



UTHUKELA DISTRICT MUNICIPALITY

KWAZULU NATAL

EZAKHENI / EMNAMBITHI BULK WATER INFRASTRUCTURE UPGRADE PROJECT

MOTIVATION FOR CONSTRUCTION OF 20 ML POTABLE WATER
RESERVOIR ON THE BRAKFORTEIN FARM SITE.

VERSION: 1.0

DATE: 7 AUGUST 2015

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TABLE OF CONTENTS

1	INTRODUCTION	1
2	CURRENT SITUATION	3
3	PURPOSE OF THIS REPORT	3
4	BACKGROUND	4
4.1	Key Conceptual Considerations	4
4.2	Design Development.....	4
4.3	Site Evaluation.....	5
4.4	Discussion	8
5	RECOMMENDATION	8

NOMENCLATURE

AC	Asbestos Cement
BWSP	Bulk Water Services Provider
BAR	Basic Assessment Report
DWA	Department of Water Affairs
ISD	Institutional and Social Development
JIT	Just In Time
KPI	Key Performance Indicator
NRW	Non Revenue Water
MIG	Municipal Infrastructure Grant
O&M	Operation and Maintenance
PDI	Previously Disadvantaged Individual
PDC	Previously Disadvantaged Company
PMU	Project Management Unit
PSC	Project Steering Committee
PTO	Permission To Occupy
RDP	Reconstruction and Development Programme
RWSS	Regional Water Supply Scheme
UDM	Uthukela District Municipality
UAW	Un-Accounted for Water
URV	Unit Reference Value

WCDM Water Conservation and Demand Management

WSA Water Services Authority

WSP Water Services Provider

WTP Water Treatment Plant

1 INTRODUCTION

Water supply infrastructure within Ezakheni/Emnambithi is currently supply constrained. On 21 September 2008 WMN Consultancy was appointed by the Uthukela District Municipality for the development of the “Emnambithi/Ezakheni Infrastructure Upgrade Masterplan”.

The Ezakheni / Emnambithi Bulk Water Infrastructure Upgrade Masterplan includes for the provision of bulk infrastructure to address the supply constraints as well as internal water conservation and demand management initiatives (AC, replacement, pressure control, pressure zoning, bulk water monitoring et al) to improve sustainability and address the unacceptably high physical water losses within Ladysmith / Ezakheni.

The bulk water supply elements of the project as envisaged at masterplan stage comprised the following:

- Water source: Existing Spionkop Dam
- 50 MI/d raw water pumpstation at Spionkop Dam (ultimate capacity 150 MI/d)
- DN 1400/1250/1200 * 9100m raw water suction and rising main to WTP
- 50 MI/d WTP located on Brakfontein Farm (Ultimately 150 MI/d).
- 20 MI potable water command reservoir located on Brakfontein Farm.
- DN1200/900 potable water gravity main from the WTP to the distribution supply nodes.

The project area is indicated in **Annexure A**. Currently the more formal areas of this supply area are serviced by the Ladysmith and Ezakheni water treatment plants. The Ladysmith Water Treatment Plant (WTP) is dated and cannot readily be upgraded and the Ezakheni WTP has significant operational challenges and is inefficient from an energy and water conservation perspective. This project targets several areas which currently have no reliable water supply including Roosboom, which has experienced service delivery protests, and the Driefontein complex, an RBIG project, where there is a moratorium upon further bulk water supply development due to the lack of water source, which this project addresses.

The target population is summarised below:

Table 1: Current Target Population (Current 2007 population estimates)

PROPOSED SOURCE OF POTABLE WATER					
COMMUNITY	LADYSMITH WTP SUPPLY NODE	EZAKHENI WTP SUPPLY NODE	LADYSMITH WTP SUPPLY NODE PLANNED BUT NOT IMPLEMENTED DUE TO CAPACITY CONSTRAINTS	POTENTIAL BENEFIT FROM REGIONAL SCHEME (SPIOENKOP WTP)	COMMENT
	I	II	III	IV	As per bullets above
	2007 POPULATION	2007 POPULATION	2007 POPULATION	2007 POPULATION	
Ladysmith	54424				
Ezakheni		80375			
Roosboom		8405			Proposed SUPPLY FROM Ezakheni WTP, currently borehole supply
Driefontein Complex			72158		
Nkunzi (Steincoalspruit)			2415		
Matiwane			12087		
Indaka			117646		
Colenso				5566	Emnambithi LM
Weenen				12787	Umshezi LM
Winterton				3712	Okhahlamba LM
Bergville				738	Okhahlamba LM
Rookdale				6528	Okhahlamba LM
Woodford / Bethany				10652	Okhahlamba LM
Hambrook / Acton Homes				4404	Okhahlamba LM
Greenpoint				3981	Okhahlamba LM
Bhekuzulu				56689	Imbababazane LM
ESTIMATED 2007 TOTALS	42187	101018	204306	105057	

Aside from the potential regional development (population served some 100 000), the targeted served population is some 350 000. Of this total, at least 200 000 persons served may be regarded as indigent.

Early in the design stage it became apparent that the Brakfontein Farm site was extremely sensitive from a heritage perspective. An archaeological investigation was conducted by

Mr Gavin Anderson's investigation (see Report entitled "Ladysmith Bulk Pipeline: Spionkop to Ladysmith" dated 15 May 2015" submitted under separate cover) confirmed this finding and alternative sites were accordingly investigated.

2 CURRENT SITUATION

Projects of this nature take time to gather momentum and the current status of the project is as follows:

- The Masterplan was approved by the Uthukela Council in July 2012.
- The Business Plan for the "Ezakheni / Emnambithi Bulk Water Infrastructure Upgrade Project: September 2012: V1.0)" was approved in principle at a special meeting chaired by Ms A. Masefield on 23 April 2013. Due to the significant financial implication of the project, the DWS requested that a separate business plan "Application for funding to prepare designs for the bulk water infrastructure programme" be prepared.
- The project was approved unconditionally in the amount of R 1,279,440,000 by the DWS at the SAC meeting on 8 May 2013.
- COGTA in their letter dated 7 October 2013 advised that funding for the design (for priority bulk infrastructure projects to tender stage) in the amount of R 35,173,214.58 (VAT inclusive) had been approved.
- Design work for the priority bulk infrastructure commenced in earnest in February 2015. The Basic Assessment Report has been submitted to the EDTEA, the WULA application is in progress and initial specialist heritage studies at the Brakfontein site have been carried out.

3 PURPOSE OF THIS REPORT

There are a multitude of affected parties and stakeholders on a regional project of this nature. All of these stakeholders have genuine concerns regarding the project and the selection of the optimal WTP and Command reservoir sites is of paramount importance.

The purpose of this report is to:

- Identify the potential WTP and Command Reservoir sites.

-
- Attempt to place into perspective the relative importance of economic, engineering, environmental and heritage considerations applicable to this project.
 - Furnish an overview of the methodology applied in the site evaluation process and identify the optimal WTP and command reservoir site thus identified.
 - Furnish motivation for the use of the Brakfontein site as the optimal site for the potable water Command Reservoir

4 BACKGROUND

4.1 KEY CONCEPTUAL CONSIDERATIONS

The bulk water treatment and transfer system as envisaged in the conceptual masterplan essentially comprised:

- A raw water pumpstation located at Spionkop which transferred raw water via a DN1200 pipeline to a 50 MI/d Water Treatment Plant / 20 MI Potable Water Command Reservoir located on Brakfontein Farm.
- The potable water **Command Reservoir** (at a commanding elevation of 1200masl) was able to **GRAVITY supply** virtually the entire project footprint with minimal downstream pumping via a DN1200/900m gravity bulk main.

A key consideration contributing to the scheme's technical sustainability was the gravity supply from a single "command" reservoir. A single short pumping "lift" followed by gravity supply from a reservoir at a commanding elevation has been proven to lead to improved sustainability and reliability of water supply schemes for the following reasons:

- Simpler management.
- Reduced skills levels to maintain remote pump stations.
- Reduced reliability on energy supplies at remote locations. The current practice of load-shedding further exacerbates this situation as sensitive electronic equipment used to control remote pumpstations is prone to failure during power surges.

The Brakfontein site is the only site reasonably close to the pipeline route located at the required command elevation of 1200masl (See **Annexure B**). It is noted that a DN1200 pipeline of this nature costs approximately R25 000 000/km.

4.2 DESIGN DEVELOPMENT

Very soon in the development of the design of the system it became apparent that the proposed Brakfontein WTP/reservoir site was very sensitive from a heritage perspective

and that it would be unlikely that the site could accommodate a water treatment plant and 20 MI Command Reservoir without compromising the heritage considerations and intruding upon the “sense of place”. The engineering team accordingly proposed separate sites for the Water Treatment Plant and Command Reservoir. This WTP site is indicated as Site Option 3 in Annexure B and it was assumed that the reservoir would still be located on the Brakfontein site.

At this juncture it is worth noting that from an economic, engineering (and management) perspective it is preferable to have a WTP and potable water reservoir on the same site in close proximity whereby potable water is discharge from the WTP under gravity directly into the reservoir. The separation of the WTP and reservoir sites as contemplated above introduces an intermediate potable water pumpstation at considerable (but not exorbitant) cost. Importantly, the energy costs associated with an intermediate pumpstation are not materially greater than for a single “lift”.

As the design progressed further it became necessary to engage with affected parties who in this instance are largely commercial farmers represented by the Ladysmith Farmers Association. Whilst initially wary of the project, they as a group very shortly embraced the project, although they are not beneficiaries, and have been very supportive of the engineering team. However, they did not support the alternate WTP site proposed by the engineering team described above (Site Option 3 in Annexure B) as it was considered to intrude upon the “sense of place” of the Spionkop hills and the general ambience of the pastoral environment.

The Ladysmith Farmers Association has submitted under separate cover a report indicating their own preferences for the water treatment plant and command reservoir sites which should be read in conjunction with this report. A copy of this report is given in Annexure C.

In light of the above considerations the engineering team requested that the environmental consultant commission a detailed archaeological investigation of the Brakfontein site and undertook an exhaustive study of all potential WTP and Command Reservoir sites (ie reservoir sites located at 1200 masl).

4.3 SITE EVALUATION

Potential WTP and reservoir sites are indicated in Annexure B. Areas above 1200masl are highlighted in GREEN and these are accordingly identified as potential command reservoir sites.

The site assessment matrix, together with the outcome of the site evaluation undertaken at Spionkop Lodge on 11 June 2015 with affected parties and stakeholder representatives is given in **Annexure D**. The minutes of this meeting are given in **Annexure E**

The following criteria were used to evaluate the sites:

ECONOMIC CONSIDERATIONS (Weighting Factor = 10 (28%))

- Capital Cost
- Life Cycle Cost

ENGINEERING CONSIDERATIONS (Weighting Factor = 10 (28%))

- Ability to accommodate treatment and storage facilities on the same site.
- Position relative to pipe corridor
- Ease of access
- Site slop conducive to hydraulic profile
- System energy efficiency
- Safety
- Effective disposal of waste streams

ENVIRONMENTAL (Weighting Factor = 5 (14%))

- Bio-physical environmental impact (score on post mitigation measures if mitigation measures are not considered to be material)
- Disposal of waste streams

VISUAL / SOCIAL IMPACT (Weighting Factor = 5 (14%))

- Negative impact upon social community
- Negative commercial impact (tourism)

HERITAGE (Weighting Factor = 5 (14%))

- Sensitivity of site (heritage /graves)
- Negative impact upon "Sense of place".
- Negative impacts upon historical artefacts (post mitigation eg improve tourism)

At the meeting Mr. J. Richardson (Environmental Consultant) suggested that the weighting of the "Hard" issues (economic, engineering) should equate to the "Soft" issues (environmental, visual & social impact, heritage). After discussion it was agreed by sufficient consensus that the weighting of the "Hard"(57%) and "Soft" (43%) issues was

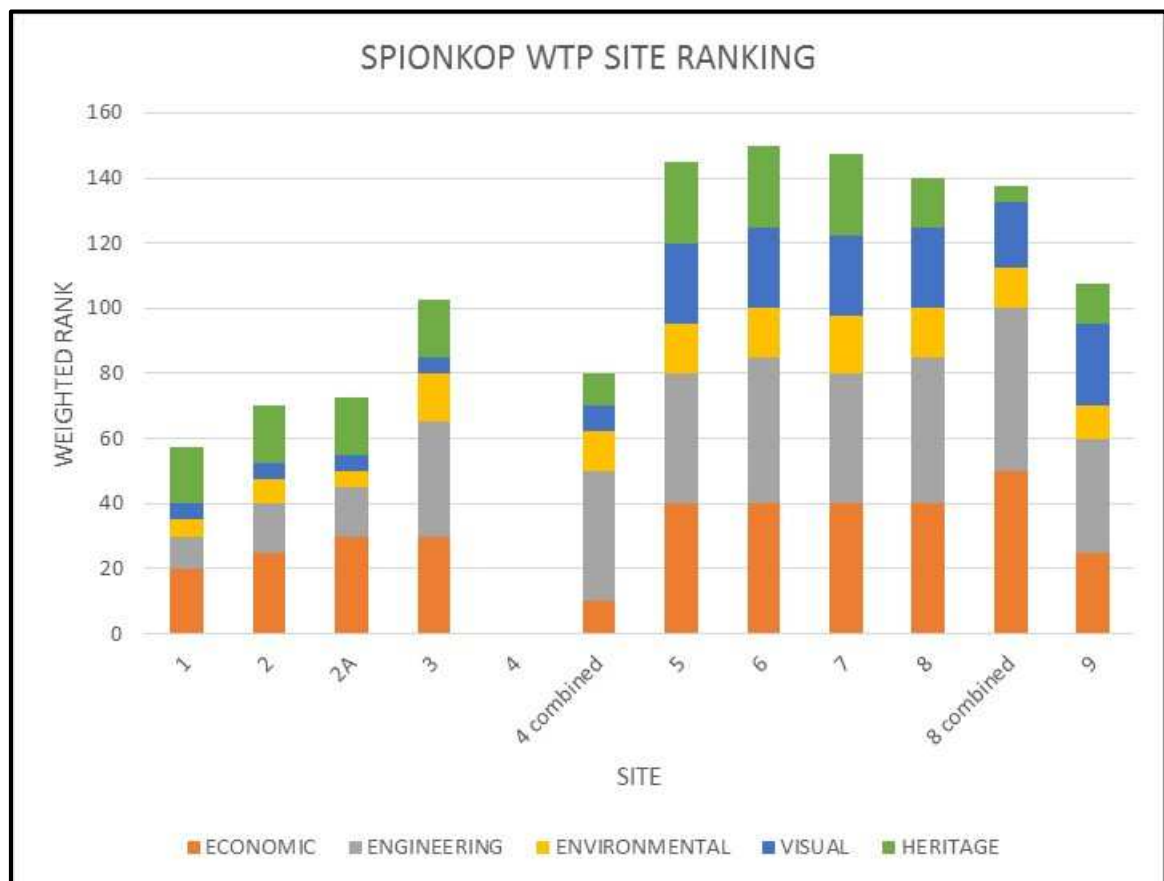
appropriate in our developing country where reliable water supply to some 350 000 people (200 000 indigent) was at stake.

Discussion during the evaluation exercise was led by the following persons:

- Economic and engineering: Messrs F. Klopper and C. Mitchell.
- Environmental: Mr. J. Richardson
- Visual / social Impact & Heritage: Mr. R. Heron who formed part of the archaeological Team

The matrix scoring was carried out by Mr. D. Hodgkinson on the basis of sufficient consensus after lively debate. In reality consensus was achieved remarkably quickly.

The results of the evaluation exercise are summarised below:



Notes:

1. Combined = WTP and Command Reservoir on the same site
2. In all cases save for Site 4, the command reservoir is assumed to be located on Brakfontein
3. Site 4 (Reservoir only) not evaluated as it would not be practical to split WTP & Reservoir in this instance.

Chart 1: Ranking of WTP/ Command Reservoir Sites

4.4 DISCUSSION

The evaluation indicates that sites 6 and 7 are the preferred sites with Site 6 having a marginal advantage.

Inspection of the above chart indicates that Site 4_{combined} achieves a very low economic score. This is due to the considerable increase in length of the pipelines conveying water to and from the WTP / reservoir (Site 6 vs Site 4: $\sim 2 * 2.8\text{km} = 5.6\text{km}$ additional length) which is estimated to be at a cost premium of R140 000 000 (5600m @ R25 000/m = R 140 000 000). It is noted that the cost associated with a road upgrade to effect chemical delivery to this site is not included in the above estimate.

In view of the considerable cost premium associated with Site 4, it is considered that there is a compelling reason to locate the Reservoir on Site 6 (no material heritage impact) and the Command Reservoir on Site 8 (Brakfontein Site) and carry out necessary measure to mitigate impact upon this site.

Discussions with the owner of the Brakfontein farm (Mr. P. Schoeman) have indicated that there is very little public knowledge of this valuable heritage site. As the design process has evolved the professional team has developed a sound working relationship with the affected parties and we jointly consider that should permission be granted to locate the Command Reservoir on the Brakfontein Site, measures could be put in place to mitigate the impact of the reservoir upon the “sense of place” and consideration could be given to creating a small museum to display any artefacts discovered during the “search and rescue” investigation that would precede any construction activity. This would increase public awareness of this valuable site and could have a positive impact upon local tourism. The proposed revised WTP layout on Site 6 together with a possible Command Reservoir location on Site 8 (Brakfontein) is indicated in Annexure F. This location has been selected on the basis of minimising impact of the reservoir upon the site. It is noted that we have a degree of flexibility to reduce the reservoir footprint with a concomitant increase in water depth.

5 RECOMMENDATION

The primary purpose of this project is to provide reliable, sustainable and affordable water to some 350 000 persons, of which about 200 000 may be regarded as indigent. In view of this compelling factor and the above considerations it is **RECOMMENDED** that:

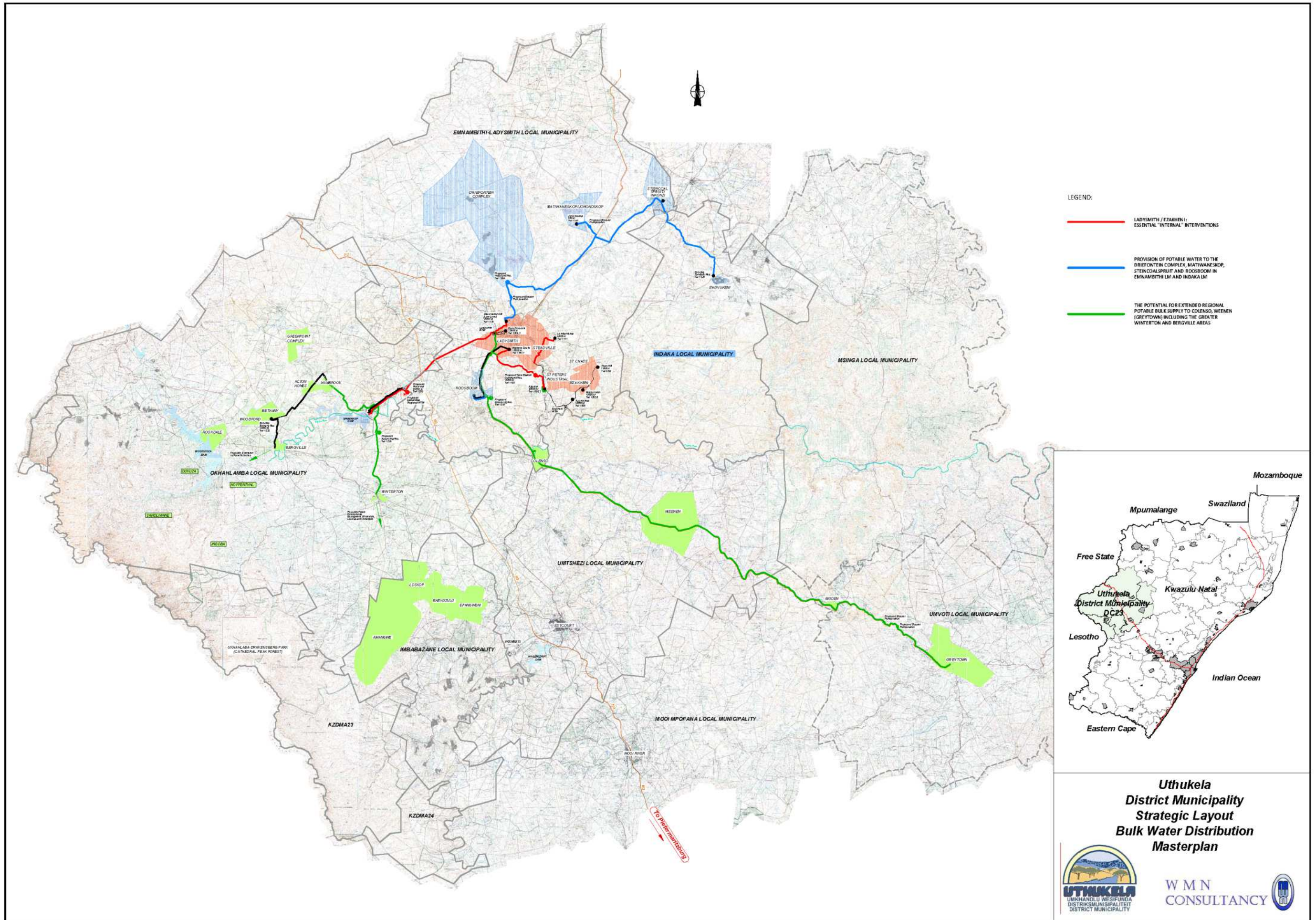
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- AMAFA give favourable consideration to the use of the Brakfontein site for the construction of the 20 MI potable water Command Reservoir.
 - AMAFA assist the professional team in seeking an optimal location on this site for the reservoir to minimise the impact upon the “sense of place” and other factors.
 - AMAFA furnish the professional team with a specification for “search and rescue” of archaeological artefacts and give consideration / advice to the development of a small museum on the site to increase public awareness.
 - AMAFA advise the professional team of any other measures that could enhance the heritage value of this site.

We look forward to AMAFA’s favourable consideration of these recommendations and working together with AMAFA’s assigned specialists in order to ensure that the water service backlogs within the greater Emnambithi area are addressed whilst still satisfying the requirements of stakeholders and affected parties.

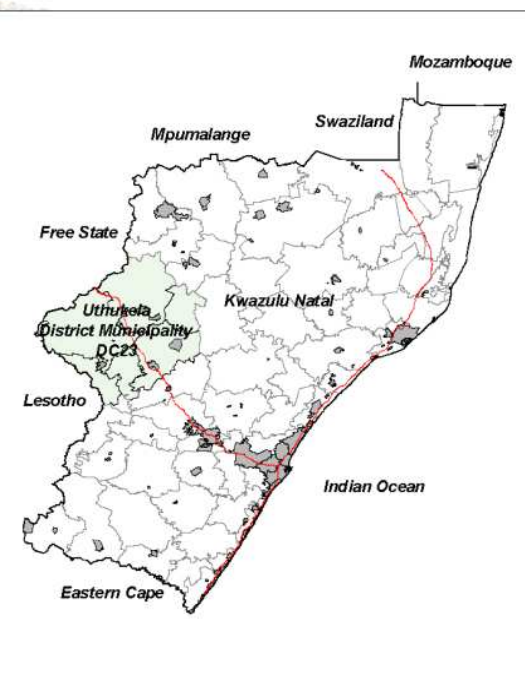
ANNEXURE A
PROJECT AREA SHOWING KEY BULK INFRASTRUCTURE AS ENVISAGED AT
MASTERPLANNING STAGE

(Sheet 1: Project Footprint)

(Sheet 2: Primary Project Footprint (Ladysmith /Ezakheni) & Key Bulk Infrastructure)



- LEGEND:
- LADYSMITH / EZAKHENI: ESSENTIAL "INTERNAL" INTERVENTIONS
 - PROVISION OF POTABLE WATER TO THE DRIEFONTEIN COMPLEX, MATIWANESKOP, STERCKFONTEIN AND ROODBOOM IN EMNAMBITHI LM AND INDAKA LM
 - THE POTENTIAL FOR EXTENDED REGIONAL POTABLE RISK SUPPLY TO COLENSO, WEENEN (GREYTOWN) INCLUDING THE GREATER WINTERTON AND BERGVILLE AREAS

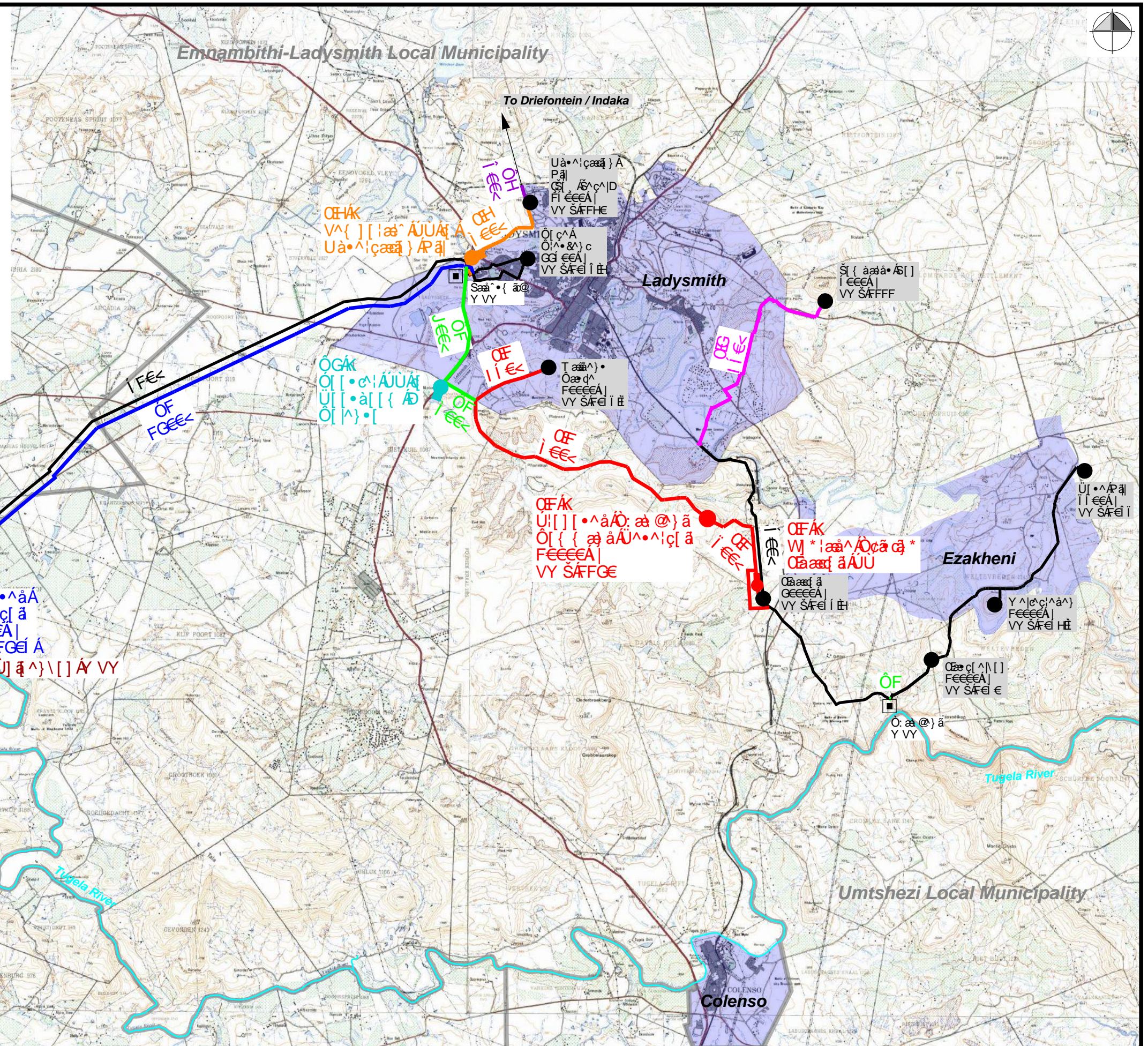


**Uthukela
District Municipality
Strategic Layout
Bulk Water Distribution
Masterplan**



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ANNEXURE B
WTP & COMMAND RESERVOIR SITE OPTIONS

ANNEXURE C
**COPY OF LADYSMITH FARMERS ASSOCIATION REPORT INDICATING THEIR
PREFERENCE FOR THE WTP & COMMAND RESERVOIR SITES**

Dear Amafa

As farmers of the Ladysmith/Winterton community we have as much interest in the development of the new Spionkop/Ladysmith pipeline as you do from an historical perspective. We therefore hope to shed some practical viewpoints on what we understand to be a site of historical significance at Brakfontein Heights.

Many of us take a keen interest in the history of the area, and actively promote tourism to, and the preservation of, historical sights and monuments. We often visit these sights in our own capacity with friends and family, and even events such as the well-known Berg & Bush mountain bike race make a concerted effort to raise awareness of the historical significance of the area and the many historical landmarks. These sights also provide employment opportunities for locals, which in turn benefits the socio-economic dynamic of our community. As such, it is very much within our sphere of interest to preserve the rich historical value of the area and the contribution that it makes to the local community.

With regards to Brakfontein Heights in particular, it has long since been our perception that this is an unused and neglected site relating to the Battle of Vaal Kranz. Being people of the land, we are very aware of the comings and goings of the area, and can say with some confidence that the Brakfontein Heights site is almost never visited. This is due, in no small measure, to the lack of appropriate access and the overgrown and unkept state of the site. Therefore, it is our suggestion that we view the proposed water works treatment plant adjacent to the Brakfontein Heights historical site as a great opportunity to uplift the awareness, usage and state of the site itself. This venture provides the ideal opportunity to add Brakfontein Heights as a frequented landmark on the battlefields route, which will in turn go some way to ensuring its long-term preservation.

It is the intention of the farming community, along with the contracted engineers, to use this opportunity to create an extension to the waterworks access road that will lead to the battlements of Brakfontein Heights, with the addition of a small parking area for its dedicated use. In addition, we suggest that betterment and maintenance work could be undertaken in order to preserve existing landmarks, while also creating a more usable environment for interested parties. This will greatly benefit local tour guides and their guests by making the Brakfontein Heights a viable addition to their battlefields experience. In so doing, with additional awareness and usage, the site will no doubt benefit from a long-term, sustainable preservation perspective.

We are very much in favour of the proposed waterworks site on Brakfontein Heights, and it is not our intention to mask that in any way, but we do genuinely believe that by using the waterworks as a springboard for ensuring the long-term preservation of the historical site of Brakfontein Heights we are faced with a win-win situation. The alternative waterworks site, in our view, creates far more of an issue with regards to undermining sites of historical value. Sitting on the banks of the Tugela River, within full view of the entire south-facing slope of Spioenkop, the unsightly visual impact of a waterworks plant would undermine

the entire experience and impact of the battle of Spioenkop for historical tourists and interested parties. Southern viewpoints encompass the British approach and Buller's position at Mount Alice. It is our position that the negative impact of this site is far greater than any perceived impact on the Brakfontein Heights site.

We hope to engage with you in this process in order that proactive and purposeful conversations might take place for the benefit of all interested parties. May I once again reiterate that as a community we see ourselves as proud custodians of the history and heritage of the area, and wish to continue to play an active role in its preservation for the benefit of all interested parties, current and future.

Kind regards,

Justin Green

On behalf of the Ladysmith Farmers Association and other affected parties

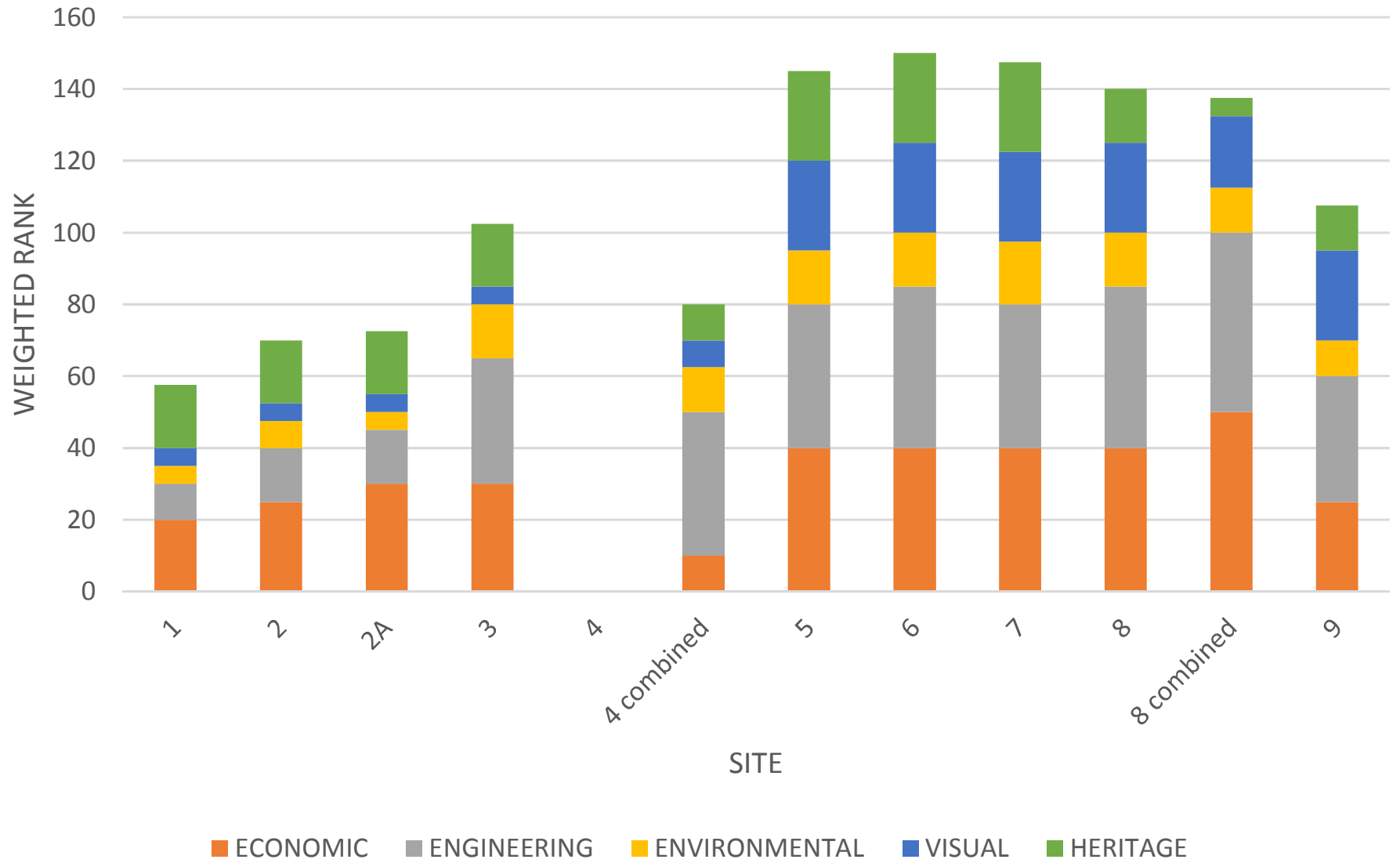
ANNEXURE D
SITE EVALUATION MATRIX & OUTCOME

SPIONKOP - LADYSMITH WATER TREATMENT PLANT SITE ASSESSMENT MATRIX			
PURPOSE			
The purpose of this matrix is to identify the optimal water treatment plant and potable water storage reservoir site taking due account of economic, engineering, environmental and heritage factors			
It is noted that the project has been approved in principle by the DWS and that the over-riding benefit of the project which is key to system sustainability is a regional potable water supply by gravity. To this end it is imperative that the potable water storage reservoir be located with a top water level not less than 1200msl			
NOMENCLATURE			
The following sub-factors should be considered when assessing the factors listed below:			
ECONOMIC:			
	Capital cost		
	Life cycle costs (energy and maintenance)		
Weighting Factor	:		10
Low cost	:		5
High cost	:		1
ENGINEERING			
	Ability to accommodate treatment and storage facility on the same site		
	Position relative to the pipe corridor		
	Ease of Access		
	Site slope conducive to hydraulic profile		
	System energy efficiency		
	Staff accommodation		
	Safety		
	Effective disposal of waste streams		
Weighting Factor	:		10
Good site	:		5
Poor site	:		1
ENVIRONMENTAL			
	Bio physical environmental impact. Score on post mitigation if mitigation costs are not considered to be material		
	Social environmental impact. Score on post mitigation if mitigation costs are not considered to be material		
	Disposal of waste streams		
Weighting Factor	:		5
Low impact	:		5
High impact	:		1
VISUAL/SOCIAL IMPACT			
	Negative impact on social (local community perceptions)		
	Negative commercial impact (Tourism)		
Weighting Factor	:		5
Low	:		5
High	:		1
HERITAGE			
	Sensitivity of site (heritage/graves)		
	Negative impact upon "sense of place"		
	Negative impact upon historical artefacts (post mitigation; eg improved tourism)		
Weighting Factor	:		5
Low	:		5

SCORE CONCENSUS					
SITE	ECONOMIC	ENGINEERING	ENVIRONMENT	VISUAL	HERITAGE
1	2	1	1	1	3.5
2	2.5	1.5	1.5	1	3.5
2A	3	1.5	1	1	3.5
3	3	3.5	3	1	3.5
4	0	0	0	0	0
4 combined	1	4	2.5	1.5	2
5	4	4	3	5	5
6	4	4.5	3	5	5
7	4	4	3.5	5	5
8	4	4.5	3	5	3
8 combined	5	5	2.5	4	1
9	2.5	3.5	2	5	2.5

WEIGHTED SCORES							
SITE	ECONOMIC	ENGINEERING	ENVIRONMENT	VISUAL	HERITAGE	TOTAL	NUMERIC SITE
1	20	10	5	5	17.5	57.5	1
2	25	15	7.5	5	17.5	70	2
2A	30	15	5	5	17.5	72.5	3
3	30	35	15	5	17.5	102.5	4
4	0	0	0	0	0	0	5
4 combined	10	40	12.5	7.5	10	80	6
5	40	40	15	25	25	145	7
6	40	45	15	25	25	150	8
7	40	40	17.5	25	25	147.5	9
8	40	45	15	25	15	140	10
8 combined	50	50	12.5	20	5	137.5	11
9	25	35	10	25	12.5	107.5	12

SPIONKOP WTP SITE RANKING



ANNEXURE E
MINUTES OF SITE EVALUATION MEETING HELD ON 11 JUNE 2015

EZAKHENI / EMNAMBITHI BULK WATER INFRASTRUCTURE UPGRADE PROJECT

11 June 2015, Spionkop Lodge

14h00-17h00

Please Note: These minutes were drawn from notes taken at the Public Meeting and are not verbatim. We would also like to advise you that while utmost care was taken to record your comments accurately and faithfully, there may be some discrepancies between what has been written in the minutes that follow and what was actually said. Should you wish to have something changed we request that you contact us immediately.

ATTENDEES

Name	Organisation
Don Hodgkinson (DH)	WMN Consultancy (Pty) Ltd
Frans Klopper (FK)	WMN Consultancy (Pty) Ltd
Craig Mitchell (CM)	WMN Consultancy (Pty) Ltd
Dennis Kotze (DK)	WMN Consultancy (Pty) Ltd
John Richardson (JR)	Terratest (Pty) Ltd
Raymond Heron	Spionkop Lodge
Ian King (IK) - Chair	Ladysmith Farmers Association (left early)
Peter Schoeman (PS)	Brakfontein Farm
Justin Green (JG)	Member of LFA

APOLOGIES

Name	Organisation

Abbreviations used:

DoT: Department of Transport

EIA: Environmental Impact Assessment

EAP: Environmental Assessment Practitioner

UDM: uThukela District Municipality

DWA: Department of Water Affairs

WTP: Water Treatment Plant

WELCOME AND INTRODUCTIONS

Mr Ian King (IK) welcomed all to the meeting and requested Mr. Don Hodgkinson to elaborate on the purpose of the meeting.

PURPOSE OF THE MEETING

DH explained that the location of the waterworks / command reservoir had proved to be a most contentious issue. At masterplanning stage the waterworks and reservoir had been located on

Brakfontein with the reservoir at a commanding elevation of 1200m to enable gravity supply to the greater Emnambithi /Ezakheni area. As the preliminary design progressed it became apparent that portions of the Brakfontein were very sensitive from a heritage perspective and that it may not be possible to locate the reservoir and waterworks on the site. The professional team sought an alternate site which proved to be totally out of favour with the local community as it impacted visually upon the Spionkop Hills.

Specialist archaeological studies have been carried out on the Brakfontein site which strongly indicate that both the waterworks and reservoir cannot be located on the Brakfontein site.

The professional team seeks a compromise solution whereby all parties feel comfortable that the agreed solution is optimal and have accordingly devised a systematic and methodical means of evaluating all potential sites.

The purpose of this meeting is to:

- Agree by sufficient consensus the evaluation determinands and their weighting factors.
- Evaluate each site in terms of the agreed determinands and thereby determine the optimal site.

EVALUATION AND ASSESSMENT

Determinands

The determinands (see Annexure A) as proposed were agreed subject to the revision indicated in Annexure A.

Determinand Weighting

Mr. J. Richardson considered that the weighting for the “Environmental and Heritage” (43%) determinands should be the same as “Engineering/Economics” (57%) determinand. After discussion it was agreed by sufficient consensus that as water supply to some 350 000 persons (>250 000 indigent) in our developing country was at stake, the weighting as indicated was fair and appropriate.

Evaluation

Each site was evaluated by those present. Mr. J. Richardson led the discussion on environmental matters, Mr. Raymond Heron on archaeological matters and messrs F. Klopper and C. Mitchell on engineering / economic matters. Initially it was the intention for each individual attendee to score each site. This proved to be cumbersome and scores for each determinand were recorded by Mr. Don Hodgkinson following lively discussion.

Outcome

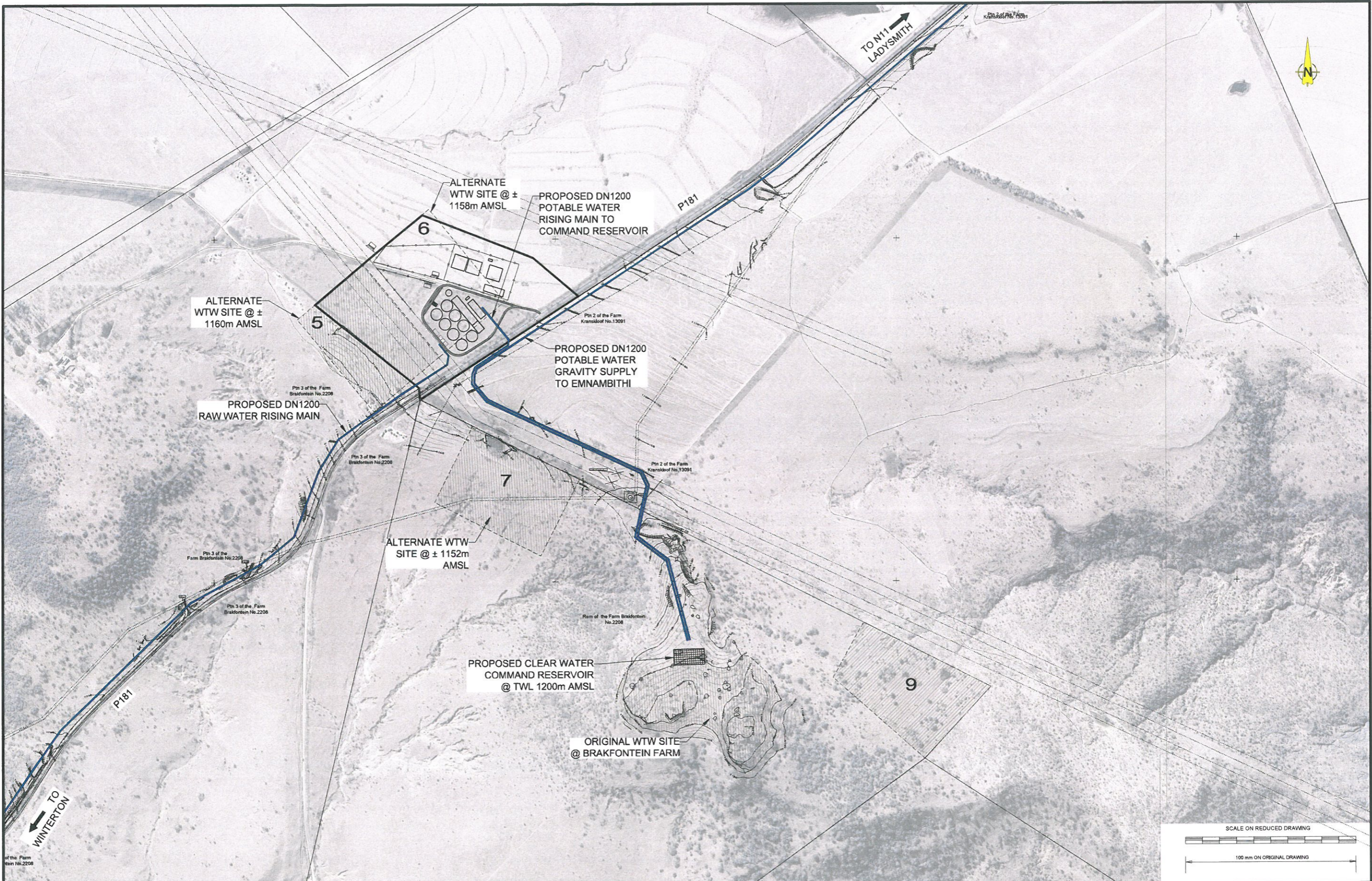
The outcome of the evaluation indicated Site 6 as the optimal site (See Annexure A for Evaluation and Annexure B for Site Locality Map).

CONCLUSION & CLOSURE

DH explained that the outcome of the evaluation would form part of a report for consideration by AMAFA.

DH thanked all present for their attendance and the meeting closed at 17h15.

ANNEXURE F
PROPOSED WTP (SITE 6) AND COMMAND RESERVOIR LOCATION ON
BRAKFORTEIN



No.	ISSUED FOR EIA APPROVAL	AUG 2015
A	AMENDMENTS	DATE

CLIENT



UTHUKELA DISTRICT MUNICIPALITY

PROJECT **EZAKHENI / EMNAMBITHI BULK WATER INFRASTRUCTURE UPGRADE PROJECT**

DESCRIPTION **WTW AND RESERVOIR LAYOUT**

PROJECT No. 100A-5

CONTRACT No.

DESIGNED C. MITCHELL

DRAWN T. v.d. WALT

CHECKED D. HODGKINSON

DATE AUG 2015



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SCALE 1:5 000 (A1)

SHEET 1 OF 1

APPROVED CONSULTING ENGINEER

DATE

PLAN No. **100A-5-BAR01-002**