> Trenches remaining open for long periods of time.</p> <p><i>Impacts:</i> Collapsed trenches may create an erosion and safety hazard.</p>	6 (Medium)	<p>The following measures must be carried out to mitigate hazards related to open trenches:</p> <ul style="list-style-type: none"> • Trenches must not remain open indefinitely. • Trench work must be completed in sections and then closed once the pipe has been laid in that section. • Small inspection holes may be left open along the route but the rest of the trench must be closed. • Cleared areas must not be left exposed for long periods of time and must be re-vegetated as each stage of pipework is completed. • Trenches must not remain open during building shut down periods i.e. over Christmas and Easter. Trench work must be planned so that trenches are closed before these shut down periods as there is a risk that the trenches will either collapse or fill with water if left unattended and this can create a hazard for children and animals. • All trenches must be demarcated. • During the excavation of trenches, flows must be diverted around active work areas where required. Water diversion must be temporary and re-directed flow must not be diverted towards any stream banks that could cause erosion. <p>This impact can be avoided and mitigated.</p>	2 (Low)
8.	<p><i>Activity:</i> Incorrect filling of trenches on Completion.</p>	6 (Medium)	<p>The following measures must be carried out to mitigate against incorrect filling of trenches:</p>	2 (Low)

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁸ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
	<i>Impact:</i> The creation of points of erosion, especially on slopes and near watercourses.		<ul style="list-style-type: none"> • Care must be taken to ensure that when closing trenches, soil is compacted sufficiently and left so that the level of the trench is slightly higher than the surrounding land, to allow for settling. Should soil settle below the level of the surrounding land, it will leave a depression along which water will travel and this could create a focal point for erosion. This can often occur on sloped sections where water will follow the depression along the pipeline route, building up speed down steeper sections and creating furrows. If this occurs near watercourses, it will erode the river banks and cause them to collapse. • Rehabilitation through replanting of indigenous grass species soon after closure will aid in stabilising soil and preventing erosion and will also assist in dust control. <p>This impact can be avoided and mitigated.</p>	
9.	<p><i>Activity:</i> Clearing of vegetation within the construction footprint.</p> <p><i>Impact:</i> The disturbance will act as a driver for exotic species and result in proliferation of exotic weeds i.e. Castor Oil.</p>	8 (Medium)	<p>The vegetation of the site is already highly invaded.</p> <ul style="list-style-type: none"> • Alien vegetation must not be allowed to encroach onto the site and must be continually removed during construction. • Construction must not promote further alien plant disturbances in the surrounding area. <p>This impact can be avoided and mitigated.</p>	4 (Low)
10.	<p><i>Activity:</i> Excavations within the community</p> <p><i>Impact:</i> Impact on features with heritage value (i.e. graves).</p>	8 (Medium)	<p>Since the pipeline will be placed in areas previously disturbed by roads, footpaths and current pipeline routes, it is not anticipated that there are heritage or cultural significant aspects associated with the project area. However:</p> <ul style="list-style-type: none"> • Should any graves be identified within the project area, a 30m buffer must be maintained around the grave. • A 30m buffer must be maintained around the Mpolweni cemetery. • Construction workers must be cautioned to operate with care on site and should a culturally sensitive aspect be discovered on site, that has not been previously identified, construction activities must stop temporarily and the issue assessed and the authorities (AMAFA) notified if need be. <p>This impact can be avoided and mitigated.</p>	4 (Low)
Indirect Impacts				
11.	<p><i>Activity:</i> Employment demand</p> <p><i>Impact:</i> Job creation for the local community.</p>	0 (Positive)	This is a positive impact.	0 (Positive)

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁸ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
Operation				
Direct Impacts				
12.	<p><i>Activity:</i> Long term effects as a result of vegetation disturbance during construction.</p> <p><i>Impact:</i> Continued encroachment and establishment of alien species into the disturbed areas within the WSS construction footprint.</p>	9 (Medium)	<p>There is currently alien vegetation located within the surrounding area.</p> <ul style="list-style-type: none"> • Alien vegetation must not be allowed to encroach onto the site and must be continually removed during operation. • Maintenance activities must not promote further alien plant disturbances in the surrounding area. <p>This impact can be avoided and mitigated.</p>	5 (Low)
13.	<p><i>Activity:</i> In-complete trenching and rehabilitation of the site.</p> <p><i>Impact:</i> Long-term erosion around watercourses and damage to watercourse banks where pipe crossings have been placed.</p>	9 (Medium)	<p>The following measures must be carried out to mitigate against long term erosion:</p> <ul style="list-style-type: none"> • Trench rehabilitation must be effectively carried out before contractors leave the site. • Soil in the trenches must be compacted effectively to the same level or slightly higher than the surrounding land to prevent settling which could create depressions for water to travel along, creating erosion funnels and exposing the pipeline. • Indigenous vegetation must be planted after the soil has been compacted. The vegetation must have taken successfully before contractors leave the site. <p>This impact can be avoided and mitigated.</p>	5 (Low)
14.	<p><i>Activity:</i> Improper placement of pipes in the beds of watercourses.</p> <p><i>Impact:</i> Permanent impact on the flow regime of the watercourses.</p>	8 (Medium)	<p>Please note, due to the small size of the pipes and tributaries as well as the placement of the pipeline underneath the bed of the watercourses, the pipelines will not impact the flow regime of the rivers during operation. The pipes will be tied to existing structures where possible, or placed underneath the stream bed.</p> <p>This impact can be avoided and mitigated.</p>	4 (Low)
Indirect Impacts				
15.	<p><i>Activity:</i> Construction of the Mpolweni and Thokozani WSS</p> <p><i>Impact:</i> Improving potable water supply into the community.</p>	0 (Positive)	This is a positive impact.	0 (Positive)
16.	<p><i>Activity:</i> Failure of the water pipes</p> <p><i>Impact:</i> Localised flooding and erosion.</p>	6 (Medium)	<p>Various measures to ensure pipe integrity must be implemented including:</p> <ul style="list-style-type: none"> • Scour valves will be used to control the supply of water. These are used to stop supply when any repairs are carried out on a section of pipeline. • Isolating Valves will be placed along the pipeline length which effectively break the line into smaller sections thereby decreasing the overpressures. These valves have been designed for placement on long pump mains. • Air valves will be installed at all local high points and at 600m 	2 (Low)

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁸ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<p>maximum spacing along flat pipe runs in bulk mains.</p> <ul style="list-style-type: none"> Pressure Reducing Valves (PRV's) will be situated where the pressure in the reticulation mains exceeds 7.5 bar. <p>This impact can be avoided and mitigated.</p>	
17.	<p><i>Activity:</i> Illegal connections</p> <p><i>Impact:</i> Damage to pipework, flooding, erosion and loss of water supply.</p>	7 (Medium)	<p>Since most of the households in the area will have easy access to water, there are unlikely to be illegal connections, however the pipeline will be laid in trenches at least 1m deep. The water service provider must monitor the pipeline through routine inspections with any leaks being repaired as soon as they are reported.</p> <p>This impact can be avoided and mitigated.</p>	3 (Low)
Cumulative				
18.	<p><i>Activity:</i> Construction related erosion</p> <p><i>Impact:</i> Increased sedimentation within the catchment</p>	8 (Medium)	<p>Provided that the Contractor is compliant with the measures included in the attached EMP, waste management and erosion control will be sufficiently managed to prevent this cumulative impact.</p> <p>This impact can be avoided and mitigated.</p>	4 (Low)
19.	<p><i>Activity:</i> Increased water demand</p> <p><i>Impact:</i> Pressure on water resources in the Umgeni Catchment</p>	9 (Medium)	<p>The project will increase the demand for potable water in the region. Raw water is collected at Midmar Dam which is the source water to the Upper Mgeni System. The raw water is treated at DV Harris Wastewater Treatment Works then distributed to the project area. Umgeni Water who are the custodians of Midmar Dam are responsible for the distribution and conservation of this water and have committed the bulk water supply to Mpolweni and Thokozani for the next 20 years. This commitment is in line with Umgeni Water's long-term planning to ensure sustainable use of water.</p>	5 (Low)
20.	<p><i>Activity:</i> Operation of the Mpolweni and Thokozani WSS.</p> <p><i>Impacts:</i> Improved service delivery to the local area</p>	0 (Positive)	This is a positive impact.	0 (Positive)

Mpolweni and Thokozani WSS (Standard Construction Impacts)

See Appendix H for the full impact scoring matrix, which assesses the impacts on the above system. The below impacts relate to the preferred site and technology alternatives – Generic Impacts.

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁹ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
Construction				
Direct Impacts				
No generic direct impacts				
Indirect Impacts				
1.	<p><i>Activity:</i> Increase in heavy truck traffic on-site and on the surrounding road network as construction vehicles travel to the site for construction activities</p> <p><i>Impact:</i> Increased risk to pedestrians and traffic.</p>	6 (Medium)	<p>The construction activity will pose an increased risk to pedestrians and traffic.</p> <ul style="list-style-type: none"> • Appropriate construction safety signage must be erected to notify of construction activities and potential hazards on-site; • Appropriate barriers must be used to cordon off construction excavations, hazardous areas, and areas undergoing construction. • Flagmen must be in attendance to direct traffic where required. • All drivers must be appropriately licenced and trained. • All drivers associated with the construction must operate within the speed limits, and due caution must be exercised especially when pedestrians are on the road. 	1 (Low)
2.	<p><i>Activity:</i> Movement of construction vehicles.</p> <p><i>Impact:</i> Dusty conditions generated during the construction phase.</p>	5 (Low)	<p>There will be increased dust generated during the construction phase; however, this will be temporary i.e. the site will be worked continuously for a few months until construction is completed. Further to this:</p> <ul style="list-style-type: none"> • Vehicle speed limits must be reduced to 40km/hr to reduce the amount of dust raised along the gravel roads to and from the site. • The material being transported to the site in the back of the trucks must be covered. • Water carts must be used on-site should dust levels elevate to a nuisance level. • Shade cloth must be utilised for stockpiled materials where required. • The applicant must comply with the National Dust Regulations (Government Notice R827, 2013) with regards to dust levels produced on site. 	1 (Low)
3.	<p><i>Activity:</i> Damage to any unidentified existing services on site.</p> <p><i>Impact:</i> Failure of infrastructure that may be affected i.e. water, electricity etc.</p>	8 (Medium)	<p>Services have been identified on the site; however, the following measures must be followed if any unidentified services are discovered:</p> <ul style="list-style-type: none"> • As standard construction practice, the engineer and contractor must identify any potential existing services that 	4 (Low)

¹⁹ See Appendix H for more details.

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁹ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			<p>may be affected before construction.</p> <ul style="list-style-type: none"> Any infrastructure that is removed must be replaced, and any damage caused by construction must be repaired. 	
4.	<p><i>Activity:</i> Emissions from construction vehicles associated with the Mpolweni and Thokozani WSS.</p> <p><i>Impact:</i> Decrease in the local air quality impacting local residents.</p>	7 (Medium)	<p>The construction phase of the project will see an increase in vehicles moving through the area, which will result in a rise in emissions into the atmosphere.</p> <ul style="list-style-type: none"> All construction vehicles operating on the site must be fitted with the appropriate silencers and exhausts to reduce the emissions and noise into the atmosphere. 	5 (Low)
5.	<p><i>Activity:</i> Temporary increase in waste and litter due to the construction process associated with the Mpolweni and Thokozani WSS.</p> <p><i>Impact:</i> Pollution of the local receiving environment.</p>	7 (Medium)	<p>The construction phase of the project will see an increase in construction staff on-site and therefore, an increase in waste on-site.</p> <ul style="list-style-type: none"> Littering will not be permitted on site; Designated waste storage areas with appropriate waste receptacles must be set up within the construction site camp; Waste must be removed from the site and disposed of at a registered waste disposal site; Safe disposal slips for the disposal of all waste must be obtained and kept on-site as proof of safe disposal. 	2 (Low)
6.	<p><i>Activity:</i> Insufficient number of toilet facilities on site.</p> <p><i>Impact:</i> Non-compliant with the Occupation Health and Safety Act and pollution of the surrounding habitat.</p>	9 (Medium)	<p>The increase in construction personnel during the construction phase will require an appropriate amount of toilet facilities for the site.</p> <ul style="list-style-type: none"> Appropriate and sufficient toilet facilities (1 toilet per 15 employees) must be provided by the Contractor; All toilet facilities must be checked daily; All toilet facilities must be emptied and cleaned weekly. 	4 (Low)
7.	<p><i>Activity:</i> Inappropriate disposal of toilet waste.</p> <p><i>Impact:</i> Contamination of the environment.</p>	6 (Medium)	<p>The following mitigation measures must be adhered to:</p> <ul style="list-style-type: none"> All toilet facilities on site utilised by the construction personnel must be checked daily and emptied weekly by the contractor. A registered waste removal contractor must remove sewage waste from the site, or sewage waste must be disposed of at a permitted Waste Water Treatment Site; Safe disposal slips for the disposal of effluent waste must be obtained and kept on-site as proof of safe disposal. 	1 (Low)
8.	<p><i>Activity:</i> Generation of noise associated with the construction.</p> <p><i>Impact:</i> Nuisance impact on residents living in close proximity to the construction site.</p>	6 (Medium)	<p>The construction phase of the project will see the increase in vehicles moving through the area, which will increase noise.</p> <ul style="list-style-type: none"> All construction vehicles operating on-site must be fitted 	1 (Low)

No.	Nature and Consequences of impact	Sig. rating of impacts ¹⁹ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
			with standard silencers to reduce the noise levels produced.	
9.	<p><i>Activity:</i> Poor construction methodologies.</p> <p><i>Impact:</i> Damage to adjacent properties during construction.</p>	7 (Medium)	<p>The following mitigation measures must be adhered to:</p> <ul style="list-style-type: none"> • All services must be identified before construction through notifying surrounding stakeholders before any potential traffic congestion; • The contractor must create alternative access routes to the properties where required; • The contractor must be aware of the stakeholders' movements, and where possible, disruptive activities must be scheduled outside of peak traffic hours; • Surrounding landowners and stakeholders must be notified before any disruptive construction events; • Any infrastructure that gets removed must be replaced, and any damage caused by construction must be repaired. 	3 (Low)
10.	<p><i>Activity:</i> Unsustainable sourcing of raw materials such as gravel, sand, water etc.</p> <p><i>Impact:</i> Promotion of illegal mining operations which can cause significant damage to the environment at other locations.</p>	10 (Medium)	<p>The construction of the WSS will require raw materials to be sourced and brought to the site.</p> <ul style="list-style-type: none"> • Contractors must provide proof of sustainable sourcing of materials, i.e. permits for quarries and sand winning operations from which stone and sand have been obtained. 	5 (Low)
Operation				
Direct Impacts				
No generic direct impacts				
Indirect Impacts				
No generic indirect impacts				
Cumulative Impacts				
No generic cumulative impacts				

6.3 Technology Alternative 2

Mpolweni and Thokozani WSS (Site-specific)

See Appendix H for the full impacts scoring matrix, which assesses the impacts on the above system. The impacts relating to the preferred Alternative and Alternative 2 are very similar, therefore the table below includes the impacts which differentiate the most between the two alternatives.

No.	Nature and Consequences of impact	Sig. rating of impacts ²⁰ :	Proposed mitigation and Extent to which impact can be reversed/avoided, managed or mitigated:	Sig. rating of impacts after mitigation:
Construction				
Direct Impacts				
Direct Impacts will remain as per the Preferred Alternative				
Indirect Impacts				
1.	<i>Activity:</i> Increased construction costs due to the pier bridge construction methodology. <i>Impact:</i> Increased economic strain on the Municipality	10 (Medium)	This impact cannot be mitigated (so then why does the number go down on the right?).	10 (Medium)
Operation				
Direct Impacts				
2.	<i>Activity:</i> Improper placement of piers to support the pipes across the watercourses. <i>Impact:</i> Permanent impact on the flow regime of the watercourses.	9 (Medium)	The following must be implemented to mitigate against any permanent impact on the flow regime: <ul style="list-style-type: none"> The number of concrete piers located in the watercourse must be limited. Piers must be placed outside of preferential flow paths with the least number of pier structures used as possible Where possible the pipeline should span across the entire width of the watercourse, therefore, negating the need for any piers in the watercourse. 	5 (Low)
3.	<i>Activity:</i> Operation of a pier pipeline structure. <i>Impact:</i> Exposure to flood damage and consequential ongoing maintenance and service disruption.	10 (Medium)	The following must be implemented to mitigate against any damage from flood events: <ul style="list-style-type: none"> The pipeline must be raised above the 1:100-year flood line level to avoid flood damage. The raised pipe must include additional reinforcement for protection from weathering. 	6 (Medium)
Indirect Impacts				
Indirect Impacts will remain as per the Preferred Alternative				
Cumulative Impacts				
Cumulative Impacts will remain as per the Preferred Alternative				

Mpolweni and Thokozani WSS (Standard Construction Impacts)

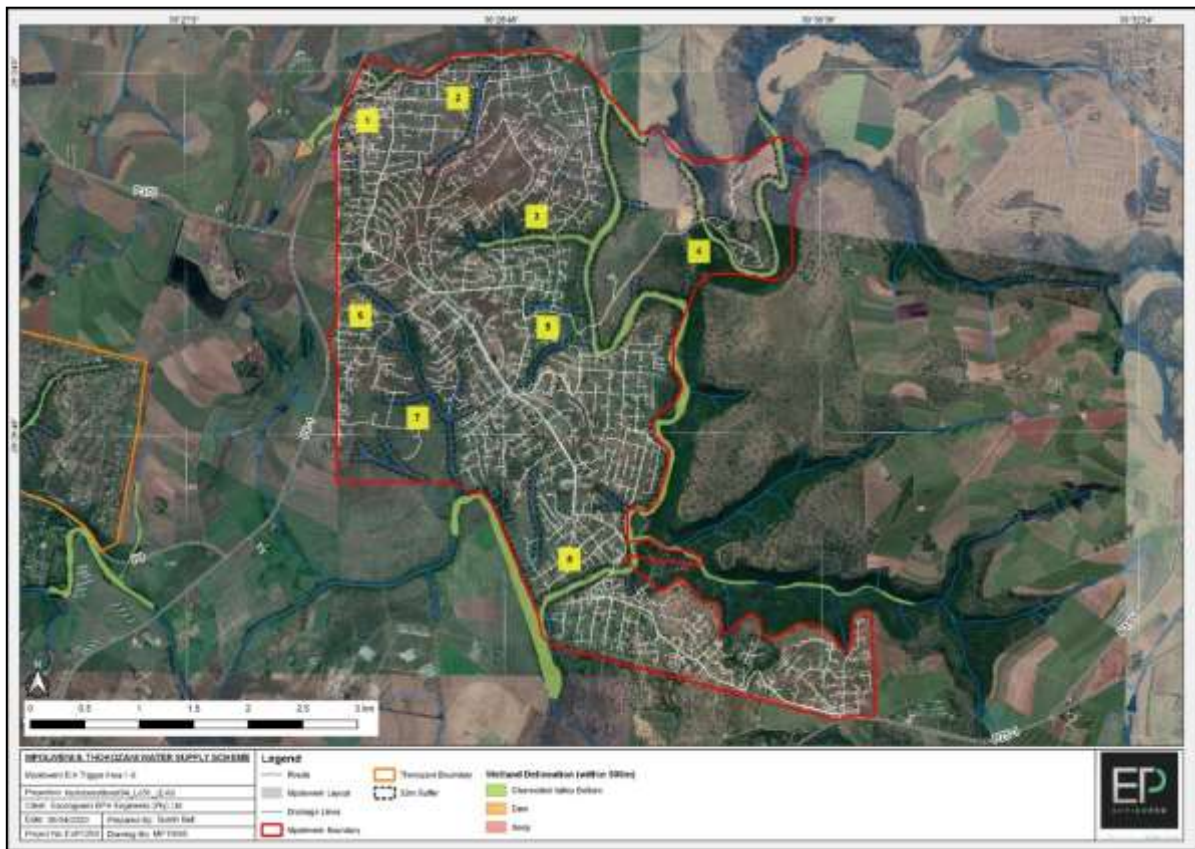
Generic impacts for the Mpolweni and Thokozani WSS will be the same for both alternatives.

²⁰ See Appendix H for more details.

6.4 Environmental Impact Statement as per section (I)

The key impacts associated with the construction of the water supply scheme relate to those during the construction period. Issues such as clearing indigenous vegetation, damaging watercourses, and the management of erosion need to be addressed. This can be best managed by minimising the clearing of vegetation strictly to the project footprint, treating the watercourses (drainage lines and wetlands) as sensitive no-go areas and by implementing effective stormwater measures. All construction activity is to be confined to the existing pipeline footprint area. Should a large tree or section of riparian vegetation require clearing, the ECO must be consulted before clearing takes place. All vehicles must use the existing road and operate within the existing route. All identified impacts can only be mitigated if all conditions stipulated in the EMP are adhered to during both the construction and operational phases. Therefore, there should be no significant impacts related to the construction and operation of Mpolweni and Thokozani WSS, as depicted in Figure 24 and Figure 25 below. Taking into consideration the above impacts and mitigation measures, it is the EAP's opinion that the Mpolweni and Thokozani WSS be authorised.

Figure 24: Overview of Mpolweni Project Area.



Given the nature of this project, it is recommended that **monthly** ECO audits be carried out for the duration of the construction phase of this project. One post-construction audit should be conducted once construction is complete.

The EMPr details the post-construction, rehabilitation, and closure objectives which will be monitored by the ECO and compliance authorities.

6.8 Financial Provisions as Per Section 3(s)

No upfront financial provision is required for this project. The contractor is responsible for and must ensure that the site has been rehabilitated in full before leaving the site.

6.9 EAP Opinion on Whether Or Not to Authorise Activity and Recommendations and Conditions for Authorisation as Per Section 3(n) and (p)

Concerning the site and technology alternatives, it is recommended that preferred alternatives be authorised. The significance of the impacts associated with the Mpolweni and Thokozani WSS are considered 'low'.

6.10 Summary of Recommendations for the Mpolweni and Thokozani WSS: Stakeholders, Properties & Services

- As standard construction practice, the engineer and contractor must identify all existing services that may be affected before construction.
- The contractor must liaise with local community members regarding restriction of access during construction.

Traffic & Pedestrians

- The contractor must take into consideration the potential movements of the surrounding stakeholders.
- Appropriate signage and barriers must be used to cordon off construction areas.
- All construction vehicles must be fitted with the appropriate silencers and exhausts.
- Speed limits must be obeyed.

Housekeeping, waste management, storage, and materials handling

- Littering must not be permitted on site.
- All hazardous materials and substances must be stored within a secure area in the construction camp. The storage area must be a hard-surfaced, bunded, and covered area.
- Cement mixing must be done on a hard surface that is protected from stormwater runoff.
- Contractors are required to dispose of construction rubble at an appropriate landfill site. Delivery notes and safe disposal certificates to prove appropriate disposal must be available.
- Appropriate and sufficient toilet facilities must be provided by the contractor.
- Toilet facilities must be provided by a registered company and all sewage must be disposed of at an appropriate facility. Safe disposal certificates must be kept on record.
- Toilet facilities must not be located within 22m of any watercourse.

Dust and erosion control

- A water cart must be used to dampen dusty surfaces and suppress dust.
- Exposed areas must be rehabilitated and revegetated as soon as possible during construction.
- Areas exposed to erosion must be protected through the use of sandbags, berms and efficient construction processes, i.e.: limiting the extent (footprint) and duration period that areas are exposed. The contractor must ensure that any blockages created during construction are resolved.

Stormwater management and protection of the watercourses

- The engineer/contractor must ensure that only clean stormwater runoff enters the environment. Any contaminated runoff must be collected and disposed of at an appropriate waste facility.
- All watercourses must be identified and demarcated at the start of construction.
- No excavated material or fill material may be stored within any watercourse or 22m buffer of any watercourse.
- Only the area directly in the path of construction may be cleared and excavated. The remainder of the watercourse must be demarcated as a 'no-go' area.

- Heavy vehicles must avoid working near the watercourse as much as possible.
- Stormwater may not be channelled directly into any water body without the flow velocity being slowed. Channelled flows must be diffused.

Protection of Heritage Resources

- Attention is drawn to the South African Heritage Resources Act, 1999 (Act No. 25 of 1999) and the KwaZulu-Natal Heritage Act (Act no 4 of 2008) which, requires that operations which expose archaeological or historical remains should cease immediately, pending evaluation by the provincial heritage agency.

Specific conditions

- The construction footprint must be demarcated and the recommended 22m buffer must be implemented.
- Ensure that the construction activities do not interrupt flow within the watercourse and wetland even during low flow periods;
- Vehicles must only use the designated crossing points;
- Heavy vehicles must remain outside the 22m buffer unless required for construction purposes;
- No storage may occur within the 22m buffer from any watercourse.
- Any additional stormwater outlets must be fitted with erosion protection features to diffuse flow.
- The pipeline must be regularly inspected (quarterly) for any signs of failure, damage or leaks. Adequate maintenance measures need to be implemented upon finding pipeline issues and failures.
- The following method statement must be submitted by the contractor:
 - A soil management strategy for the excavation and backfilling of trenches.

Appendix A: Drawings and Maps

Appendix B: Specialist Reports

Appendix C: Noticeboard

Appendix D: Notification

Appendix E: Adverts

Appendix F: Registered I & Aps

Appendix G: Comments and Responses

Appendix H: Impacts Scoring Matrix

Appendix I: EAP Declaration

Appendix J: Environmental Management Programme (EMPr)