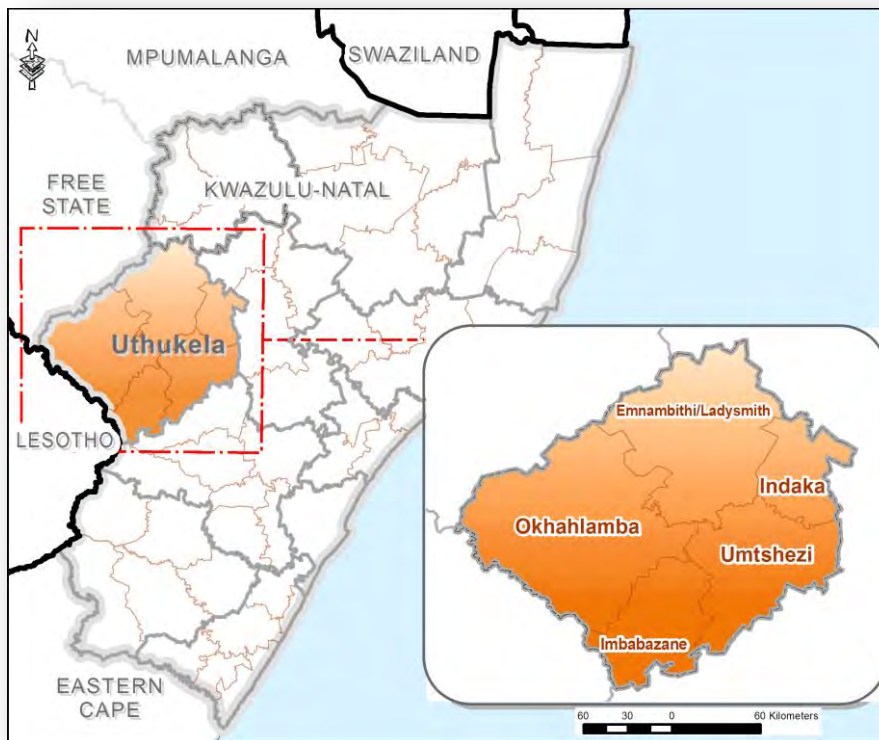


UNIVERSAL ACCESS PLAN PHASE 2 – PROGRESSIVE DEVELOPMENT OF A REGIONAL CONCEPT PLAN FOR THE UTHUKELA DISTRICT MUNICIPALITY

CONTRACT NO. 2015/178



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Prepared for: Umgeni Water

Contact Person : Vernon Perumal
Tel: 033-341 1232 | Cell: 082 852 9308
vernon.perumal@umgeni.co.za

Prepared by: UWP Consulting (Pty) Ltd in
Association with Ziyanda Consulting

Contact Person : Sandra Munnik
Tel: 012-424 9707 | Cell: 082 828 8211
sandram@uwp.co.za

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Prepared for:	Client's Name: Umgeni Water	Contact Person: Vernon Perumal Tel No.: Tel: 033-341 1232 Cell: 082 852 9308 Email address: vernon.perumal@umgeni.co.za		
Prepared at / by:	Office: Pretoria	Division: Infrastructure Planning		
Verification Process:	Name:	Capacity:	Signature:	Date:
Verification by Author:	M Esterhuizen	Deputy Study Leader		22/6/2016
Checked by:	S Munnik	Study Leader and Project Director		22/6/2016
Authorised by:	S Munnik	Study Leader and Project Director		22/6/2016
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EXECUTIVE SUMMARY

A. INTRODUCTION

Umgeni Water initiated a study in 2014 to develop Universal Access Plans (UAP, Phase 1) for bulk water supply, for all District Municipalities in the KwaZulu-Natal Province (KZN). The study culminated in a rudimentary report for each District Municipality that provides the water requirements and conceptual scheme areas and costing to provide access to bulk water supply, based on information at hand at the time.

Umgeni Water, together with the Department of Water & Sanitation (DWS) and the KZN Department of Cooperative Governance and Traditional Affairs (COGTA) sought to improve on the existing studies and initiated the follow-up study: Universal Access Plan (UAP) Phase 2 – Progressive Development of a Regional Concept Plan, again for each District Municipality in the KZN, as well as the Alfred Nzo and OR Tambo Districts in the Eastern Cape Province. Various Professional Service Providers (PSP's) were appointed to conduct the studies based on Water Services Authority (WSA) status.

The 2011 Census as well as updated Eskom Spot Building Count datasets could be applied for the improved studies. Furthermore, the DWS expressed the need to review and update their Reference Framework Geodatabase (2013) – especially the settlements and infrastructure components as part of the UAP Phase 2 study.

The objectives of the UAP Phase 2 study were to review and update the UAP Phase 1 study reports in order to improve the following:

- The Phase 1 study focused on small, localised schemes for universal access in the near future, however these proposed schemes are not necessarily sustainable;
- The proposed schemes were largely designed in isolation and took little cognisance of other water planning studies and recommendations;
- Many of the Water Services Development Plans were being updated during the course of the Phase 1 study, and need to be incorporated into UAP Phase 2;
- The study didn't go as far as Umgeni Water's extended area into the Eastern Cape Province; and
- The footprints did not take cognisance of town planning type information that would give an indication of future demands.

The UAP Phase 2 study aimed to improve on the above and to ensure a more aligned approach between the various PSP's appointed for the different study areas.

This report is the UAP Phase 2 report for the uThukela District Municipality, KwaZulu-Natal Province and hence forth, information reflected relates to this WSA.

B. DEMOGRAPHICS

The uThukela District Municipality (uTDM) has the fifth lowest number of households (146 621) within the KZN Province compared to the other DM's, but is the third largest in geographic area (11 326km²).

For the purpose of this study, the 2011 Census was used as base as it is available for the whole of South Africa and is also used by the municipalities for their planning and reporting purposes.

The population figures were projected according to calculated growth rates provided by Umgeni Water, based in inputs from Statistics SA (growth profiles, migration and updated household surveys) as well as local knowledge of the study areas.

The demographics from the 2011 Census (sub-place level, summarised per LM) and projected to 2035, are presented in **Table B**.

Table B Demographics Summary: 2011 Census and 2035 (Projected)

Local Municipality	2011		2035	
	Population	Households	Population	Households
Emnambithi/Ladysmith	237 335	57 809	314 898	77 035
Imbabazane	103 028	19 921	147 543	29 100
Indaka	83 119	19 185	133 346	25 849
Okhahlamba	132 040	27 468	173 609	36 164
Umtshezi	113 011	22 238	109 843	25 459
TOTAL	668 533	146 621	879 239	193 607

The number of people and households are expected to increase by an estimated 1.31% and 1.34% per annum respectively due to natural growth and migration. The Umtshezi LM however is projected to have a low population growth rate of 0.12% per annum. The Indaka LM is projected to have the highest population growth rate of 2.52% per annum.

C. WATER SERVICE LEVELS AND WATER REQUIREMENTS

The consumers in the uTDM have access to water supply in various forms, ranging from no formal access (obtain water directly from natural water sources), to formal and high levels of service in the form of household connections and waterborne sanitation.

The uTDM has initiated several projects to improve access to water supply – both reticulated supply and bulk water services. Services have improved, but also, many communities in the more rural areas of the uTDM gain access to formal schemes through illegal connections. This affects the quantity of water available to all as schemes were not initially designed for yard or house connections (supplied from community stand pipes).

The 2011 Census service levels and water requirement projections (million m³/a and MI/d) are presented in **Table C1** and **Table C2** respectively.

Table C1 2011 Census Service Levels and Water Requirements (million m³/a), Per LM

Local Municipality	Households (2011)	HH Below RDP (2011)	Water Requirements (Million m ³ /a)				
			2015	2020	2025	2030	2035
Emnambithi / Ladysmith	57 809	10 832	20.322	22.794	25.107	27.234	28.920
Imbabazane	19 921	11 098	4.205	5.343	6.455	7.095	7.598
Indaka	19 185	7 377	5.650	6.679	7.662	8.241	8.677
Okhahlamba	27 468	12 439	6.029	7.428	8.783	9.612	10.274
Umtshezi	22 238	4 922	6.305	7.167	8.001	8.677	9.194
TOTAL	146 621	46 668	42.511	49.411	56.007	60.858	64.663

The Emnambithi / Ladysmith LM has by far the highest water requirements due to the larger number of people residing in the area, large number of industries and expected future developments.

Table C2 2011 Census Service Levels and Water Requirements (MI/d), Per LM

Local Municipality	Households (2011)	HH Below RDP (2011)	Water Requirements (MI/d)				
			2015	2020	2025	2030	2035
Emnambithi / Ladysmith	57 809	10 832	55.675	62.448	68.785	74.614	79.233
Imbabazane	19 921	11 098	11.521	14.637	17.685	19.437	20.817
Indaka	19 185	7 377	15.479	18.299	20.992	22.578	23.771
Okhahlamba	27 468	12 439	16.519	20.349	24.062	26.333	28.147
Umtshezi	22 238	4 922	17.275	19.637	21.922	23.773	25.188
TOTAL	146 621	46 668	116.469	135.370	153.446	166.735	177.156

The largest growth in water volume between 2015 and 2035 is expected in the Emnambithi / Ladysmith and Okhahlamba LM's (by 23.558MI/d and 11.628MI/d respectively) whereas the largest growth in percentage water required is in the Imbabazane and Okhahlamba LM's (81% and 70% respectively).

D. WATER CONSERVATION AND WATER DEMAND MANAGEMENT

The uTDM was part of a water meter audit study completed in 2015 to establish the then state of affairs in terms of bulk water abstracted and supplied. There were very few bulk water supply areas with adequate metering and recommendations were made for improving water metering in the uTDM. This in turn would assist in developing an accurate water balance and therefore the development of suitable Water Conservation and Water Demand Management (WC/WDM) programmes.

Currently there are no formal WC/WDM programmes being implemented in the uTDM, but the following areas (highlighted because of the volume of potential water and revenue losses) require urgent attention:

- **Ezakheni:** high water losses due to leakages. The 2015 water requirements, including losses, were estimated as 7.414 million m³/a (20.313MI/d) whereas it is reported that the Ezakheni WTW supplies 41MI/d (47MI/d, but 6MI/d is supplied to Ladysmith WSS) – more than double the water required. The per capita consumption equates to **537 litres per capita per day**, which is excessively higher than benchmark figures for the service levels experienced in such an area.
- **Estcourt** supply area, including **Wembezi:** possible high water losses due to leakages and illegal connections. The 2015 water requirements, including losses, were estimated as 5.623 million m³/a (15.405MI/d). The Archie Rodel WTW and George Cross WTW supplies 9MI/d and 23MI/d respectively, equating to a total of 32MI/d – more than double the water required. The per capita consumption equates to **475 litres per capita per day**, which is considered higher than benchmark figures – unless the water sector use can be more clearly defined (domestic versus industrial).
- **Ladysmith:** high water losses due to leakages. The 2015 water requirements, including losses, were estimated as 9.197 million m³/a (25.196MI/d) whereas it is reported that the Ladysmith WTW supplies 31MI/d then added to that, the 6MI/d supplied from the Ezakheni WTW, it equates to 37MI/d – almost double the water required. The per capita consumption equates to **418 litres per capita per day**, which is considered higher than benchmark figures – unless the water sector use can be more clearly defined (domestic versus industrial).

The above areas are by no means the only areas requiring urgent WC/WDM interventions. The uTDM has to at least account for all water abstracted, supplied and consumed by the users connected to formal water supply infrastructure.

Illegal water connections need to be formalised and metered – all consumers need to be metered where water is supplied in the form of yard and house connections.

Night flows need to be monitored and areas experiencing high pressure need to be addressed.

Furthermore, the consumer base needs to be improved in terms of revenue recovery for water supply services. This in turn would increase the funding that can be applied to eradicate the backlog in water supply; upgrade and extend existing water supply services and maintain infrastructure components.

E. WATER RESOURCES

The uTDM falls within the Pongola Mtamvuna Water Management Area (WMA) – it is a combination of the previously Thukela, Mvoti to UMzimkhulu and Usutu to Mhlathuze WMA's. The uTDM includes all or part of the tertiary catchments V11, V12, V13, V14, V31, V60 and V70, which forms part of the Thukela Catchment area.

The main rivers in the Thukela Catchment (applicable to the uTDM) are: Thukela with its major tributaries: Little Thukela, Klip, Sundays and Bushmans Rivers. This catchment area is the main source of water for the Tugela-Vaal Transfer Scheme that supports water supplies to the Gauteng region.

The main dams (applicable to the uTDM) are the Woodstock Dam, Spioenkop Dam, Wagendrift Dam and the Driel Dam (Barrage). The water sources drain towards the east coast of the KZN Province, where it discharges into the Indian Ocean.

According to the Uthukela Water Management Area ISP, surplus water is available downstream of the Driel Barrage – therefore from the Spioenkop Dam and downstream thereof, from the Thukela River. Surplus water is also available from the sub-catchment of the Bushmans River. The Little Thukela and Sundays sub-catchments however are already stressed in terms of water allocations. In the case of the Little Thukela, only water for basic human needs can still be allocated (DWAF, 2004).

The main water supply schemes utilise surface water as source, but there are also many consumers reliant on groundwater sources as well as springs, for water supply. Groundwater quality in the northern parts of the uTDM is however affected by the coal mining activities and coal deposits found in those areas.

The 2015/2016 drought conditions have had an effect on the water availability in the uTDM and some areas experienced water shortages. The uTDM implemented water restrictions and utilised water tankers to provide consumers with water where their existing sources have dried up.

The conjunctive use of surface and groundwater is still an option for many areas not provided with adequate water supplies and should be encouraged

F. EXISTING WATER SUPPLY SCHEMES AND WATER REQUIREMENTS

Most areas in the uTDM (estimated 95%) enjoy service coverage in some form of water supply – be it basic services or progressively higher levels of service up to full waterborne sanitation. The existing schemes, their current water supply and estimated water requirements, are provided in **Table F** overleaf.

From the summary table, it is clear that there are some areas that should not experience a deficit in water supplied, but there are other areas which likely experience water supply deficit or interrupted supply due to infrastructure constraints.

Table F 2011 Existing Water Supply Schemes, Water Supplied and Water Requirements¹

WSS	Households (2015)	Water Supplied* (MI/d, 2015)	Water Requirements (MI/d)				
			2015	2020	2025	2030	2035
Bergville WSS	5 845	3.8	4.030	4.500	4.933	5.347	5.685
Blue Bank BH Supply	160		0.027	0.044	0.061	0.070	0.077
Colenso WSS	1 728	1.7	1.739	1.892	2.034	2.206	2.344
Cornfields WSS	1 077		0.563	0.651	0.734	0.806	0.863
Drakensberg WSS TBC	114		0.079	0.087	0.095	0.105	0.112
Driefontein WSS	13 194		5.611	7.070	8.502	9.485	10.288
Ekuvukeni Lime Hill WSS	18 543	10	11.413	13.220	14.950	16.216	17.232
Emoyeni-Amangwe WSS	3 996		1.380	1.852	2.323	2.605	2.834
Estcourt Rudimentary WSS	8 185		2.726	3.513	4.292	4.815	5.243
Estcourt WSS	16 743	32	13.691	15.078	16.413	17.838	18.948
Ezakheni WSS	19 928	47	18.666	20.285	21.762	23.591	25.071
Howe Wittekop WSS	352		0.067	0.103	0.140	0.159	0.175
Jagersrust WSS TBC	105		0.094	0.101	0.107	0.115	0.121
Ladysmith WSS	24 160	31	23.184	25.383	27.421	29.792	31.707
Langkloof WSS	379	0.1	0.068	0.108	0.149	0.169	0.186
Loskop WSS	6 417	1.2	2.934	3.494	4.036	4.457	4.799
Ngedlengedleni-Umhlumayo WSS	642		0.178	0.272	0.366	0.411	0.448
Tugela Estates WSS	1 851	1.2	1.152	1.376	1.593	1.745	1.864
Weenen WSS	1 650	1.5	0.988	1.121	1.248	1.364	1.457
Winterton WSS	1 896	2	1.451	1.577	1.697	1.853	1.976
Zwelisha Moyeni	10 412	2.4	4.495	5.708	6.896	7.611	8.166
TOTAL	137 377		107.470	123.253	138.265	150.050	159.250

* Empty cells denote that information was not available at the time of preparing this report.

¹ Information was not available for all scheme areas on the quantity of water supplied. Furthermore, many scheme area managers and operators had to provide an estimate of water volumes supplied due to a lack of existing or accurate bulk water metering.

G. PLANNED AND IMPLEMENTATION PROJECTS

The uTDM has several projects for addressing water supply within its area of jurisdiction. Most are funded from the Municipal Infrastructure Grant (MIG). There is one Regional Bulk Infrastructure Grant (RBIG) project, namely RBIG KNR 020: Driefontein Complex Bulk Water Supply Project.

This project is located in the Emnambithi / Ladysmith LM as well as the Indaka LM and relates to water supply improvement and extension to the Driefontein WSS area and Ekuvukeni-Lime Hill WSS area. The water source will be the Spioenkop Dam after construction and implementation of the proposed Spioenkop Dam WTW and supporting bulk and distribution infrastructure (possibly by 2019).

The project aims to serve 86 660 people in the Driefontein WSS area and 117 646 people in the Ekuvukeni-Lime Hill WSS area.

The following MIG projects (for water supply) are currently under construction in the uTDM:

- MIG/KZN0595/W/07/09: Moyeni/ Zwelisha RWSS Ph. 4 (Dukuza / Hoffenthal) (AFA) MIS 172338;
- MIG/KZN0589/W/06/12: Driefontein Complex Bulk Water Supply;
- MIG/KZN0590/W/06/09: Bergville Bulk Water Supply Extension and Reticulation;
- MIG/KZN0927/W/06/07: Moyeni / Zwelisha Community Water Scheme;
- MIG/KZN1391/W/04/12: Ntabamhlophe Water Supply Phase 4 to 13 (AFA) MIS 220289; and
- MIG/KZN1687/W/07/11: Fitty Park Umhlumayo Extensions.

Most of the above projects relate to the development of new reticulation and secondary bulk infrastructure.

There are a further two projects in the design and tender phase of implementation, namely:

- MIG/KZN2589/W/12/13: Emergency repairs to the Spioenkop to Ladysmith Bulk Water Supply Pipeline
- MIG/KZN2674/W/11/12: Emergency Upgrade of Wagonsdrift Pump Station

The uTDM is developing a Regional Bulk Infrastructure Scheme, part of the Emnambithi / Ladysmith Water and Sanitation Master Plan. The objective is to construct a new WTW at the Spioenkop Dam that would supply the areas of Ladysmith, Ezakheni and further north into the Driefontein WSS and perhaps even into Indaka. The existing Ladysmith and Ezakheni WTW's would then be decommissioned. Depending on the programme, implementation may commence during 2019.

H. BULK WATER SUPPLY INTERVENTIONS CONSIDERED

This study aims to ensure that the uTDM can make provision for and plan to supply all consumers within its area of jurisdiction with at least basic water supply services. Not all consumers are currently supplied with formal schemes and part of the objectives of this study was to determine where these consumers are,

their water requirements and what options can be considered to ensure universal access to water supply, up to 2035.

A number of new scheme areas were identified during this process, where areas can be served either by linkage to existing schemes, or through new scheme developments in the form of conceptual scheme areas. These conceptual scheme areas, number of applicable households, population and their water requirements are illustrated in in **Table H**.

Table H Conceptual Scheme Areas, Households and Water Requirements

WSS	Households (2015)	Population (2015)	Water Requirements (Ml/d)				
			2015	2020	2025	2030	2035
Amangwane WSS TBC (SW, GW)	346	1748	0.158	0.219	0.280	0.308	0.330
Bergville WSS Future TBC	3 493	19 187	1.659	2.276	2.883	3.165	3.383
Bester WSS TBC	68	390	0.038	0.049	0.060	0.065	0.069
Colenso WSS Future TBC	528	3 536	0.226	0.358	0.489	0.544	0.586
Empangweni Future WSS	820	4 374	0.487	0.602	0.714	0.787	0.844
Etatane 2 Future WSS	161	774	0.095	0.104	0.113	0.124	0.133
Frere WSS TBC current GW	247	1 272	0.100	0.143	0.187	0.206	0.221
KwaNdema WSS TBC	226	1 176	0.277	0.305	0.330	0.356	0.382
Lusitania WSS TBC	152	560	0.096	0.104	0.110	0.117	0.122
Mtontwane WSS TBC	223	1 268	0.122	0.161	0.199	0.217	0.231
Weenen North WSS Future TBC	669	3 813	0.210	0.361	0.511	0.570	0.616
Weenen South WSS Future TBC	1 323	8 324	0.444	0.773	1.103	1.231	1.332
Zwelisha Moyeni WSS Future TBC	3 336	18 842	1.316	1.986	2.652	2.929	3.145
TOTAL	11 592	65 264	5.228	7.441	9.631	10.619	11.394

The two largest of the conceptual scheme areas, both geographically (km² extent) and in terms of water quantity (Ml/d), are the Bergville WSS Future TBC and Zwelisha Moyeni WSS Future TBC located in the Okhahlamba LM. Next is the Weenen South WSS Future TBC conceptual scheme area located in the Umtshezi LM.

To provide for the 2035 water requirements for the two conceptual scheme areas in the Okhahlamba LM alone would cost an estimated , R1 671.7 million and would require between 55 and 79 months (4.5 and 6.6 years) to complete.

I. CONCLUSIONS AND RECOMMENDATIONS

The uTDM still faces a backlog in water supply – not only in providing all consumers within its area of jurisdiction with access to water supply according to its WSA duties, but also in ensuring sustainable water services of existing supply.

There are an estimated 70 000 people not having access to some form of formalised water supply infrastructure, which includes relying on tankered water supplies. Most of these people reside in the Okhahlamba LM and are spread over a large geographic extent. Furthermore, there are areas where the existing water supply infrastructure as well as water source, are insufficient to meet current and projected future water requirements. New developments and urbanisation put further strain on existing supplies and resources.

The uTDM has initiated a number of MIG projects as well as an RBIG project to address some of the water requirement challenges. Most relate to the upgrade and augmentation of existing water scheme areas, where current and future needs can be met. Areas in or near a water supply deficit, but which have projects in hand / being implemented are as follows:

- Bergville WSS;
- Driefontein WSS;
- Emoyeni-Amangwe WSS;
- Estcourt Rudimentary WSS;
- Ezakheni WSS;
- Ladysmith WSS;
- Loskop WSS;
- Weenen WSS; and
- Zwelisha-Moyeni WSS.

There are however areas in a water supply deficit or not having access to at least basic RDP standards of water supply. In the case of conceptual and existing bulk (water requirements > 2Ml/d) water supply areas, these are:

- Bergville WSS Future (conceptual supply area);
- Ekuvukeni Lime Hill WSS (existing supply area); and
- Zwelisha Moyeni WSS Future (conceptual supply area).

It is recommended that detail feasibility studies be conducted for the above three areas as there are options to be considered in terms of water source (existing and development thereof) and water supply infrastructure (cost versus service level and implementation programme).

For the Bergville WSS Future and Zwelisha Moyeni WSS Future areas, conceptual water source and water supply infrastructure options have been developed, along with the applicable costing and implementation timeframes. Since these are the two largest scheme areas and with the largest water requirements, it is suggested to commence as soon as possible with the detail planning for these scheme areas.

The Bergville WSS Future area's total estimated conceptual development cost is R564.2 million to meet the 2035 water requirements. The estimated time to implement this scheme, including Inception, technical or feasibility study, design, procurement, construction and close-out is 67 months for bulk infrastructure and 55 months for reticulation infrastructure. Therefore implementation is during 2021/2022 if commencing July 2016.

The Zwelisha Moyeni WSS Future area's total estimated conceptual development cost is R985.3 million to meet the 2035 water requirements. The estimated time to implement this scheme, including Inception, technical or feasibility study, design, procurement, construction and close-out is 79 months for the bulk and reticulation infrastructure respectively. Therefore implementation is during 2022/2023 if commencing July 2016.

The Ekuvukeni Lime Hill WSS is an existing supply area, but have been experiencing water shortages as a result of water source and water supply infrastructure constraints. The main source – Oliphantskop Dam – is silted up and furthermore the dam level was very low due to the 2015/2016 drought conditions. Immediate attention has to be given to the options that can improve the storage capacity as well as operation of the Ekuvukeni WTW due to the abstraction point currently below the silt level. Costing for resolving this matter cannot be determined at this stage, but at a cost of R10 000/ha, for a silt survey of the dam of +-20ha, at least R200 000 should be budgeted for this initial study.

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ABBREVIATIONS

Abbreviation	Description
BWS	Bulk Water Scheme
CESA	Consulting Engineers South Africa
COGTA	Department of Cooperative Governance and Traditional Affairs
DBSA	Development Bank of Southern Africa
DORA	Division of Revenue Act
DWS	Department of Water & Sanitation
GIS	Geographic Information System
IDP	Integrated Development Plan
LM	Local Municipality
MIG	Municipal Infrastructure Grant
MWIG	Municipal Water Infrastructure Grant
NRW	Non-Revenue Water (volume of water supplied at source minus volume of water paid for)
O&M	Operation and Maintenance
PMU	Project Management Unit
PSP	Professional Service Provider
RBIG	Regional Bulk Infrastructure Grant
RDP	Reconstruction and Development Programme
TOR	Terms of Reference
UAP	Universal Access Plan
UAW	Unaccounted for Water (volume of water supplied at source minus volume of water billed)

uTDM	uThukela District Municipality
WC/WDM	Water Conservation and Water Demand Management
WMA	Water Management Area
WSA	Water Services Authority
WSP	Water Services Provider
WSDP	Water Services Development Plan
WTP	Water Treatment Plant
WTW	Water Treatment Works
WWTP	Wastewater Treatment Plant
WWTW	Wastewater Treatment Works

1. BACKGROUND, INTRODUCTION AND STUDY OBJECTIVES

This report is the Bulk Water Master Plan report for the study: Universal Access Plan Phase 2 – Progressive Development of a Regional Concept Plan for the uThukela District Municipality, an appointment in the series of appointments made by Umgeni Water in February 2015.

This section provides the background of the study, an introduction and description of the study objectives.

1.1 BACKGROUND

This study follows the first study: Development of a Universal Access Plan (UAP) for Water Services in the uThukela District Municipality (2014). The studies were conducted for each of the District Municipalities in the KwaZulu-Natal Province. The outcome of the 2014 UAP provided a fair amount of base information with regards to water supply in the Province. There was however a number of areas identified for improvement in order to proceed to a more detailed level of investigation.

Furthermore, the 2014 study only had access to municipal information, the 2001 Census and subsequent higher level demographic updates, the rudimentary All Towns Reconciliation Strategies (2008 – 2011), Department of Water and Sanitation (DWS) Reference Framework Geodatabase (2013 or earlier) and the 2011 and 2013 Eskom Spot Building Count. A number of these datasets and studies have since been updated and the 2011 Census results became available on the lowest level of detail that can be used for planning purposes.

Since the release of the 2011 Census data in the latter half of 2013, Umgeni Water decided to review the Phase 1 UAP and furthermore extend the study area into the Eastern Cape Province.

This resulted in the Universal Access Plan Phase 2 study that commenced during 2015. The Project Execution Plan (PEP) for this District is attached under **Appendix A** of this document.

1.2 PERTINENT LEGISLATION

Various Acts of Parliament make provision for existing or planned institutional structures for management of water resources and water and sanitation services. These are (and briefly discussed in this section):

- Current Acts of Parliament: National Water, Water Services, Municipal Structures, Municipal Systems, Division of Revenue Acts; and
- Existing and proposed policy documents such as The White Paper on Water Services, the Local Government White Paper and the White Paper on Municipal Service Partnerships.

These Acts relate to the management of water resources and the provision of water services by the following institutions:

- The Catchment Management Agencies (CMA's) which will be established throughout South Africa over the next three years;
- Water User Associations comprising co-operative associations of individual water users at a restricted local level;
- National Government;
- Water Service Authorities (WSA) comprising District Municipalities or Local Municipalities;
- Water Boards;
- Water Service Providers (WSP);
- Provincial Government; and
- Advisory Committees.

1.2.1 National Water Act

The National Water Act (Act 36 of 1998) aims to ensure that the country's water resources are protected, used, developed, conserved, managed and controlled such that:

- It can meet the basic human needs of current and future consumers;
- Promote the equitable access to water;
- Redress the discrimination of the past: racial and gender;
- Promote the efficient, sustainable and beneficial use of water in the public interest;
- Facilitate social and economic development;
- Provide for the growing demand for water use;
- Protect aquatic and associated ecosystems and their biological diversity;
- Reduce and prevent pollution and degradation of water resources;
- Meet international obligations;
- Promote dam safety;
- Manage floods and droughts; and
- In order to achieve the above, establish suitable institutions and to ensure that they have appropriate community, racial and gender representation.

It has its focus therefore on the use and protection of the water as natural resource.

1.2.2 Water Services Act

The objectives of the Water Services Act (Act 108 of 1997) are to ensure the right of all consumers to have access to basic water supply and basic sanitation (thus encompassing the use of water for human needs – all types of sectors). Furthermore:

- To secure sufficient water and an environment not harmful to human health or well-being;
- Set national standards and norms and standards for tariffs in respect of water services;
- Ensure preparation and adoption of water services development plans by water services authorities;
- Create a regulatory framework for water services institutions and water services intermediaries;
- Make provision for the establishment and disestablishment of water boards and water services committees and their duties and powers;
- Monitoring of water services and intervention by the Minister or by the relevant Province;
- Provide for financial assistance to water services institutions;
- Ensure collection of information in a national information system and the distribution of that information;
- Warrant the accountability of water services providers; and
- Promote effective water resource management and conservation.

The Water Services Act (Act 108 of 1997) states that each WSA must for its area of jurisdiction, prepare a Water Services Development Plan (WSDP). Whilst the WSDP is a legal requirement, the real value in preparing the WSDP lies in the need to plan for Water Services (Water Supply and Sanitation Provision) whereby key targets are set. At least six WSDP key focus areas need to be addressed during the planning process. These are:

- Basic Service: Water supply, sanitation, free basic water supply and free basic sanitation;
- Higher Levels of Service: Water supply, sanitation, associated needs and economic development;
- Water Resources: Appropriate choice, demand and water conservation management, water resource protection and integrated water resource management;
- Environmental Issues: Health, natural and social environment;
- Effective Management: planning, organisational or institutional aspects, management, financial and regulatory aspects; and
- Transfers: Infrastructure related transfers.

Water services development planning must also be done as part of the Integrated Development Plan (IDP) process (section 12 (1) (a)) and the WSDP must be incorporated into the IDP (section 15 (5)).

Water Services Authorities must report on the implementation of its WSDP every year i.e. annual performance reporting (section 18). Water Services Authorities must also comply with applicable regulations including Regulation No. R. 509, Government Gazette No. 22355, 8 June 2001 which requires the inclusion of a Water Services Audit as part of the annual performance report.

The Department must monitor the performance of every water services authority to ensure its compliance with every applicable water services development plan (section 62 (1) (c)).

The Minister may require any water services institution to furnish information to be included in the national information system (section 68 (a)). Based on the above, the preparation of a WSDP is a legal requirement and a critical development tool for the planning, provision and management of water services.

1.2.3 Municipal Structures Act

The Municipal Structures Act (117 of 1997), which was subsequently amended by the Municipal Structure Amendment Act (33 of 2000), addresses the basis for establishing municipalities (Category A, B & C) and stipulates that Category A and C (Metropolitan and District) municipalities are WSA's and the Category B (local) municipalities can only be WSA's if authorised by the Minister (national Minister responsible for local government).

1.2.4 Municipal Systems Act

The Municipal Systems Act (32 of 2000) legislates internal systems and addresses the differences between the authority and the provider functions and alternative mechanisms for providing municipal services.

1.3 INTRODUCTION AND STUDY OBJECTIVES

Umgeni Water appointed UWP Consulting (Pty) Limited, in association with ZIYANDA Consulting cc, to review the Phase 1 UAP in the form of developing UAP – Phase 2, for the following areas:

- Amajuba District Municipality (ADM), in the KwaZulu-Natal province;
- Newcastle Local Municipality (NLM), in the KwaZulu-Natal province;
- uThukela District Municipality (uTDM), in the KwaZulu-Natal province;
- Alfred Nzo District Municipality (ANDM), in the Eastern Cape province; and
- O.R. Tambo District Municipality (ORTDM), in the Eastern Cape Province.

The above municipalities were all allocated Water Services Authority (WSA) status for their respective areas of jurisdiction, except for the whole of the ADM. The ADM's responsibilities as WSA exclude the area of Newcastle LM which itself is a WSA.

The UAP Phase 2 aims to review and update the UAP Phase 1 study reports in order to improve the following:

- The project focused on small, localised schemes for universal access in the near future, however these proposed schemes are not necessarily sustainable;
- The proposed schemes were largely designed in isolation and took little cognisance of other water planning studies and recommendations;
- Many of the WSDP's were being updated during the course of the project, and need to be incorporated into UAP planning;
- The project didn't go as far as Umgeni Water's extended area into the Eastern Cape; and
- The footprints didn't take cognisance of town planning type information that would give an indication of future demands.

The deliverables of the UAP Phase 2 study are divided into two phases:

- Phase 1: Development of an Interim Regional Bulk Scheme Report; and
- Phase 2: Reconnaissance into the Proposed Regional Bulk Schemes per Water Services Authority.

Phase 1 includes the information review and development of a High Level Status Quo Assessment.

Phase 2 includes the development of a demand model and needs development plan, culminating in a Reconnaissance Study report on bulk water supply.

The UAP Phase 2 study information would be used to update the DWS Reference Framework (RF) geodatabase where possible.

1.4 NEEDS ANALYSIS AND BULK WATER MASTER PLAN

This document is the second deliverable of the study, namely the needs analysis, culminating in a Bulk Water Master Plan. This document was prepared for the uThukela District Municipality (uTDM) that includes the following Local Municipalities:

- Emnambithi/Ladysmith Local Municipality;
- Imbabazane Local Municipality;
- Indaka Local Municipality;
- Okhahlamba Local Municipality; and
- Umtshezi Local Municipality.

The following sections set the scene, provide the current and future water requirements and reconcile it with the available water sources to ensure universal bulk water supply access to all within the uTDM.

2. METHODOLOGY

This section describes the objectives of the study methodology followed to undertake the study: Universal Access Plan Phase 2 – Progressive Development of a Regional Concept Plan for the uThukela District Municipality.

2.1 BACKGROUND

This study follows the first Development of a Universal Access Plan for Bulk Water Supply for Water Services Authorities in the KwaZulu-Natal (KZN) Province, completed in 2014. Umgeni Water, together with the DWS and COGTA, identified the need to further the study to improve the planning capacity of not only the benefiting Water Services Authorities (WSA's), but also for the DWS and COGTA – the supporting water services entities.

This study – Phase 2 – aimed to improve on the level of detail, taking into account current project and master planning, implementation of projects and recent updates on available water sources. Furthermore, the study again includes the whole of the KZN province, but has been extended into the Eastern Cape, including the Alfred Nzo and OR Tambo District Municipalities.

The Professional Service Provider (PSP) teams appointed for the various study areas worked closely together with Umgeni Water, DWS and COGTA to ensure an aligned study approach. This included the utilisation of the 2011 Census as base data for the calculation of water requirements between 2011 and 2035.

This study would aim to update the DWS Reference Framework geodatabase, particularly the settlement footprint and bulk water supply infrastructure.

2.2 STUDY ENGAGEMENT WITH STAKEHOLDERS

This study was presented to all WSA's in the KZN Province during a WSDP workshop held by the DWS, during July 2015. The PSP's subsequently engaged each WSA individually during inception meetings to introduce the study, its objectives and detailed approach.

The first deliverable was a Status Quo report on demographics, bulk water supply, water requirements and institutional arrangements of the WSA's. The Status Quo reports were also presented to each WSA and submitted to Umgeni Water.

The Status Quo was followed by the development of a water requirements model, improvement of information available on existing and planned water supply infrastructure as well as available water sources and development of the water requirements model.

During this process, further individual engagements took place with knowledgeable individuals from each WSA, particularly water scheme managers or supervisors. It included site visits to some of the supply areas.

The result was the development of a Reconciliation Report – this report – to present the alignment of water requirements – for all areas in a WSA – with existing and planned infrastructure and available water sources in order to provide universal access to bulk water services.

The Reconciliation Report was presented to each WSA to obtain comments and inputs, which were considered for the final study report submitted to Umgeni Water, DWS and COGTA.

2.3 WATER REQUIREMENTS MODEL

It was agreed that all PSP teams would utilise the 2011 Census as base database for demographics and service levels to apply to the water requirements model. The water requirements were calculated for the period from 2011 to 2035, in five year increments, starting from 2015. Umgeni Water provided the calculated demographic growth rates, per Census sub-place for the KZN province, which were incorporated into the model.

The PSP's engaged with each WSA to determine the current and planned level of service, which informed the potential development and service level growth for each settlement or town area. Furthermore, for the purpose of this study area – **uThukela DM** – the PSP utilised an approach also used in the All Towns Reconciliation Study for the DWS Northern Planning Region. In this approach three scenarios were identified to make provision for progressively higher levels of service in areas, depending on the settlement or town type (guided by the characteristic of the settlement or town).

The water use categories applied for the various settlement or town categories are presented in **Table 2.3**. These categories were applied together with the service level scenarios and population growth rates, to determine the water requirements up to 2035.

Table 2.3 Settlement or Town Categories and Water Use

Category	Description	Household Income Per Annum	Consumption (l/c/d)
1	Very High Income; villas, large detached house, large luxury flats	>R1 228 000	410
2	Upper middle income: detached houses, large flats	153 601 – 1 228 000	295
3	Average Middle Income: 2 - 3 bedroom houses or flats with 1 or 2 WC, kitchen, and one bathroom, shower	38 401 – 153 600	228
4	Low middle Income: Small houses or flats with WC, one kitchen, one bathroom	9 601– 38 400	170
5	Low income: flatlets, bedsits with kitchen & bathroom, informal household	1 - 9600	100
6	No income & informal supplies with yard connections		100
7	Informal with no formal connection		70
8	Informal below 25 l/c/d		12

It was found that the theoretical model's water requirements, which also made provision for water losses, aligned reasonably well with the actual water supply. Opportunities for WC/WDM could also be identified based on the expected water use and the actual water use.

2.4 DWS REFERENCE FRAMEWORK GEODATABASE

The DWS Directorate: Water Services – Planning and Information – maintains a national database for water services planning. It is a spatial database, in a GIS format, that includes layers for settlements, water supply infrastructure, sanitation supply infrastructure, water resources and projects.

This study aimed to update the service levels for settlements based on feedback from each WSA. Furthermore, where possible, the bulk and reticulation infrastructure components in the geodatabase were also updated to include the latest existing, but also planned water supply infrastructure.

2.5 RECONCILIATION REPORT

The final deliverable of this study was a Reconciliation Report – this report – to reconcile the water requirements, with available water sources, for all areas in a WSA. This included the evaluation of existing capacities of infrastructure, potential extensions to new areas, or scheme development options for areas where linkage to existing schemes are not feasible.

The potential costs for scheme development and timeframes were investigated and are presented in this report. Umgeni Water provided unit reference costs for infrastructure components and they were applied where possible.

Information on available water sources were mainly obtained from existing DWS Reconciliation Strategies (larger systems and from the All Towns Studies). Where available, project-specific study or technical reports were consulted to verify information on available water sources. Information on groundwater availability and quality is however not readily available and to a sufficient level of detail.

2.6 INFORMATION SOURCES

Information used in this study was obtained from current and existing technical reports, regional studies and inputs from municipal and knowledgeable officials. It included feasibility studies (where available), master plans and studies such as the 2011 All Towns Reconciliation Strategies prepared for this area.

A number of meetings were held with the area managers and technical staff of the uTDM to obtain their feedback and to ensure that the latest available specifications and information is applied for the purpose of this study.

Furthermore, existing spatial and non-spatial databases were used as reference such as the 2001 and 2011 Census and the Department of Water and Sanitation (DWS) Reference Framework geodatabase.

A reference list is provided in **Annexure A**.

3. OVERVIEW OF THE STUDY AREA

This section provides an overview of the study area, setting the scene and discusses the institutional arrangements for water supply. It also provides a brief overview of the demographics in the area and the development opportunities.

3.1 GENERAL OVERVIEW

The uThukela District Municipality (uTDM) is located in the western portion of the KwaZulu-Natal Province and is bordered in the north by the Amajuba District Municipality (DM), the uMzinyathi DM in the east, the uMgungundlovu DM in the south and the Kingdom of Lesotho in the west. The 2011 Census indicated that the DM had a total population of 668 847 people and 147 217 households.

The District covers an area of 11 326km² and is divided administratively into five Local Municipalities (LM) namely Emnambithi/Ladysmith, Imbabazane, Indaka; Okhahlamba and Umtshezi. The majority of the DM is rural farmland with scattered settlements. The main urban developed nodes are Ladysmith and Ezakheni, Colenso, Weenen and Estcourt. There are also a handful of smaller developed towns supporting the agricultural and tourism sectors and functioning as service nodes in rural areas.

The topography forms part of the Drakensberg mountain range in the south-west whereas towards the east the topography is more undulating as it forms part of the Tugela catchment and drains towards the Indian Ocean. The Tugela is the largest river system in the DM with its main tributaries being the Bushmans, Klip, Masongwane, Sand and Sundays Rivers. The major dams include the Driel Dam (Barrage), Spioenkop Dam, Wagendrift Dam and Woodstock Dam. The rainfall in the area varies between 700mm and 1 200mm per annum, falling predominantly in the summer months.

The N3 national road linking the Gauteng Province to the East Coast – Pietermaritzburg and Durban traverses north-south through the DM. The N11 national road connects to the N3, west of Ladysmith and traverses to the northeastern areas towards Newcastle.

According to the 2011 Census, 57% of households (83 348 households) were supplied with water from a regional or local water scheme, whereas 19% of households (27 409 households) were supplied from boreholes. The remainder of households had access to water through springs, water tankers, rivers or streams or water vendors. A number of projects have since been implemented, giving access to formal water supply to more households. There are a number of households on privately-owned property – farm areas – that have not been included in the conceptual planning of bulk, local or rudimentary supply schemes. It is the responsibility of the farm or property owner to provide services to the tenants or labourers.

3.2 INSTITUTIONAL ARRANGEMENTS FOR WATER SUPPLY

The uThukela DM is the Water Services Authority (WSA) for its area of jurisdiction. It is also the Water Services Provider (WSP) for bulk and retail water and sanitation services. Previously the DM was part of the consortium that established a municipal entity – uThukela Water – to provide services in the areas of the uThukela DM, Amajuba DM (including Newcastle LM) and part of uMzinyathi DM.

Mr Mdu Radebe is the General Manager: Water, Sanitation and Technical Services and is responsible for water and sanitation services provision in the uTDM. This Department includes the Project Management Unit (PMU, managed by Mr Sanele Zikalala), Water Services Operations and Water Services Customer Management. The positions for the Managers for Water Services Operations and Water Services Customer Management are currently not filled. Mr Bheki Khosa is the WSA Manager for the uTDM.

Under the Water Services Operations, the uTDM established Area Engineers responsible for the various surface water schemes, per Local Municipality and a Manager for Assets Maintenance (here borehole schemes are included). They are assisted each by a team of technical staff and operators, varying in qualifications and experience. There is one team responsible for all groundwater schemes in the uTDM.

There are no other WSPs operating within the uTDM's area of jurisdiction.

Billing is centralised and administered by the uTDM (not all areas receiving water from surface or groundwater schemes are billed). The level of non-revenue for water supply and sanitation cannot be determined yet.

Figure 1 illustrates the high-level organisational layout of the uTDM as illustrated during December 2015 on the website, however, this has changed slightly (January, 2016) as illustrated overleaf in **Figure 2** regarding technical services. The final organogram is still to be approved.

Figure 1. uTDM Organogram, December 2015

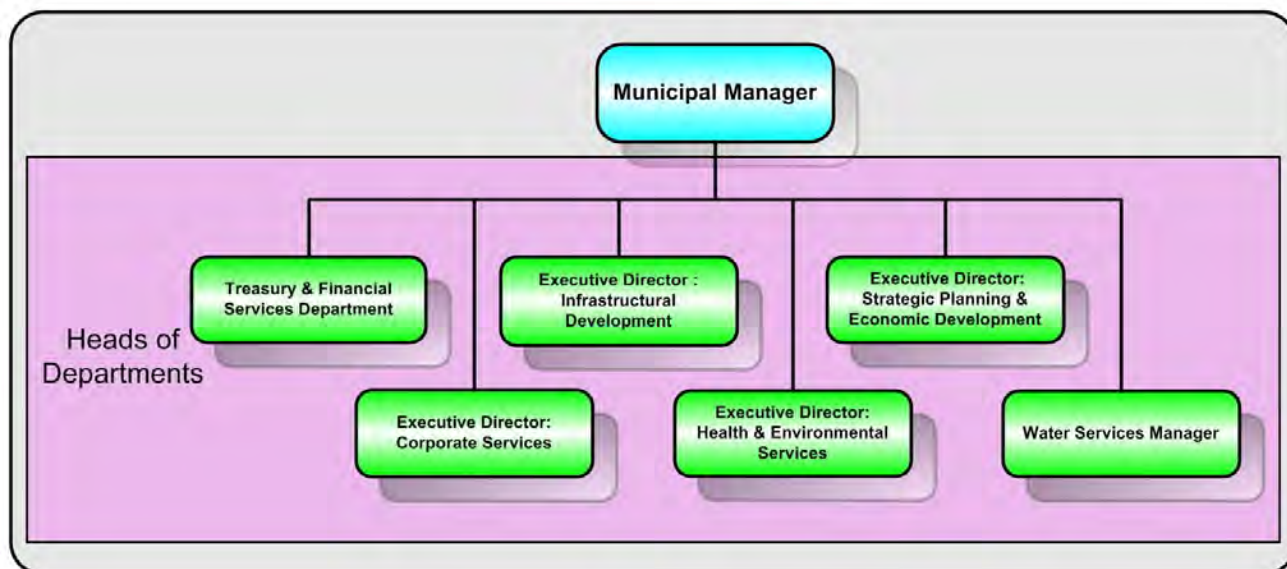
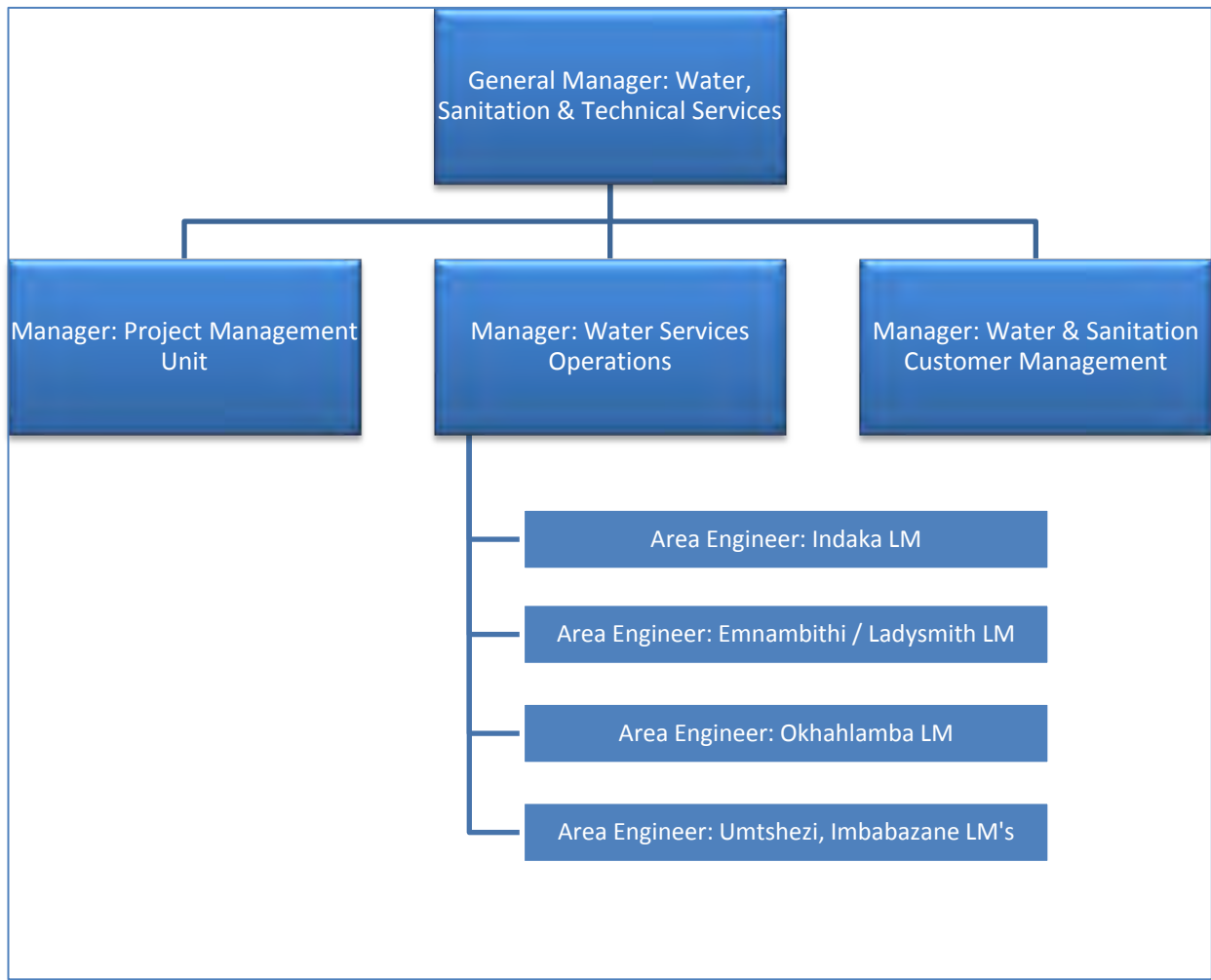


Figure 2. uTDM Organogram for Water, Sanitation and Technical Services, January 2016



4. DEMOGRAPHICS

The uThukela District Municipality has the fifth lowest number of households within the KZN Province compared to the other DM's, but is the third largest in geographic area (11 326km²).

For the purpose of this study, the 2011 Census was used as base as it is available for the whole of South Africa and is also used by the municipalities for their planning and reporting purposes.

The demographics reported on include all settlements and households in the District. For planning purposes of existing and conceptual scheme areas however, the focus was on settlement areas and not on individual farm homesteads. The latter are households on private property in predominantly rural areas and are not the direct responsibility of the Water Services Authority to provide universal coverage of water supply services.

4.1 2011 DEMOGRAPHICS

The demographics from the 2011 Census (sub-place level, summarised per LM) are presented in **Table 4.1**.

Table 4.1. Census 2011 Demographics Summary

Local Municipality	Population	Households
Emnambithi/Ladysmith	237 335	57 809
Imbabazane	103 028	19 921
Indaka	83 119	19 185
Okhahlamba	132 040	27 468
Umtshezi	113 011	22 238
TOTAL	668 533	146 621

The average number of people per household for the entire district is 4.56.

Most of the households are located in the Emnambithi / Ladysmith LM and more specifically, in the urban areas of Ladysmith (19 939 households) and Ezakheni (18 218 households).

The Imbabazane, Indaka and Okhahlamba LM's are characterised by rural settlements (representing 45% of the uTDM households), either densely located or dispersed, depending on the topography of the area. The level of urbanisation (geographic settlement type: urban / traditional areas / farms) in these LM's are 4%, 15% and 9% respectively. This already provides an indication of service level infrastructure options that can be provided (capital investment) and affordability to operate and maintain infrastructure (revenue management).

The 2015 uThukela District Municipality Growth and Development Plan indicated that the average growth in population between 2001 and 2011 was 2% per annum for the District. The Indaka LM had a negative growth rate of -0.1% per annum whereas the Umtshezi LM had the highest population growth rate of 4% per annum.

There appears to be a steady improvement in the number of people employed as well as more people earning an income (although still in the lower categories). However, more effort is required to increase education levels and thereby opportunities of employment for younger people.

4.2 2015 – 2035 DEMOGRAPHICS AND POPULATION GROWTH

The population figures from the 2011 Census were applied as base data for the projection of the population up to 2035. Umgeni Water provided their calculated population growth projections on a sub-place level, taking into account factors such as:

- Migration;
- Updated population growth from Statistics SA; and
- Comparison with the 2011 and later Eskom Spot Building Count.

This information was applied to the water requirements model, which uses the demographics, service levels and income categories for the projected water requirements.

The projected demographics from 2011 to 2035 (summarised per LM) are presented in **Table 4.2A** and **Table 4.2B** respectively.

Table 4.2A Demographic Projections – Population

Local Municipality	2015	2020	2025	2030	2035
Emnambithi/Ladysmith	248 655	267 278	283 273	301 683	314 898
Imbabazane	118 686	127 051	134 112	142 071	147 543
Indaka	108 626	116 052	122 234	128 990	133 346
Okhahlamba	138 751	148 728	157 149	166 792	173 609
Umtshezi	87 215	93 519	99 092	105 460	109 843
TOTAL	701 933	752 628	795 860	844 996	879 239

Most people reside in the Emnambithi / Ladysmith LM which during the 2011 Census, had an estimated 53% of the population living in urban areas. The Umtshezi LM had most people living in urban areas, estimated at 61%. The growth rate per annum varies between 1.14% (Indaka LM) and 1.33% (Emnambithi / Ladysmith LM).

Table 4.2B Demographic Projections – Households

Local Municipality	2015	2020	2025	2030	2035
Emnambithi/Ladysmith	60 637	65 213	69 161	73 736	77 035
Imbabazane	23 399	25 051	26 446	28 018	29 100
Indaka	21 037	22 481	23 685	25 000	25 849
Okhahlamba	28 902	30 984	32 746	34 755	36 164
Umtshezi	20 161	21 625	22 931	24 427	25 459
TOTAL	154 136	165 354	174 969	185 936	193 607

4.3 MAIN DEVELOPMENT NODES

This section highlights key elements from the uThukela District Municipality Growth and Development Plan, 2015.

The uTDM's main development sectors are agriculture, manufacturing & industry and tourism. In the west, agriculture potential is higher due to the higher rainfall and availability of water sources. In the east, manufacturing and industry is more prevalent due to closer proximity to main transport and railway routes. Tourism is divided into the various themes, such as the Drakensberg World Heritage Site areas, Battlefields and Nature Conservation Parks or Game Reserves.

Ladysmith is seen as the district development node and the areas of Estcourt, Bergville and Winterton being the core or primary development nodes. The areas of Ezakheni, Ekuvukeni, Colenso and Wembezi were identified as secondary development nodes. Other areas form part of the rural and agricultural service centres in the District.

Key Development Issues listed:

- The Strategic Infrastructure Project (SIP) 2: Durban – Free State – Gauteng Logistics and Industrial Corridor Development;
- Maluti Drakensberg Trans frontier Park;
- uThukela District Municipality Tourism Route;
- Industrial Logistics Hub and Dry Port: Emnambithi / Ladysmith LM; and
- Electronics Hub: Emnambithi / Ladysmith LM.

All the above strategic projects will have an influence on the water sources available and use in the region. Consideration would need to be given to adjacent catchment areas and the sharing of water for national strategic importance such as the transfer schemes for Eskom and water to the Vaal catchment (and Gauteng).

There are a number of key strategic infrastructure projects that will play a role in the development of the District in terms of economy, employment opportunities, infrastructure improvement, investment, environmental protection and social development. They are as follows:

- Rural water supply development;
- Spioenkop Dam Regional Bulk Water Supply Scheme & Driefontein Bulk Water extension;
- Ladysmith Airport upgrade;
- Ingula Pumped Storage Scheme (Van Reenen);
- N11 national road upgrade;
- Ladysmith – Ezakheni road linkage upgrade;
- Road and railway network upgrade; and
- Umtshezi Water Network.

Of the nine strategic projects listed above, five are related to water source development and water services development. This emphasises the importance of the protection, development and efficient utilisation of the water sources in the District.

Furthermore, the uTDM would also aim to improve the commercial agricultural potential within the District with amongst others further development of the Besters Agricultural Project; Construction of abattoirs; Construction of an agricultural hub, and to continue assistance with processing of land claims and develop skills in agricultural management.

5. WATER SERVICE LEVELS AND REQUIREMENTS

This section provides an overview of the water service levels (uTDM level) and water requirements as calculated using the demand model developed for the purpose of this study. A summary of the water requirements is provided firstly for the District and then for each of the Local Municipalities. The total number of households (HH) as obtained from the 2011 Census and the number of households below RDP standards are also provided. (Households below RDP standards include all households having water supply – any form – further than 200m from the household).

Note that Water Supply Scheme (WSS) boundaries do not necessarily coincide with municipal boundaries. There are supply areas that traverse more than one Local Municipality. The water requirements reported on are per LM and if a WSS is split by a LM, the water requirements are reported based on this split.

5.1 UTHUKELA DISTRICT MUNICIPALITY

The uTDM IDP 2015/016 reported on water service levels from the 2011 Census and own analyses. The total number of households without access to safe water supply, was given as 40 146 (28.75% of all uTDM households).

The uTDM highlighted the following areas as priorities to address water backlogs:

- uMhlumayo and Sahlumbe (Indaka LM);
- Pepsworth and Elandslaagte (Emnambithi / Ladysmith LM);
- Frere and Cornfields (Umtshezi LM);
- Cathedral Peak (Okhahlamba LM); and
- Loskop (Imbabazane LM).

The uTDM has resolved to provide free water services (communal water supply) to all rural areas.

In **Table 5.1A** and **Table 5.1B** the water requirements (million m³/a & Ml/d) for the uTDM are presented, per LM. These water requirements were calculated for consumers having formal water supply schemes **and** for consumers not yet supplied from a formal water supply scheme. The Methodology Section in this report explains the approach for the calculations to determine the theoretical water requirements and adjusted for water losses.

Table 5.1A 2011 Census Service Levels and Water Requirements (million m³/a), Per Local Municipality

Local Municipality	Households (2011)	HH Below RDP (2011)	Water Requirements (Million m ³ /a)				
			2015	2020	2025	2030	2035
Emnambithi / Ladysmith	57 809	10 832	20.322	22.794	25.107	27.234	28.920
Imbabazane	19 921	11 098	4.205	5.343	6.455	7.095	7.598
Indaka	19 185	7 377	5.650	6.679	7.662	8.241	8.677
Okhahlamba	27 468	12 439	6.029	7.428	8.783	9.612	10.274
Umtshezi	22 238	4 922	6.305	7.167	8.001	8.677	9.194
TOTAL	146 621	46 668	42.511	49.411	56.007	60.858	64.663

The Imbabazane, Okhahlamba and Umtshezi LM's are predominantly rural in nature therefore their water requirements are also much less than those of the Emnambithi / Ladysmith and Umtshezi LM's. It is estimated that between 2015 and 2035, there will be a 50% increase in water requirements for the uTDM.

Table 5.1B 2011 Census Service Levels and Water Requirements (MI/d), Per Local Municipality

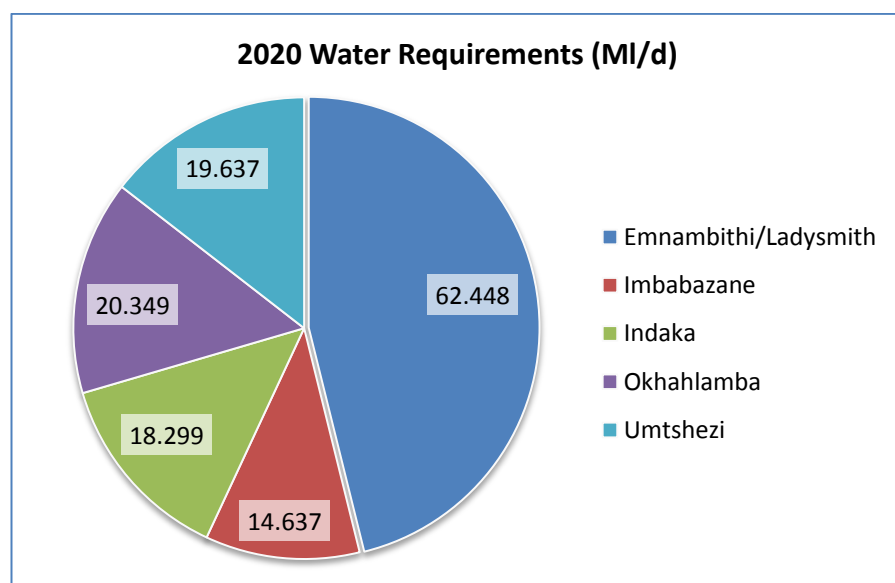
Local Municipality	Households (2011)	HH Below RDP (2011)	Water Requirements (MI/d)				
			2015	2020	2025	2030	2035
Emnambithi / Ladysmith	57 809	10 832	55.675	62.448	68.785	74.614	79.233
Imbabazane	19 921	11 098	11.521	14.637	17.685	19.437	20.817
Indaka	19 185	7 377	15.479	18.299	20.992	22.578	23.771
Okhahlamba	27 468	12 439	16.519	20.349	24.062	26.333	28.147
Umtshezi	22 238	4 922	17.275	19.637	21.922	23.773	25.188
TOTAL	146 621	46 668	116.469	135.370	153.446	166.735	177.156

The largest growth in water volume between 2015 and 2035 is expected in the Emnambithi / Ladysmith and Okhahlamba LM's (by 23.558MI/d and 11.628MI/d respectively) whereas the largest growth in percentage water required is in the Imbabazane and Okhahlamba LM's (81% and 70% respectively).

The largest growth is expected in the Emnambithi / Ladysmith and Okhahlamba LM's due to the developments (residential, industrial, business and commercial) already in the area, urbanisation and the increased service levels for consumers.

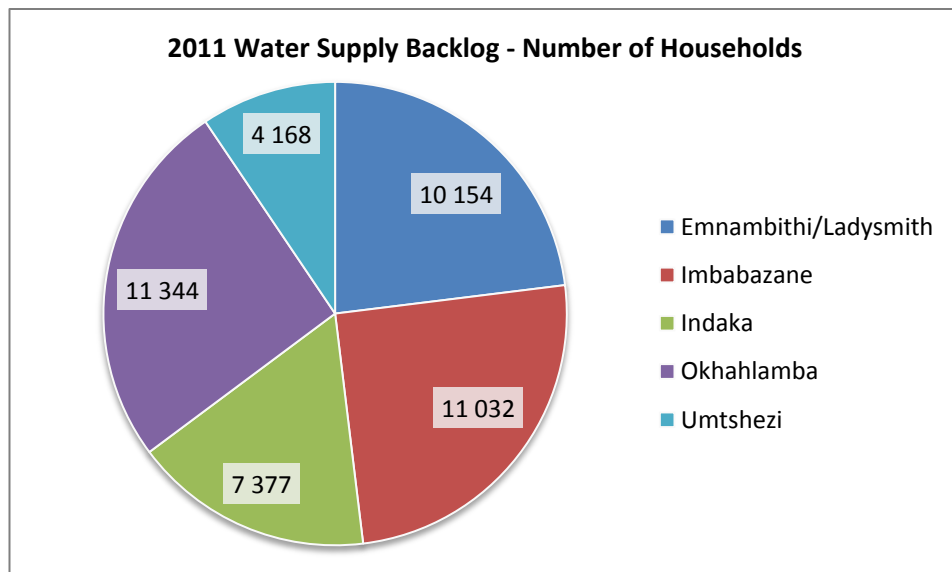
The 2020 water requirements per LM are presented in **Figure 3** in the form of a pie chart, illustrating that the Emnambithi / Ladysmith LM is the largest water consumer in the uTDM, requiring 46% of all water.

Figure 3. uTDM Water Requirements: 2020 (MI/d)



The water supply backlog of 2011 can be graphically illustrated in **Figure 4** below. There are a number of MIG projects already being implemented to eradicate the backlog and improve water supply services in the area.

Figure 4. uTDM Water Supply Backlog: 2011



Backlogs are largely prevalent in the more rural areas, but in urban areas, urbanisation, establishment of informal settlements and natural growth are the main drivers in water supply and sanitation development.

5.2 EMNAMBITHI / LADYSMITH LM

The water requirements for the Emnambithi / Ladysmith LM are presented in this section, per existing Water Supply Scheme (WSS) area and potential future WSS area, therefore for all consumers in the municipality. **Table 5.2A** and **Table 5.2B** represent the water requirements in million m³/a and Ml/d respectively.

Table 5.2A Water Requirements (million m³/a), Per Existing and Potential WSS

WSS	Households (2011)	HH Below RDP (2011)	Water Requirements (Million m³/a)				
			2015	2020	2025	2030	2035
Bester WSS TBC	64	37	0.014	0.018	0.022	0.024	0.025
Blue Bank BH Supply	154	151	0.012	0.021	0.030	0.034	0.037
Colenso WSS	1 644	114	0.683	0.746	0.802	0.868	0.918
Driefontein WSS	12 607	6 630	2.594	3.332	4.049	4.457	4.781
Ezakheni WSS	19 032	1 087	7.414	8.065	8.656	9.347	9.893
Ladysmith WSS	23 200	2 130	9.197	10.101	10.936	11.839	12.556
Lusitania WSS TBC	145	5	0.035	0.038	0.040	0.043	0.045
TOTAL	56 848	10 154	19.949	22.321	24.535	26.611	28.256

The greatest backlog in number of households, are within the areas of Driefontein WSS, Ladysmith WSS and Ezakheni WSS, totalling 9 847 households. There is currently a MIG project under way in Driefontein for the construction of a reticulation network and bulk pipelines that will in future receive water from the proposed Spioenkop WTW.

Table 5.2B Water Requirements (MI/d), Per Existing and Potential WSS

WSS	Households (2011)	HH Below RDP (2011)	Water Requirements (MI/d)				
			2015	2020	2025	2030	2035
Bester WSS TBC	64	37	0.038	0.049	0.060	0.065	0.069
Blue Bank BH Supply	154	151	0.032	0.057	0.082	0.092	0.100
Colenso WSS	1 644	114	1.872	2.042	2.198	2.377	2.516
Driefontein WSS	12 607	6 630	7.107	9.129	11.093	12.212	13.100
Ezakheni WSS	19 032	1 087	20.313	22.096	23.715	25.607	27.105
Ladysmith WSS	23 200	2 130	25.196	27.675	29.961	32.436	34.401
Lusitania WSS TBC	145	5	0.096	0.104	0.110	0.117	0.122
TOTAL	56 848	10 154	54.654	61.152	67.219	72.906	77.413

5.3 IMBABAZANE LM

The water requirements for the Imbabazane LM are presented in this section, per existing Water Supply Scheme (WSS) area and potential future WSS area, therefore for all consumers in the municipality. **Table 5.3A** and **Table 5.3B** represent the water requirements in million m³/a and Ml/d respectively.

Table 5.3A Water Requirements (million m³/a), Per Existing and Potential WSS

WSS	Households (2011)	HH Below RDP (2011)	Water Requirements (Million m ³ /a)				
			2015	2020	2025	2030	2035
Emoyeni-Amangwe WSS	3 808	2 506	0.643	0.886	1.127	1.244	1.336
Empangweni Future WSS	786	370	0.178	0.220	0.261	0.287	0.308
Estcourt Rudimentary WSS	7 815	4 356	1.291	1.694	2.088	2.307	2.479
Estcourt WSS	3 398	1 684	0.649	0.816	0.979	1.074	1.148
Etatane 2 Future WSS	154	5	0.035	0.038	0.041	0.045	0.049
Loskop WSS	6 121	2 111	1.364	1.637	1.900	2.073	2.209
TOTAL	22 082	7 377	4.160	5.290	6.396	7.030	7.529

The largest backlogs in the Imbabazane LM are within the Emoyeni-Amangwe WSS, Estcourt Rudimentary WSS, Estcourt WSS and Loskop WSS, totalling 10 657 households. There are MIG projects for the improvement of water supply in Loskop, Bhekuzulu-Empangweni and Ntabamhlophe-Good Home.

Table 5.3B Water Requirements (MI/d), Per Existing and Potential WSS

WSS	Households (2011)	HH Below RDP (2011)	Water Requirements (MI/d)				
			2015	2020	2025	2030	2035
Emoyeni-Amangwe WSS	3 808	2 506	1.761	2.427	3.088	3.408	3.661
Empangweni Future WSS	786	370	0.487	0.602	0.714	0.787	0.844
Estcourt Rudimentary WSS	7 815	4 356	3.537	4.640	5.721	6.319	6.792
Estcourt WSS	3 398	1 684	1.777	2.235	2.682	2.942	3.145
Etatane 2 Future WSS	154	5	0.095	0.104	0.113	0.124	0.133
Loskop WSS	6 121	2 111	3.738	4.485	5.205	5.680	6.053
TOTAL	22 082	7 377	11.395	14.493	17.523	19.260	20.628

5.4 INDAKA LM

The water requirements for the Indaka LM are presented in this section, per existing Water Supply Scheme (WSS) area and potential future WSS area, therefore for all consumers in the municipality. **Table 5.4A** and **Table 5.4B** represent the water requirements in million m³/a and MI/d respectively.

Table 5.4A Water Requirements (million m³/a), Per Existing and Potential WSS

WSS	Households (2011)	HH Below RDP (2011)	Water Requirements (Million m ³ /a)				
			2015	2020	2025	2030	2035
Ekuvukeni Lime Hill WSS	17 660	6 178	5.038	5.910	6.741	7.239	7.613
Ngedlengedleni WSS	606	552	0.081	0.131	0.180	0.199	0.213
Tugela Estates WSS	1 762	647	0.531	0.638	0.742	0.804	0.850
TOTAL	20 028	7 377	5.650	6.679	7.662	8.241	8.677

The largest water supply backlog in the Indaka LM is within the Ekuvukeni Lime Hill WSS although the other two areas – Ngedlengedleni-uMhlumayo and Tugela Estates also have large backlogs. There is a MIG project for a bulk water audit in this LM as well as a project to improve water supply in the Fitty Park (Ekuvukeni-Lime Hill WSS) area. Construction of reticulation in Fitty Park is expected to be completed before the end of the 2015/2016 financial year.

Table 5.4B Water Requirements (Ml/d), Per Existing and Potential WSS

WSS	Households (2011)	HH Below RDP (2011)	Water Requirements (Ml/d)				
			2015	2020	2025	2030	2035
Ekuvukeni Lime Hill WSS	17 660	6 178	13.802	16.193	18.467	19.832	20.857
Ngedlengedleni WSS	606	552	0.223	0.358	0.493	0.544	0.584
Tugela Estates WSS	1 762	647	1.454	1.748	2.032	2.202	2.330
TOTAL	20 028	7 377	15.479	18.299	20.992	22.578	23.771

5.5 OKHAHLAMBA LM

The water requirements for the Okhahlamba LM are presented in this section, per existing Water Supply Scheme (WSS) area and potential future WSS area, therefore for all consumers in the municipality. **Table 5.5A** and **Table 5.5B** represent the water requirements in million m³/a and Ml/d respectively.

Table 5.5A Water Requirements (million m³/a), Per Existing and Potential WSS

WSS	HH (2011)	HH Below RDP (2011)	Water Requirements (Million m³/a)				
			2015	2020	2025	2030	2035
Amangwane WSS TBC (SW, GW)	329	234	0.058	0.080	0.102	0.112	0.120
Bergville WSS	5 573	683	1.716	1.918	2.103	2.264	2.391
Bergville WSS Future TBC	3 319	2 241	0.606	0.831	1.052	1.155	1.235
Drakensberg WSS TBC	110	5	0.030	0.033	0.036	0.040	0.042
Howe Wittekop WSS	337	307	0.030	0.049	0.069	0.077	0.083
Jagersrust WSS TBC	100	2	0.035	0.037	0.040	0.042	0.045
KwaNdema WSS TBC	218	12	0.101	0.112	0.120	0.130	0.139
Langkloof WSS	362	332	0.031	0.053	0.074	0.082	0.089
Winterton WSS	1 812	47	0.590	0.641	0.689	0.749	0.796
Zwelisha Moyeni WSS	9 932	4 862	1.641	2.084	2.517	2.778	2.981
Zwelisha Moyeni WSS Future TBC	3 176	2 619	0.481	0.725	0.968	1.069	1.148
TOTAL	25 268	11 344	5.317	6.562	7.770	8.499	9.069

The largest water supply backlogs in the Okhahlamba LM are within the areas south of the existing Bergville WSS, existing Zwelisha Moyeni WSS as well as the remainder of the Zwelisha Moyeni area not currently connected to any basic formal water supply infrastructure, totalling 9 722 households.

Table 5.5B Water Requirements (MI/d), Per Existing and Potential WSS

WSS	HH (2011)	HH Below RDP (2011)	Water Requirements (MI/d)				
			2015	2020	2025	2030	2035
Amangwane WSS TBC (SW, GW)	329	234	0.158	0.219	0.280	0.308	0.330
Bergville WSS	5 573	683	4.702	5.255	5.761	6.204	6.550
Bergville WSS Future TBC	3 319	2 241	1.659	2.276	2.883	3.165	3.383
Drakensberg WSS TBC	110	5	0.081	0.090	0.098	0.108	0.116
Howe Wittekop WSS	337	307	0.083	0.135	0.188	0.211	0.228
Jagersrust WSS TBC	100	2	0.095	0.102	0.109	0.116	0.122
KwaNdema WSS TBC	218	12	0.277	0.305	0.330	0.356	0.382
Langkloof WSS	362	332	0.086	0.144	0.202	0.225	0.244
Winterton WSS	1 812	47	1.617	1.756	1.888	2.053	2.179
Zwelisha Moyeni WSS	9 932	4 862	4.495	5.708	6.896	7.611	8.166
Zwelisha Moyeni WSS Future TBC	3 176	2 619	1.316	1.986	2.652	2.929	3.145
TOTAL	25 268	11 344	14.569	17.976	21.287	23.286	24.845

5.6 UMTSHEZI LM

The water requirements for the Umtshezi LM are presented in this section, per existing Water Supply Scheme (WSS) area and potential future WSS area, therefore for all consumers in the municipality. **Table 5.6A** and **Table 5.6B** represent the water requirements in million m³/a and MI/d respectively.

Table 5.6A Water Requirements (million m³/a), Per Existing and Potential WSS

WSS	Households (2011)	HH Below RDP (2011)	Water Requirements (Million m³/a)				
			2015	2020	2025	2030	2035
Colenso WSS Future TBC	502	448	0.083	0.131	0.179	0.198	0.214
Cornfields WSS	1 030	315	0.258	0.301	0.342	0.372	0.395
Estcourt WSS	12 613	842	4.974	5.409	5.823	6.289	6.643
Frere WSS TBC current GW	235	188	0.037	0.052	0.068	0.075	0.081
Mtontwane WSS TBC	210	141	0.044	0.059	0.073	0.079	0.084
Weenen North WSS Future TBC	638	618	0.077	0.132	0.187	0.208	0.225
Weenen South WSS Future TBC	1 256	1 227	0.162	0.282	0.403	0.449	0.486
Weenen WSS	1 577	389	0.425	0.487	0.546	0.592	0.628
TOTAL	502	4 168	6.059	6.852	7.619	8.263	8.756

In the Umtshezi LM, the areas with the largest water supply backlog are south of Weenen and the Estcourt area (water supply scheme area falling within this LM), totalling 2 069 households. This is the LM with the least number of households with a water supply backlog.

Table 5.6B Water Requirements (MI/d), Per Existing and Potential WSS

WSS	Households (2011)	HH Below RDP (2011)	Water Requirements (MI/d)				
			2015	2020	2025	2030	2035
Colenso WSS Future TBC	502	448	0.226	0.358	0.489	0.544	0.586
Cornfields WSS	1 030	315	0.708	0.825	0.936	1.018	1.082
Estcourt WSS	12 613	842	13.628	14.820	15.954	17.231	18.200
Frere WSS TBC current GW	235	188	0.100	0.143	0.187	0.206	0.221
Mtontwane WSS TBC	210	141	0.122	0.161	0.199	0.217	0.231
Weenen North WSS Future TBC	638	618	0.210	0.361	0.511	0.570	0.616
Weenen South WSS Future TBC	1 256	1 227	0.444	0.773	1.103	1.231	1.332
Weenen WSS	1 577	389	1.163	1.333	1.496	1.622	1.719
TOTAL	502	4 168	16.601	18.774	20.875	22.639	23.987

6. WATER CONSERVATION AND WATER DEMAND MANAGEMENT (WC/WDM)

This section describes the current programmes planned or implemented within the uTDM per Local Municipality.

Water Conservation and Water Demand Management (WC/WDM) forms a critical component in the water services provision business and management of sustainable services. It is a requirement by the DWS that the WSA should illustrate its commitment to implement WC/WDM for any new projects submitted for funding applications.

Activities and programmes related to WC/WDM typically include the following:

- Water billing and auditing – recording of customers in a financial system, metering and billing (revenue management);
- Pressure management – management of pressure in water supply pipelines to reduce or eliminate pipe bursts;
- Metering – bulk and reticulation – to ensure records are kept of water abstracted, treated, stored, supplied and consumed. It includes monitoring of night flows to establish potential leaks in the water supply system;
- Use of supporting or alternative water sources such as rainwater in the form of rainwater harvesting tanks; and
- Consumer awareness and training – to save, conserve and use water responsibly. This should also include awareness in the cost of water and the municipal policy to assist indigents and provision of free basic services.

Included in this section are recommendations from the recently completed study: Development and Implementation of Water Conservation / Water Demand Management in uThukela District Municipality. Bulk Water Meter Audit Report. Compiled by UWP Consulting (Pty) Ltd, in association with the Department of Water & Sanitation. March 2015. This was conducted as part of the Accelerated Community Infrastructure Programme (ACIP).

6.1 EMNAMBITHI / LADYSMITH LM

Currently there are no WC/WDM programmes in this municipality.

Only the areas of Ladysmith and Ezakheni are provided for in the billing system. Only the consumers in Ladysmith are billed and revenue collected for water services. No information is available yet on the level of Non-Revenue Water for this area.

The 2015 water requirements were estimated as 55.675MI/d or 55 675kl/day. At R8/kl, it equates to a potential income of R13.362 million per month.

6.2 IMBABAZANE LM

Currently there are no WC/WDM programmes in this municipality.

There are no consumers provided for in the billing system in this municipality and no consumers are paying for water services. Non-Revenue water is therefore 100%.

The 2015 water requirements were estimated as 11.521MI/d or 11 521kl/day. At R8/kl, it equates to a potential income of R2.765 million per month.

6.3 INDAKA LM

There is a MIG project registered (2006MIGFDC23114315) for a water audit and feasibility study in this municipality.

There are no consumers provided for in the billing system in this municipality and no consumers are paying for water services. Non-Revenue water is therefore 100%.

The 2015 water requirements were estimated as 15.479MI/d or 15 479/day. At R8/kl, it equates to a potential income of R3.71 million per month.

6.4 OKHAHLAMBA LM

Currently there are no WC/WDM programmes in this municipality. The schemes' Superintendent has applied for bulk meters in order to at least measure the volume of water treated, stored and supplied in the bulk system.

Only the consumers in Bergville and Winterton are billed and revenue collected for water services. No information is available yet on the level of Non-Revenue Water for this area.

The 2015 water requirements were estimated as 16.519MI/d or 16 519kl/day. At R8/kl, it equates to a potential income of R3.96 million per month.

6.5 UMTSHEZI LM

Currently there are no WC/WDM programmes in this municipality.

Only the consumers in Estcourt, Weenen, Colenso and Cornfields are billed and revenue collected for water services. No information is available yet on the level of Non-Revenue Water for this area.

The 2015 water requirements were estimated as 17.275MI/d or 17 275kl/day. At R8/kl, it equates to a potential income of R4.146 million per month.

6.6 RECOMMENDATIONS FROM THE BULK WATER METER AUDIT REPORT (MARCH 2015)

The Bulk Water Meter Audit study assessed all the bulk water supply scheme areas and included groundwater scheme only when linked to larger surface water schemes. The study included field investigations to establish the location, condition and operation of bulk water supply meters (where available and access possible). A number of sites and meter chambers were found to be in poor condition or not accessible. Where necessary (meter not accessible or no meter installed), meter sizes were estimated based on the pipeline diameter.

The report emphasised the following to improve water source management, metering and monitoring of water supply:

- Priority should be given to repair or replace existing bulk meters;
- Maintenance and upkeep of meter sites and chambers are required to ensure adequate operation of infrastructure and access to meters;
- The meter chamber at Spioenkop Dam has is leaking, which affects water supply to the Ladysmith, Roosboom and Ezakheni supply areas;

- Review meter sizing requirements after the implementation of some of the maintenance and upkeep measures;
- Installation of new meters (where not yet repaired / replaced), especially where:
 - Revenue collection can be improved;
 - Assist in determining the water balance; and
 - Where water losses are greatest – assist in addressing non-revenue water by targeting specific areas.
- Furthermore, consider purchase and use of a portable water meter and pressure management equipment for assessment of installed meters and monitoring of water pressure and flow.

The Joat Group are busy to develop Non-Revenue Water Master Plan for the uThukela District Municipality, which should be completed by June 2016. The implementation of this Plan should assist the uTDM in ensuring more reliable water supply and to delay capital investment required for new water supply schemes or upgrading of existing water supply schemes.

7. WATER RESOURCES

This section provides an overview of the water resources and water sources used for water supply to the domestic consumers in the uTDM. Some of the water sources are also shared for the purpose of industrial and irrigation / agricultural use.

It further provides a brief summary of water sources, commencing with the water sources located in the western part of the uTDM and therefore the western part of the catchment.

7.1 OVERVIEW

The uTDM falls within the Pongola Mtamvuna Water Management Area (WMA), which drains towards the east coast of South Africa. The WMA border coincides with the northern and western border of the District as illustrated in the overview in **Figure 5**. The north-western border is formed by the Free State Province and the south-western border by the neighbouring country of Lesotho.

The most prominent surface water resources in the uTDM are the Tugela (also known as Thukela) River, including major tributaries such as Klip, Little Tugela, Bushmans and Sundays Rivers, then also the Woodstock Dam, Spioenkop Dam, Wagendrift Dam and the Driel Dam (Barrage).

Figure 5. Overview of Water Resources in the uTDM



There are a number of groundwater sources such as boreholes and springs, which are utilised in the rural areas of each municipality as well as to augment surface water schemes; supply. The sections providing an overview of the main water sources are mainly extracted from the following reports:

- Development of Universal Access Plan for Water Services in uThukela District Municipality, 2014
- All Towns Strategies (2011 strategies as no strategies were reviewed in this area for the 2012-2015 study period) for:
 - Bergville WSS Area
 - Colenso WSS Area;
 - Ekuvukeni WSS Area;
 - Estcourt WSS Area;
 - Ezakheni WSS Area;
 - Ladysmith WSS Area;
 - Loskop WSS Area
 - Weenen WSS Area;
 - Winterton WSS Area; and
 - Zwelisha WSS Area.
- The Development of Water Supply and Drought Operating Rules for Stand-alone Schemes and Dams Typical of Rural/Small Municipal Water Supply Schemes. Eastern Cluster. Ekuvukeni Water Supply Scheme: Oliphantskop Dam Decision Support System, 2012.
- Department of Water Affairs and Forestry. Internal Strategic Perspective. Thukela Water Management Area. Version 1. 2004.
- Department of Water and Sanitation: Registration Details of Dams Registered (2011) in terms of the Dam Safety Legislation.
- Department of Water and Sanitation: KwaZulu-Natal Province State of Dams on 27 July 2015.

Information on Full Supply Capacity (FSC) and Historic Firm Yield (HFY) is provided in **Table 7.1A** overleaf.

Table 7.1A Water Resources: FSC, HFY

Water Resource	FSC	HFY
	Mm ³	Mm ³ /a
Woodstock Dam	373.26	
Spioenkop Dam	272.27	
Driel Barrage	8.70	
Wagendrift Dam	55.90	
Kilburn Dam	36.70	
Oliphantskop Dam – original capacity	1.45	3.34
Oliphantskop Dam – 85% siltation (current status)		1.10
Oliphantskop Dam – with EWR		0.00
Slangdraai Dam	10.30	4.17

An overview of the 2005 water balance and reconciliation of main surface water sources in the Thukela Water Management Area (in million m³/a) is provided in **Table 7.1B**.

Table 7.1B Reconciliation of water requirements and available resources for the Thukela WMA

Key Area	Available water			Water requirements/allocations			Balance
	Local yield	Transfers In	Total	Local requirements	Transfers out	Total	
Upper Thukela	506	0	506	114	377+11 ¹	502	4
Little Thukela	8	0	8	38	0	38	(30)
Bushmans	80	0	80	40	29 ¹	69	11
Sundays	8	0	8	32	0	32	(24)
Mooi	64	0	64	52	22	74	(10)
Buffalo	174	0	174	96	55	151	23
Lower Thukela	105	40 ²	145	58	87	145	0
Total	945	0	945	430	541	971	(26)
Allocable							38³

Notes:

1. Releases to support the Lower Thukela Key Area.
2. Supplied from Spioenkop and Wagendrift dams.
3. Since it is not feasible to supply the shortages in the Little Thukela, Sundays or Mooi Key Areas from the surpluses in the Upper Thukela, Buffalo or Bushmans Key Areas, there is at least 38 million m³/a available for allocation in the Thukela WMA.

Source: Uthukela Water Management Area ISP (DWAF, 2004)

7.2 TUGELA RIVER AND TUGELA-VAAL TRANSFER SCHEME

This sub-section provides details on the Tugela River traversing the length of the uTDM and the Tugela-Vaal Transfer Scheme that supports water supplies to the Gauteng region.

7.2.1 Tugela River

The Tugela River is utilised (in the uTDM) for abstraction of water to supply the Colenso, Langkloof, Ezakheni and Tugela Estates Water Supply Schemes. Furthermore, the Driel Barrage on the Tugela River supplies the Bergville WSS and the Spioenkop Dam on the Tugela River supplies the Ladysmith WSS and Ezakheni WSS. The Tugela River is also known as the Thukela River.

The Tugela River originates in the Drakensberg Mountains near Lesotho and flows through the KwaZulu-Natal Province in an easterly direction, discharging into the Indian Ocean at Tugela Mouth, just south of Macambini on the East Coast. The Little Tugela, Klip, Bloukrans, Bushmans, Sundays, Mooi and Buffalo rivers are the main tributaries of the Tugela River.

The Thukela WMA ISP, made mention of the proposed Jana Dam that would have been located in the Tugela River (DWAF, 2004). This Dam would have assisted in the water supply and economic development in the region.

The following Wastewater Treatment Works (WWTW) discharges in or nearby in a tributary of the Tugela River:

- Bergville WWTW: 2014 Green Drop score of 76.5%, putting it in a high risk category, improving to 70.59% according to the 2013 Green Drop Assessment; and
- Colenso WWTW: 2014 Green Drop score of 70.6%, putting it in a medium-high risk category. It was further improved to 58.82% according to the 2013 Green Drop Assessment.

7.2.2 Tugela-Vaal Transfer Scheme

The main surface water resources in the uTDM form part of a larger system of water resources of strategic importance. The Tugela and Klip Rivers are the primary rivers in this catchment. The Tugela Catchment Area is divided into the Upper Tugela (tertiary catchments V11, V12, V14 and quaternaries, V60G, V60H and V60J) and Lower Tugela (tertiary catchments V40, V50 and quaternaries, V33C, V33D and V60K) at the confluence of the Bushmans River, north-east of Weenen.

The Upper Tugela Mean Annual Runoff (MAR), is 1 256 million m³/a. The gross available surface water resource in the Upper Tugela based on development levels in 2004 was estimated to be between 553 and 570 million m³/a depending on where water in this catchment was supplied to. This already included provision for the Environmental Water Reserve estimated at 71 million m³/a. Water use within the Upper Thukela was estimated to be 114million m³/a (312.33MI/d), with irrigation the biggest user at 87 million m³/a (238.36MI/d). Urban use (Ladysmith, Colenso and Bergville) was estimated at 17 million m³/a (46.58MI/d), according to the Thukela Water Management Area ISP (DWAF, 2004).

The following is an extract from the Thukela Water Management Area ISP (DWAF, 2004) and provides an overview of the Thukela-Vaal Transfer Scheme infrastructure:

- Woodstock Dam, located on the upper reaches of the Thukela River, is the main source of water for the scheme. The net storage capacity of the dam is 373 million m³;
- Driel Barrage situated on the Thukela River 7km downstream of the Woodstock Dam. Water is released from Woodstock Dam to Driel Barrage, from where it is pumped to a transfer canal that feeds the Jagersrust Balancing Dam. The net storage capacity of Driel Barrage is 8.7 million m³;
- A transfer canal, which allows transferred water to gravitate to the Jagersrust Balancing Dam before it is pumped to Kilburn and over the catchment divide to Sterkfontein Dam. The canal has a maximum capacity of some 20 m³/s;

- Diversion weirs in the Upper Thukela River which divert run-of-river flows upstream of Woodstock Dam into the above-mentioned transfer canal. The estimated capacity of these diversions is some 4 m³/s, which is additional to the total canal capacity of 20 m³/s mentioned above;
- Jagersrust Balancing Dam, provides balancing storage at the end of the transfer canal from where water is pumped to Kilburn Dam;
- Kilburn Dam, the lower reservoir in the Eskom pump storage scheme, with an active storage capacity of 27 million m³. Kilburn Dam provides both the storage for the transferred water and is a sump for the water discharged after electricity generation;
- Sterkfontein Dam, located in the headwaters of the Wilge River, a main tributary of the Vaal River, provides storage for water transferred over the escarpment. This dam, with a capacity of 2 617 million m³. Water is released from Sterkfontein Dam to Vaal Dam when required;
- Driekloof Dam is the upper reservoir of the Eskom pump storage scheme and is situated in the upper reaches of the Sterkfontein Dam catchment. Water can only be transferred from Driekloof Dam to Sterkfontein Dam when Driekloof Dam is spilling;
- Spioenkop Dam was constructed to regulate flow downstream of the Driel Barrage to mitigate the effect of the transfer scheme. This dam has a capacity of 280 million m³. The dam also supplies water to Ladysmith and supports water requirements for the farmers between the dam and the confluence of the Little Thukela River. Releases are also occasionally called for to dilute the effluent discharged by Sappi into the lower Thukela near the river mouth. It should be noted, however, that SAPPI does not have a formal allocation from the dam. The Tugela-Mhlathuze Water Transfer Scheme at Middeldrift can also be supported from Spioenkop Dam if necessary.
- The proposed Jana Dam, which forms part of the Thukela Water Project, will also be located in this area on the Thukela River should this project proceed. It is important that the optimal long-term benefits be derived from the development of the Thukela River, and that both the national and local interests should be considered.

7.3 WOODSTOCK DAM

The Woodstock Dam (quaternary catchments V11D and V11E) is the main source of water for the Thukela-Vaal Transfer Scheme. It is currently not used directly as water source for domestic supply. It does however play a strategic role in the management of the local resources further down the Tugela River and the Thukela-Vaal Transfer Scheme.

The Zwelisha Moyeni WSS is located next to the Woodstock Dam, but obtains its water from the Khombe River.

7.4 KHOMBE RIVER

A weir in the Khombe River (quaternary catchment V11C), a tributary of the Tugela River and located just upstream from the Woodstock Dam, supplies the Zwelisha Moyeni WSS.

According to the water balance assessment for the Thukela Internal Strategic Perspective (ISP) from the Department of Water Affairs and Forestry (2004), the available water in the upper Tugela River was 506 million m³/a and the water requirements including the transfer of 377 million m³/a to the Vaal River System and 11 million m³/a to support the lower Tugela River system, leaves a surplus of 4 million m³/a (10.96Ml/d). This water is available in the Spioenkop Dam, which is downstream of the Zwelisha Moyeni Water Supply Area. The current and future water requirements for the Zwelisha Moyeni WSS can be met from the available water supplies in the upper Tugela River (All Towns Strategy for the Zwelisha Moyeni WSS, 2011).

7.5 DRIEL DAM AND DRIEL BARRAGE

The Bergville WSS obtains its water from the Driel Dam (quaternary catchment V11J), where it is abstracted at the Driel Barrage. The Driel Dam, together with the Woodstock and Spioenkop Dams, are part of the Upper Tugela River regulatory system for water resources.

The 2011 All Towns Strategy for the Bergville WSS indicated that although the water requirements can be met currently from the Driel Barrage, the Operating Rules of the Upper Tugela need to be reviewed in order to ensure future water requirements are met.

The 2004 Thukela Water Management Area ISP (DWAF) advised on the construction of farm dams, which are generally discouraged upstream of the Driel Barrage. There is potentially between 15 million m³/a and 30 million m³/a available downstream of the Driel Barrage.

7.6 SPIOENKOP DAM

The Spioenkop Dam (quaternary catchment V11L), is located just downstream of the Driel Barrage. The Dam forms an integral part of water regulation in the Tugela River. It is currently used by the Ladysmith WSS for domestic supply at a rate of 18Ml/d (6.57 million m³/a) and it provides water for irrigation.

Depending on where water in the system is abstracted, there could be 15 million m³/a available at the Spioenkop Dam, if abstracted directly from the Dam. If abstracted at the proposed Jana Dam site, there could be 30 million m³/a available. The proposed site for the Jana Dam is just below the confluence of the Tugela and Little Tugela Rivers.

7.7 LITTLE TUGELA RIVER

The Little Tugela River (quaternary catchments V13A and V13C) is utilised for abstraction of water to supply the Loskop WSS and Winterton WSS.

According to the Thukela WMA ISP (DWAF, 2004), the river is mainly utilised for irrigation and water requirements already exceeded the sustainable yield. Furthermore, if the EWR is implemented, there will be no further opportunity for increased water use from this system. The Thukela WMA ISP further reported that after allowance for the EWR and return flows, the yield from the Little Tugela River catchment was estimated as 8 million m³/a (at a 1:50 assurance level). The water balance was a deficit of 30 million m³/a, after allocations were made for irrigation, domestic (urban and rural), industrial and afforestation.

There are plans to increase the treatment capacity of the Loskop WTW and to construct a new abstraction works along the Little Tugela River. The 2010 Business Plan for this (and the other scheme components) indicated that a hydrological assessment still needed to be conducted to establish whether the yield from the river would be sufficient to augment supply to the Loskop WTW and its extension to Bhekuzulu and Empangweni. The hydrological study was completed in October 2015 and confirmed that enough water is available to meet the requirements for water supply to domestic consumers (IWR, 2015).

7.8 KLIP RIVER

The Klip River (quaternary catchment V12G), supplies water to the Ladysmith WTW for use in Ladysmith, Steadville and Roosboom (augmented with supply from the Spioenkop Dam).

The Klip River originates north-west of Ladysmith, at the border with the Free State Province, in quaternary catchment V12A. It flows east then south, passing through the Driefontein WSS area before joining the Sand River about 3km before the Ladysmith WTW. Water quality in the Klip River is affected by high organic loads from uncontrolled sewerage along its flow path as well as from agricultural and livestock activities.

The Windsor Dam (+6km north of the Ladysmith WTW) is the only dam in the Klip River and was initially built as a flood control measure for Ladysmith. It has been superseded by the Qedusizi Dam (Mt Pleasant Dam) in fulfilling this purpose.

The Ladysmith WWTW (design capacity of 21MI/d, operating at 151% of its design!) located east of Leonardsville and Nambiti discharges into the Klip River. The 2014 Green Drop Report indicated a risk rating of 90.9%, putting it in a critical risk category. The uTDM however has initiated a project to rehabilitate the WWTW, already reducing the risk rating (was 85.19% according to the 2013 Green Drop assessment). The Ezakheni WWTW also discharges into the Klip River and it received a 2014 Green Drop Score of 77.3%, putting it also in a high-risk category. The 2013 risk rating remained unchanged.

No further information is available on the available yield from the Klip River.

7.9 OLIPHANTSKOP DAM

The Oliphantskop Dam (quaternary catchment V60C), is used as water source for the Ekuvukeni Lime Hill WSS. The dam was empty during December 2015 as a result of drought conditions (experienced in most of the country), but the level has increased slightly after some rains during January 2016 – see **Figure 6**.

The Dam is located in the Sundays River, approximately 8km west of Ekuvukeni. The estimated full storage capacity of the Dam is 1.45 million m³ (DWA, 2012). The Dam is however heavily silted and cannot fulfil the water requirements of the current abstraction for consumers in the Ekuvukeni Lime Hill WSS. The **DWA report emphasised the need to identify an alternative water source for domestic consumers reliant on this Dam** as the siltation problem will only continue due to upstream soil erosion. The abstraction point is located beneath the silt level and this has a direct, adverse effect on the operation of the WTW and quality of water produced.

If the Environmental Water Reserve is taken into account, the Oliphantskop Dam cannot be utilised for any other water consumption activities.

Figure 6. Oliphantskop Dam – after recent rains that followed the drought conditions, January



7.10 BUSHMANS RIVER

The Bushmans River (quaternary catchment V70G), is one of the two water sources supplying the Estcourt WSS, where abstraction takes place at the Bushmans River weir, to supply the George Cross WTW. The Bushmans River is also utilised as indirect source to supply the Weenen WSS by means of a balancing dam, supplied via an irrigation canal. The River is intensively used for irrigation (31 million m³/a) whereas the domestic use represents only a fraction (4 million m³/a).

The Bushmans River originates near the borders with Lesotho and neighbouring uMgungundlovu District Municipality, in the southern part of the uTDM (quaternary catchment V70A). Along with the Tugela River, it is one of the longest rivers in the uTDM. It traverses in a north-easterly direction, past Estcourt, where it joins the Tugela River, near Tugela Estates in the east of the uTDM. The Wagendrift Dam just south of Estcourt is located on the Bushmans River.

The Thukela WMA ISP (2004) reported that after allowance for the EWR and return flows, the yield from the Bushmans River catchment was estimated as 80 million m³/a (at a 1:50 assurance level). The water balance was a surplus of 40 million m³/a, after allocations were made for irrigation, domestic (urban and rural), industrial and afforestation. This water – mainly available through the Wagendrift Dam – could be utilised in this catchment area, or the Lower Tugela catchment area.

The proposed Mielietuin Dam site (part of the Thukela Water Project) is located near Estcourt in the southern reaches of the Bushmans River, south of the Wagendrift Dam. If constructed, it could further improve water security in this area. However, recent correspondence with DWS (30 November 2015) confirmed that the Lesotho Highlands Water Project Phase 2 would take preference over the Thukela Water Project.

The quality of water in the Bushmans River below Estcourt is affected by diffuse pollution from agricultural activities. The Estcourt WWTW discharges into the Bushmans River, just south of the Wagendrift Dam. The 2014 Green Drop score of the WWTW was 86.4%, putting it in a high risk category. The Weenen anaerobic ponds are located just south of the town of Weenen and north of the Bushmans River. Its 2014 Green Drop score was 47.1%, representing a low risk, but it increased to 76.47% during 2013, putting it in a high risk category.

7.11 WAGENDRIFT DAM

The Wagendrift Dam (quaternary catchment V70C), is the second of the two water sources supplying the Estcourt WSS, where abstraction takes place at the Dam to supply the George Cross WTW.

The Wagendrift Dam, just south of Estcourt, is located on the Bushmans River and was built in 1963 with its main purpose being supporting irrigation requirements. The Dam has a capacity of 55.9 million m³. The water balance in the Bushmans River catchment is 40 million m³/a and could be utilised through this Dam. New allocations have to take cognisance however of the Fairbreeze mine development and ecological reserve requirements of the lower Tugela.

7.12 SUNDAYS RIVER

The Sundays River (quaternary catchment V60B), originates in the north of the uTDM, at the border with the Free State Province and traverses south through the Ekuvukeni Lime Hill WSS, before it meets the Tugela River, near the confluence with the Bushmans River. The Oliphantskop Dam, located on the Sundays River, is the water source for the Ekuvukeni Lime Hill WSS.

The Slangdraai Dam (Waterfall, quaternary catchment V60B) in the upper reaches of the river is the main storage reservoir in this river, with a capacity of 10.3 million m³. The main use in this catchment area is for irrigation, followed by domestic consumption. The registered water use however reflects only a small percentage of the actual water use and needs to be verified.

The Thukela WMA ISP (2004) reported that after allowance for the EWR and return flows, the yield from the Sundays River catchment was estimated as 8 million m³/a (at a 1:50 assurance level). The water balance was a deficit of 24 million m³/a, after allocations were made for irrigation, domestic (urban and rural), industrial and afforestation.

The Ekuvukeni WWTW discharges into the Wasbank River, a tributary of the Sundays River. The 2014 Green Drop Report indicated a critical risk rating of 94.1% for this WWTW (activated sludge and lagoons, with a design capacity of 2.4Ml/d, assumed to operate at full capacity). The 2013 Green Drop Assessment reported in improved risk rating (though still high risk category) of 76.47%.

The Sundays River is further impacted by diffuse pollution from rural domestic consumers having no improved access to sanitation, fertilizers and runoff from agricultural activities and disused coal mines.

7.13 GROUNDWATER

There are a number of households (37 462, or 25% of the total number of households in the uTDM) in the non-urban areas that are supplied from groundwater sources. Groundwater is also utilised for agriculture, irrigation and industrial activities. The water use registered on the WARMS database needs to be confirmed.

Groundwater quality is often affected by the coal mining activities (present and past) in the region, especially in the north and eastern parts of the uTDM. It is further affected by rural sanitation installations not according to RDP standards and wastewater works not functioning properly according to license conditions.

According to the 2004 Thukela WMA ISP (DWAF), the median depth of the water table in this WMA is 20m. Groundwater quality is generally good, specifically in the higher rainfall areas. The area consists of hard-rock

aquifer formations and generally results in low-yielding groundwater supplies (0.1 – 0.6l/s), but higher yields can be obtained in suitable areas.

Groundwater use plays an important role in providing access to water to rural areas where larger, formalised water supplies from treated surface water sources are costly to construct and maintain. The following areas are supported or rely fully on groundwater as source:

- South of the existing Bergville WSS – borehole supply;
- Ngedlengedleni WSS – sand aquifer next to the Tugela River, borehole supply;
- Cornfields WSS – borehole supply for Cornfields town;
- Driefontein WSS – borehole supply;
- Howe Wittekop WSS – likely borehole supply. To be confirmed; and
- Ekuvukeni Lime Hill WSS – borehole supply to augment surface water supplies to the Fitty Park area.

There are no large-scale hydrogeological studies available for the uTDM to quantify the groundwater available for use in domestic supply. There are however small scale maps for South Africa which may provide a general indication of groundwater availability, yield, quality and borehole depth. There are as mentioned however, a number of communities supplied with and reliant on groundwater supplies for water use.

8. EXISTING WATER SUPPLY SCHEMES

This section provides an overview of the current surface water supplied schemes and the larger groundwater schemes (not for individual consumption) in the uTDM. The figures illustrating the schemes are provided in **Annexure B** of this document.

Population figures were provided based on the 2011 Census, but the current water supplied, were obtained and confirmed from officials and based on recent technical reports.

The Water Supply Scheme (WSS) footprints were initially obtained from the DWS Reference Framework geodatabase (spatial database), but have been updated based on discussions with officials from the uTDM. Only settlements or areas currently served by existing schemes are discussed in this section. It is presumed that rural areas not served by regional bulk, local bulk or local rudimentary schemes consist of mostly labour tenants working on privately-owned farms.

The uTDM is one of the poorest-performing WSA's in the KZN Province regarding the safety and operation of its Water Treatment Works and Wastewater Treatment Works according to the 2014 Blue and Green Drop Report results. The average 2014 Blue Drop score for eight systems reported on, is only 26.69%, putting the systems in a critical risk category (between 0 and 31%)!

The average 2014 Green Drop score for nine systems reported on is 89.41% (the higher the percentage, the higher the risk), therefore also putting it near the critical risk category (between 90 and 100%)! All nine systems digressed from previous years' Green Drop assessments.

8.1 BERGVILLE WSS

The Bergville WSS is located in the central area of Okhahlamba LM, north of the Driel Barrage and between the Woodstock Dam in the west and Spioenkop Dam in the east. The Bergville WSS serves the areas of Bergville, Bethany, iNdanyana, Rookdale, Woodford, Hambrook, Action Homes, Malottas Kraal and Green Point, totalling 5 547 households (2011). There is another settlement north of Malottas Kraal, namely Greenpoint (2011 Census reported 54 households in this area), which is currently served via water tanker. It is included at this stage in the Bergville WSS for planning purposes.

Water is abstracted from the Driel Barrage in the Tugela River, where it is treated at the Bergville WTW. The 2014 Blue Drop Report (DWS) listed the design capacity of the Bergville WTW as 4.0MI/d and operating at 3.72MI/d (93%) of its capacity. The scheme area manager indicated that the WTW is operating at an estimated 3.8MI/d (November, 2015), therefore very close to its design capacity. There are a number of refurbishment and improvement needs currently (2015/2016) being planned and implemented for this WTW to ensure optimal performance.

The settlements of Hambrook, Green Point and Malottas Kraal are also supplied from boreholes if there is water available, but currently they are dried up (March 2016). The uTDM manager responsible for the borehole schemes indicated that not all are in working condition and the one at Malottas Kraal provides a very low yield.

Most of the bulk pipelines are originally asbestos-cement, but replacements are made using uPVC pipes. There is currently no bulk meters at the WTW, but they are being procured in order to measure water at the inlet and outlet of the WTW.

The Bergville WWTW has a design capacity of 0.4MI/d and is currently not functioning (November, 2015). A new WWTW (design capacity of 1.0MI/d) is being constructed would have been completed by January 2016, but was 55% at the time of reporting in February 2016. Along with the new WWTW, bulk and reticulated infrastructure is also constructed for house connections to the sewer system.

The 2015 water requirements, including losses, were estimated as 1.716 million m³/a (4.702MI/d). This is projected to increase to 2.391 million m³/a (6.550MI/d) by 2035.

8.2 BLUE BANK BOREHOLE SCHEME

The Blue Bank Borehole Scheme a stand-alone scheme located in the western reaches of the Emnambithi / Ladysmith LM. The Blue Bank Borehole Scheme serves the settlements of Blue Bank and Glasgow, totalling 153 households (2011).

According to the 2011 Census, water is provided from a borehole, but the extent of the supply – according to RDP standards – needs to be verified as well as the service level as the 2011 Census also indicates that all households are below RDP level. No information is available on the quality of water used for domestic purposes. No other information is available on water supply infrastructure and storage for this settlement.

The 2015 water requirements, including losses, were estimated as 0.012 million m³/a (0.032MI/d). This is projected to increase slightly to 0.037 million m³/a (0.100MI/d) by 2035.

8.3 COLENZO WSS

The Colenso WSS is located in the southern portion of the Emnambithi / Ladysmith LM and currently serves the town of Colenso, Inkanyesi and the new Magazini development, totalling 1 642 households (2011). There is a mine development towards the east of Colenso and Inkanyesi, which may provide assistance in improving infrastructure in this area.

Water is abstracted from the Tugela River, where it is treated at the Colenso WTW. The water abstracted has however a high turbidity (up to 4 000 NTU), which poses challenges in treating the water. The 2014 Blue Drop Report (DWS) listed the design capacity of the Colenso WTW as 2.6MI/d operating at 1.378MI/d (53%) of its design capacity. The plant supervisor indicated however that the plant has an estimated design capacity of 1.1MI/d and is operating at 1.7MI/d (November, 2015). The plant capacity could also be 2.0MI/d (input from previous process controller) therefore the capacity has to be confirmed.

The Colenso WWTW has an estimated design capacity of 3.2MI/d (Green Drop Report, 2014) and operating at 151% of its design capacity (but this could be due to No Information Available). The uTDM however stated the design capacity as an estimated 1.5MI/d (November 2015) and operating at 100% of its design capacity. The operating capacity of the WWTW according to the Green Drop Report is almost double the operating capacity of the WTW – details on the design and operating capacity of the Colenso WWTW should be confirmed.

There are a number of reticulation leaks, which should be addressed as a matter of urgency.

The 2015 water requirements, including losses, were estimated as 0.683 million m³/a (1.872MI/d), equating to an estimated 285 litres per person per day. This is projected to increase slightly to 0.918 million m³/a (2.516MI/d) by 2035.

8.4 CORNFIELDS WSS

The Cornfields WSS is located just west of Weenen, in the central-western area of the Umtshezi LM. It includes the settlements of Cornfields, Mbondwana and Thembalihle, totalling 1 022 households (2011).

According to the uTDM area engineer, Cornfields is supplied mainly from boreholes (two of which one is awaiting spares and is not currently operational) and water tankers, whereas Thembalihle and Mbondwana obtain water from the Mtontwanes River (Sterkspruit). The groundwater is treated with chlorine tablets before distribution to the domestic consumers (August, 2015). Water consumption is not metered (and not billed). There is therefore no water treatment works serving this area.

The 2015 water requirements, including losses, were estimated as 0.258 million m³/a (0.708MI/d). This is projected to increase to 0.395 million m³/a (1.082MI/d) by 2035 – just more than double the current (2015) water required.

8.5 DRAKENSBURG INDIVIDUAL SCHEME

The Drakensberg Individual Scheme a stand-alone scheme located in the north of the Okhahlamba LM, next to the Jagersrust Individual Scheme. This Scheme serves Drakensberg formal area – an Eskom township – totalling 110 households (2011).

According to the 2011 Census, water is provided from a local scheme and at least 92% of households receive water in the form of a house or yard connection. No other information is available on water supply infrastructure and storage for this settlement.

The 2015 water requirements, including losses, were estimated as 0.030 million m³/a (0.081MI/d). This is projected to increase slightly by 2035, namely 0.042 million m³/a (0.116MI/d).

8.6 DRIEFONTEIN WSS

The Driefontein WSS is located in the central and eastern portion of the Emnambithi / Ladysmith LM. It covers an area of approximately 850km² and serves around 13 settlements including Watersmeed and Matiwane, totalling 12 542 households (2011).

Consumers are currently (November, 2015) supplied from groundwater (thus no WTW), but reticulation is being installed to serve consumers by 2019 from water supplied from the Spioenkop Dam. A new WTW (phased installation, capacity of the new WTW still awaited from the planning consultants) is being planned to abstract and treat water from the Dam to serve a regional bulk scheme, including Ladysmith and from there, areas towards the east and further north. Water supply is not metered and consumers are not billed for consumption. There is no 2014 Blue or Green Drop report for this area.

Most consumers (70% in 2011) do not have sanitation facilities at or above RDP levels of service.

The 2015 water requirements, including losses, were estimated as 2.594 million m³/a (7.107MI/d). This is projected to increase to 4.781 million m³/a (13.100MI/d) by 2035.

8.7 EKUVUKENI LIME HILL WSS

The Ekuvukeni Lime Hill WSS constitutes the majority of the Indaka LM and includes the areas of Ekuvukeni, Amakasi, Entabeni and Limehill along with another 54 settlement areas, totalling 17 566 households (2011). The WSS area footprint extends south up to Mziyanke, Zamokuhle, Mjinti and Ndaka, which is just south of the Sundays River. The area of Fitty Park however (north of Zamokuhle) receives water from the Ngedlengedleni-Umhlumayo WSSWSS (November, 2015).

Water is abstracted from the Oliphantskop Dam located in the Sundays River, where it is treated at the Ekuvukeni WTW. The 2014 Blue Drop Report (DWS) listed the design capacity of the Ekuvukeni WTW as 10MI/d and operating at 7.5MI/d (75%) of its capacity. The plant supervisor reported that the plant is operating at 100% of its design capacity (August, 2015). Some areas are also supplied from boreholes.

The Oliphantskop Dam is sludged up and dried up during December 2015 as a result of the prevailing drought conditions. Internal Strategic Perspective (ISP) for the Uthukela Water Management Area indicated that the Sundays River catchment area is already in a deficit in water balance (DWAf, 2004). Rains received at the end of December 2015 and beginning of January 2016 allowed the dam to have a 70-80cm water level above the silt, however the abstraction point is below the silt level. The NTU of water remains very high and this affects the operation of the plant as well as the water quality. The Water Use License registered under the uTDM for use from the Oliphantskop Dam is only 1.323 million m³/a (3.626MI/d).

Water supply to outlying areas poses a challenge as water demand is high even though there is sufficient reservoir storage capacity. This area is already in a deficit of water supplied and it is exacerbated further due to the lack of sufficient water sources and inefficient WTW operation.

Most consumers in this scheme are not metered (except in Ekuvukeni proper) and not billed for water supplied. There are no bulk meters to measure water supplied.

The Ekuvukeni WWTW has a design capacity of 2.4MI/d and is operating at 1.3MI/d (November, 2015). The 2014 Green Drop report indicated that the plant (design capacity of 2.34MI/d) is operating at 151% of its design capacity (although this could be due to No Information Available). About half of consumers are still below RDP levels of sanitation service and would require improved services by 2019. A MIG project is under way to improve reticulation in the Fitty Park and Umhlumayo areas. Construction started in the Fitty Park area and should be completed during the 2015/2016 financial year.

The 2015 water requirements, including losses, were estimated as 5.038 million m³/a (13.802MI/d). This is projected to increase to 7.613 million m³/a (20.857MI/d) by 2035.

8.8 EMOYENI-AMANGWE WSS

The Emoyeni-Amangwe WSS is located south of the Loskop WSS, in the western portion of the Imbabazane LM. It serves the settlements of Emoyeni, Emandabeni, Emakhekheni, Emnyangweni, Emadolobwe and Engodini, totalling 3 791 households (2011).

Water is usually supplied by means of a weir in the Little Tugela (Injasuti) River and two 10MI storage ponds south of Engodini. After treatment (with chlorine tablets) water is then pumped to a concrete storage reservoir for distribution via gravity to the communal stand pipes. Distribution pipes are in poor condition and pipe bursts are frequently experienced. There are some illegal yard and house connections in Emoyeni. The 2014 Blue Drop report

listed the design capacity of the system (referred to as Loskop – rural scheme) as 0.5MI/d, and operating at 100% of its design capacity.

The WARMS database lists one registered water use by a WSP for this area for a volume of 0.870 million m³/a (2.382MI/d).

Sanitation is provided in the form of pit latrines and therefore there is no sewer treatment required, but this is below RDP standards (minimum requirements is a VIP).

At present, due to the drought conditions, no water is available from the mountain sources and water is tankered into the communities for supply (November, 2015). Consumers are not billed and are therefore not paying for water supply. A study was conducted to augment water supply, one of the options being a new river abstraction point (Bhekuzulu / Epangweni Community Water Supply Feasibility Study / Technical Report, 2010).

The 2015 water requirements, including losses, were estimated as 0.643 million m³/a (1.61MI/d). This is projected to increase to 1.336 million m³/a (3.661MI/d) by 2035.

8.9 ESTCOURT WSS

The Estcourt WSS is located in the west-central portion of the Umtshezi LM, but extends further south-west into the Imbabazane LM. The main urban areas are Estcourt, Wembezi, Zwelisha and Boschi and immediate surrounds. This is one of the major urban and industrial nodes in the uTDM. The scheme serves a total of 15 948 households (2011).

There are two water treatment works serving consumers in this scheme. The Archie Rodel WTW, located south-west of Estcourt, is supplied from the Bushmans River Weir. According to the uTDM area engineer, the Archie Rodel WTW currently (August, 2015) operates at an estimated 8-10MI/d (66% – 75% of its design capacity given as 14MI/d). The 2014 Blue Drop report listed the design capacity of the Archie Rodel WTW as 12MI/d, and operating at 9MI/d (75%) of its design capacity.

The George Cross WTW, located to the south-east of Estcourt, is supplied from the Wagendrift Dam, where water is abstracted and pumped to the WTW. According to the uTDM area engineer, the George Cross WTW currently (August, 2015) operates at an estimated 23-24MI/d (110% – 114% of its design capacity of 18MI/d). The 2014 Blue Drop report listed the design capacity of the George Cross WTW as 21MI/d, and operating at 18.06MI/d (86%) of its design capacity.

The water use in Wembezi needs to be measured and recorded daily and monthly in order to determine the extent of authorised consumption and of water losses. Water is also supplied to a number of informal areas (not yet formalised), which increases the water required from each of the WTW. Jeffares and Green conducted a water logging exercise during 2015 for this area. The information from this study may be useful for future planning activities.

The Estcourt WWTW has a design capacity of 12MI/d and is operating at 9MI/d (November, 2015). There are also oxidation ponds for the sewer from the Wembezi area, with a design capacity of 1.25MI/d and it is also utilised at full capacity (November, 2015).

Most of the bulk meters in the water supply scheme are not operational and water actually supplied and consumed cannot be reported on accurately.

The 2015 water requirements, including losses, were estimated as 5.623 million m³/a (15.405MI/d). This is projected to increase to 7.791 million m³/a (21.345MI/d) by 2035. The significant difference in calculated water requirements and actual water supplied may indicate potential for the implementation of WC/WDM programmes to reduce water losses.

8.10 ESTCOURT RUDIMENTARY WSS

The area south of Shayamoya, and from KwaSobabili, Good Home and Edashi onwards (south), receive water from boreholes and a weir in a tributary of the Bushmans River, constituting the Estcourt Rudimentary WSS. The service area includes an estimated 7 772 households (2011). Water from the river is treated with chlorine tablets before being supplied to consumers. Most consumers obtain water from communal stand pipes and sanitation is provided mostly in the form of pit and VIP latrines.

Bulk infrastructure is currently being constructed to connect the Estcourt Rudimentary WSS area to the Estcourt WSS. More information on the phasing and design parameters of this extension should be obtained. A MIG project (Phase 3-14) is in the design and tender phase for water supply in the Ntabamhlophe-Good Home area north of Edashi.

The 2015 water requirements, including losses, were estimated as 1.291 million m³/a (3.537MI/d). This is projected to increase to 2.479 million m³/a (6.792MI/d) by 2035.

8.11 EZAKHENI WSS

The Ezakheni WSS is located adjacent and east of the Ladysmith WSS, in the Emnambithi / Ladysmith LM. It serves the areas of Ezakheni A to Ezakheni E, Acaciavale, Umbulwana, Graythorne and Brakfontein. Although the Doornkloof area is not currently supplied from the scheme, it is accounted for in the household count and water requirements. The service area includes a total of 18 953 households (2011).

Water is abstracted from the Tugela River Weir, where it is treated at the Ezakheni WTW (design capacity of 32MI/d – also given as such in the 2014 Blue Drop Report). The plant supervisor at **the Ezakheni WTW confirmed that the plant is currently (August, 2015) operating between 47MI/d and 51MI/d (160% of design capacity!)** and that this may compromise the quality of treated water. The capacity of the infrastructure is not able to safely meet current water requirements. This WTW received a 2014 Blue Drop score of 31%, digressing from its previous score (was 45.93 in 2012). There is a project however nearing completion for the refurbishment and upgrade of the Ezakheni WTW.

Furthermore, the Ezakheni WSS augments supply to the neighbouring Ladysmith WSS at an estimated rate of 6.12MI/d. Taking into consideration that the WSS serves an estimated 76 286 people, it equates to a **consumptive use of 537 litres per capita per day**, which are excessively higher than benchmark figures. Water use by different consumer types (domestic, industrial and business) should be quantified. There are **high occurrences of leaks** in this area, resulting in extremely high **water losses. This has to be addressed as a matter of urgency!**

The Ezakheni WWTW has an estimated design capacity of 10MI/d (reported by Talbot & Talbot – refurbished the plant, October 2015) and operates at between 14MI/d and 16MI/d. However, the 2014 Green Drop report stated the design capacity as 12MI/d and operation at 151% of its design capacity (but this could be due to No Information Available).

The 2015 water requirements, including losses, were estimated as 7.414 million m³/a (20.313MI/d). This is projected to increase to 9.893 million m³/a (27.105MI/d) by 2035.

8.12 HOWE WITTEKOP WSS

The Howe Wittekop WSS is located in the northern portion of the Okhahlamba LM, north-west of Malottas Kraal and Greenpoint. The Howe Wittekop WSS includes the areas of Nqula, Tintwa, Wittkop and Howe, totalling 336 households.

According to the area operators of the uTDM, people are provided with water via water tankers. There are no stand pipes and water is stored in JoJo tanks.

The 2015 water requirements, including losses, were estimated as 0.030 million m³/a (0.083MI/d). This is projected to increase to 0.083 million m³/a (0.228MI/d) by 2035.

8.13 JAGERSRUST INDIVIDUAL SCHEME

The Jagersrust Individual Scheme a stand-alone scheme located in the north of the Okhahlamba LM, next to the Drakensberg Individual Scheme. This Scheme serves Jagersrust formal area – an Eskom township – totalling 99 households (2011).

According to the 2011 Census, water is provided from a local scheme and at least 98% of households receive water in the form of a house or yard connection. No other information is available on water supply infrastructure and storage for this settlement.

The 2015 water requirements, including losses, were estimated as 0.035 million m³/a (0.095MI/d). This is projected to increase slightly by 2035, namely 0.045 million m³/a (0.122MI/d).

8.14 LADYSMITH WSS

The Ladysmith WSS is located in the central to southern portion of the Emnambithi / Ladysmith LM and includes the Ladysmith urban area, Steadville, Ezakheni Proper as well as Roosboom and Meadows (the latter two areas being located 8km to the south-west of Ladysmith). This is one of the major urban and industrial nodes in the uTDM. The service area includes 23 118 households (2011).

The Ladysmith WTW is supplied from water abstracted from the Klip River as well as water abstracted from the Spioenkop Dam. The raw water from the Spioenkop Dam is provided via a 32km, 510mm diameter pipeline (had two pipe bursts in the last twelve months November 2014 – November 2015) at a current rate of 18MI/d. No information is available on the actual pipeline route from the Dam to Ladysmith. An estimated 12MI/d is provided from the Klip River to the WTW. The abstraction from the Klip River is unreliable at present (November, 2015) due to the prevailing drought conditions.

Roosboom and Meadows are supplied at a rate of 32kl/h (0.384MI/d if running a cycle of 12 hours) from the Ladysmith WTW. There are boreholes also in use in Roosboom, which augments supply in the case of drought, as is currently the situation in the Province (November, 2015).

The plant supervisor confirmed (August, 2015) that the Ladysmith WTW has a design capacity of 23MI/d and is currently operating at 31MI/d (135% of its design capacity!). The Ladysmith WSS is also augmented with water

supplied from the neighbouring Ezakheni WSS at a rate of 510m³/hour. If supplied for 12 hours, it equates to approximately 6.12MI/d. The consumption needs to be verified and split between domestic, industrial and business use. The 2014 Blue Drop Report (DWS) listed the design capacity of the Ladysmith WTW as 23MI/d and operating at 20.93MI/d (91%) of its design capacity.

There are high occurrences of leaks in the Ladysmith and Steadville areas, resulting in high water losses. This has to be addressed as a matter of urgency! Details of the WC/WDM Programme implemented by the uThukela DM should still be obtained.

The uTDM recently embarked (project still ongoing) on a bulk flow meter installation programme, starting with Ladysmith and Ezakheni. The water flow is also monitored and recorded in a SCADA system.

The Ladysmith WWTW has a design capacity of 21MI/d and is operating at an estimated 16MI/d if all sewer pump stations are operational (November 2015). However, Talbot & Talbot (refurbished selected WTW's & WWTW's in the uTDM) reported the design capacity as 16MI/d and operating at 14MI/d (October, 2016). The 2014 Green Drop Report still reported the design capacity as 21MI/d, operating at 151% of its design capacity (but this could be due to No Information Available).

The 2015 water requirements, including losses, were estimated as 9.197 million m³/a (25.196MI/d). This is projected to increase significantly to 12.556 million m³/a (34.401MI/d) by 2035.

8.15 LANGKLOOF WSS

The Langkloof WSS, serving the settlement of Langkloof, is located in the northern part of the Okhahlamba LM, just north-west of the Woodstock Dam and the Zwelisha Moyeni WSS. The Kilburn Dam wall is situated about 3km north of Langkloof. There are an estimated 362 households within the scheme area (2011).

The water source is the Tugela River, where water is abstracted and pumped to the Langkloof WTW. This is a package plant with a design capacity of 0.1MI/d, operating at full capacity. The area manager is in the process of procuring bulk meters in order to record the water input and outflow of the plant (November, 2015). The 2014 Blue Drop Report stated the design capacity as 0.1MI/d, operating at only 29% of its design capacity.

The reticulated infrastructure components include stand pipes distributed evenly within the settlement. The residents however have made a number of illegal connections to improve services yard connections. This increases the water consumption in this area, which have initially not been made provision for. The number of households has increased significantly according to the area operators. There are no metered connections and no consumer pays for water (November, 2015).

The majority of consumers have pit latrines (below RDP standards) and the remainder are served with VIP latrines. There is therefore no sanitation treatment infrastructure in this area.

The 2015 water requirements, including losses, were estimated as 0.031 million m³/a (0.086MI/d). This is projected to increase to 0.089 million m³/a (0.244MI/d) by 2035.

8.16 LOSKOP WSS

The Loskop WSS is located in the northern part of the Imbabazane LM and includes the settlements of Bhekuzulu, Engonyameni and Etatane amongst others. There are a total of eight settlement areas, having an estimated 6 098 households (2011).

Water is abstracted from the Little Tugela River, where it is treated at the Loskop WTW with a design capacity of 1.2MI/d and operating 100% of its capacity. The 2014 Blue Drop Report (DWS) provided the design capacity of the Loskop WTW as 1.2MI/d and operating at 1.2MI/d (100%) of its design capacity. (There are conflicting reports in the MIG Business Plans and MIG Implementation Plans on the capacity of the works – being much smaller at 100kl/d).

Currently most consumers are provided with stand pipes, but there are many illegal connections to homes (therefore yard or house connections). Due to the illegal connections and increased water use, water cannot reach the settlement of Bhekuzulu and they are currently provided with tankered water supply (November, 2015). Also, the scheme was initially designed to supply 25l/c/d to Bhekuzulu, but it seems the water consumption is much higher, resulting in water shortages.

A study was conducted to augment water supply for this scheme area, including upgrading of the Loskop abstraction works, WTW and distribution infrastructure (Sukuma, 2010). Construction has commenced and will happen in phases (planned completion initially 2017, but now it is 2019). Furthermore, the WSS will be extended to the Empangweni area which is currently served by a single borehole, but this borehole is insufficient to meet the water requirements and water is also provided via water tanker (November, 2015).

The Internal Strategic Perspective (ISP) for the Uthukela Water Management Area indicated that the Little Tugela River is already stressed in terms of water allocations – predominantly for irrigation (DWAf, 2004). The development of farm dams may improve water availability to consumers. The implementation of the Ecological Reserve however may further reduce the water availability for human needs (any user sector).

The WARMS database lists one registered water use by a WSP for this area for a volume of 1.872 million m³/a (5.129MI/d).

The level of sanitation services are mostly in the form of pit latrines and septic tanks.

The 2015 water requirements, including losses, were estimated as 1.364 million m³/a (3.738MI/d). This is projected to increase to 2.209 million m³/a (6.053MI/d) by 2035. This indicates that this supply area is **potentially urgently in need of augmentation** to meet their water requirements.

8.17 NGEDLENGEDLENI-UMHLUMAYO WSS

The Ngedlengedleni-Umhlumayo WSS is located just south of the Ekuvukeni Lime Hill WSS, within the Indaka LM. It includes the settlements of Oqungweni, Bhaza and Ghobo amongst others in ward 9, having 948 households (2011). It may be that consumers in the neighbouring Msinga Local Municipality, residing in Majozi, Bhaza and Ghobo are also supplied from this scheme, but this has to be confirmed.

The plant supervisor of the Ekuvukeni Lime Hill WSS indicated that this area is a borehole supply scheme (August, 2015). Furthermore, there is a small abstraction and treatment works south of this scheme (water abstracted from the sand aquifer next to the Tugela River) next to the existing Tugela Estates WTW that used to supply the Ngedlengedleni-Umhlumayo WSS area, but this works is currently not operational (November, 2015). It is possible that it will extend further north to Fitty Park and other areas in the neighbouring wards 6, 7 and 8. (Construction is currently taking place in the Fitty Park area to establish the bulk distribution and reticulation network, storage and pumping stations).

The 2015 water requirements, including losses, were estimated as 0.081 million m³/a (0.223MI/d). This is projected to increase to 0.213 million m³/a (0.584MI/d) by 2035.

8.18 TUGELA ESTATES WSS

The Tugela Estates WSS is located just south of the Ngedlengedleni WSS and forms the southern border of the Indaka LM. It includes the areas of Kokwane, Langa, Mbango, The Ravine, Tugela Estates and Zamazema, totalling 1 758 households (2011).

Water is abstracted from the Thukela River and then treated at the Tugela Estates WTW to serve the consumers in ward 10 via stand pipes. The plant supervisor indicated that the plant design capacity is 1.2MI/d and it is operating at 70 – 100% of its design capacity (August, 2015). The 2014 Blue Drop Report (DWS) listed the design capacity of the Tugela Estates WTW as 1.2MI/d and operating at 0.9MI/d (75%) of its design capacity. There are however a number of illegal connections to bring water to yard level connections. Consumers in the east, in Langa are served via community stand pipes.

Sanitation services are in the form of pit latrines which are below RDP standards.

The 2015 water requirements, including losses, were estimated as 0.531 million m³/a (1.454MI/d). This is projected to increase slightly to 0.850 million m³/a (2.330MI/d) by 2035.

8.19 WEENEN WSS

The Weenen WSS is located in the central-eastern part of the Umtshezi LM and is also one of the developed urban nodes in the uTDM. It currently serves the areas of Weenen, Ezitendeni and Impembeni, totalling 1 570 households (2011).

Water is abstracted from a balancing dam that is supplied from an irrigation canal that in turn is supplied from the Bushmans River. The water is then treated at the Weenen WTW located just south of Weenen, next to the Bushmans River. The area engineer and engineering consultant (ECA Consulting Engineers) indicated that the Weenen WTW capacity is 1.45MI/d (operating at 100% of its design capacity). The 2014 Blue Drop Report (DWS) listed the design capacity of the Weenen WTW as 1.4MI/d and operating at 1.41MI/d (101%) of its design capacity.

There is a new package plant of 2.7MI/d being commissioned as part of the MIG-funded Kwanobamba-Ezitendeni (Weenen) Water Supply Project, bringing the total to an estimated 4.15MI/d. Construction of the MIG project is 50% complete (February 2016). It will be possible to further extend the package plant to a total capacity of 5MI/d, allowing for the decommissioning of the existing 1.45MI/d WTW.

The irrigation canal is shared with farmers, which put the water supply assurance for domestic use at risk during high water use for irrigation purposes.

Weenen has full waterborne sanitation or septic tanks and house connections for water whereas in Ezitendeni and Impembeni, consumers are provided with water from stand pipes. There are however illegal connections, therefore actually providing water to yard or house connections. Consumers in Ezitendeni and Impembeni have VIPs for sanitation services.

Weenen has a very small wastewater treatment system (maturation ponds) of 0.1MI/d and it is operating at full capacity. (November, 2015). A new 1.5MI/d WWTW will be constructed starting in and the expected completion is in 2017. This project is currently in the tender phase (February 2016).

The 2015 water requirements, including losses, were estimated as 0.425 million m³/a (1.163MI/d). This is projected to increase to 0.628 million m³/a (1.719MI/d) by 2035.

There are plans to extend water supply from the Weenen WTW and further augment the supply via the George Cross WTW to serve consumers to the north and east of Weenen. (Refer to the next section, detailing the Umtshezi Regional Water Supply Scheme Planning, 2016).

8.20 WINTERTON WSS

The Winterton WSS is located in the eastern section of the Okhahlamba LM and includes the areas of Winterton and Khethwani, totalling 1 807 households (2011).

Water is abstracted from a weir in the Little Tugela River, where it is treated at the Winterton WTW, having a design capacity of 1.3MI/d, operating at full capacity (area superintendent, March 2016). The 2014 Blue Drop Report (DWS) listed the design capacity of the Winterton WTW as 1.3MI/d and operating at 0.806MI/d (62%) of its design capacity. The area manager is in the process of procuring bulk water meters to measure the inflow and outflow from the WTW. More staff is required to ensure full operation and maintenance of the WTW. The abstraction works and WTW are not functioning optimally – a study was conducted by the uTDM, but details on the recommendations are not available to the area superintendent.

Water supply pipes are mostly from asbestos-cement material, but are replaced as necessary when breakages or leaks occur, with uPVC pipes. The condition of the infrastructure is generally acceptable but consumers experience interruptions in supply from time to time due to low pressure in the system. All consumers in Winterton and Khethwani have waterborne sanitation and house connections. Consumers in Winterton pay for water services, but none of the consumers in Khethwani pay for water services provided.

Winterton has a WWTW with a design capacity of 2MI/d and it is operating at full capacity, but requires urgent remedial attention. This is hampered due to staff shortages. The 2014 Green Drop Report listed the design capacity as 2MI/d and operating at 151% (although this could be due to No Information Available).

The 2015 water requirements, including losses, were estimated as 0.590 million m³/a (1.617MI/d). This is projected to increase to 0.796 million m³/a (2.179MI/d) by 2035.

8.21 ZWELISHA MOYENI WSS

The Zwelisha Moyeni WSS is located in the central area of the Okhahlamba LM, continuing towards the western border with the Free State Province and the Kingdom of Lesotho. It includes about 29 settlement areas, amongst other Mkukwini, Nyusana, Zwelisha, Amazizi, Bhalekisi, Mazizini (including Newstende) and Moyeni, totalling 9 887 households (2011).

Water is abstracted from a canal and weir system in the Khombe River, where it is treated at the Zwelisha Moyeni WTW. The Woodstock Dam and Driel Barrage are located along the eastern boundary of the WSS. The 2014 Blue Drop Report (DWS) listed the design capacity of the Zwelisha Moyeni WTW as 5.0MI/d and operating at 2.4MI/d (48%) of its capacity. The area manager indicated that once the bulk meters for the WTW inflow and outflows have been procured (submission was made to the head office), more accurate information can be provided on the actual operational capacity (November, 2015).

The WTW is also being upgraded and a MIG project (MIG/KZN0595/W/07/09) is being implemented to improve reticulation and water supply (Dukuza / Hoffenthal, Esibomvu, Emakhosaneni, Gosheni, Nkomanzana, KwaNkosana, Gangadweni) – pipelines have been constructed, but are not yet linked to the existing scheme.

The bulk water supply pipelines (asbestos-cement) are in a fair condition. Pipelines replaced as a result of breakages or leaks are from the uPvc material type.

Most of the consumers are provided with water via communal stand pipes – varying distances from the households (within 200m, more than 200m). However, most households have established illegal connections from the stand pipes to yard connections. This increases the water requirements from the Zwelisha Moyeni WTW for this area. Furthermore, water from the Khombe River is also utilised by irrigators along the canal.

There is no WWTW in this area as most consumers are served with dry sanitation (pit and VIP latrines). There are also no individual meters to measure water consumption and no consumer pays for water supplied.

The 2015 water requirements, including losses, were estimated as 1.641 million m³/a (4.495MI/d). This is projected to increase to 2.981 million m³/a (8.166MI/d) by 2035.

9. PLANNED AND POTENTIAL FUTURE WATER SUPPLY – PROJECTS

This section provides an overview of the currently planned and potential future water supply projects in the uTDM as registered under the Municipal Infrastructure Grant (MIG) programme, Municipal Water Infrastructure Grant (MWIG) programme and Regional Bulk Infrastructure Grant (RBIG) programme since 2009/2010/2011 or that are still under construction.

9.1 PROJECT LIST FROM COGTA - MIG

Information in this section was obtained from the KwaZulu-Natal Provincial Department of Co-operative Governance & Traditional Affairs – COGTA.

The January 2016 project list for projects not yet completed, received from KZN COGTA is provided in **Table 9.1**.

Table 9.1 MIG Project list for the uTDM

Provincial Reference Number	National Project Number	Project Name	Reg Year	Project Status	Total Project Cost	MIG Funds
KN057		AMANGWE / LOSKOP		Construction	R 44 974 818	R 44 974 818
2006MIGFDC2311 1829	MIG/KZN0595/ W/07/09	Moyeni/ Zwelisha RWSS Ph. 4 (Dukuza / Hoffenthal) (AFA) MIS 172338	2006	Construction	R 56 013 761	R 56 013 761
2006MIGFDC2311 2081	MIG/KZN0589/ W/06/12	Driefontein Complex Bulk Water Supply	2006	Construction	R 126 101 362	R 126 101 362
2006MIGFDC2311 3342	MIG/KZN0590/ W/06/09	Bergville Bulk Water Supply Extension and Reticulation	2006	Construction	R 24 362 664	R 24 362 664
2006MIGFDC2311 4315	MIG/KZN0770/ W/06/07	Indaka Bulk Water Audit / Feasibility	2006	Registered	R 498 038	R 498 038
2007MIGFDC2314 7504	MIG/KZN0927/ W/06/07	Moyeni / Zwelisha Community Water Scheme	2007	Construction	R 9 357 063	R 9 357 063
2008MIGFDC2316 0811	MIG/KZN1391/ W/04/12	Ntabamhlophe Water Supply Phase 4 to 13 (AFA) MIS 220289	2008	Construction	R 239 514 159	R 212 031 939
2008MIGFDC2316 2167	MIG/KZN1687/ W/07/11	Fitty Park Umhlumayo Extensions	2009	Construction	R 15 700 000	R 15 700 000
2010MIGFDC2319 6318	MIG/KZN2095/ W/10/14	Bhekuzulu-Epangweni Community Water Supply (AFA) MIS 201661	2010	Des & Tender	R 272 728 464	R 239 235 495
2011MIGFDC2320 2432	MIG/KZN2252/ W/10/11	Ezakheni_Emnambithi Bulk Water Infrastructure Upgrade Project - Design Phase (AFA) MIS 216393	2011	Des & Tender	R 40 699 215	R 40 699 215
2012MIGFDC2320 9383	MIG/KZN2589/ W/12/13	Emergency repairs to the Spioenkop to Ladysmith Bulk Water Supply Pipeline	2012	Registered	R 3 782 830	R 3 782 830
2012MIGFDC2320 7795	MIG/KZN2674/ W/11/12	Emergency Upgrade of Wagonsdrift Pump Station	2012	Registered	R 8 516 370	R 8 516 370
2013MIGFDC2321 3176	MIG/KZN2858/ W/12/15	Kwanobamba-Ezitendeni (Weenen) Water Supply Project	2013	Registered	R 207 769 329	R 207 769 329

9.1.1 Provincial Project Number: KN057. AMANGWE / LOSKOP

This project is located in the Imbabazane LM and serves the areas of Amangwe (Emoyeni) and Loskop. It involves the upgrading of bulk supply infrastructure and extension of the existing infrastructure to new areas.

9.1.2 Provincial Project Number: 2006MIGFDC23111829. Moyeni/ Zwelisha RWSS Ph. 4 (Dukuza / Hoffenthal) (AFA) MIS 172338

This project is located in the Okhahlamba LM and serves the area of Dukuza / Hoffenthal in the Zwelisha Moyeni WSS. It involves the upgrading of bulk supply infrastructure and extension of the existing infrastructure to new areas.

The scope of works includes:

- The construction of 9km 160mm mPVC gravity main, a pump station and 2.5km of 110mm rising main, a 1MI reservoir and approximately 95km of associated reticulation dispensed at 150 communal standpipes.

9.1.3 Provincial Project Number: 2006MIGFDC23112081. Driefontein Complex Bulk Water Supply

This project was initiated in 2005/2006 is located in the Emnambithi / Ladysmith LM where 13 contracts were awarded for the improvement and extension of the reticulated infrastructure within the communities. The water source currently in use is production boreholes – until such time that the Spioenkop Dam Bulk Water Upgrade project would be fully operational (planned first phase by 2019).

The scope of works includes the following:

- Two new pumping stations; 13km of bulk water feeder mains; construction of a 3MI reservoir.
- The development of bulk water distribution network within the area of some 78km in length to effect linkage to the five existing schemes including supply to an additional eight new strategically located storage reservoirs with capacities ranging between 100kl & 500kl.
- Provision of a reticulation infrastructure to all the remaining backlog communities from strategically located standpipes and the laying of some 235km reticulation mains.

9.1.4 Provincial Project Number: 2006MIGFDC23113342. Bergville Bulk Water Supply Extension and Reticulation

This project is located in the Okhahlamba LM and applies to the Bergville WSS. It involves the extension of water supply infrastructure to new areas including reticulated water supply.

The scope of works includes:

- Upgrading of the pump station at Bergville WTW; new 5km rising main; new 1MI reservoir at Bethany; 23.25km of bulk reticulation to link the five target communities; provision of reticulation infrastructure (16.5 km), and communal standpipes.

Further technical details on the project scope are still being sourced. The water source remains the Driel Barrage, which should have sufficient water available for augmentation of this scheme area.

9.1.5 Provincial Project Number: 2006MIGFDC23114315. Indaka Bulk Water Audit / Feasibility

This project is located in the Indaka LM and applies to the Ekuvukeni Lime Hill WSS with consideration of the neighbouring Driefontein WSS and Ngedlengedleni-Umhlumayo WSS.

Details on the water audit scope of work and feasibility study to be conducted should still be obtained.

9.1.6 Provincial Project Number: 2007MIGFDC23147504. Moyeni / Zwelisha Community Water Scheme

This project is located in the Okhahlamba LM and applies to the Zwelisha Moyeni WSS. It includes extensions to the Zwelisha Moyeni WSS. Further details on the scope of work should be obtained.

9.1.7 Provincial Project Number: 2008MIGFDC23160811. Ntabamhlophe Water Supply Phase 4 to 13

This project is located in the Imbabazane LM and applies to the Estcourt Rudimentary WSS. It entails the improvement and construction of water supply infrastructure to the area of Ntabamhlophe-Good Home. (Phase 1 of the project – KN347 – has been completed).

A variation order was submitted for the change in scope of works to the following (Variances from the original proposed scope of works are indicated in brackets):

- Construction of five pump stations (2 additional pump stations),
- Construction of a total of 87 644 metres of bulk piping (26,099 m),
- Construction of a total of 188 274 metres of reticulation piping (82,413 m),
- Construction of 11 new reservoirs (4 additional reservoirs),
- Construction of 455 communal standpipes (107 additional standpipes),
- A gravel access road to new reservoir site for the phase 6 community supply (new item), and
- Construction of one water office for the O&M of the scheme (no variance).

9.1.8 Provincial Project Number: 2008MIGFDC23162167. Fitty Park Umhlumayo Extensions

This project is located in the Indaka LM and falls within the Ekuvukeni-Lime Hill WSS area. It includes the construction of new reticulated infrastructure for the Fitty Park area, currently supplied from production boreholes. The future water source would however be the sand aquifer / groundwater abstracted near the Tugela River, by the neighbouring Ngedlengedleni-Umhlumayo WSS.

The scope of work includes:

- Construction of 500kl and 600kl reservoirs, pump stations, approximately 7.3km of gravity and pumping mains and reticulation.

9.1.9 Provincial Project Number: 2010MIGFDC23196318. Bhekuzulu-Epangweni Community Water Supply (AFA) MIS 201661

This project is located in the Imbabazane LM and provides for the extension of water supply infrastructure from the existing Loskop WSS into Amangwe, Bhekuzulu and Empangweni settlement areas.

The scope of works includes:

- Increasing the capacity of the existing Loskop abstraction works from 100kl/d to 300kl/d and also the existing WTW from 100kl/d to 300kl/d.
- Installation of pumps and rising main to existing reservoir A-A and a new pump station from Res A-A to new Res B2 and B3.

- Construction of 24km bulk pipeline and 28km reticulation network and 80 standpipes, new river abstraction works, pump station, break pressure tanks and treatment facility for Amangwe South, bulk meters at each supply reservoir.

9.1.10 Provincial Project Number: 2011MIGFDC23202432. Ezakheni / Emnambithi Bulk Water Infrastructure Upgrade Project (Planning phase)

This project is located in the Emnambithi / Ladysmith LM and aims to improve the reliability, volume and management of water supplied to the urban areas of Ladysmith, Ezakheni and Roosboom. The following aspects would be addressed in particular:

- Implement bulk water infrastructure;
- Ensure sufficient storage;
- Internal interventions to optimise use of existing infrastructure;
- Develop and implement a rehabilitation strategy; and
- Implement a WC/WDM programme.

A variation order has been submitted for the design of the bulk water supply infrastructure and the scope of works for the project would include:

- Construction of additional 15MI reservoir at Observation Hill;
- Upgrade Observation Hill Bulk Distribution;
- Upgrade Bulk Supply from Spioenkop Dam;
- Construction of new WTW near Spioenkop Dam;
- Dedicated supply to Observation Hill;
- Bulk Supply connection for Driefontein / Indaka Complex to Hobsland reservoir;
- Ladysmith to Ezakheni Bulk Extension;
- Booster pump station to Roosboom, Weenen, Colenso.

9.1.11 Provincial Project Number: 2012MIGFDC23209383. Emergency repairs to the Spioenkop to Ladysmith Bulk Water Supply Pipeline

This project is located in the Emnambithi / Ladysmith LM and relates to the 510mm diameter bulk water supply pipeline from the Spioenkop Dam that feeds the Ladysmith WTW and is part of the Ladysmith WSS.

The pipeline has been exposed due to flooding in the area and has suffered damage as a result and due to erosion from repeated overflows. During one such flood, a section of the pipeline was washed away and repaired. This project was registered for the rehabilitation and further repair of the pipeline.

9.1.12 Provincial Project Number: 2012MIGFDC23207795. Emergency Upgrade of Wagonsdrift Pump Station

This project is located in the Imbabazane LM and is for the upgrade of the Wagonsdrift Pump station which supplies the George Cross WTW – part of the Estcourt Water Supply Scheme.

The pumps at the Wagonsdrift pump station are ageing and it affects performance and operation of the WTW, putting consumers at risk as the quality of water and efficient operation of the WTW cannot be guaranteed. Two pumps are working but the standby pump is broken.

The scope of works includes:

- Replacement of the pumps, which means the non-return valves and pipe work needs to be modified, the existing 2.2Kv Eskom line will have to be upgraded and the 2.2Kv Transformer replaced, to accommodate the modern pumps.

9.1.13 Provincial Project Number: 2013MIGFDC23213176. Kwanobamba-Ezitendeni (Weenen) Water Supply Project

This project is located in the Umtshezi LM and applies to the KwaNombamba-Ezintendeni settlement area east of Weenen. An estimated 10 790 people (2 203 households) are set to benefit from this project, of which 867 households are currently below a basic level of RDP water supply.

The scope of works includes:

- Repairs / refurbishment of canal system;
- Construction of 5.0 Ml water treatment works;
- Construction of nine new reservoirs;
- Construction of the water bulk and reticulation networks to approximately 2 203 households;
- Replacement of asbestos cement pipe network;
- Extending networks to rural areas surrounding Weenen;
- The network will include for air valves, isolating valves and scour valves. Isolating valves will be located to minimise the effect of closure on the supply and to suit scour activities;
- Bulk meters will be provided at the boundary of each distinct supply zone; and
- The networks will be designed to cater for the ultimate demand.

The total project cost (construction, fees and VAT) is estimated to be R207.77 million.

Construction has started on the project (planned construction start date was in May 2013) and currently – January 2016 – it is 50% complete.

9.2 PROJECT LIST FROM DWS - RBIG

Information in this section was obtained from the KwaZulu-Natal Provincial Department of Water and Sanitation, Programme Manager for RBIG projects.

9.2.1 Provincial Project Number: RBIG KNR 020. Driefontein Complex Bulk Water Supply Project

This project is located in the Emnambithi / Ladysmith LM as well as the Indaka LM and relates to water supply improvement and extension to the Driefontein WSS area and Ekuvukeni-Lime Hill WSS area. The water source will be the Spioenkop Dam after construction and implementation of the proposed Spioenkop Dam WTW and supporting bulk and distribution infrastructure (possibly by 2019).

The project aims to serve 86 660 people in the Driefontein WSS area and 117 646 people in the Ekuvukeni-Lime Hill WSS area. The project² will be implemented in stages and work packages as follows:

Stage 1. KNR 010: Driefontein Complex Bulk Water Supply Project

- To address outstanding bulk water supply infrastructure components within the Driefontein Complex including the development of Production Boreholes as an interim water source (Emnambithi LM area) – 3 Contracts:
 - uThukela DM Contract 02/2010: Eastern Bulk Water Feeder Main & CWSS. Completed September 2012.
 - uThukela DM Contract 34/2011: Western Bulk Water Feeder Main & CWSS. Completed June 2013.
 - uThukela DM Contract 96/2012: 5 Mℓ. Hobsland Balancing Reservoir. Completed March 2014.
- Development of the bulk water supply feeder main from Ladysmith (Observation Hill Res.) to the Hobsland Reservoir located within the Driefontein Complex (Emnambithi LM area) – 1 Contract:
 - uThukela DM Contract 97/2012: Driefontein Bulk Water Feeder Main. Practical Completion October 2014.

Stage 2. KNR 020: Driefontein Bulk Water Supply Extension Project

- Extension of the bulk water supply infrastructure from Hobsland Reservoir to Matiwanoskop (Emnambithi LM area) – 2 Contracts:
 - The first 20.2 km portion of the 630 mm dia. PVC-O bulk water gravity feeder main to the Indaka LM. The first 13.5km due for completion October 2015.
 - A 5.4 km, 315/250 mm dia. linkage to a strategically located reservoir at Jononoskop, including a booster pumping installation en-route the feeder main. Due for completion by December 2016.
- Hobsland Booster Pump Installation – 1 Contract:
 - Construction of a booster pumping installation at a strategic location between the Observation Hill Reservoir (Ladysmith) and the Hobsland Reservoir (Driefontein). Progress will be in accordance with the implementation of the Spioenkop Dam Bulk Water Upgrade project.
- Further extension of the bulk water supply infrastructure to Steincoalspruit / Inkunzi (Emnambithi LM area) – 1 Contract:
 - The second 8.3 km portion of the 630 mm dia. PVC-O bulk water gravity feeder main to the Indaka LM. Progress will be in accordance with the implementation of the Spioenkop Dam Bulk Water Upgrade project.
 - An 8.6 km, 200 mm dia. uPVC linkage to a strategically located reservoir in Steincoalspruit / Inkunzi. Progress will be in accordance with the implementation of the Spioenkop Dam Bulk Water Upgrade project.
- Further extension of the bulk water supply infrastructure to the existing Zandbult Reservoir (Ekuvukeni) to serve the ultimate needs of the Indaka LM area – 3 Contracts:
 - The final 19.5 km portion of the 630 mm dia. PVC-O bulk water gravity feeder main to the existing Zandbult reservoir in the Indaka LM. Progress will be in accordance with the implementation of the Spioenkop Dam Bulk Water Upgrade project.
 - Construction of a 5 Mℓ balancing reservoir midway en-route the feeder main. Progress will be in accordance with the implementation of the Spioenkop Dam Bulk Water Upgrade project.

² Information from: Proposed Driefontein Complex Bulk Water Supply and Community Reticulation Project. Feasibility Report, March 2006. Amendment No. 1, June 2009; and

9.3 EZAKHENI / EMNAMBITHI BULK WATER INFRASTRUCTURE UPGRADE PROJECT BUSINESS PLAN (2012) AND LADYSMITH WATER MASTER PLAN (2011)

The uTDM appointed a consortium of consultants to develop a long term Water and Sanitation Master Plan for the Emnambithi / Ladysmith LM and possibly surrounding areas. There is potential to establish a large (up to +-150MI/d) WTW – implemented in phases (50MI/d modules) – that would then supply all consumers in the Emnambithi / Ladysmith LM as well as potentially extend into neighbouring LMs.

The existing Ladysmith WTW would then be decommissioned.

Information modelled and captured into the Master Plan is available electronically in the IQMS Infrastructure Asset Management Software package in use by the uTDM.

A Business Plan: Ezakheni / Emnambithi Bulk Water Infrastructure Upgrade Project (version 1.0 draft) has been prepared by WMN Consulting (Pty) Ltd, (September, 2012). The following salient information is provided from the said Business Plan:

- The Business Plan is based on the Master Plan Report entitled “Ezakheni / Emnambithi Bulk Water Infrastructure Upgrade Project: Tender 07/2008” dated November 2011 which has been approved by the Uthukela District Municipal Council.
- The project area for the infrastructure upgrade has been divided into two geographic areas:
 - Primary Project Area: Existing water supply area of the Ladysmith, Ezkheni proper, St Chads, Steadville and the Pieters Industrial Area.
 - Secondary Project Area: Roosboom, Driefontein WSS area, Indaka Local Municipality and further into Okhahlamba Local Municipality and Umtshezi Local Municipality.
- The purpose of the upgrade project is to ensure reliable water supply to the project areas as they are currently affected by water source constraints (Klip River and Oliphantskop Dam), infrastructure constraints (old AC pipes, capacity of bulk infrastructure, leakages) and high Non-Revenue Water.

The Spioenkop Dam raw water pipeline (in poor condition) has an installed capacity of 19MI/d, whereas the Ladysmith WTW has a design capacity of 24MI/d and the Ezakheni WTW has a design capacity of 32MI/d. The Ladysmith WTW has limited potential for upgrading, but the Business Plan lists a number of actions and options to upgrade and improve operations of the Ezakheni WTW.

The water losses were estimated as 25% and even up to 75% in the Ladysmith WSS and Ezakheni WSS areas respectively. These are largely a result of the infrastructure network consisting of AC pipes, high pressures in the system, inadequate metering and therefore management of water flows, inadequate use of storage facilities, illegal connections and insufficient operation and maintenance procedures.

The Business Plan proposed the following internal interventions:

- WC/WDM (Urgent): water loss control programme, AC pipes replacement programme, bulk water metering, pressure control and improved revenue collection;
- Dedicated Supply and Zoning Interventions; and
- Interventions to address future developments: business and residential.

Further to the above, the Business Plan proposed Regional Projects in two development stages as follows:

- Development Stage 1
 - Regional Water Treatment Facility of to 50MI/d modules near the Spioenkop Dam; and
 - New bulk water transfer system from the Spioenkop Dam to the Ladysmith WTW.
- Development Stage 2
 - Increased Spioenkop Dam WTW capacity to 150MI/d. Provision will be made for a WTW spatial footprint of 200MI/d should the need arise.

A summary of the direct and indirect costs for the two Development Stages is provided in **Table 9.3** below.

Table 9.3 Summary of Direct and Indirect Costs for Development Stage 1 and Development Stage 2

SUMMARY OF COST				
Direct Costs	Indirect Costs			Total
Construction	Engineering fees Fees	ISD and Training		
		Construction Phase	Operational Phase	
R 1,086,763,129.69	R 129,976,870.31	R 16,301,446.95	R 10,867,631.30	R 1,243,909,078.24

Note: All costs exclude 14% VAT.

The "Engineering fees" include for professional fees, construction monitoring, third party inspections, land survey and environmental costs.

The Business Plan indicated the WSP for both bulk and retail functions as the uTDM, however at present it did not possess the required skills to operate a bulk regional scheme of this magnitude. Upon request of the uTDM, provision is made in the Business Plan for training and development up to 18 months from commissioning of the works in this project.

The uTDM has yet to apply for an increased water use license for abstraction from the Spioenkop Dam, from the Department of Water and Sanitation.

At the time of preparing the Business Plan, funding for the Ezakheni / Emnambithi Bulk Water Infrastructure Upgrade Project would have been sourced from MIG.

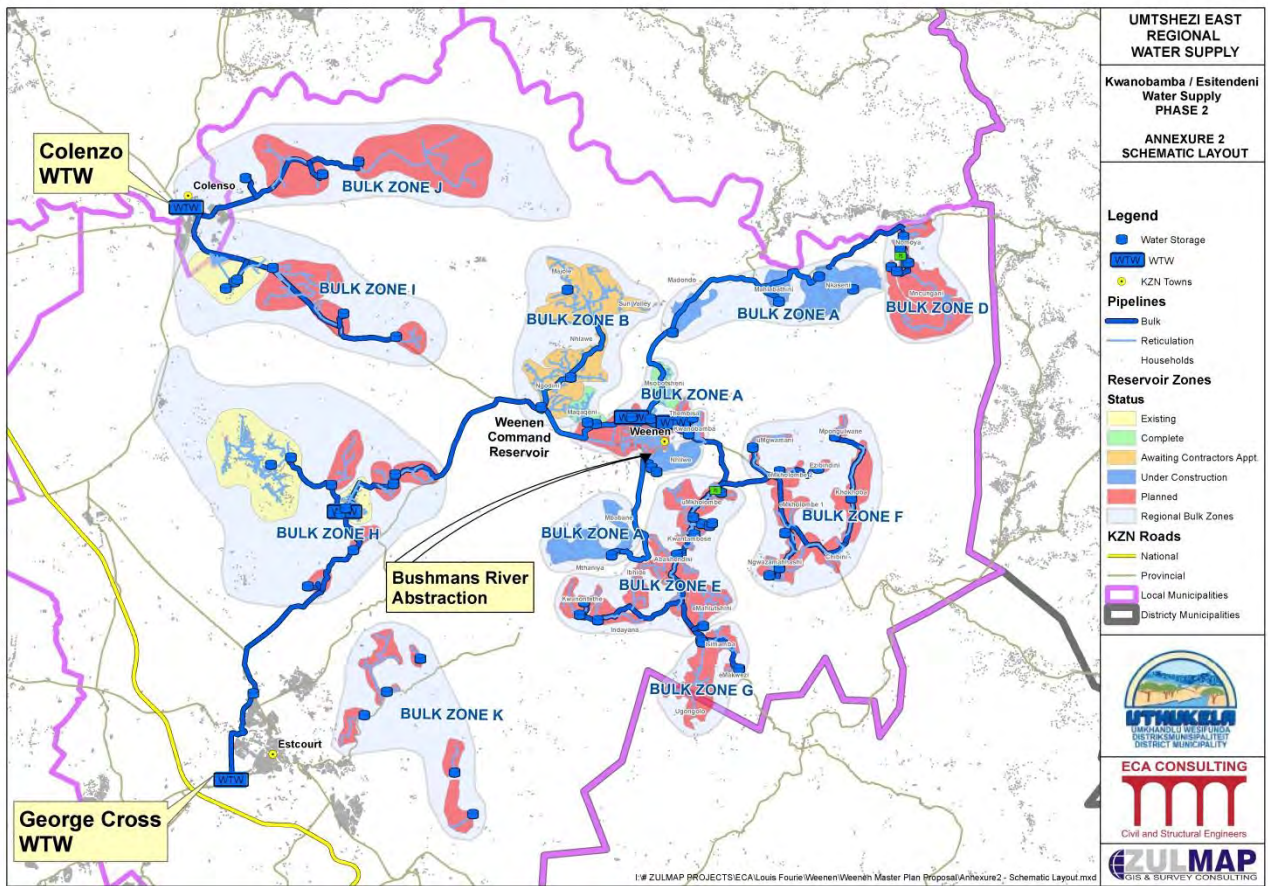
The above-mentioned Master Plan and Business Plan are provided as separate items under this study's deliverables.

9.4 UMTSHEZI REGIONAL WATER SUPPLY – PLANNING PHASE

The Umtshezi Regional Water Supply Scheme (RWSS) is still in the planning phase (Business Plan being developed) and aims to ensure water supply for the consumers in Weenen, the consumers towards the north-west and west of Weenen and to Colenso and towards the east of Colenso. Colenso is in the neighbouring Emnambithi/Ladysmith LM, but consumers towards the east of the town reside in the Umtshezi LM.

The schematic layout of the planned Umtshezi RWSS is illustrated in **Figure 7**. A larger format drawing is included in the map series, included under **Annexure B** of this document.

Figure 7. Umtshezi LM Regional Water Supply – Planned Bulk Supply Zones.



9.4.1 Weenen and Cornfields Areas’ Improved Water Supply

Water supply to the town of Weenen will be augmented from the George Cross WTW, from the Estcourt WSS in the southern part of the Umtshezi LM. It is planned to upgrade and refurbish the George Cross WTW from its design capacity of 18-20MI/d, to 40MI/d. It already operates (August 2015) at 110% of its design capacity. The WTW is supplied from the Wagendrift Dam, which potentially has 40 million m³/a available yield (~109MI/d) according to the Uthukela Water Management Area ISP (DWAf, 2004).

The WTW would then be able to supply an additional 7MI/d to the eastern areas of Umtshezi LM (including Weenen) and an additional 13MI/d to the Estcourt water supply area.

Water from the WTW will be pumped to a bulk supply reservoir situated above the town of Estcourt and a bulk gravity main line will be supplying a command reservoir at Weenen. Water can then be reticulated from the command reservoir to the supply areas of the Weenen and Kwanobamba WSS. Three booster pump stations would allow distribution to communities situated on higher elevation.

Furthermore, the area of Thembalihle east of Cornfields, would also be linked to the Estcourt WTW bulk gravity main to supply Thembalihle and Mbondwana.

9.4.2 Colenso Improved Water Supply

The Colenso Esikebheni WTW (design capacity of 2.21.1MI/d and is operating at 1.7MI/d, November 2015) should be refurbished and upgraded in order to supply a further 800kl/d to the rural areas of Moordkraal, Ganna Hoek, Ekhuthuleni and Mtontwane. A new pump station would also be required to reach the additional supply nodes from the WTW.

10. WATER REQUIREMENTS AND AREAS NOT SERVED BY EXISTING SCHEMES

This section describes the areas not yet covered by existing formal water supply schemes. Where possible, it will be indicated whether there is an existing RBIG or MIG-funded project.

This section includes a summary per Local Municipality, of the water requirements for the potential scheme areas not yet included in existing formal water supply schemes.

10.1 AMANGWANE WSS TBC (SW, GW)

The Amangwane area lies in the southern part of the Okhahlamba LM, and just north of the Bell Park Dam located on the Mtoti River. It is approximately 15km south-west of Winterton and similar in distance, east of the Loskop WTW (as the crow flies).

The 2011 Census Sub-place layer refers to this area by the name of Amangwane and recorded a total of 329 households, of which 234 were below RDP levels of water supply. The area consists of AmaSwazi and Meadowsweet. The area superintendent and area operators indicated that AmaSwazi receives water from a spring – supplying community stand pipes and Meadowsweet receives tankered water.

There is no further information on the water supply infrastructure, water quality, storage or water use.

The 2015 water requirements, including losses, were estimated as 0.058 million m³/a (0.158MI/d). This is projected to increase slightly to 0.120 million m³/a (0.330MI/d) by 2035.

There is no project registered for this area.

10.2 BERGVILLE WSS FUTURE TBC

The Bergville Future WSS is located in the central area of Okhahlamba LM, south of the Tugela River and south-west of the Spioenkop Dam in the east. The Bergville Future WSS includes the areas of Malefetheni, Situlwane, Bukweni and Kwanokopela amongst others, totalling 3 319 households (2011). This is mostly a rural area with dispersed settlements and households.

The majority of households (2 307) obtain water from private boreholes and springs. There were an estimated 2 241 households (68%) with water supply below RDP standards. The Driel Barrage is located in the upper west corner and the area is further bounded in the west by the Mlambonja River.

The Bergville WTW and existing water supply area is located towards the north of this area.

The 2015 water requirements, including losses, were estimated as 0.606 million m³/a (1.659MI/d). This is projected to increase to 1.235 million m³/a (3.383MI/d) by 2035.

There is no project registered for this area.

10.3 BESTER WSS TBC

The Bester WSS area – to be confirmed – is located in the central area of Emnambithi / Ladysmith LM, 8km north-west of the Windsor Dam and about 5km west of Kirkintulloch and Watersmeet. It includes the settlement of Bester that has 64 households (2011).

Water is obtained from boreholes, springs as well as tankered water. There were an estimated 37 households (56%) with water supply below RDP standards.

The 2015 water requirements, including losses, were estimated as 0.014 million m³/a (0.038MI/d). This is projected to increase to 0.025 million m³/a (0.069MI/d) by 2035.

There is no project registered for this area.

10.4 COLENZO WSS FUTURE TBC

The future Colenso WSS area – to be confirmed – is located in the northern part of the Umtshezi LM and east of the existing formal Colenso WSS and north of the Bloukrans River. The potential future supply includes new developments as well as rural areas with an estimated 502 households (2011).

This area forms part of the rural sub-place area of the 2011 Census (uMtshezi NU – referring to the whole of the area of the Umtshezi LM, not including the built-up urban or developed areas) and detailed information on the current water sources in use is not available. It is presumed that most residents obtain water from boreholes, springs and other local sources.

The 2015 water requirements, including losses, were estimated as 0.083 million m³/a (0.226MI/d). This is projected to increase to 0.214 million m³/a (0.586MI/d) by 2035.

There is no project registered for this area, however, provision is made in the Umtshezi East Regional Water Supply Planning Phase – to increase supply from the Colenso WTW by 800kl/d (0.80MI/d0) in order to supply these areas. A business plan is still being developed.

10.5 EMPANGWENI FUTURE WSS

The Empangweni Future WSS area is located just east of the existing Loskop WSS and includes the settlement of Empangweni with an estimated 786 households (2011).

Currently most consumers obtain water from a single borehole (if operational) or tankered water. There are plans to extend the Loskop WSS area to Empangweni (and improve supply to neighbouring Bhekuzulu) once the Loskop WTW has been upgraded. Details on the service levels to be provided should be verified from the MIG project: 2010MIGFDC23196318. Construction is expected to be completed by 2017.

The 2015 water requirements, including losses, were estimated as 0.178 million m³/a (0.487MI/d). This is projected to increase slightly to 0.308 million m³/a (0.844MI/d) by 2035.

10.6 ETATANE 2 FUTURE WSS

The Etatane 2 Future WSS area is located just north of the existing Loskop WSS, less than 4km north of Mqedandaba and includes the settlement of Etatane 2 (2011 Census sub-place name) with an estimated 153 households (2011).

The 2011 Census indicated that this area is supplied from a local water supply scheme, but the water source has to be verified – whether it is a local borehole scheme or whether the consumers are actually connected to the existing Loskop WSS. The 2011 Census further indicates that almost all consumers are supplied with water at or above RDP standards.

The 2015 water requirements, including losses, were estimated as 0.035 million m³/a (0.095MI/d). This is projected to increase slightly to 0.049 million m³/a (0.133MI/d) by 2035.

There is no project registered for this area, however, it seems to be included in the project to upgrade and extend the Loskop WSS.

10.7 FRERE WSS TBC CURRENT GW

The Frere WSS area – currently supplied from groundwater in the form of a borehole – is located in the north-western area of the Umtshezi LM, 6km west of Colenso and about 15km of Loskop. It includes the settlement of Frere that has 235 households (2011). The borehole has dried up (January 2016) due to the prevailing drought conditions. The Bloukrans River runs through the settlement and there is an existing weir which may serve as an option for water supply in this area.

Water supply services are in the form of communal stand pipes, but most consumers do not have adequate access (within 200m walking distance) therefore there are an estimated 80% of households below RDP standard.

The 2015 water requirements, including losses, were estimated as 0.037 million m³/a (0.100MI/d). This is projected to increase to 0.081 million m³/a (0.221MI/d) by 2035.

There is no project registered for this area.

10.8 KWANDEMA WSS TBC

The KwaNdema WSS area lies in the southern, central area of the Okhahlamba LM, 8km west of Loskop. It includes the areas of Cathkin Peak, Champagne Castle and other private residential or tourist areas. The area is also known as Bergville or Driefontein (not the same as Bergville near the Driel Barrage in the northern part of the LM and not the same as Driefontein in the Emnambithi / Ladysmith LM) and is represented by 218 households (2011).

Most consumers (almost all) have adequate water supply at or above RDP standards, from groundwater sources.

The 2015 water requirements, including losses, were estimated as 0.101 million m³/a (0.277MI/d). This is projected to remain the same being 0.139 million m³/a (0.382MI/d) by 2035.

There is no project registered for this area and it is not required.

10.9 LUSITANIA WSS TBC

Lusitania is a small settlement located in the north of the Emnambithi / Ladysmith LM, about 12km north of Watershed and Doornhoek. It is currently not connected to the Driefontein WSS supply area. There are an estimated 145 households in the settlement (2011).

According to the 2011 Census, all households are supplied via water tanker.

There are no boreholes in use in this area. Potential for groundwater exploitation is reduced due to the coal deposits, affecting water quality.

The 2015 water requirements, including losses, were estimated as 0.035 million m³/a (0.096MI/d). This is projected to increase slightly to 0.045 million m³/a (0.122MI/d) by 2035.

There is no project registered for this area.

10.10 MTONTWANE WSS TBC

The Mtontwane future supply area is located just west of Impembeni and Weenen, in the Umtshezi LM. There are an estimated 210 households of which 141 households (67%) do not receive water supply at least at RDP standards (2011).

Most consumers obtain water directly from rivers or streams (it is near the confluence of the Nyandu and Mtontwanes Rivers), boreholes or other sources.

The 2015 water requirements, including losses, were estimated as 0.044 million m³/a (0.122MI/d). This is projected to increase to 0.084 million m³/a (0.231MI/d) by 2035.

There is no project registered for this area, however, provision is made in the Umtshezi East Regional Water Supply Planning Phase – to increase supply from the Colenso WTW by 800kl/d in order to supply these areas. A business plan is still being developed.

10.11 WEENEN NORTH WSS FUTURE TBC

The area north of Weenen and Impembezi, along the Bloukrans River up to where it converges with the Tugela River, is currently not provided for by the existing Weenen WSS (Umtshezi LM). There are an estimated 638 households in this area, of which there are 618 households (97%) below RDP standards (2011).

Water use is likely from local sources such as rivers or streams. There are no boreholes in use or operated and maintained by the uTDM in this area.

A study is being conducted to extend the existing Weenen WSS area. The details of this proposed scheme extension is addressed in the section: Umtshezi Regional Water Supply – Planning Phase, of this report.

The 2015 water requirements, including losses, were estimated as 0.077 million m³/a (0.210MI/d). This is projected to increase to 0.225 million m³/a (0.616MI/d) by 2035.

There is no project registered for this area.

10.12 WEENEN SOUTH WSS FUTURE TBC

The area south and east of Weenen and Impembezi, lies south of the Bushmans River and includes the surrounding area of the Umngwenya River in the west and the iBusone River in the east. It is currently not provided for by the existing Weenen WSS (Umtshezi LM). There are an estimated 1 256 households in this area, of which there are 1 227 households (98%) below RDP standards (2011).

Water use is likely from local sources such as rivers or streams. There are no boreholes in use or operated and maintained by the uTDM in this area.

A study is being conducted to extend the existing Weenen WSS area. The details of this proposed scheme extension is addressed in the section: Umtshezi Regional Water Supply – Planning Phase, of this report.

The 2015 water requirements, including losses, were estimated as 0.162 million m³/a (0.444MI/d). This is projected to increase to 0.486 million m³/a (1.332MI/d) by 2035.

There is no project registered for this area.

10.13 ZWELISHA MOYENI WSS FUTURE TBC

The Zwelisha Moyeni WSS future area is located in the southern central area of the Okhahlamba LM, south of the existing Zwelisha Moyeni WSS. It includes an estimated 18 rural settlements – based on the 2011 Census Sub-Places, totalling 3 176 households. Of these, there are an estimated 2 619 households (82%) below RDP levels of service.

Consumers currently obtain water mainly from boreholes and springs. The Woodstock Dam, fed from the Mnweni River is situated just north of the settlements and the Nxwaye, Thonyelana-mpumalanga and Mlambonja Rivers traverse through the potential scheme area.

The 2015 water requirements, including losses, were estimated as 0.481 million m³/a (1.316MI/d). This is projected to increase to 1.148 million m³/a (3.145MI/d) by 2035.

There is currently no MIG project to improve water supply in this area.

10.14 WATER REQUIREMENTS PER LOCAL MUNICIPALITY FOR FUTURE AREAS – SUMMARY

The total water requirements of potential future scheme areas discussed above, per Local Municipality, are provided here in **Table 10.14A** and **Table 10.14B** (in million m³/a and MI/d).

There are no areas in the Indaka LM that are not already included in existing water supply schemes even though the existing infrastructure may not be providing adequate, reliable services.

Table 10.14A Water Requirements for Future Supply Areas (million m³/a), Per Local Municipality

Local Municipality	Households (2011)	HH Below RDP (2011)	Water Requirements (Million m ³ /a)				
			2015	2020	2025	2030	2035
Emnambithi / Ladysmith	209	42	0.049	0.056	0.062	0.066	0.070
Imbabazane	786	375	0.213	0.258	0.302	0.333	0.357
Indaka							
Okhahlamba	7 042	5 106	1.245	1.748	2.243	2.467	2.643
Umtshezi	2 841	2 622	0.402	0.655	0.908	1.010	1.090
TOTAL	11 032	8 145	1.909	2.717	3.515	3.876	4.159

Table 10.14B Water Requirements for Future Supply Areas (MI/d), Per Local Municipality

Local Municipality	Households (2011)	HH Below RDP (2011)	Water Requirements (MI/d)				
			2015	2020	2025	2030	2035
Emnambithi / Ladysmith	209	42	0.134	0.153	0.170	0.182	0.191
Imbabazane	786	375	0.582	0.706	0.827	0.911	0.977
Indaka							
Okhahlamba	7 042	5 106	3.410	4.786	6.145	6.758	7.240
Umtshezi	2 841	2 622	1.102	1.796	2.489	2.768	2.986
TOTAL	11 032	8 145	5.228	7.441	9.631	10.619	11.394

The largest water requirements for future supply areas are within the Okhahlamba LM, particularly the future Bergville WSS area (3.383MI/d by 2035) which is located south of the existing Bergville WSS. This is followed by the future Zwelisha Moyeni WSS area (3.145MI/d by 2035).

11. BULK WATER SUPPLY INTERVENTIONS CONSIDERED – RECONCILIATION

This section details the water supply reconciliation options for bulk water services within the uTDM – considering existing use and future supplies and water sources, per scheme area. The preliminary costs and programme for scheme augmentation or development is also provided, with a summary at the end of this section.

Provision was made for surveys, designs, tender, construction monitoring, land acquisition, environmental & community liaison, health & safety, site office and contingencies. Escalation (CPA) percent increase applied was 4.3% per annum. Costs do not include Value Added Tax (VAT).

The following standard costs and fees were applied per project, irrespective of the size of the project (as provided by Umgeni Water):

- Contingencies: 50%;
- Land acquisition: 7.5%;
- Environmental, Community Liaison: R2 000 000;
- Health & Safety, Quality Assurance: 1%;
- Project office: 3.5%; and
- P's & G's: 30%.

Furthermore, we have established a base-line cost for borehole development, which includes the site investigation, average drill depth of 70m (based on a desktop evaluation of the study area's groundwater characteristics) and fittings, including provision for solar energy source and site protection (fencing).

It is presumed that rural areas not served by regional bulk, local bulk or local rudimentary schemes consist of mostly labour tenants working on privately-owned farms. Conceptual scheme areas were not developed for these scattered households on private land.

11.1 AMANGWANE WSS TBC (SW, GW)

Consumers in the Amangwane supply area do not have adequate water supply at or above RDP levels of service. The number and yield of existing boreholes should still be confirmed along with the existing infrastructure and storage. According to the GRA2 DWS database, this area may have a potential yield of between 0.1 and 0.5l/s from groundwater sources (described as Intergranular and fractured).

Should this be a formalised rudimentary scheme, then the scheme components (including source development) would include:

- Groundwater development.
- Bulk distribution and reticulated pipelines: 75mm and 90mm diameter, 8km.
- Storage tank of 750kl.
- Standpipes: 65 units.

The total estimated cost is R34.5 million, equating to R79 128/household (2035 household projection).

Estimated time to implement this scheme, including Inception, technical or feasibility study, design, procurement, construction and close-out is 34 months for bulk infrastructure and 20 months for reticulation infrastructure.

11.2 BERGVILLE WSS

There is already a project under way to upgrade the water supply infrastructure to meet future water requirements. Further technical details on the project scope are still being sourced – including the benefiting settlements for this project. The water source remains the Driel Barrage, which should have sufficient water available for augmentation of this scheme area.

11.3 BERGVILLE WSS FUTURE TBC

The area south of the existing Bergville WSS and the Tugela River is currently reliant on local sources such as boreholes, springs and other unprotected water sources.

The settlement pattern is typical rural, dispersed households, thereby increasing the challenges to provide sustainable, affordable water services in such an area. Considering the water requirements, and geographic extent of the area, options of source development may include a localised groundwater scheme or surface water scheme.

The Situlwane River traverses the area whereas the Mlambonja River forms a natural boundary to the west of the potential scheme area where flows into the Driel Dam. The Driel Dam is further supplied from the Tugela River. Furthermore, there are small dams (for schedule 1 use and for irrigation) just adjacent to, north-east of the scheme area. According to the ISP for the Tugela Catchment (DWAf, 2004), no surplus water is available upstream of the Driel Barrage, except for basic human needs. There is an estimated 15 – 30 million m³/a available downstream of the Driel Barrage, depending on where the water is abstracted. It is further recommended to make use of conjunctive use of groundwater and surface water sources, to ensure adequate water available to the Tugela-Vaal Transfer system.

According to the GRA2 DWS database, this area may have a potential yield of between 0.1 and 0.5l/s from groundwater sources (described as Intergranular and fractured).

Should this be a formalised surface water scheme, then the scheme components would include:

- Abstraction works.
- Water treatment plant of 3.4Ml/d.
- Pump station.
- Bulk pipelines: 200mm and 350mm diameter, 30km.
- Reticulated pipelines: 75mm and 90mm diameter, 80km.
- Storage reservoirs: five units of 750kl each.
- Standpipes: 1 500 units.

The total estimated cost is R564.2 million, equating to R131 699/household (2035 household projection).

Estimated time to implement this scheme, including Inception, technical or feasibility study, design, procurement, construction and close-out is 67 months for bulk infrastructure and 55 months for reticulation infrastructure.

11.4 BESTER WSS TBC

The Bester WSS is located about 5km to the west of the existing Driefontein WSS, near Kirkintulloch and Watersmeet. There is a small dam to the immediate east of the settlement, but there are no WARMS entries for water use from this dam. There are however two records for schedule 1 use registered in the WARMS database, but no registered volume.

According to the GRA2 DWS database, this area may have a potential yield of between 0.5 and 2.0l/s from groundwater sources (described as Intergranular and fractured).

The water requirements are very small and could likely be met through the development of groundwater sources. Of the 64 households, 37 households are below RDP standards.

Should this be a formalised rudimentary scheme, then the scheme components (including source development) would include:

- Groundwater development.
- Bulk distribution and reticulated pipelines: 75mm diameter, 4km.
- Storage tank of 150kl.
- Standpipes: 15 units.

The total estimated cost is R13.8 million, equating to R166 265/household (2035 household projection).

Estimated time to implement this scheme, including Inception, technical or feasibility study, design, procurement, construction and close-out is 20 months for bulk and reticulation infrastructure respectively.

11.5 BLUE BANK BH SUPPLY

The settlements of Blue Bank and Glasgow are located in the western area of the Emnambithi / Ladysmith LM. The Sand River forms the eastern boundary of the settlements. Even though the 2011 Census indicates the water source being a borehole, the level of service is reported as no access to any type of water supply. All 153 households are below RDP standards in terms of water supply – the borehole is not operational.

There are no WARMS database entries for water use in this area. According to the GRA2 DWS database, this area may have a potential yield of between 0.5 and 2.0l/s from groundwater sources (described as Intergranular and fractured).

The water requirements are very small and could likely be met through the development of groundwater sources.

Should this be a formalised rudimentary scheme, then the scheme components (including source development) would include:

- Groundwater development.
- Bulk distribution and reticulated pipelines: 75mm diameter, 2.4km.
- Storage tank of 200kl.
- Standpipes: 15 units.

The total estimated cost is R15.2 million, equating to R73 430/household (2035 household projection).

Estimated time to implement this scheme, including Inception, technical or feasibility study, design, procurement, construction and close-out is 20 months for bulk and reticulation infrastructure respectively.

11.6 COLENZO WSS

The towns of Colenso and Inkanyesi are bordered in the north by the Tugela River which is also the source of water supply in this area. The biggest challenge utilising this source is the high levels of turbidity, not necessarily the quantity of water available.

There is a mine development towards the east of Colenso and Inkanyesi – details on the water requirements for this area is not available.

The WTW is operating at 77% of its design capacity, but it has been confirmed that there are a number of reticulation leaks in the supply area. The uTDM should develop a WC/WDM programme for this WSS to address the leakages, ensure consumers are metered and implement a consumer awareness programme.

Once the WC/WDM programme can be implemented, the existing infrastructure and water source should be sufficient to meet the current and future water requirements for this area.

11.7 COLENZO WSS FUTURE TBC

The areas towards the east (12km from Colenso) and the south-east (5km from Colenso) of Colenso are rural in character and rely on individual boreholes and springs for water supply.

There are about nine WARMS database entries for water use in this area – for schedule 1 use – all from surface water sources (Bloukrans River – a major tributary of the Tugela River and further tributaries of the Tugela and Bloukrans Rivers). There is however no registered volume recorded for these entries.

According to the GRA2 DWS database, this area may have a potential yield of between 0.5 and 2.0l/s from groundwater sources (described as Intergranular and fractured).

The water requirements are very small and could likely be met through the development of groundwater sources. The 2015 water requirements of the area towards the east (12km from Colenso) is 0.0183 million m³/a (0.050MI/d) and the 2015 water requirements of the area towards the south-east (5km from Colenso) is 0.0586 million m³/a (0.161MI/d).

A portion of the consumers in the south-east (estimated 100 households) could potentially be connected to the existing Colenso WSS with yard or house connections as service level. (If not actually already connected by 2016). The remainder of the south-eastern area could be served through the development of groundwater sources. Similarly, the area in the east could also be served with the development of groundwater sources.

Should this be a formalised rudimentary scheme, then the scheme components (including source development) for the groundwater-sourced scheme areas would include:

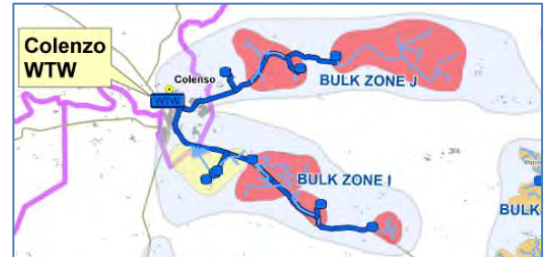
- Groundwater development.
- Bulk distribution pipelines: 75mm diameter, 4km.
- Reticulated pipelines: 75mm diameter, 10km.

- Storage tanks: one 250kl and one 500kl.
- Standpipes: 135 units.

The total estimated cost is R49.4 million, equating to R75 305/household (2035 household projection).

Estimated time to implement this scheme, including Inception, technical or feasibility study, design, procurement, construction and close-out is 34 months for bulk and reticulation infrastructure respectively.

This area (Bulk Zone I and J) has also been made provision for in the Umtshezi Regional Water Supply Scheme Plan – still being developed. In the Plan, water is proposed to be supplied from the Colenso WTW. The costing and time-frame for implementation is not yet available.



11.8 CORNFIELDS WSS

The Cornfields WSS are consists of Cornfields township then the Mbondwana and Thembalihle townships in the east, less than four kilometres from Cornfields. Cornfields (693 households) is supplied with water from two boreholes (one is currently not operational) as well as water tankers, but there are still 245 households below RDP. In Mbondwana and Thembalihle, which obtain water from boreholes, springs and other local sources, there are an estimated 70 out of 336 households below RDP.

The Bloukrans River, a major tributary of the Tugela River, forms the north-western boundary of Cornfields whilst the Mtontwanes River divides the Mbondwana and Thembalihle townships. Quality in the Bloukrans River seems to be affected by poor sanitation infrastructure in Cornfields, Mbondwana and Thembalihle areas (DWAf, 2004).

There are about five WARMS database entries for water use directly west of Colenso – for schedule 1 use – all from surface water sources (Bloukrans River and Mlazi / Umlaas River, a tributary of the Bloukrans River). There is however no registered volume recorded for these entries.

According to the GRA2 DWS database, this area may have a potential yield of between 0.5 and 2.0l/s from groundwater sources (described as Intergranular and fractured).

Options for improved water supply in this area include:

- Option 1: Extension of the Estcourt WSS (less than 5km to the south) to serve the Cornfields WSS (long term option);
- Option 2: Extension of the Estcourt WSS (less than 5km to the south) to serve the Cornfields and Thembalihle townships (long term option). Then local groundwater source development to serve Mbondwana;
- Option 3: Development of a local surface water scheme with the Bloukrans River as source; or
- Option 4: Development of a local groundwater scheme.

Furthermore, there are an estimated 110 households in Thembalihle – a more formalised settlement – that should be upgraded to house or yard connections and an estimated 15 households in Mbondwana that should receive

water at least to RDP level (within 200m). To ensure full coverage of community stand pipes in the rural village of Mbondwana (132 dispersed households in 2011), it requires an estimated 45 stand pipe units.

It is recommended to pursue the following option for further investigation:

- Option 3: Development of a local surface water scheme with the Bloukrans River as source. This includes the following scheme components:
 - Abstraction works.
 - Water treatment works of 1.1Ml/d.
 - Pump station of 0.1MW.
 - Storage: one 500kl and two 750kl tanks.
 - Bulk distribution pipelines: 150mm and 200mm diameter, 12.6km in total.
 - Reticulation pipelines: 75mm diameter, 15km.
 - Yard connections: 15.
 - Standpipes: 110 units.

The total estimated cost is R128.2 million, equating to R95 458/household (2035 household projection).

Estimated time to implement this scheme, including Inception, technical or feasibility study, design, procurement, construction and close-out is 46 months for bulk and reticulation infrastructure respectively.

11.9 DRAKENSBERG WSS TBC

The Drakensberg WSS area is an Eskom-owned development and water supply is already adequate for its consumers. No further action is required to ensure sufficient bulk water supply in this area to meet current and future water requirements.

11.10 DRIEFONTEIN WSS

The Driefontein WSS is being provided for in the larger Regional Water Master Plan for Emnambithi / Ladysmith LM. There are already projects in place for the improvement and extension of infrastructure in the Driefontein area. Reticulation is complete and the level of service currently is stand pipes, but the new infrastructure makes provision for yard connections. The scheme is planned for completion and connection to the Ladysmith WSS by 2019.

However, the yield analysis and hydrological study for water available from the Spioenkop Dam is still being conducted.

11.11 EKUVUKENI LIME HILL WSS

The Ekuvukeni Lime Hill WSS is served from the Oliphantskop Dam located in the Sundays River, but the Dam is heavily silted up and dries up as it did in the 2015/2016 summer during drought conditions. The abstraction works inlet is located beneath the silt level, resulting in high turbidity levels, affecting water treatment processes and water quality.

The Ennambithi / Ladysmith Water Master Plan further makes provision for connecting this area to the planned regional bulk scheme to be supplied by 2019 from the Spioenkop Dam. It would not suffice however for the interim period between 2016 and 2019.

Immediate attention is required to improve water supply in the Ekuvukeni Lime Hill area, including the development of a WC/WDM programme to address illegal connections, reticulation leaks and pressure management. This includes metering and measurement of all water consumers.

According to the GRA2 DWS database, this area may have a potential yield of between 0.5 and 2.0l/s from groundwater sources (described as Intergranular and fractured) in the northern and central regions. In the south-west and south-eastern regions, they may have a potential yield of between 0.1 and 0.5 l/s.

There are about sixteen WARMS database entries for water use in this area: four for companies (two for agricultural use, two for schedule 1 use), eleven for individuals (three for agricultural use, one industrial use and seven for schedule 1 use) and one for a Water Services Provider (being the uTDM). Only two of these are for groundwater use whilst the remainder, including the WSP registration (for the Oliphantskop Dam), are for use from the Sundays River, the Wasbank River or tributaries thereof. Water volume registered for use in irrigation or agriculture is 0.498 million m³/a (1.364MI/d), for industry is 0.002 million m³/a (0.005MI/d) and for the WSP it is 1.323 million m³/a (3.626MI/d). There is no registered volume recorded for scheduled 1 use.

Options for improved water supply in this area include:

- Option 1: Investigate the option of surface water supply from the Sundays River and the Wasbank River;
- Option 2: Consider the augmentation of supplies from groundwater sources – groundwater quality needs to be confirmed; or
- Option 3: Extension of the Ladysmith WSS this area, but potentially the whole of the Indaka LM.

As mentioned before, the intention is to connect this area to the planned Regional Bulk scheme from Ladysmith, but this may only realise by 2019 or thereafter. As a short to medium-term (SMT) measure, the following steps can be considered:

- SMT Step 1: Emergency design for the top extraction from the dam, therefore not abstracting below the siltation level.
- SMT Step 2: Desilting of the Oliphantskop Dam. This is a project on its own and requires specialist expertise with a proper investigation of the current situation and potential approach to desludge the Dam.
- SMT Step 3: Detail study to define the extent of water requirements as it is a fairly large geographic area. Then investigate the option to develop a rudimentary groundwater scheme to meet these requirements.

The potential costs for SMT Step 2 and Step cannot be determined at this stage as there are too many variables and unknowns that may influence the costs. (It could be though that more information is available from the Water and Sanitation Master Plan for the Ennambithi / Ladysmith LM, but this report was not available at the time of finalising this study). The duration of the required studies could take an estimated 20 months.

11.12 EMOYENI-AMANGWE WSS

This area is affected during drought conditions and local water sources are not available. Currently water is being tankered into the area. There are projects under way in the neighbouring Loskop WSS, located north of the Emoyeni-Amangwe WSS for the upgrade of the WTW and extension of the Loskop scheme. It is planned to then augment supply to the Emoyeni-Amangwe area, however construction has commenced and will happen in phases (planned completion initially 2017, but now it is 2019).. A hydrological assessment was recently completed to confirm that supply from the Little Tugela River is adequate for two planned off-channel storage dams.

Project references:

- Provincial Project Number: KN057 AMANGWE / LOSKOP;
- Provincial Project Number: 2010MIGFDC23196318. Bhekuzulu-Epangweni Community Water Supply (AFA) MIS 201661.

11.13 EMPANGWENI FUTURE WSS

The Empangweni Future WSS area is located east of the existing Loskop WSS and is also earmarked for future supply from the upgraded Loskop WSS.

Project references:

- Provincial Project Number: KN057 AMANGWE / LOSKOP;
- Provincial Project Number: 2010MIGFDC23196318. Bhekuzulu-Epangweni Community Water Supply (AFA) MIS 201661.

11.14 ESTCOURT WSS

The existing water supply in the Estcourt WSS area totals an estimated 34MI/d, for 15 948 households (2011). The Archie Rodel WTW still has George Cross WTW still has about 25% capacity available (~4MI/d) whereas the George Cross WTW is operating at about 114% above its design capacity of 18MI/d.

This is one of the larger demand nodes in the uTDM and there are a number of townships being supplied, but water is not metered in all areas. The existing water sources: Bushmans River Weir and Wagendrift Dam lie on the Bushmans River, a major tributary of the Tugela River. According to the ISP for the Tugela Catchment potential exists for further development of water sources in this catchment. A site downstream of the Wagendrift Dam has been identified for the proposed Mielietuin Dam should such a need arise (DWAF, 2004).

The calculated water requirements for this scheme are much less than the current volume of water supplied, potentially indicating opportunities for WC/WDM. No further infrastructure developments are planned to address backlog service levels in this area.

11.15 ESTCOURT RUDIMENTARY WSS

The Estcourt Rudimentary WSS area lies south of the existing Estcourt WSS. The uTDM is currently implementing projects in the Ntabamhlope-Good Home area to improve service levels. Furthermore, it is planned to connect this area to the existing Estcourt WSS. Details of this planned scheme should still be obtained.

11.16 ETATANE 2 FUTURE WSS

The Etatane 2 sub-place stands to benefit from the Loskop proposed scheme augmentation and extension.

Project references:

- Provincial Project Number: KN057 AMANGWE / LOSKOP;
- Provincial Project Number: 2010MIGFDC23196318. Bhekuzulu-Epangweni Community Water Supply (AFA) MIS 201661.

11.17 EZAKHENI WSS

The Ezakheni WSS is adjacent to the Ladysmith WSS but the Ezakheni WSS utilises the Tugela River Weir as water source. This area forms part of the greater regional bulk water supply scheme planned for supplying the Emnambithi / Ladysmith LM as well as potentially the Indaka LM.

The biggest challenge in the Ezakheni WSS is the current excessive levels of water use and reticulation leaks. The 2015 water requirements were calculated as 6.654 million m³/a (18.23MI/d) whilst it is estimated that an amount of 47MI/d is supplied to consumers in this area. It amounts to a probable use of 550l/c/d! (This includes having taken into account the augmentation from the Ezakheni WTW to the Ladysmith WSS at a rate of 6.12MI/d).

A WC/WDM programme needs to be developed and implemented as a matter of urgency. It includes metering and measurement of all consumers.

There is currently one area – Doornkloof (615 households according to the 2011 Census) – to the east of Ezakheni, that is not completely connected to the existing water supply infrastructure. Most consumers utilise some form of rudimentary connections and boreholes for water supply. There were 492 households (80%) below RDP standards of water supply in 2011. It should be established whether this area is included in the water supply upgrade project for Ezakheni / Emnambithi.

- Provincial Project Number: 2011MIGFDC23202432. Ezakheni / Emnambithi Bulk Water Infrastructure Upgrade Project (Planning phase)

11.18 FRERE WSS TBC CURRENT GW

The settlement of Frere has a borehole for water supply, but it has dried up due to the drought conditions (January, 2016). Consumers therefore do not have access to adequate basic levels of water supply.

The Bloukrans River runs through the settlement and there is an existing weir. There may already be a water supply treatment plant and connection to provide water to the train station and college in the settlement. Options to

improve water supply therefore includes the extension of existing surface water supplies to all households, or to develop a new borehole.

Scheme components (including source development) would include:

- Groundwater development.
- Water treatment works of 0.23Ml/d.
- Bulk distribution pipelines: 110mm diameter, 1.2km.
- Reticulated pipelines: 110mm diameter, 6.2km.
- Storage tanks: one 150kl and one 250kl.
- Yard connections: 260 units.

The total estimated cost is R35.5 million, equating to R116 776/household (2035 household projection).

Estimated time to implement this scheme, including Inception, technical or feasibility study, design, procurement, construction and close-out is 20 months for bulk and reticulation infrastructure respectively.

11.19 HOWE WITTEKOP WSS

The Howe Wittekop WSS is in the north of the Okhahlamba LM. The uTDM does not currently provide any formal water supply services in this area. Of the 336 households in the supply area (neighbouring settlements of Howe, Wittekop and Nqula), 307 are below basic RDP service levels.

There are three records for schedule 1 use registered in the WARMS database, but no registered volume. The registrations are for water from the Sandspruit River – a tributary of the Sand River. The Sandspruit River originates just north of Nqula and the Njongola River originates just south of Howe.

According to the GRA2 DWS database, this area may have a potential yield of between 0.1 and 0.5l/s from groundwater sources (described as Intergranular and fractured).

The water requirements are very small and could likely be met through the development of groundwater sources.

Should this be a formalised rudimentary scheme, then the scheme components (including source development) would include:

- Groundwater development.
- Bulk distribution and reticulated pipelines: 75mm diameter, 6km and 22km respectively.
- Storage tanks of 150kl. Number of units: 3.
- Standpipes: 180 units.

The total estimated cost is R87.7 million, equating to R197 523/household (2035 household projection).

Estimated time to implement this scheme, including Inception, technical or feasibility study, design, procurement, construction and close-out is 34 months for the bulk infrastructure and 46 months for the reticulation infrastructure.

11.20 JAGERSRUST WSS TBC

The Jagersrust WSS area is an Eskom-owned tourism resort and water supply is already adequate for its consumers. No further action is required to ensure sufficient bulk water supply in this area.

11.21 KWANDEMA WSS TBC

KwaNdema WSS includes the areas of Cathkin Peak, Champagne Castle and other private residential or tourist areas. Most consumers (almost all) have adequate water supply at or above RDP standards, from groundwater sources and further augmentation is not required.

11.22 LADYSMITH WSS

The Ladysmith WSS is one of the larger demand nodes in the uTDM and there are a number of townships being supplied, but water is not metered in all areas. The largest demand zones are the Ladysmith proper and Ezakheni proper townships. Water is also supplied further south to Roosboom and Meadows. The existing water sources are the Klip River – although water supply is affected during drought conditions as experienced currently during the 2015/2016 summer – and the Spioenkop Dam. The 2015 water requirements, including losses, were estimated as 8.2997 million m³/a (22.74MI/d).

A large regional bulk water supply scheme is being planned (construction has started on some components) with the source being the Spioenkop Dam – supplying a new WTW. The first phase of the WTW is planned for a design capacity of 50MI/d.

The scheme would supply the current Ladysmith WSS area, the Ezakheni WSS area then extend further north to include the Driefontein WSS as well as potentially the neighbouring areas in the Indaka LM (Ekuvukeni Lime Hill WSS area).

Project reference:

- Provincial Project Number: 2011MIGFDC23202432. Ezakheni / Emnambithi Bulk Water Infrastructure Upgrade Project (Planning phase;

The hydrological study to establish the available yield from the Spioenkop Dam is still under way. The 2004 Thukela ISP indicated that there is potentially between 15 million m³/a and 30 million m³/a available downstream of the Driel Barrage in the upper Tugela catchment (DWAf, 2004). Depending on where water in the system is abstracted, there could be 15 million m³/a (41MI/d) available at the Spioenkop Dam, if abstracted directly from the Dam. If abstracted at the proposed Jana Dam site, there could be 30 million m³/a available. The proposed site for the Jana Dam is just below the confluence of the Tugela and Little Tugela Rivers, about 20km south of Ladysmith.

Augmentation plans for this supply area as well as extensions to further supply areas in the Emnambithi / Ladysmith LM and Indaka LM is therefore already in place.

It is estimated that supply from the Spioenkop Dam new WTW commences during 2019.

11.23 LANGKLOOF WSS

The Langkloof settlement is supplied from the Tugela River where water is treated at the 1Ml/d WTW – operating at full capacity. The 2011 Census reported that of the 362 households, 260 households don't have access to formal water supply and that in total, 332 households are below RDP. The households not having access to the scheme's supply (mostly through community stand pipes and illegal connections), utilise springs as water source. There are only dry sanitation installations in this settlement.

The 2015 water requirements, including losses, were estimated as 0.022 million m³/a (0.061Ml/d), but according to the area operators, there may be more people in this area than initially made provision for in this study.

The uTDM officials indicated that there are many illegal connections and reticulation leaks.

No consumers are metered and no consumer pays for water supply. This has to be addressed as part of the WC/WDM programme.

A WC/WDM programme needs to be developed and implemented for this area as a matter of urgency to curb water losses and manage water supply.

11.24 LOSKOP WSS

The Loskop WSS is currently being augmented via MIG projects to improve and increase water supply to existing consumers as well as extending the scheme to the areas of Bhekuzulu and Empangweni. It is further anticipated to link the Emoyeni-Amangwe WSS to the Loskop WSS as the Emoyeni-Amangwe WSS experiences water shortages during periods of drought (such as in 2015/2016).

Project references:

- Provincial Project Number: KN057 AMANGWE / LOSKOP;
- Provincial Project Number: 2010MIGFDC23196318. Bhekuzulu-Empangweni Community Water Supply (AFA) MIS 201661.

A hydrological study has been completed in October 2015 to determine the off-channel storage dam options (two dams) for this scheme (IWR, 2015). The ISP for the Uthukela Water Management Area indicated that the Little Tugela River is already stressed in terms of water allocations – predominantly for irrigation (DWAf, 2004). Construction of additional storage in this catchment may improve water availability for human needs (all user sectors).

The WARMS database lists two registered water use records by a WSP for the Loskop and Emoyeni-Amangwe WSS areas with a combined volume of 2.742 million m³/a (7.512Ml/d). The 2015 water requirements for the two scheme areas were calculated as 1.443 million m³/a (3.953Ml/d).

Should groundwater sources be considered as an option to further augment water supply, the GRA2 DWS database indicated that this area has a potential yield of between 0.5 and 2.0l/s from groundwater sources (described as Intergranular and fractured).

11.25 LUSITANIA WSS TBC

The settlement of Lusitania is located about 12km north of the Watershed settlement in the Driefontein WSS. All 145 households are supplied via water tanker. Of these, 15 households have water supply inside their dwellings and 125 households have water supply to their yards.

Groundwater sources are affected by the coal deposits in the area although the GRA2 DWS database indicated that this area has a potential yield of between 0.5 and 2.0l/s from groundwater sources (described as Intergranular and fractured). Should groundwater be developed as source, it would require treatment in order to make it safe for human consumption.

The Slangdraai Dam is situated immediately south of Lusitania and this may also be considered as potential water source for supply to this settlement although for this area, having such a small water requirement, it will likely be a more expensive option. A small treatment plant (package plant) would be required to provide water for domestic use.

Water service levels are yard and house connections with dry sanitation. The scheme components (including source development) would include:

- Groundwater development.
- Water treatment package plant of 0.13Ml/d for treatment of abstracted groundwater.
- Bulk distribution pipelines: 110mm, 2.5km.
- Reticulated pipelines: 110mm diameter, 11.5km.
- Storage tank of 250kl.
- Yard connections: 145.

The total estimated cost is R48.7 million, equating to R256 316/household (2035 household projection).

Estimated time to implement this scheme, including Inception, technical or feasibility study, design, procurement, construction and close-out is 34 months for bulk and reticulation infrastructure respectively.

11.26 MTONTWANE WSS TBC

Mtontwane is a small rural settlement of an estimated 210 households between Colenso and Weenen, at the confluence of the Mtontwanes and Nyandu Rivers. The Nyandu River is a tributary of the Bloukrans River which in turn is a major tributary of the Tugela River. There is no formal water supply to this settlement which is also not represented individually in the 2011 Census (it falls under the Umtshezi Non-Urban area). They currently make use of local (unprotected) water sources.

There is one record for schedule 1 use registered in the WARMS database for water from the Nyandu River – the location of this entry is on the opposite side of the Mtontwane settlement, upstream of the Nyandu River.

According to the GRA2 DWS database, this area may have a potential yield of between 0.5 and 2.0l/s from groundwater sources (described as Intergranular and fractured).

The water requirements are very small and could likely be met through the development of groundwater sources or considering the available surface water sources. Groundwater quality should be tested for domestic use and treated if not confirming to the SANS 241 standards for human consumption.

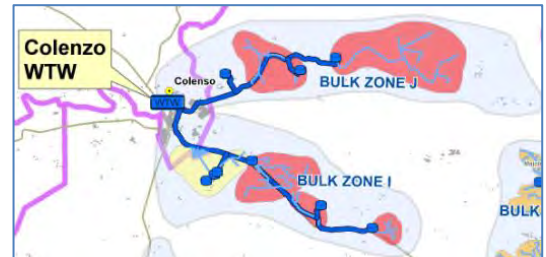
Should this be a formalised rudimentary scheme, then the scheme components (including source development) would include:

- Groundwater development.
- Bulk distribution pipelines: 75mm, 1.5km.
- Reticulated pipelines: 75mm diameter, 4km.
- Storage tank of 500kl.
- Standpipes: 35 units.

The total estimated cost is R25.4 million, equating to R91 697/household (2035 household projection).

Estimated time to implement this scheme, including Inception, technical or feasibility study, design, procurement, construction and close-out is 20 months for bulk and reticulation infrastructure respectively.

This area (furthest point of supply in Bulk Zone I) has also been made provision for in the Umtshezi Regional Water Supply Scheme Plan – still being developed. In the Plan, water is proposed to be supplied from the Colenzo WTW. The costing and time-frame for implementation is not yet available.



11.27 NGEDLENGEDLENI-UMHLUMAYO WSS

The Ngedlengedleni-Umhlumayo WSS is just south of the existing Ekuvukeni Lime Hill WSS. It supplies the areas of Umhlumayo, Vreemdeburg, Oqungweni and Nkangala in the uTDM and the scheme area further extends into the neighbouring Msinga Local Municipality serving amongst others Ghobo, Bhaza, Majozi and Ntuli. The Msinga beneficiaries and whether they are actually supplied from this scheme have to be confirmed.

Water is abstracted from sand aquifer of the Tugela River and treated before distribution. Currently the uTDM is constructing reticulation in Fitty Park located in the neighbouring Ekuvukeni Lime Hill WSS in order to be supplied from the Ngedlengedleni-Umhlumayo WSS.

The capacity of the existing WTW has to be confirmed to establish whether it is sufficient to provide for the current and future water requirements, including that of Fitty Park. No information is available for this WTW in the 2014 Blue Drop report.

11.28 TUGELA ESTATES WSS

The Tugela Estates WSS area provides consumers with water from the Tugela River in the form of community stand pipes, but there are already many illegal connections to bring water supply to yard and house connections. The community of Langa (159 households according to the 2011 Census) however does not have any adequate water supply. This has resulted in the WTW operating at full capacity of 1.2MI/d.

The 2015 water requirements, including losses, were estimated as 0.380 million m³/a (1.041MI/d), projected to increase slightly to 0.433 million m³/a (1.186MI/d) by 2035.

It is suggested to formalise the illegal connections and install bulk and reticulation meters to manage water supply. Should Langa be provided with reticulated water supply – extending the existing scheme infrastructure, the scheme components would include:

- Bulk distribution pipelines: 110mm, 7km.
- Reticulated pipelines: 75mm diameter, 12.5km.
- Storage tanks with total capacity of 150kl. Number of units: three (three supply zones).
- Standpipes: 128 units.

The total estimated cost is R63.9 million, equating to R28 162/household (2035 household projection).

Estimated time to implement this scheme, including Inception, technical or feasibility study, design, procurement, construction and close-out is 46 for bulk infrastructure and 34 months for reticulation infrastructure.

11.29 WEENEN WSS

The Weenen WSS serves the townships of Weenen, Impembeni and Ezitendeni. Not all areas are fully supplied yet at RDP level from the existing Weenen WTW (operating at 100% of its design capacity of 1.45MI/d). The uTDM has appointed consultants for the planned development and extension of the Weenen WSS to serve all consumers in the current supply area as well as additional consumers in the Umtshezi LM – Umtshezi Regional Water Supply. The master plan made provision for phased developments in the area, eventually constructing a regional bulk water supply scheme. A new water treatment package plant with design capacity of 2.7MI/d is being constructed.

There is a project currently registered under MIG for the improvement of water supply in the Kwanobamba-Ezitendeni area, namely:

- Provincial Project Number: 2013MIGFDC23213176. Kwanobamba-Ezitendeni (Weenen) Water Supply Project

The water source is the Bushmans River, a major tributary of the Tugela River. According to the ISP for the Tukela Catchment potential exists for further development of water sources in this catchment. A site downstream of the Wagendrift Dam has been identified for the proposed Mielietuin Dam (site just upstream of the Weenen Nature Reserve) should such a need arise (DWAF, 2004).

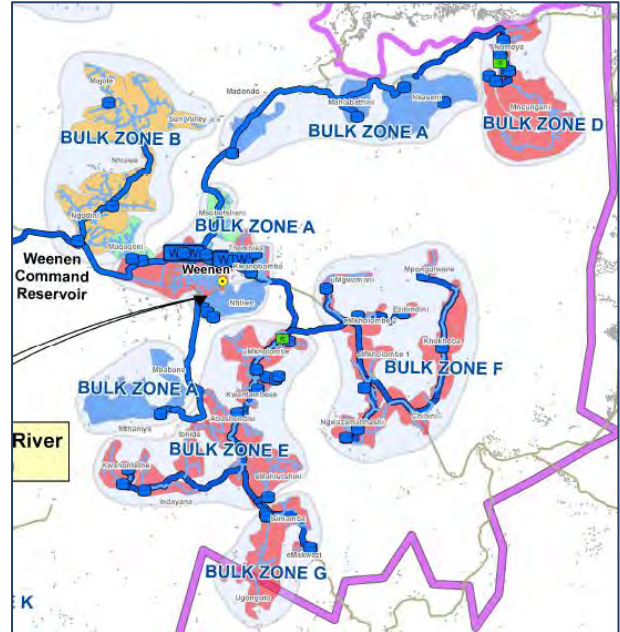
Water quality in the Bushmans River is affected by fertilizer runoff and industrial wastewater.

11.30 WEENEN NORTH AND SOUTH WSS AREAS FUTURE TBC

The areas north and south of the existing Weenen WSS are also addressed in the Umtshezi Regional Water Supply Plan that is still being finalised. Extension of the regional scheme is planned in phases, covering the areas not yet served by the existing Weenen WSS. (See Bulk Zones A, B and D in the north and Bulk Zones A, E, F and G in the south of the Umtshezi LM).

North of Weenen it includes the areas of Nhlawe, Sun Valley, Madondo, Mahlabathini, Nkaseni, Ngodini, Maqaqeni, Msobotsheni and Thembisa in Wards 5, 7 and 8, totalling an estimated 1 011 households. The area south of the existing Weenen WSS includes Nhliwe and Mbabane – Wards 5 and 7, totalling an estimated 241 households.

The following are brief area descriptions of the phases planned for the regional scheme implementation (See **Figure 8** overleaf):



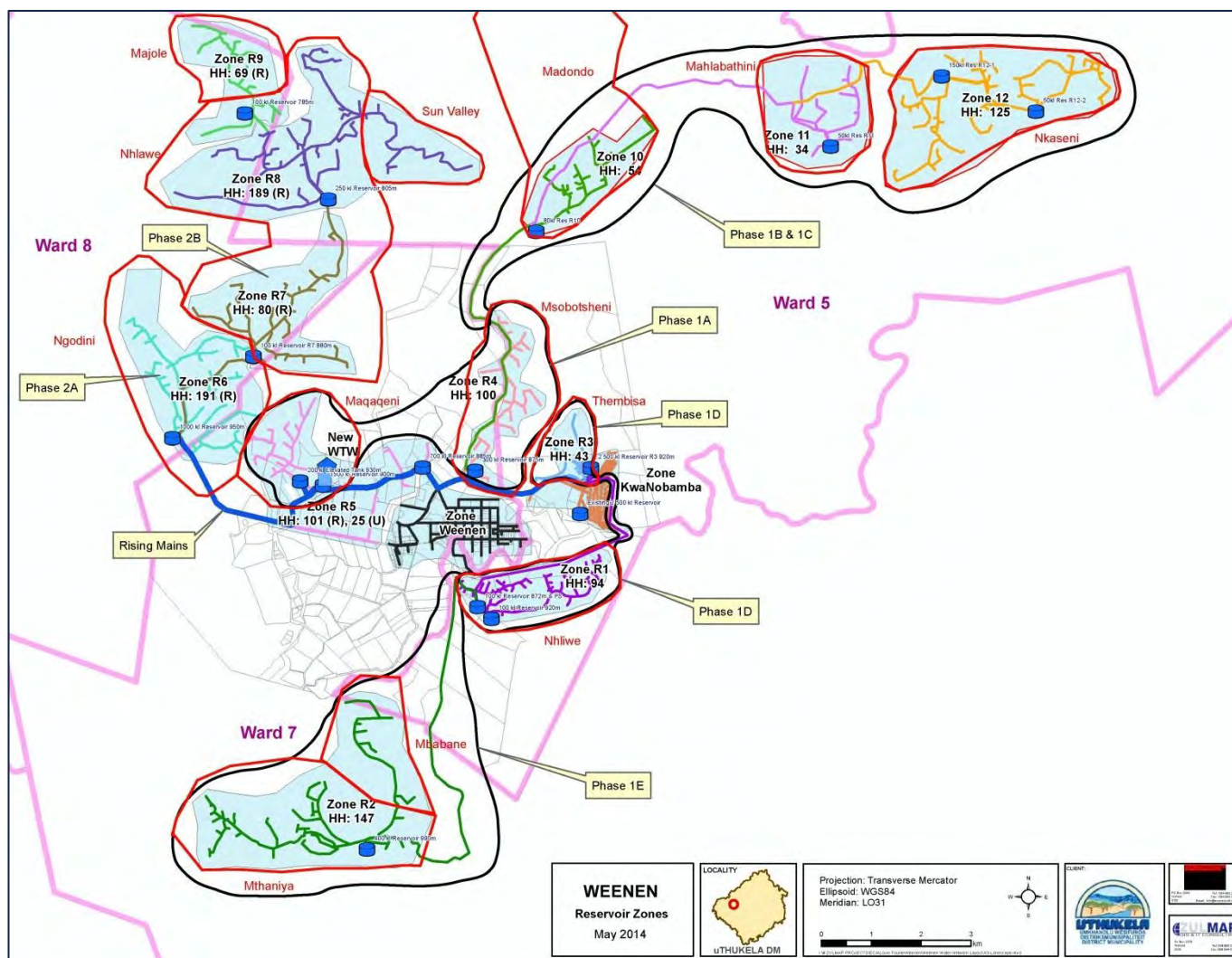
Phases 1A, 1B, 1C, 1D and 1E

- Phase 1A consists of the construction of a new package plant for water in Weenen with a design capacity of 2.7Ml/d. This could be upgraded in future as required. Extension of the supply area to Msobotsheni (100 households) is included.
- Phase 1B and 1C includes the extension of the supply area to Madondo, Mahlabathini and Nkaseni, totalling 213 households.
- Phase 1D includes the area of Thembisa adjacent to the north of KwaNombamba, totalling 43 households and Nhliwe south of KwaNombamba, totalling 94 households.
- Phase 1E extends the scheme further south of Weenen to Mbabane in Ward 7 serving an estimated 147 households.

Phases 2A and 2B

- Phase 2A includes the area of Ngodini, north-west of Weenen with an estimated 191 households.
- Phase 2B extends further north of Ngodini, serving the areas of uMposonde (80 households), Sun Valley – Nhlawe (189 households) and Majole (69 households).

Figure 8. Umtshezi LM Regional Water Supply – Planned Phases.



11.31 WINTERTON WSS

The Winterton WSS provides water from the Little Tugela River to the townships of Winterton and Khethwani. The 2015 water requirements were calculated as 0.498 million m³/a (1.365MI/d). The current WTW is already operating at its design capacity of 2MI/d. The 2035 water requirements were calculated as 0.515 million m³/a (1.41MI/d) – therefore still less than the current design capacity of the WTW.

No scheme extensions are anticipated in the Winterton supply area, but a WC/WDM programme, including metering of consumers should be developed and implemented to ensure sustainable water supply.

11.32 ZWELISHA MOYENI WSS

The Zwelisha Moyeni WSS supplies about 29 rural settlements in the Okhahlamba LM that are located to the west of the Woodstock Dam (which is a major component in the Tugela – Vaal Transfer Scheme). The water source however is the Khombe River, a small tributary of the Tugela River. The existing WTW has a design capacity of 4MI/d and is operating at only 2.4MI/d. Of the 9 887 households in the scheme area, 4 841 (49%) are still below RDP levels of water supply. This could be as a result of reticulation leaks and illegal connections – affecting water

availability to end-users of the supply network. The area supervisor reported that there are also problems being experienced with the pumps at the WTW, however the reasons for the low operational capacity of the WTW should be addressed. It is suggested to formalise the illegal connections and install bulk and reticulation meters to manage water supply.

The Khombe River is also utilised for irrigation and water sources are reduced in times of drought. There is no information on the available yield from this river, but this WSS is also located near the headwaters of the Tugela River. There are also two tributaries – Putterhill and Majaneni Rivers – within or near the Zwelisha Moyeni WSS. The future water requirements are fairly small and should be met by existing surface water sources.

There is currently one production borehole in the area maintained by the uTDM for water supply to domestic consumers. According to the GRA2 DWS database, this area may have a potential yield of between 0.1 and 0.5l/s from groundwater sources (described as Intergranular and fractured).

There are two MIG projects for the improvement of water supply in this area, the exact details thereof to be confirmed, but one is for the construction of reticulation in the Dukuza/ Hoffenthal area and perhaps further extension into Ngoba.

The area south of the existing Zwelisha Moyeni WSS may in future be linked to this WSS. Upgrades will be required to the bulk water supply infrastructure to accommodate the additional consumers.

11.33 ZWELISHA MOYENI WSS FUTURE TBC

The Zwelisha Moyeni WSS Future supply area is located south of the existing supply scheme. There is no formal water supply infrastructure and consumers make use of boreholes and springs for water supply.

The 2015 water requirements were estimated as 0.351 million m³/a (0.96MI/d), growing to 0.632 million m³/a (1.73MI/d) by 2035.

The geographic extent of this area is quite large ~ 270km² and providing infrastructure to the rural, dispersed households will be challenging. There are a number of options to consider in providing water to the settlements:

- Option 1: It may be possible to link to the existing Zwelisha Moyeni WSS, supplied from the Khombe River. The existing scheme is generally lying at a lower elevation than the Zwelisha Moyeni Future WSS.
- Option 2: Developing of local supply schemes using existing surface water sources.
- Option 3: Development of local groundwater supply schemes.

If the existing Zwelisha Moyeni WSS will be extended to serve Zwelisha Moyeni Future supply area, the existing bulk supply infrastructure (pipes, treatment works) would need to be upgraded. Furthermore, costs should be evaluated to serve an area of such large geographic extent and where pumping costs may be detrimental to the sustainability of such a scheme.

The Mnweni River traverses in the north of the potential supply area and is one of the source rivers of the Woodstock Dam. The Nxwaye River traverses in the central part of the supply area and is another source of the Woodstock Dam. The Mlambonja River that feeds the Driel Barrage, traverses in the southern portion of the supply area. The potential water availability from these surface water sources would need to be determined as part of a detail feasibility study and to determine the most appropriate option for water supply.

According to the GRA2 DWS database, this area may have a potential yield of between 0.1 and 0.5l/s from groundwater sources (described as Intergranular and fractured). The WARMS database has one entry for registered water use in this area – for a WSP – from a spring, for a volume of 0.015 million m³/a (0.041MI/d). This is not sufficient to meet the water requirements for this whole area, but may be able to supply a portion of the water requirements.

Should this be a formalised local scheme development (with sub-scheme areas), it could be divided into the Zwelisha Moyeni WSS North and Zwelisha Moyeni WSS South.

Zwelisha Moyeni WSS Future North

The Zwelisha Moyeni WSS Future North could utilise the Woodstock Dam as water source (available yield has to be confirmed). This area is projected to have a population of 10 708 and water requirements of 0.516 million m³/a (1.413MI/d) by 2035.

The scheme components (including source development) would include:

- Abstraction works.
- Water treatment works: 1.4MI/d.
- Pump station: two units of 0.1MW.
- Bulk distribution pipelines: 200mm and 300mm diameter, ~31km.
- Reticulated pipelines: 75mm diameter, 105km.
- Storage reservoirs: five units of 750kl each.
- Standpipes: 1 170 units.

Zwelisha Moyeni WSS Future South

The Zwelisha Moyeni Future WSS South could utilise the Mlambonja River as water source (available yield has to be confirmed). This area is projected to have a population of 12 172 and water requirements of 0.632 million m³/a (1.732MI/d) by 2035.

The scheme components (including source development) would include:

- Abstraction works.
- Water treatment works: 1.8MI/d.
- Pump station: 0.2MW.
- Bulk distribution pipelines: 200mm and 300mm diameter, ~17km.
- Reticulated pipelines: 75mm diameter, 92km.
- Storage reservoirs: four units of 750kl each.
- Standpipes: 965 units.

Total estimated scheme development cost and programme

The total estimated cost is R985.3 million, equating to R239 907/household (2035 household projection).

Estimated time to implement this scheme, including Inception, technical or feasibility study, design, procurement, construction and close-out is 79 months for the bulk and reticulation infrastructure respectively.

11.34 SUMMARY OF AUGMENTATION / NEW SCHEME DEVELOPMENTS: COSTING AND PROGRAMME

In **Table 11.34** a summary is provided for the uTDM per conceptual scheme development. Also illustrated in this section is a tabular summary of the infrastructure components, cost and programme of the conceptual scheme developments.

Table 11.34 uTDM Conceptual Scheme Development Summary

Conceptual Scheme	Total Project Cost (est. Rands million)	Bulk Programme (est. months)	Reticulation Programme (est. months)	Soonest Implementation by conventional means (est. by year)
Amangwane WSS TWBC(SW, GW)	34.5	34	20	Mar-2019
Bergville WSS Future TBC	564.2	67	55	Nov-2021
Bester WSS TBC	13.8	20	20	Jan-2018
Blue Bank BH Supply	15.2	20	20	Jan-2018
Colenso WSS Future TBC	49.4	34	34	Mar-2019
Cornfields WSS	128.2	46	46	Mar-2020
Ekuvukeni Lime Hill WSS	0.2	20	0	Jan-2018
Frere WSS TBC Current GW	35.5	20	20	Jan-2018
Howe Wittekop WSS	87.7	34	46	Mar-2020
Lusitania WSS TBC	48.7	34	34	Mar-2019
Mtontwane WSS TBC	25.4	20	20	Jan-2018
Tugela Estates WSS	63.9	46	34	Mar-2020
Zwelisha Moyeni WSS Future TBC	985.3	79	79	Nov-2022
TOTAL	2052.0			

Based on the summary provided in **Table 11.34**, the Bergville WSS Future TBC and Zwelisha Moyeni WSS Future TBC conceptual scheme areas would take the longest time to implement, if all planning and implementation commences at the start of the 2016/2017 municipal financial year.

The Bester WSS TBC, Blue Bank BH Supply, Frere WSS TBC Current GW and Mtontwane WSS TBC conceptual scheme areas would take the quickest to implement.

The time allocated to the Ekuvukeni Lime Hill WSS is only for a study in order to determine the costs or options for de-silting the Oliphantskop Dam as short to interim water supply option for augmenting water supply and improving existing services.

The following are some statistical summaries of the conceptual scheme development options:

- The most expensive scheme development options are:
 - Zwelisha Moyeni WSS Future (4 107 households);
 - Bergville WSS Future (4 284 households); and
 - Cornfields WSS areas (1 343 households).

- The least expensive scheme development options are:
 - Bester WSS TBC (83 households);
 - Blue Bank BH Supply (207 households); and
 - Mtontwane WSS TBC (277 households).

- The scheme development options with the highest costs per household:
 - Lusitania WSS TBC (R256 316/HH);
 - Zwelisha Moyeni WSS Future (R239 907/HH); and
 - Howe Wittekop WSS (R197 523/HH).

- The scheme development options with the lowest costs per household:
 - Tugela Estates WSS (R28 162/HH);
 - Blue Bank BH Supply (R73 430/HH); and
 - Colenso WSS Future TBC (R75 305/HH).

- The scheme areas with the highest 2035 household projection are:
 - Existing Ekuvukeni Lime Hill WSS (22 801 households);
 - Bergville WSS Future (4 284 households); and
 - Zwelisha Moyeni WSS Future (4 107 households).

- The scheme developments with the highest water requirements by 2035 are:
 - Existing Ekuvukeni Lime Hill WSS (7.61 million m³/a or 20.86ML/d);
 - Bergville WSS Future (1.23 million m³/a or 3.38ML/d); and
 - Zwelisha Moyeni WSS Future (1.15 million m³/a or 3.15ML/d).

A summary of the conceptual scheme development cost, per scheme area, component type and programme for implementation – split between bulk and reticulation, is provided overleaf.

UNIVERSAL ACCESS PLAN PHASE 2 - UTHUKELA DISTRICT MUNICIPALITY

WSS Needs Development Summary

Scheme area, components and costing																Programme Items (months)				
No	WSS	Component	Type	Quantity	Units	Potential Cost (R million)	Inception	Feasibility study	Prelim Design	Detail Design	Procurement	Construction	Close-out	Total Months	Total Years					
11.1	Amangwane WSS TWBC(SW, GW)					R million														
	Bulk					R million	19.9	1	6	6	5	3	12	1	34	2.8				
		Pipelines	90 mm dia	2.5	km															
		Storage	750 kl	1	no															
		Borehole	Complete	13	no															
	Reticulation					R million	14.6	1	3	3	3	3	6	1	20	1.7				
		Pipelines	75 mm dia	4.0	km															
		Pipelines	90 mm dia	1.5	km															
		Stand Pipes	Complete	65	no															
11.3	Bergville WSS Future TBC					R million														
	Bulk					R million	279.5	1	12	8	6	3	36	1	67	5.6				
		Pipelines	200 mm dia	10	km															
		Pipelines	350 mm dia	20	km															
		Pump Station	0.5 MW	1	no															
		Storage	750 kl	5	no															
		Abstraction Works	Complete	1	no															
		WTW	Complete	3.4	MI/day															
	Reticulation					R million	284.7	1	12	8	6	3	24	1	55	4.6				
		Pipelines	75 mm dia	65	km															
		Pipelines	90 mm dia	15	km															
		Pipelines	110 mm dia	15	km															
		Stand Pipes	Complete	1 500	no															
11.4	Bester WSS TBC					R million														
	Bulk					R million	8.5	1	3	3	3	3	6	1	20	1.7				
		Pipelines	75 mm dia	2	km															
		Storage	150 kl	1	no															
		Borehole	Complete	1	no															
	Reticulation					R million	5.3	1	3	3	3	3	6	1	20	1.7				
		Pipelines	75 mm dia	2	km															
		Stand Pipes	Complete	15	no															
11.5	Blue Bank BH Supply					R million														
	Bulk					R million	12	1	3	3	3	3	6	1	20	1.7				
		Pipelines	75 mm dia	1.2	km															
		Storage	200 kl	1	no															
		Borehole	Complete	2	no															
	Reticulation					R million	3.2	1	3	3	3	3	6	1	20	1.7				
		Pipelines	75 mm dia	1.2	km															
		Stand Pipes	Complete	15	no															
11.7	Colenso WSS Future TBC					R million														
	Bulk					R million	23.1	1	6	6	5	3	12	1	34	2.8				
		Pipelines	75 mm dia	4	km															
		Storage	250 kl	1	no															
		Storage	500 kl	1	no															
		Borehole	Complete	4	no															
	Reticulation					R million	26.3	1	6	6	5	3	12	1	34	2.8				
		Pipelines	75 mm dia	10.0	km															
		Stand Pipes	Complete	135	no															

UNIVERSAL ACCESS PLAN PHASE 2 - UTHUKELA DISTRICT MUNICIPALITY																
WSS Needs Development Summary																
Scheme area, components and costing							Programme Items (months)									
No	WSS	Component	Type	Quantity	Units	Potential Cost (R million)	Inception	Feasibility study	Prelim Design	Detail Design	Procurement	Construction	Close-out	Total Months	Total Years	
11.8 Cornfields WSS						R million										
	Bulk					R million	91.4	1	6	6	5	3	24	1	46	3.8
		Pipelines	150 mm dia	6.1	km											
		Pipelines	200 mm dia	6.5	km											
		Storage	500 kl	1	no											
		Storage	750 kl	2	no											
		Abstraction Works	Complete	1	no											
		WTW	Complete	1.1	ML/day											
		Pump Station	0.1 MW	1	no											
	Reticulation					R million	36.8	1	6	6	5	3	24	1	46	3.8
		Pipelines	75 mm dia	15.0	km											
		Yard Connections	Complete	15.0	no											
		Stand Pipes	Complete	110	no											
11.11 Ekuvukeni Lime Hill WSS							1	3	3	3	3	6	1	20	1.7	
	1. Emergency Study (Silt Survey, Assesment of Results)			10000	20 R/ha	0.2										
	2. Feasibility Study for Emergency Extraction (Study, Design and Implementation)					10% Fee on Cost of Construction										
	3. De-silting of Dam to Increase Capacity					Cost Dependant on extent of the silt content in dam										
	4. Monitoring Of Situation					Dam siltation rate to be monitored till 2019										
11.18 Frere WSS TBC Current GW						R million										
	Bulk					R million	16.6	1	3	3	3	3	6	1	20	1.7
		Pipelines	110 mm dia	1.2	km											
		Storage	150 kl	1	no											
		Storage	250 kl	1	no											
		WTW	Complete	0.23	ML/day											
		Borehole	Complete	1	no											
	Reticulation					R million	18.9	1	3	3	3	3	6	1	20	1.7
		Pipelines	110 mm dia	6.2	km											
		Yard Connections	Complete	260.0	no											

UNIVERSAL ACCESS PLAN PHASE 2 - UTHUKELA DISTRICT MUNICIPALITY																
WSS Needs Development Summary																
Scheme area, components and costing							Programme Items (months)									
No	WSS	Component	Type	Quantity	Units	Potential Cost (R million)	Inception	Feasibility study	Prelim Design	Detail Design	Procurement	Construction	Close-out	Total Months	Total Years	
11.19 Howe Wittekop WSS						R million										
	Bulk					R million	27.6	1	6	6	5	3	12	1	34	2.8
		Pipelines	75 mm dia	3	km											
		Storage	150 kl	3	no											
		Borehole	Complete	30	no											
	Reticulation					R million	60.1	1	6	6	5	3	24	1	46	3.8
		Pipelines	75 mm dia	22.0	km											
		Stand Pipes	Complete	180	no											
11.25 Lusitania WSS TBC						R million										
	Bulk					R million	18.1	1	6	6	5	3	12	1	34	2.8
		Pipelines	110 mm dia	2.5	km											
		Storage	250 kl	1	no											
		WTW	Complete	0.13	MI/day											
		Borehole	Complete	6	no											
	Reticulation					R million	30.6	1	6	6	5	3	12	1	34	2.8
		Pipelines	110 mm dia	11.5	km											
		Yard Connections	Complete	145.0	no											
11.26 Mtontwane WSS TBC						R million										
	Bulk					R million	14.9	1	3	3	3	3	6	1	20	1.7
		Pipelines	75 mm dia	1.5	km											
		Storage	500 kl	1	no											
		Borehole	Complete	11	no											
	Reticulation					R million	10.5	1	3	3	3	3	6	1	20	1.7
		Pipelines	75 mm dia	4.0	km											
		Stand Pipes	Complete	35.0	no											
11.28 Tugela Estates WSS						R million										
	Bulk					R million	20.9	1	6	6	5	3	24	1	46	3.8
		Pipelines	110 mm dia	7	km											
	Reticulation					R million	43									
		Pipelines	75 mm dia	12.5	km			1	6	6	5	3	12	1	34	2.8
		Storage	150 kl	3	no											
		Stand Pipes	Complete	128.0	no											
11.33 Zwelisha Moyeni WSS Future TBC						R million										
	Bulk					R million	408	1	12	8	6	3	48	1	79	6.6
		Pipelines	200 mm dia	37	km											
		Pipelines	300 mm dia	17	km											
		Storage	750 kl	9	no											
		Abstraction Works	Complete	2	no											
		WTW	Complete	1.8	MI/day											
		WTW	Complete	1.4	MI/day											
		Pump Station	0.1 MW	2	no											
		Pump Station	0.2 MW	1	no											
		Pipe Bridges	Complete	5	no											
	Reticulation					R million	577.3	1	12	8	6	3	48	1	79	6.6
		Pipelines	75 mm dia	220.0	km											
		Stand Pipes	Complete	2 135	no											

12. CONCLUSIONS AND RECOMMENDATIONS

This section discusses the conclusions and recommendations for the development of a Universal Access Plan for bulk water supply in the uTDM.

Furthermore, it aims to direct the decision-making process for planning and capital investment requirements in order to ensure all consumers in the uTDM have access to at least basic levels of water supply.

The national target for all people in South Africa to have access to basic levels of service (all types of civil infrastructure services), is 2019 – three years and three months from 1 April 2016 to 30 June 2019, or only 36 months.

Some of the areas in the uTDM may not be served by this time if standard planning, procurement and construction methods are followed. This document may promote innovative thinking to ensure universal access for all, for water supply by 2019.

12.1 AREAS CLASSIFIED AS BULK SUPPLY AREAS (CURRENT, FUTURE)

If applying the Regional Bulk Infrastructure Grant Framework for Implementation (version V9c, 2010) criteria for funding, any scheme where the water treatment works is designed for a minimum of 2Ml/d, is classified as a bulk water scheme.

In this case, the following scheme areas can currently be classified as bulk supply areas:

- Bergville WSS;
- Colenso WSS;
- Driefontein WSS when supplied in future from the planned Ezakheni / Ladysmith Regional BWSS (although currently supplied from groundwater);
- Ekuvukeni / Lime Hill WSS;
- Estcourt WSS;
- Ezakheni WSS;
- Ladysmith WSS;
- Loskop WSS (based on the 2015 water requirements, WTW earmarked for upgrade already); and
- Zwelisha Moyeni WSS.

Then, based on the conceptual planning for future water supply and the estimated water requirements for 2025, the following scheme areas can be added to the above:

- Emoyeni-Amangwe WSS;
- Estcourt Rudimentary WSS;
- Tugela Estates WSS;
- Weenen WSS – extended to include the northern and southern future WSS areas;
- Bergville WSS Future; and
- Zwelisha Moyeni WSS Future.

The future bulk water scheme areas are still in conceptual or planning phases, with details of the scheme developments and water source options still to be fully investigated and cost allocations made to consider by the uTDM for implementation.

12.2 AREAS IN OR NEAR DEFICIT, BUT WITH PROJECT/S IN HAND

The following areas already have a deficit in water supply versus the water requirements for 2015 or will soon be in deficit (by 2020), but there are projects in hand to address the water supply:

- Bergville WSS: technical details of the project to augment water supply infrastructure were not available at the time of completing this report, but construction has commenced;
- Driefontein WSS: reticulation infrastructure is already being constructed, with the aim of connecting this supply area to the planned new WTW from the Spioenkop Dam that would form part of the Regional Bulk Scheme to supply Ladysmith WSS, Ezakheni WSS and the Driefontein WSS areas;
- Emoyeni-Amangwe WSS: this area is made provision for in the extension and augmentation of the Loskop WSS;
- Estcourt Rudimentary WSS: this area is being incorporated into the existing Estcourt WSS;
- Ezakheni WSS and Ladysmith WSS: it is planned that these areas will be served from the new WTW from the Spioenkop Dam that would form part of the Regional Bulk Scheme to supply Ladysmith WSS, Ezakheni WSS and the Driefontein WSS areas;
- Loskop WSS: a project is already under way to augment supply in this area as well as extending it to other areas;
- Weenen WSS, including the currently unserved northern and southern areas: although the water requirements are fairly small (only reaching 2.47Ml/d by 2020), plans are being developed in the form of the Umtshezi Regional Water Master Plan to supply areas in the Umtshezi LM;
- Zwelisha Moyeni WSS: reticulation infrastructure has been constructed to augment supply in some of the areas in this WSS. However, it still has to be connected to the bulk supply.

12.3 AREAS IN OR NEAR DEFICIT, BUT NO PROJECT IN HAND

The following areas can be classified as bulk water supply areas, but do not have any projects in hand to address the water requirements for 2015 or up to 2025:

- Bergville WSS Future: No plans are in place yet to ensure sufficient water supply to this area by 2019;
- Ekuvukeni Lime Hill WSS: This supply area is already affected by water source and water infrastructure limitations. A feasibility study was registered as a project, but has not yet been completed. Urgent intervention is required to ensure current and future water requirements for this area are met;
- Zwelisha Moyeni WSS Future: There are no plans yet to improve service levels in this supply area. The water source options still need to be investigated and the most suitable technical solution developed for this area that covers a large geographic extent and has a low population density.

12.3.1 Bergville WSS Future

The population of the Bergville WSS Future area was taken from the 2011 census (Statistics South Africa) and projected to 2015 as being 19 987 (3 493 households). The population figure was further projected to increase to 23 532 by 2035 (4 284 households).

The 2015 water requirements, including losses, were estimated as 0.606 million m³/a (1.659MI/d). This is projected to increase to 1.235 million m³/a (3.383MI/d) by 2035.

Currently the area is served by boreholes and water tankers. Water tankers are an expensive method for water delivery and effort should be made to rather plan for and implement adequate water supply infrastructure for this area.

The potential scheme area is an estimated 130km², which is quite large in geographic extent.

The ISP for the Tukela Catchment (DWAf, 2004) indicated that no additional water is available upstream from the Driel Barrage, except for basic human needs. The option of conjunctive use of surface and groundwater should be investigated especially since groundwater is already utilised as a source.

There are currently community stand pipes, with illegal connections to household yards and this should be formalised so that it can be adequately managed and maintained.

The total costs for a conceptual surface water scheme is R564.2 million and planning, implementation and hand-over is estimated to take 67 months. Therefore a formalised scheme could be only be completed by 2021 if planning commences by July 2016. This scheme is the second-most expensive scheme development required in the uTDM, after the Zwelisha Moyeni WSS Future supply area.

12.3.2 Ekuvukeni Lime Hill WSS

The population of the Ekuvukeni Lime Hill WSS area was taken from the 2011 census (Statistics South Africa) and projected to 2015 as being 94 798 (18 543 households). The population figure was further projected to increase to 116 434 by 2035 (22 801 households).

The 2015 water requirements, including losses, were estimated as 5.038 million m³/a (13.802MI/d). This is projected to increase to 7.613 million m³/a (20.857MI/d) by 2035.

Currently the area is served from the existing Ekuvukeni WTW which abstracts water from the Oliphantskop Dam, fed by the Sunday's River. The Oliphantskop Dam however has been beleaguered with siltation problems and the inlet of the abstraction works is below the silt level of the Dam. The Dam is also affected by the current drought conditions. All these elements subsequently have a detrimental effect on the water quantity that can be abstracted and the raw water quality. The operational efficiency of the WTW is therefore compromised and so too the water quality provided to consumers.

The existing scheme area is an estimated 840km², which is very large in geographic extent. Consumers are provided with various service levels, including households having no access to basic RDP level of supply, to households having access to full house connections and waterborne sanitation. There are also illegal connections in the supply area, reducing the water available to intended use by all legal consumers.

The ISP for the Tukela Catchment (DWAF, 2004) indicated that no additional water is available in the Sunday's River catchment area, but registered water use has to be confirmed (information available at the time was doubtful). The irrigation sector is the largest water user in this area. Furthermore, the water quality is affected by upstream mining activities as well as domestic sewer activities.

A detail study is urgently required to investigate the water available and make recommendations on conjunctive use of surface and groundwater sources.

The total costs for a conceptual surface water scheme cannot yet be determined as there are detail planning studies required to determine water source options and reconcile it with the current and future water requirements.

12.3.3 Zwelisha Moyeni WSS Future

The population of the Zwelisha Moyeni WSS Future area was taken from the 2011 census (Statistics South Africa) and projected to 2015 as being 18 842 (3 336 households). The population figure was further projected to increase to 23 222 by 2035 (4 107 households).

The 2015 water requirements, including losses, were estimated as 0.481 million m³/a (1.316Ml/d). This is projected to increase to 1.148 million m³/a (3.145Ml/d) by 2035.

Currently the area is served by springs and water tankers. Water tankers are an expensive method for water delivery and effort should be made to rather plan for and implement adequate water supply infrastructure for this area.

The potential scheme area is an estimated 270km², which is quite large in geographic extent.

The ISP for the Tukela Catchment (DWAF, 2004) indicated that no additional water is available upstream from the Driel Barrage, except for basic human needs. The scheme area already utilises spring water and these sources could still be used to augment supply from the proposed surface water source options (from the Woodstock Dam and Mlambonja River).

There are currently community stand pipes, with illegal connections to household yards and this should be formalised so that it can be adequately managed and maintained.

The total costs for a conceptual surface water scheme is R985.3 million and planning, implementation and hand-over is estimated to take 79 months. Therefore a formalised scheme could only be completed by 2022 if planning commences in July 2016. This scheme is the most expensive scheme development required in the uTDM mainly due to the large geographic extent of the service area.

12.4 FUNDING OPTIONS

The uTDM relies mainly on grant funding programmes to fund their water supply projects. These funding programmes are mainly MIG and RBIG. The estimated costs for the conceptual scheme developments amount to R2 052.0 million. The uTDM's MIG allocation for 2015/2016 to 2017/2018 is R455.355 million and the MWIG allocation for 2015/2016 to 2017/2018 is R 171.359 million.

There is a clear shortfall in addressing the water supply backlogs within the uTDM.

Another funding option that the uTDM could consider is loan funding through the Development Bank of Southern Africa (DBSA). Special submissions to National Treasury could also be considered to create an awareness of the DM's planning and implementation readiness.

Further funding options – loan funding in most instances, include international donor organisations such as the Swedish International Development Cooperation Agency (SIDA), Japan International Cooperation Agency (JICA) and the Chinese Government, amongst others.

ANNEXURE A – REFERENCES



Reference List

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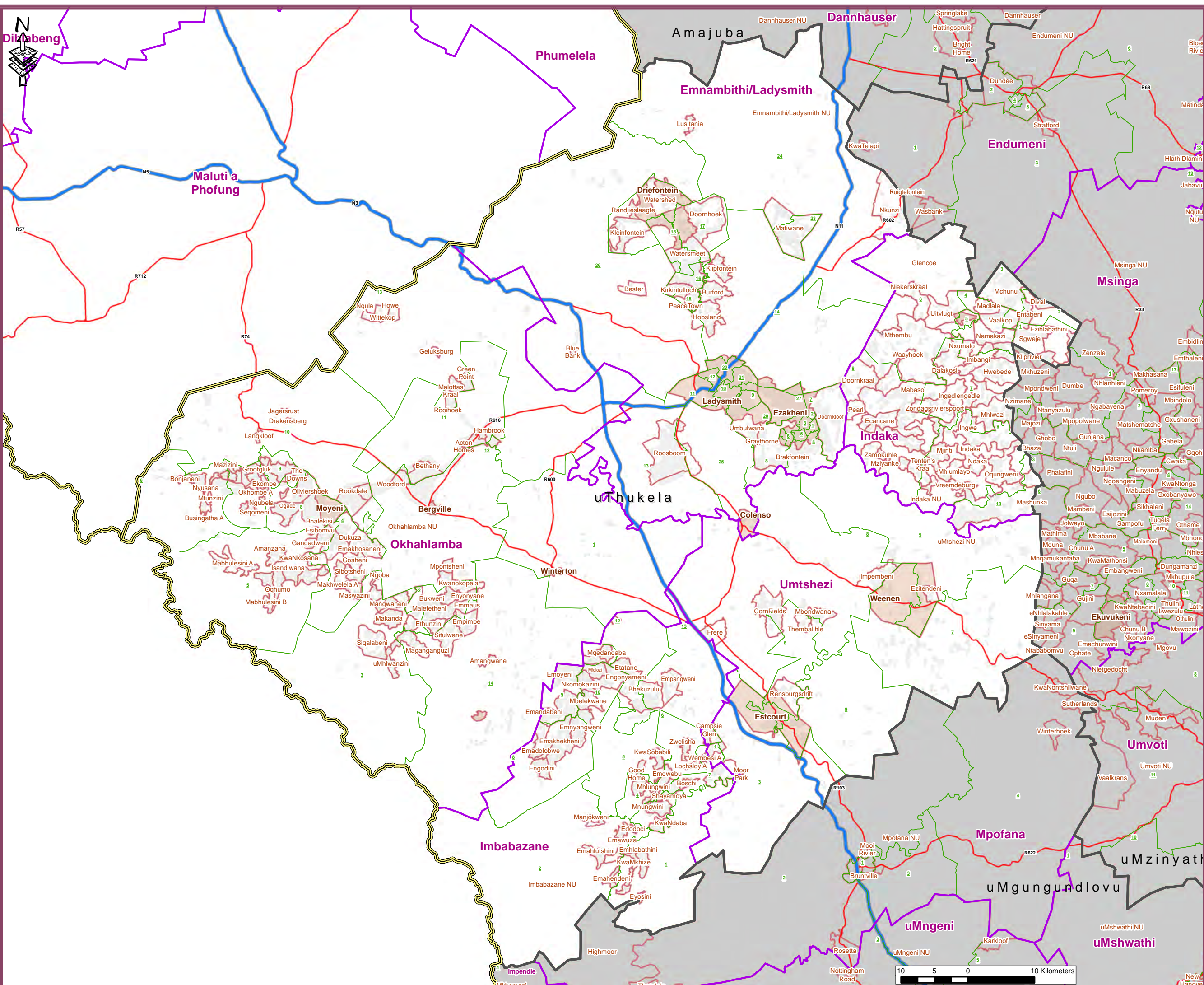
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ANNEXURE B – MAP SERIES

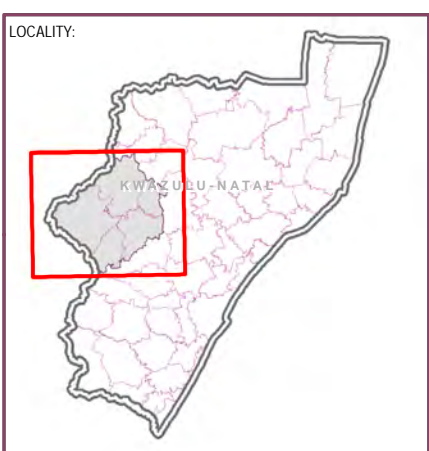




Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads

DWS: Dept. of Water & Sanitation



CONSULTANTS:

UWP
Consultants
UWP Consulting
PO Box 25549, Monument Park
Pretoria, 0105

ZIYANDA
Consultants
ZIYANDA Consulting
Pretoria, 0105

Project No.: 27811
Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

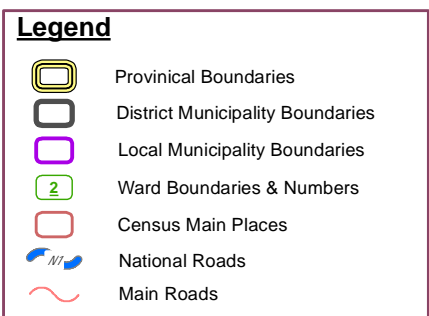
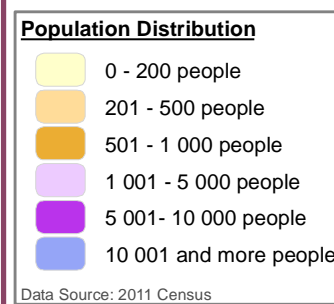
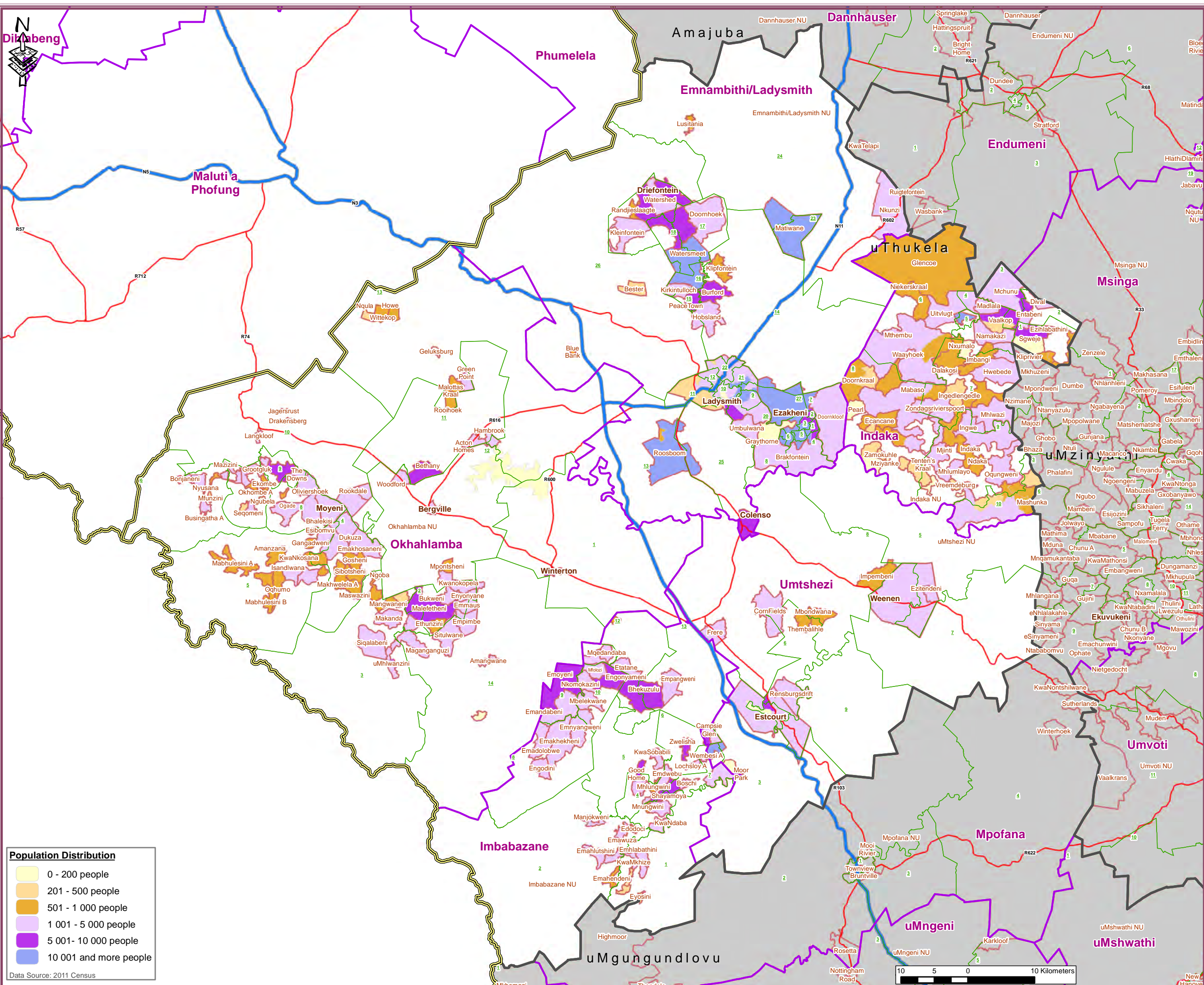
General Orientation Study Area

DATE COMPLETED:

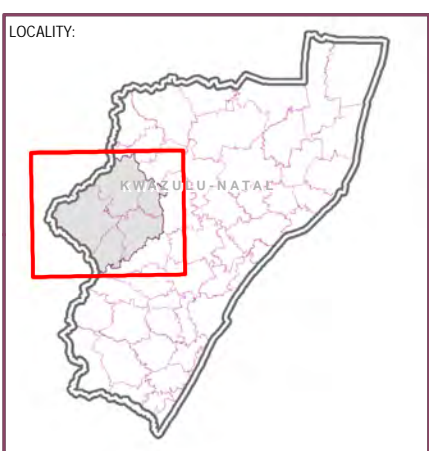
2016/06/22

MAP NO.:

DC23_Figure 1



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CONSULTANTS:

UWP
 Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

ZIYANDA
 Consulting
 Consulting & Project Management

Project No.: 27811
 Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

PROJECT TITLE

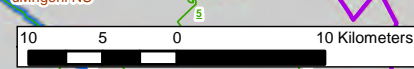
**uThukela DM: Universal Access
 Plan Phase 2 - Progressive
 Development of a Regional Water
 Supply Master Plan**

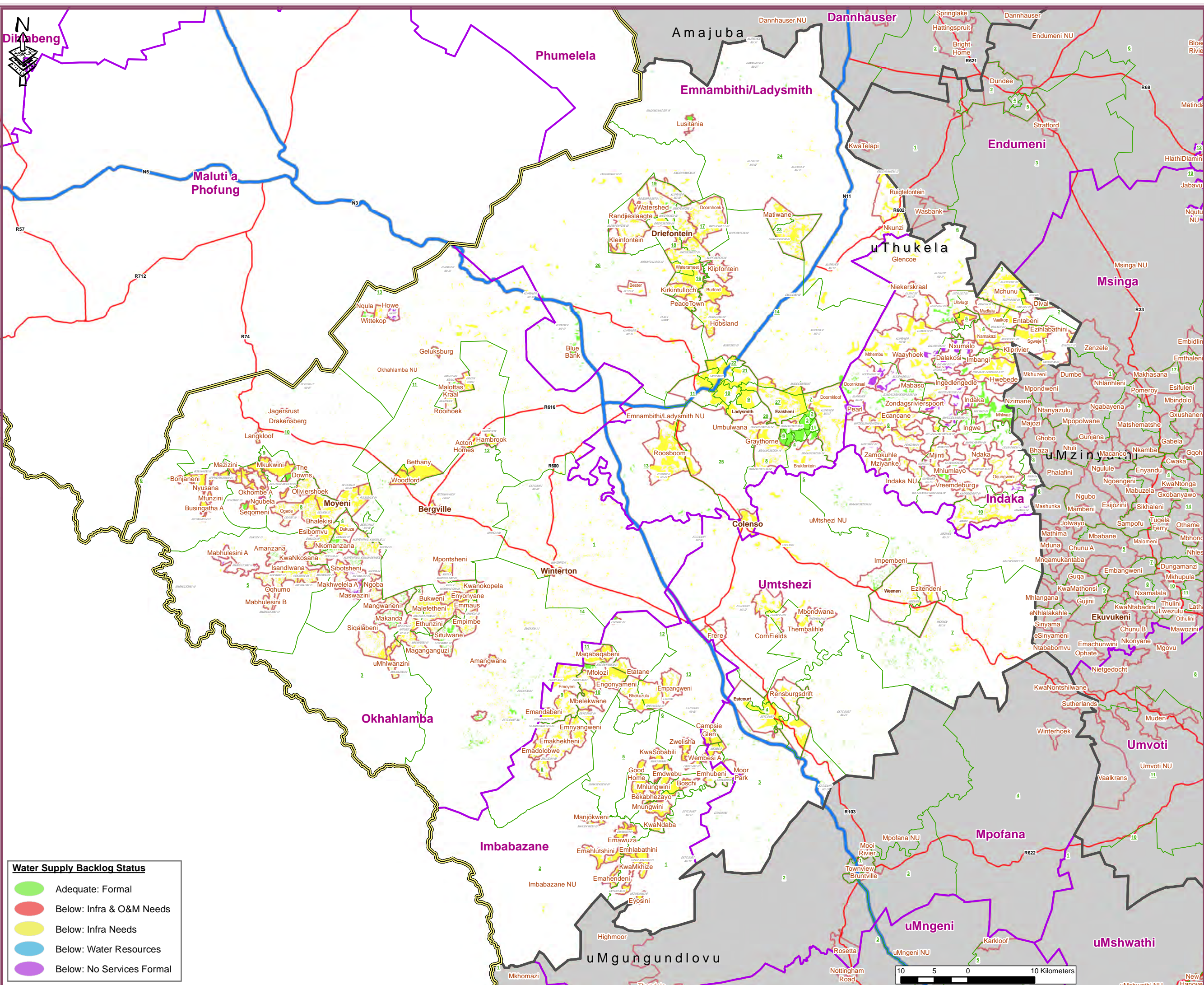
MAP TITLE:

**General Orientation
 Population Distribution**

DATE COMPLETED: 2016/03/04

MAP NO.: **DC23_Figure 2**



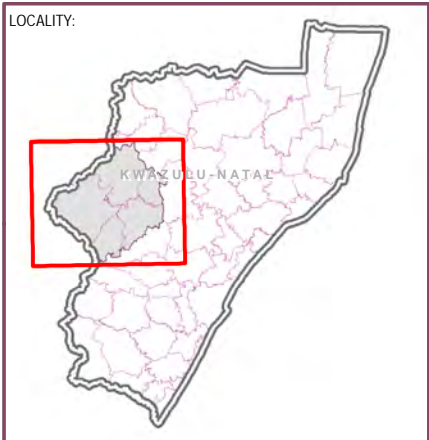


Water Supply Backlog Status

- Adequate: Formal
- Below: Infra & O&M Needs
- Below: Infra Needs
- Below: Water Resources
- Below: No Services Formal

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP
UWPPROJECTS
Ensuring the quality of life

ZIYANDA
CONSULTING
Ensuring the quality of life

UWP Consulting
PO Box 25549, Monument Park
Pretoria, 0105

Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

Project No.: 27811

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MAP TITLE:

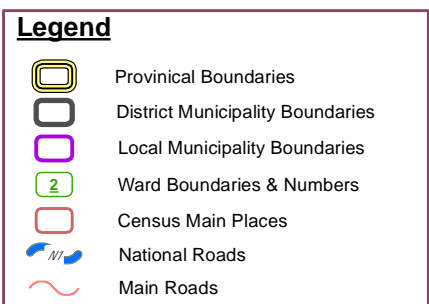
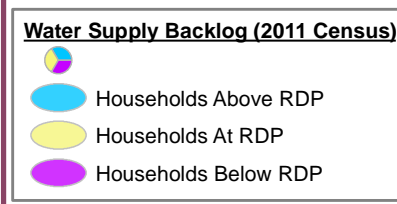
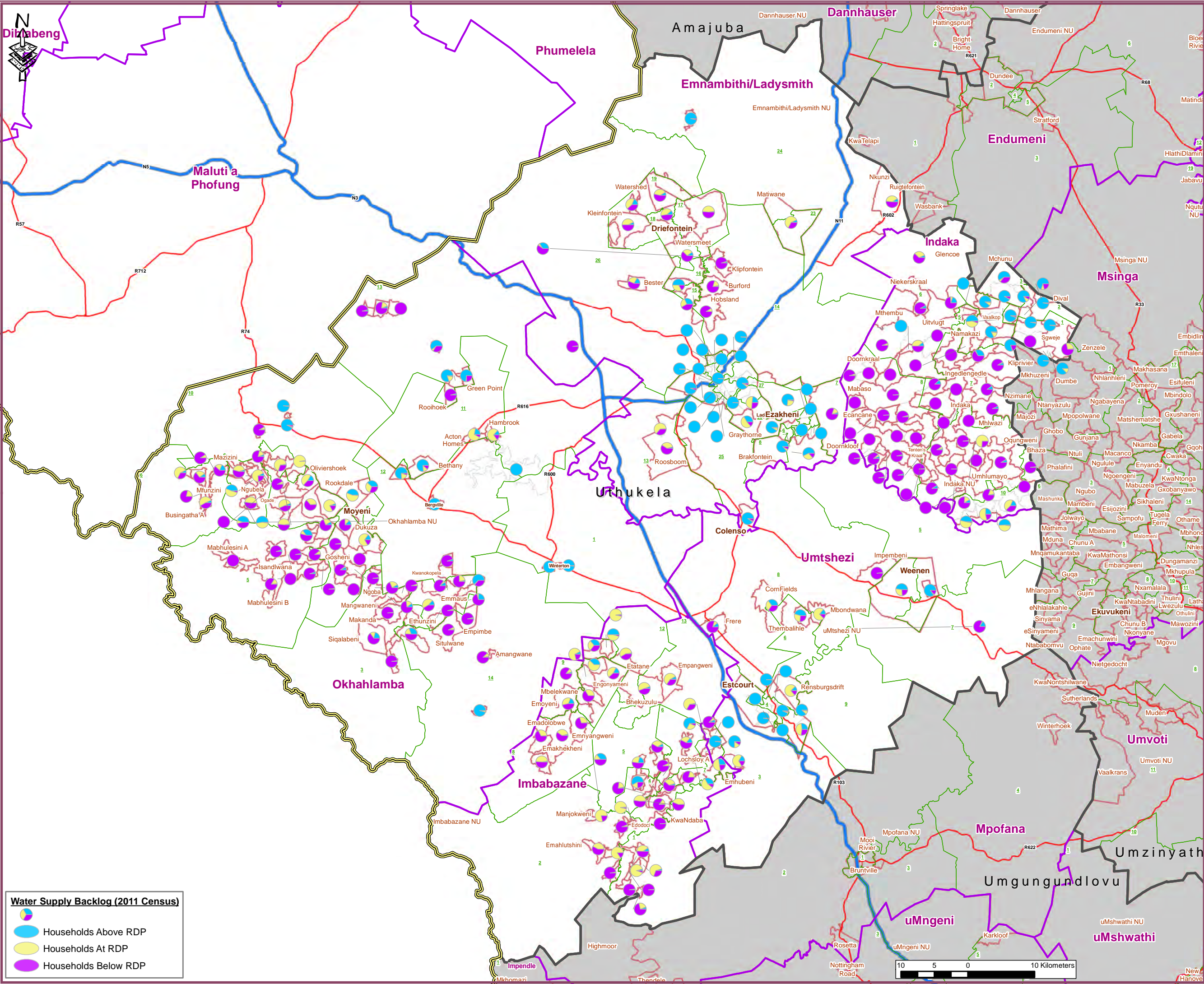
Water Supply Backlog Status

DATE COMPLETED:

2016/03/04

MAP NO.:

DC23_Figure 3



CONSULTANTS:

UWP
 UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

ZIYANDA
 Consulting

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

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uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

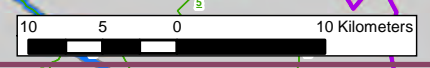
Water Supply Backlog 2011 Census

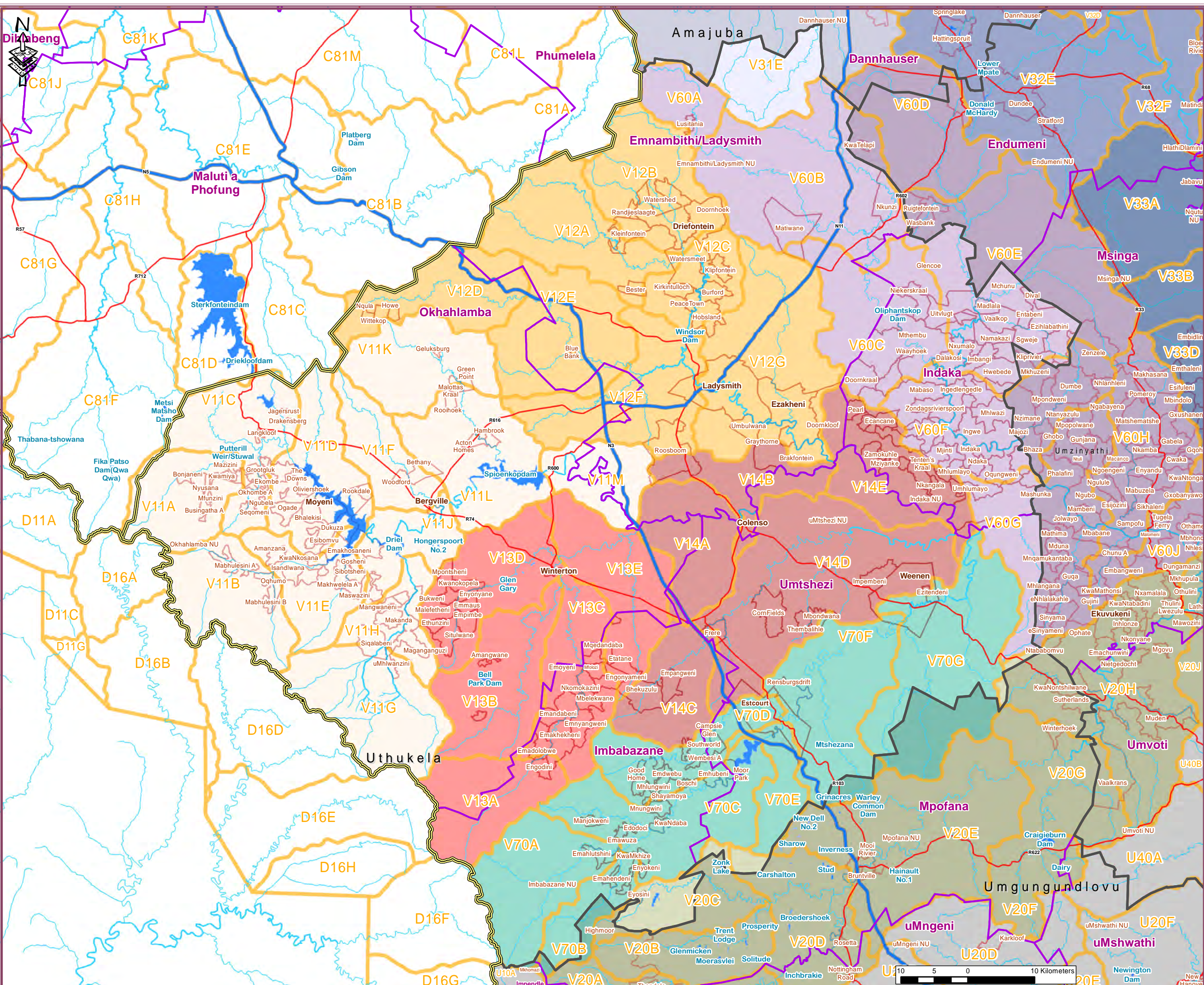
DATE COMPLETED:

2016/03/31

MAP NO.:

DC23_Figure 4

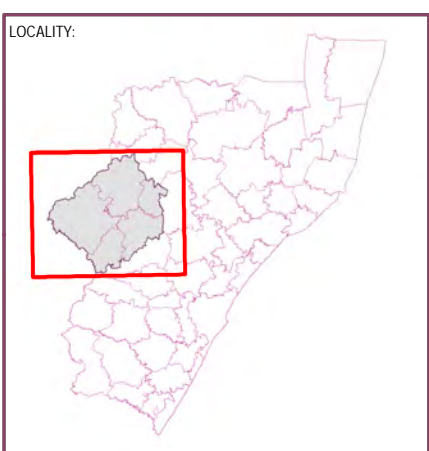




Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Census Main Places
- National Roads
- Main Roads
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers
- Quaternary Catchments

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP
UWP Consulting
PO Box 25549, Monument Park
Pretoria, 0105

ZIYANDA
ZIYANDA Consulting

Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

Project No.: 27811

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uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

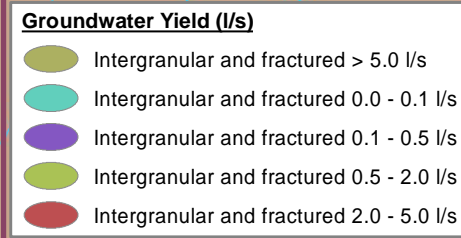
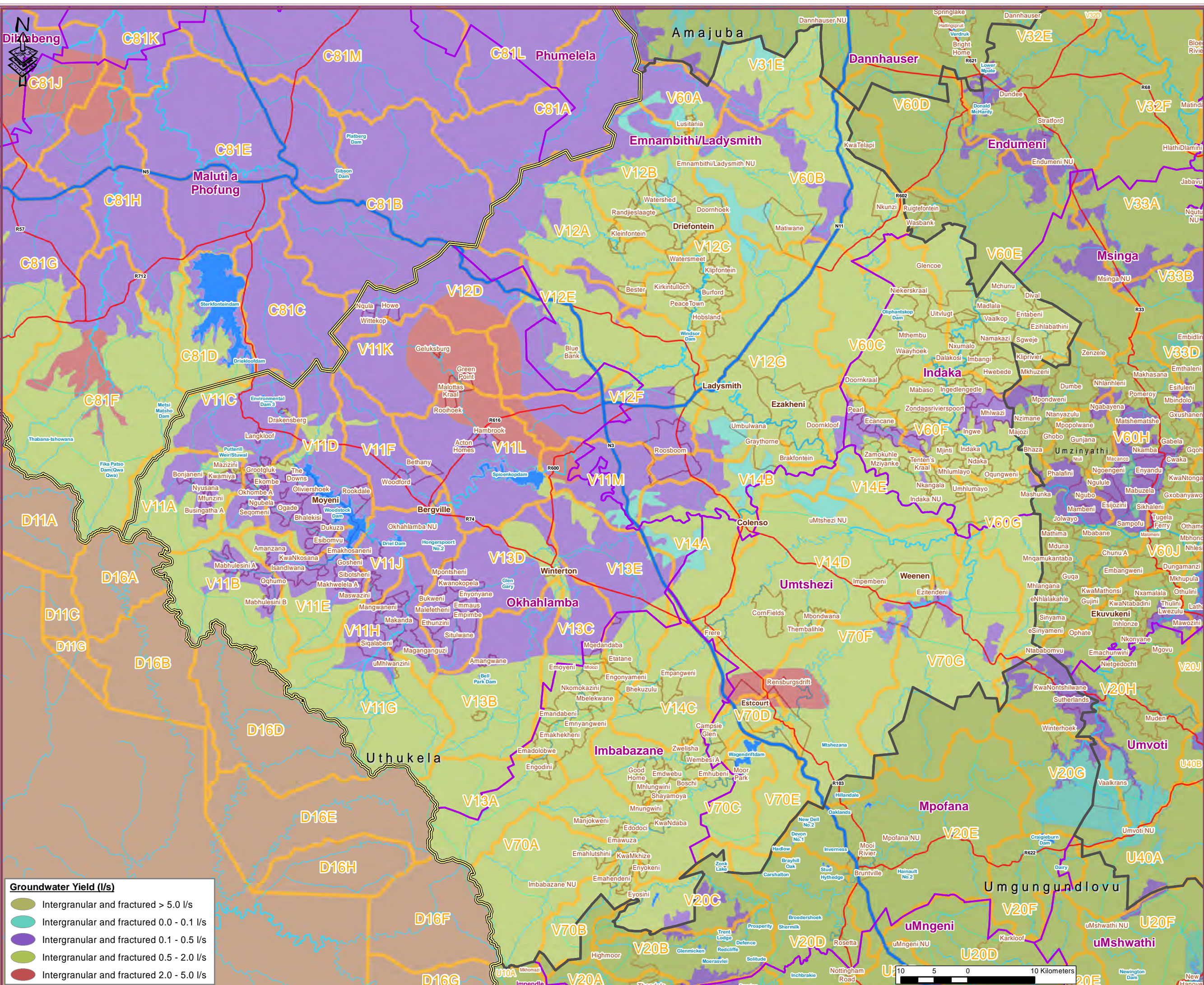
Surface Water Resources

DATE COMPLETED:

2016/03/31

MAP NO.:

DC23_Figure 5



Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Census Main Places
- National Roads
- Main Roads
- Groundwater Aquifer Class: Minor (whole of the UDM)

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

ZIYANDA Consulting

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Groundwater Resources

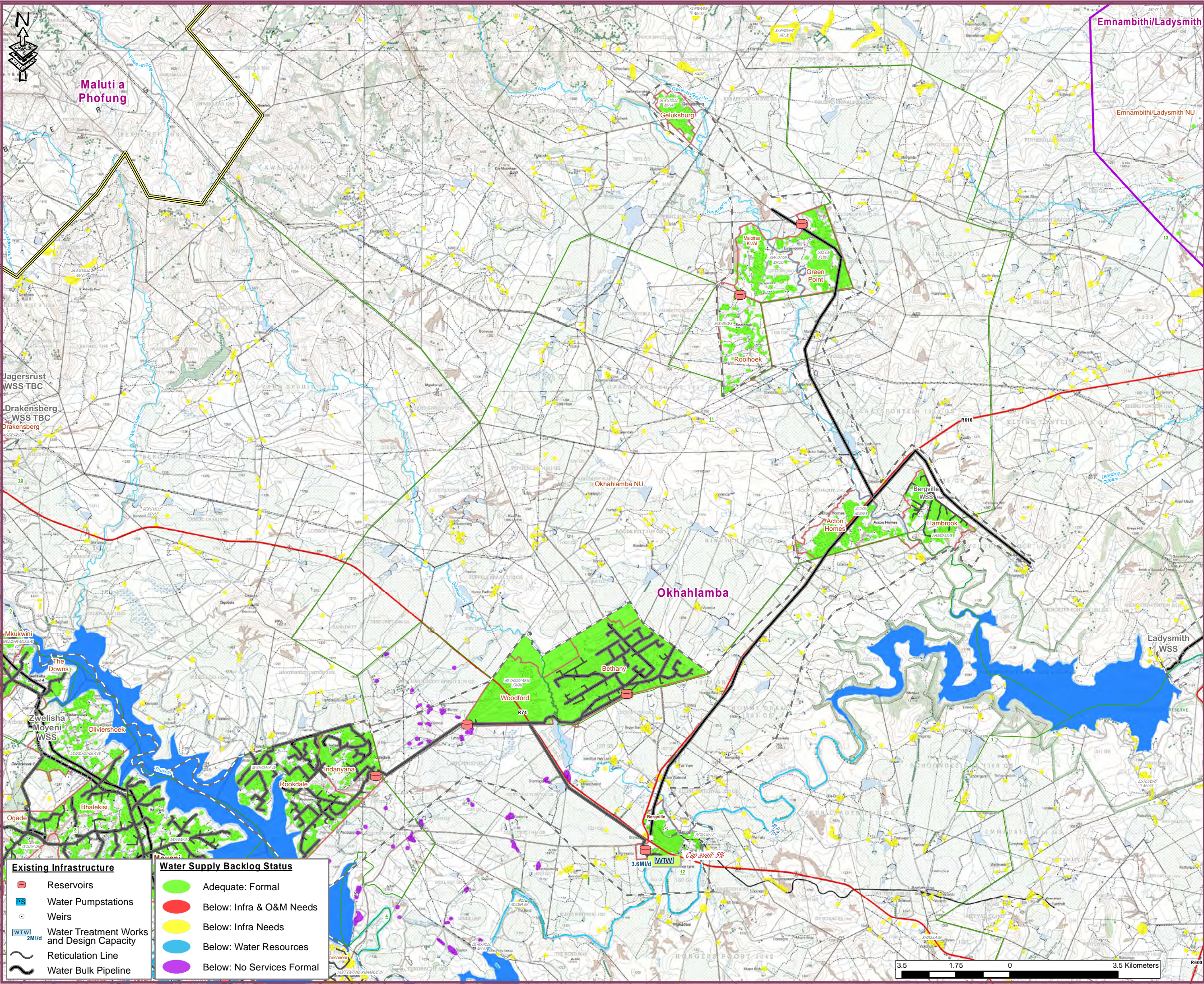
DATE COMPLETED:

2016/03/31

MAP NO.:

DC23_Figure 6





Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Water Supply Areas (All Towns Clusters)
Bergville WSS

DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0730

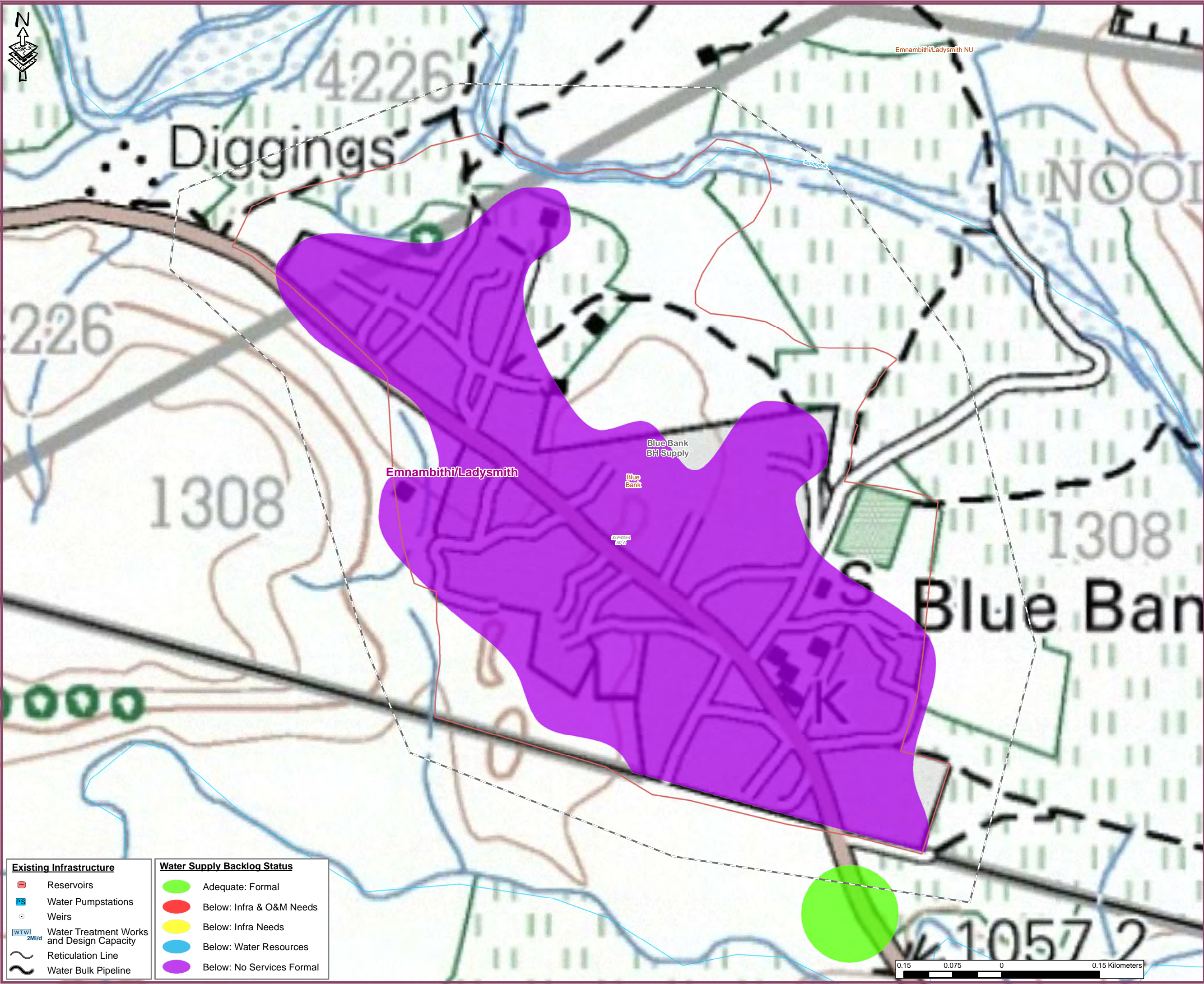
Existing Infrastructure

- Reservoirs
- Water Pumpstations
- Weirs
- Water Treatment Works and Design Capacity
- Reticulation Line
- Water Bulk Pipeline

Water Supply Backlog Status

- Adequate: Formal
- Below: Infra & O&M Needs
- Below: Infra Needs
- Below: Water Resources
- Below: No Services Formal





Existing Infrastructure		Water Supply Backlog Status	
	Reservoirs		Adequate: Formal
	Water Pumpstations		Below: Infra & O&M Needs
	Weirs		Below: Infra Needs
	Water Treatment Works and Design Capacity		Below: Water Resources
	Reticulation Line		Below: No Services Formal
	Water Bulk Pipeline		

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

UTHUKELA DISTRICT MUNICIPALITY

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

ZIYANDA consulting

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

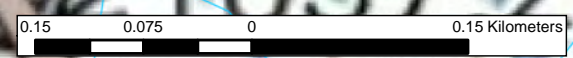
Water Supply Areas (All Towns Clusters)
Blue Bank BH Supply

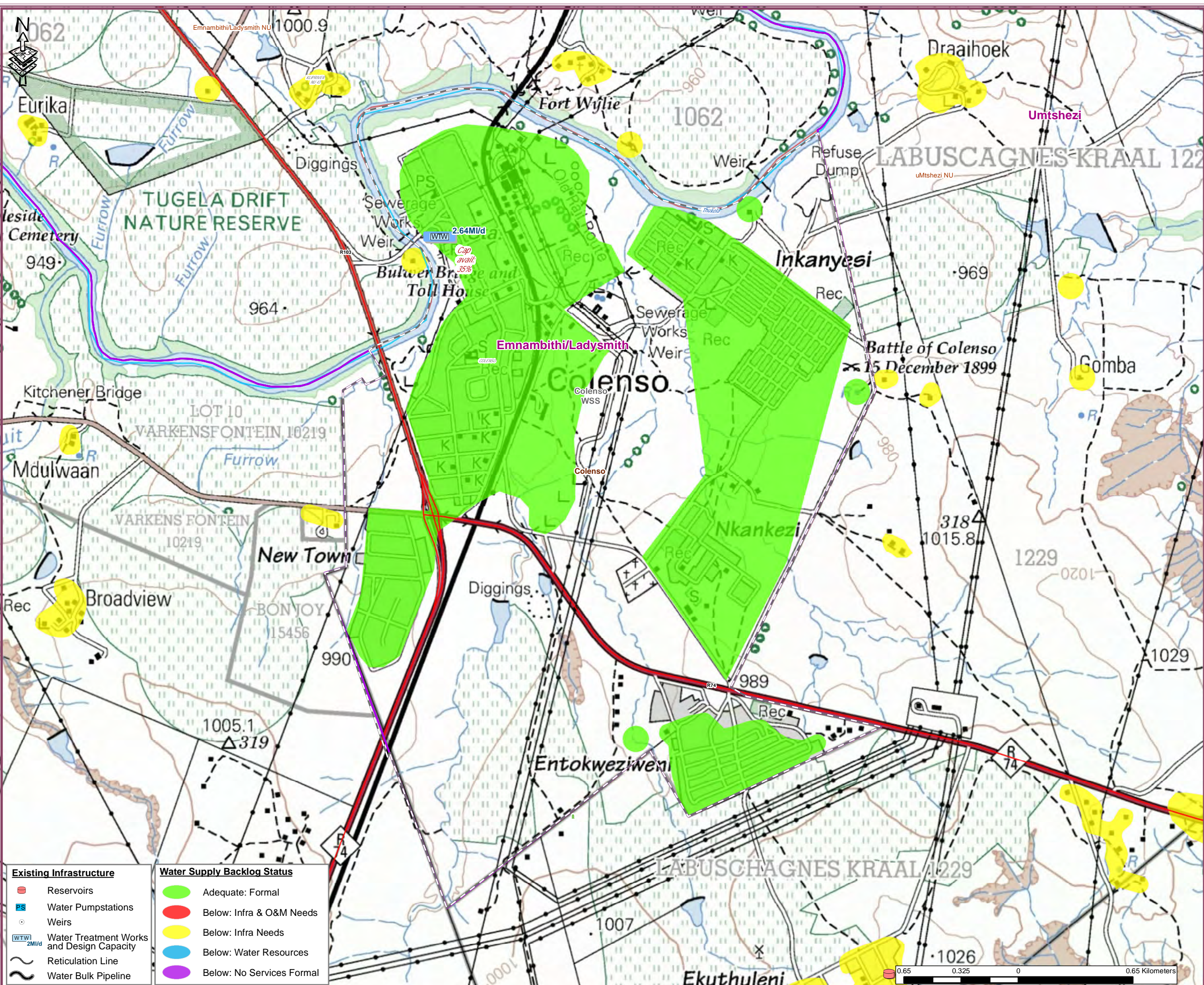
DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0792



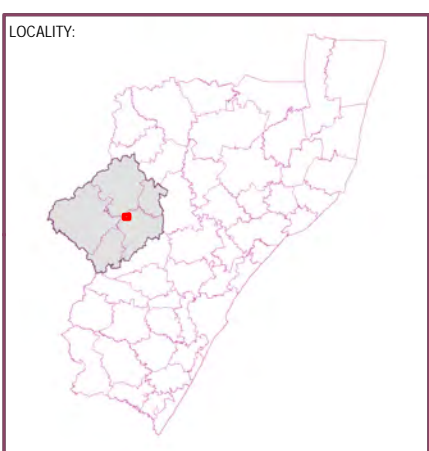


Existing Infrastructure		Water Supply Backlog Status	
	Reservoirs		Adequate: Formal
	Water Pumpstations		Below: Infra & O&M Needs
	Weirs		Below: Infra Needs
	Water Treatment Works and Design Capacity		Below: Water Resources
	Reticulation Line		Below: No Services Formal
	Water Bulk Pipeline		

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

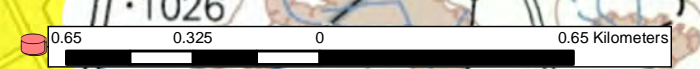
Water Supply Areas (All Towns Clusters)
Colenso WSS

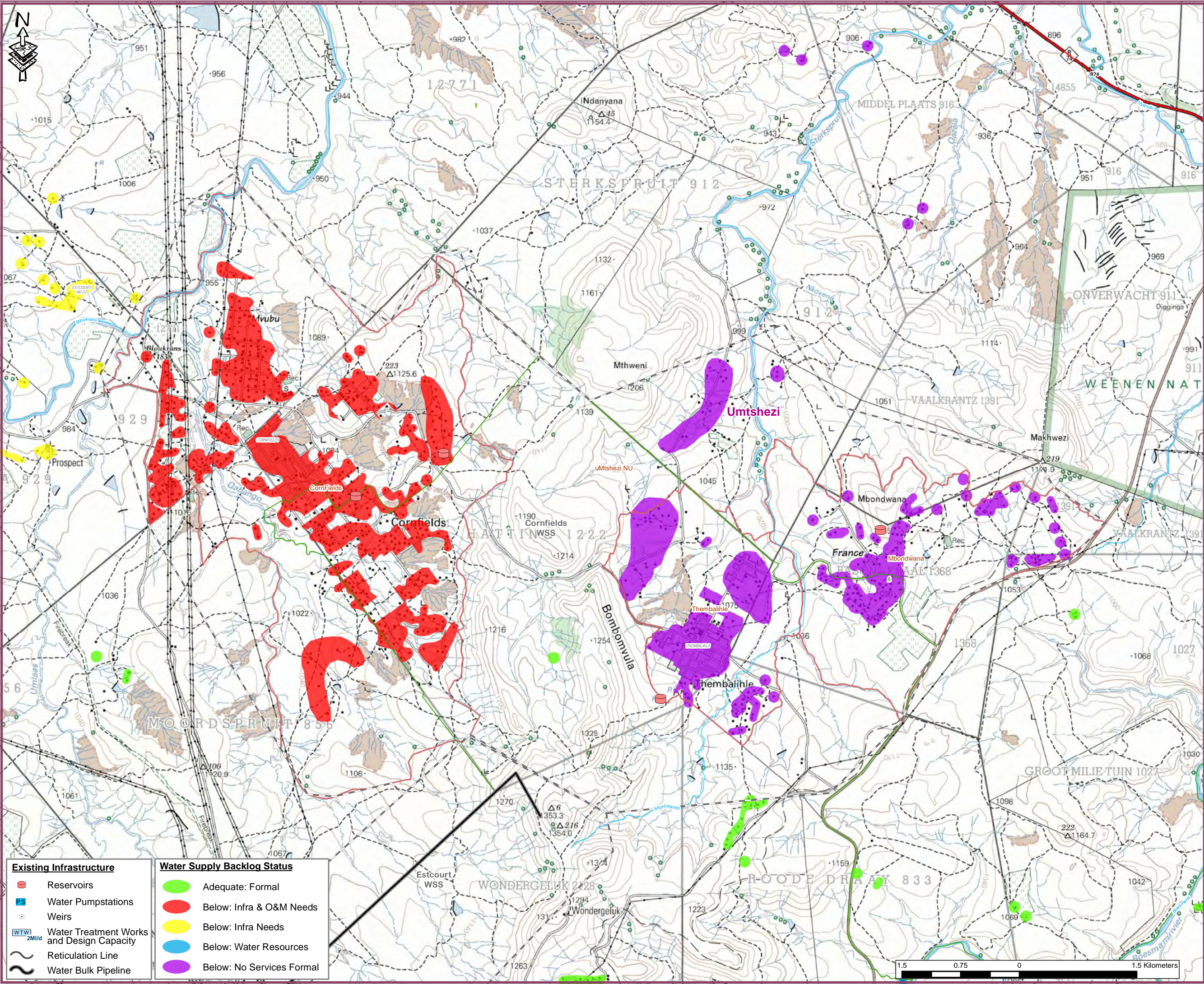
DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0732





Existing Infrastructure		Water Supply Backlog Status	
	Reservoirs		Adequate: Formal
	Water Pumpstations		Below: Infra & O&M Needs
	Weirs		Below: Infra Needs
	Water Treatment Works and Design Capacity		Below: Water Resources
	Reticulation Line		Below: No Services Formal
	Water Bulk Pipeline		

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CONSULTANTS:

UWP
UWP Consulting
PO Box 25549, Monument Park
Pretoria, 0105

ZIYANDA
ZIYANDA Consulting

Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

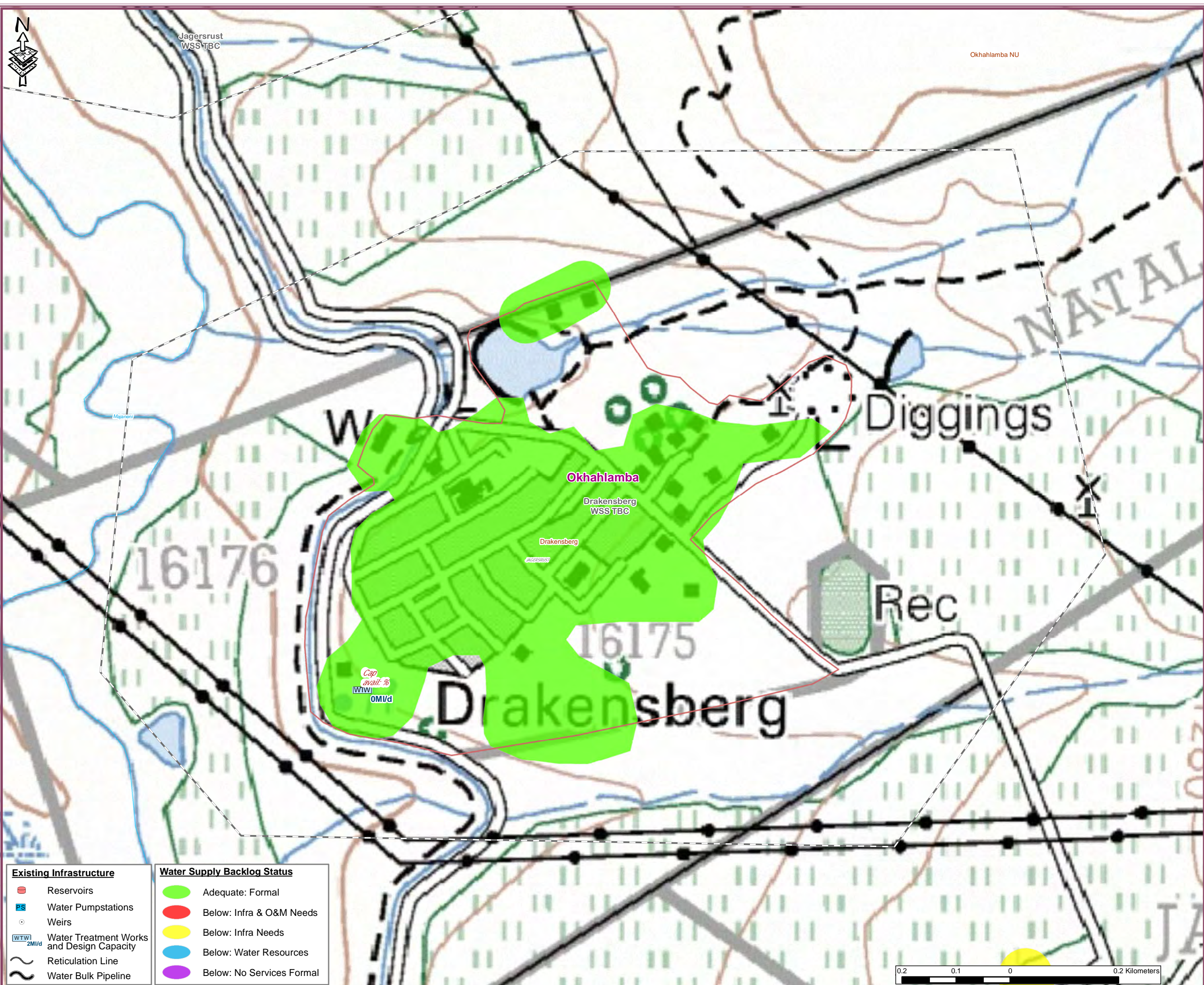
Water Supply Areas (All Towns Clusters)
Cornfields WSS

DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0733

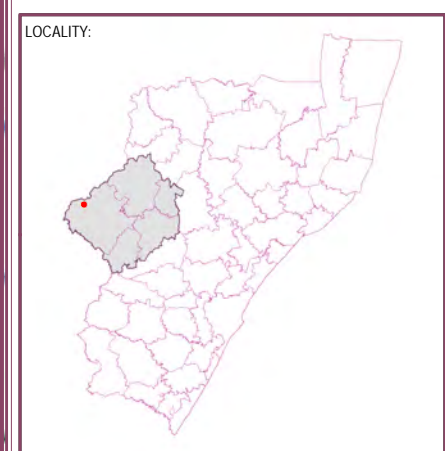


- Existing Infrastructure**
- Reservoirs
 - Water Pumpstations
 - Weirs
 - Water Treatment Works and Design Capacity
 - Reticulation Line
 - Water Bulk Pipeline

- Water Supply Backlog Status**
- Adequate: Formal
 - Below: Infra & O&M Needs
 - Below: Infra Needs
 - Below: Water Resources
 - Below: No Services Formal



- Legend**
- Provincial Boundaries
 - District Municipality Boundaries
 - Local Municipality Boundaries
 - Ward Boundaries & Numbers
 - Census Main Places
 - National Roads
 - Main Roads
 - Existing Water Supply Areas
 - Dams & Dam Names
 - Primary Rivers
 - Secondary Rivers
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CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

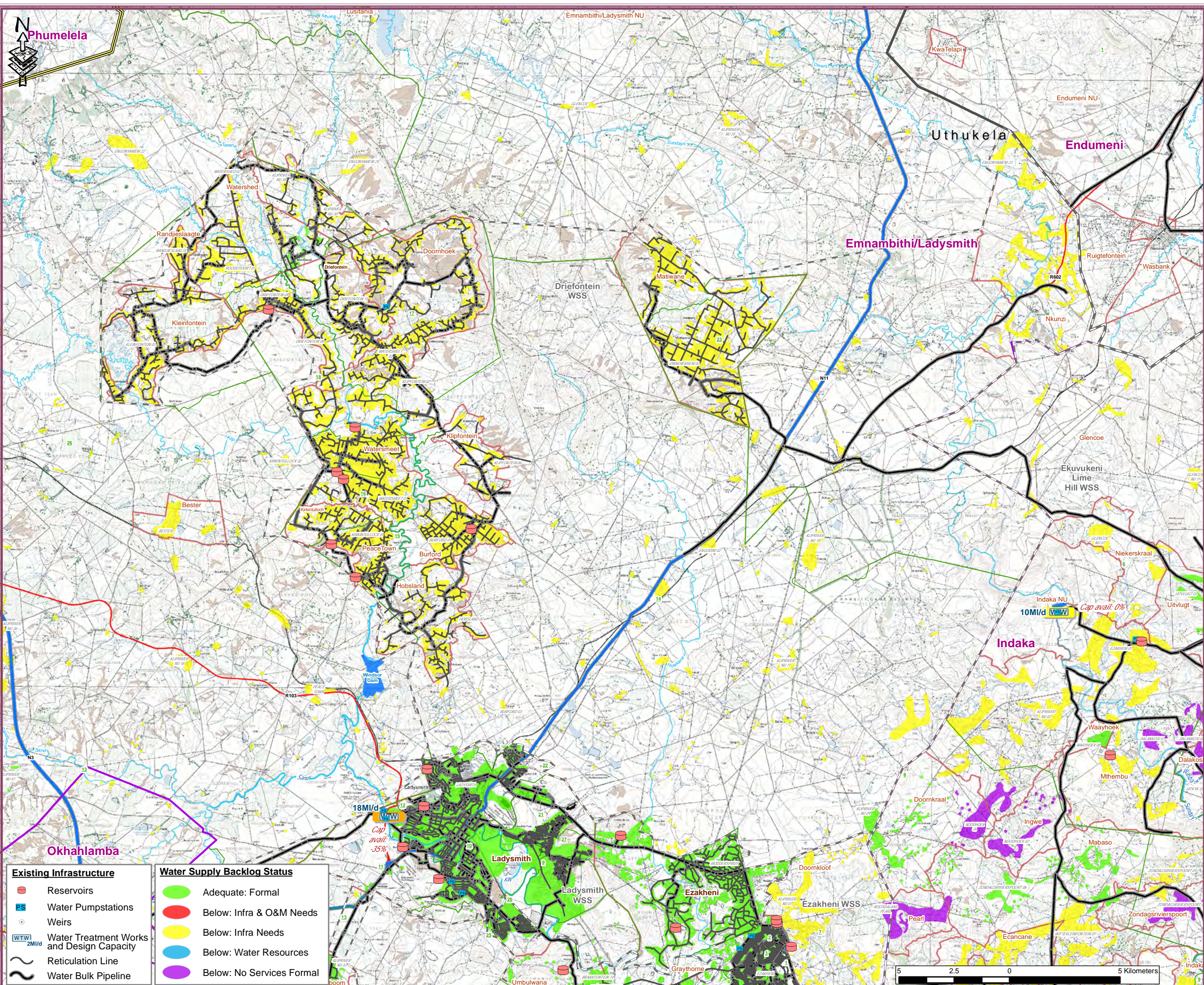
Water Supply Areas (All Towns Clusters)
Drakensberg WSS TBC

DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0790



Existing Infrastructure		Water Supply Backlog Status	
	Reservoirs		Adequate: Formal
	Water Pumpstations		Below: Infra & O&M Needs
	Weirs		Below: Infra Needs
	Water Treatment Works and Design Capacity		Below: Water Resources
	Reticulation Line		Below: No Services Formal
	Water Bulk Pipeline		

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

UTHUKELA DISTRICT MUNICIPALITY

CONSULTANTS:

UWP
UWP Consulting
PO Box 25549, Monument Park
Pretoria, 0105

Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Water Supply Areas (All Towns Clusters)
Driefontein WSS

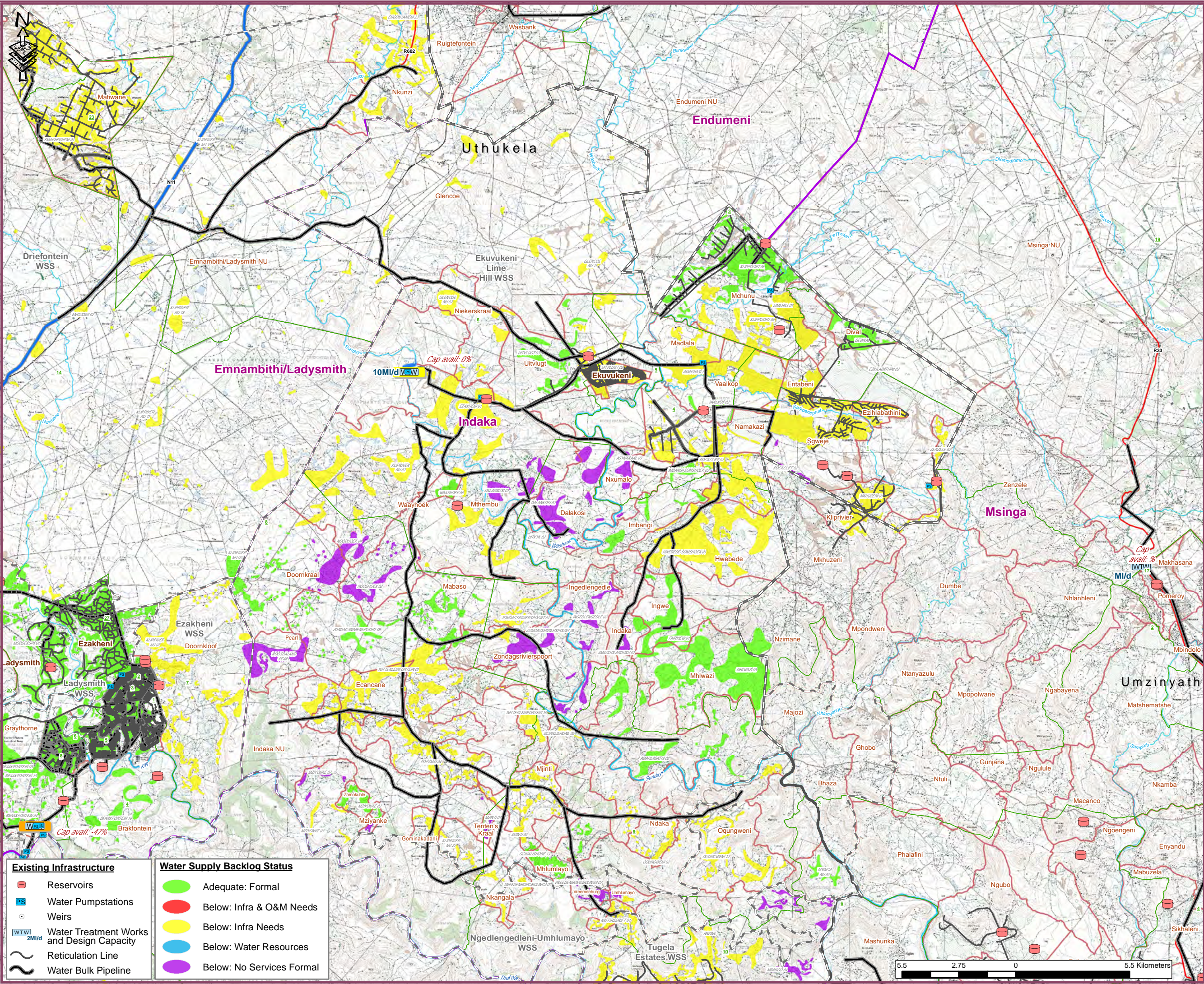
DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0735





Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CONSULTANTS:

UWP
UWP Consulting
PO Box 25549, Monument Park
Pretoria, 0105

ZIYANDA
ZIYANDA CONSULTANTS

Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Water Supply Areas (All Towns Clusters) Ekvukeni Lime Hill WSS

DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0737

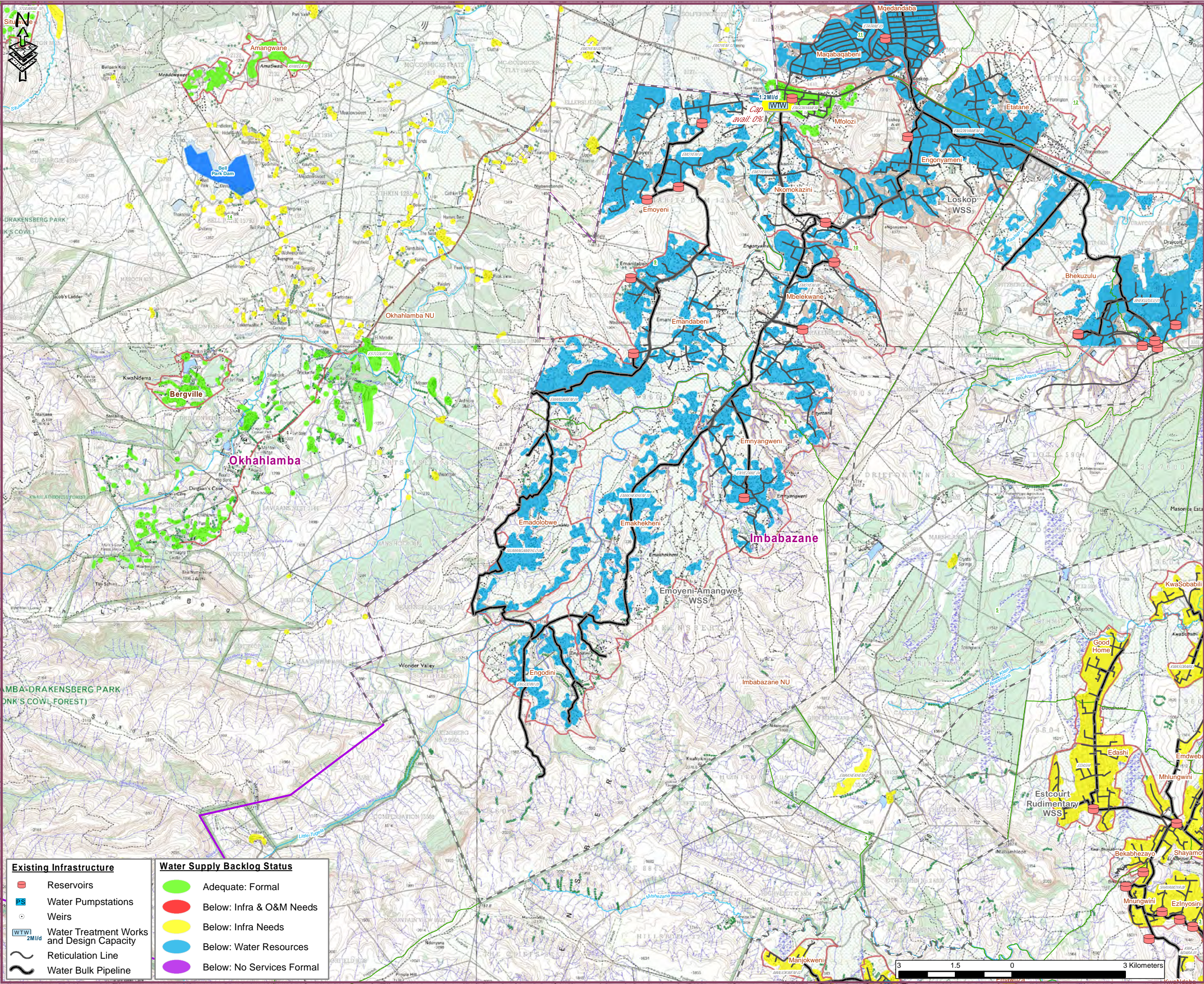
Existing Infrastructure

- Reservoirs
- Water Pumpstations
- Weirs
- Water Treatment Works and Design Capacity
- Reticulation Line
- Water Bulk Pipeline

Water Supply Backlog Status

- Adequate: Formal
- Below: Infra & O&M Needs
- Below: Infra Needs
- Below: Water Resources
- Below: No Services Formal





Existing Infrastructure		Water Supply Backlog Status	
	Reservoirs		Adequate: Formal
	Water Pumpstations		Below: Infra & O&M Needs
	Weirs		Below: Infra Needs
	Water Treatment Works and Design Capacity		Below: Water Resources
	Reticulation Line		Below: No Services Formal
	Water Bulk Pipeline		

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



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DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

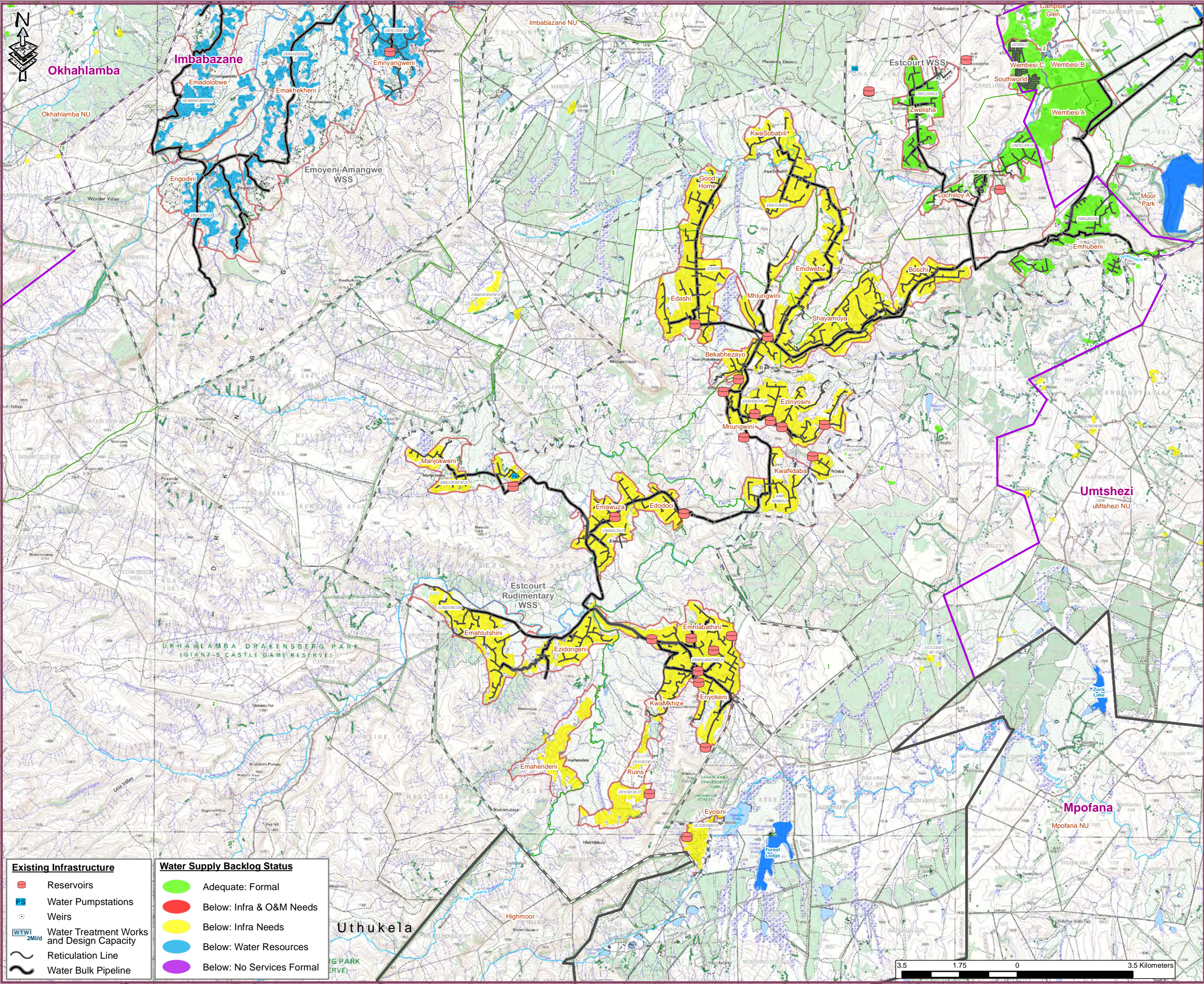
Water Supply Areas (All Towns Clusters)
Emoyeni-Amangwe WSS

DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0738



Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

UTHUKELA DISTRICT MUNICIPALITY

CONSULTANTS:

UWP
UWP Consulting
PO Box 25549, Monument Park
Pretoria, 0105

ZIYANDA
Ziyanda Consulting

Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Water Supply Areas (All Towns Clusters)
Estcourt Rudimentary WSS

DATE COMPLETED:

2016/06/02

MAP NO.:

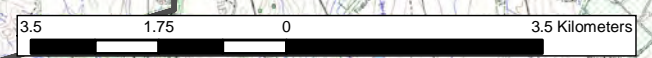
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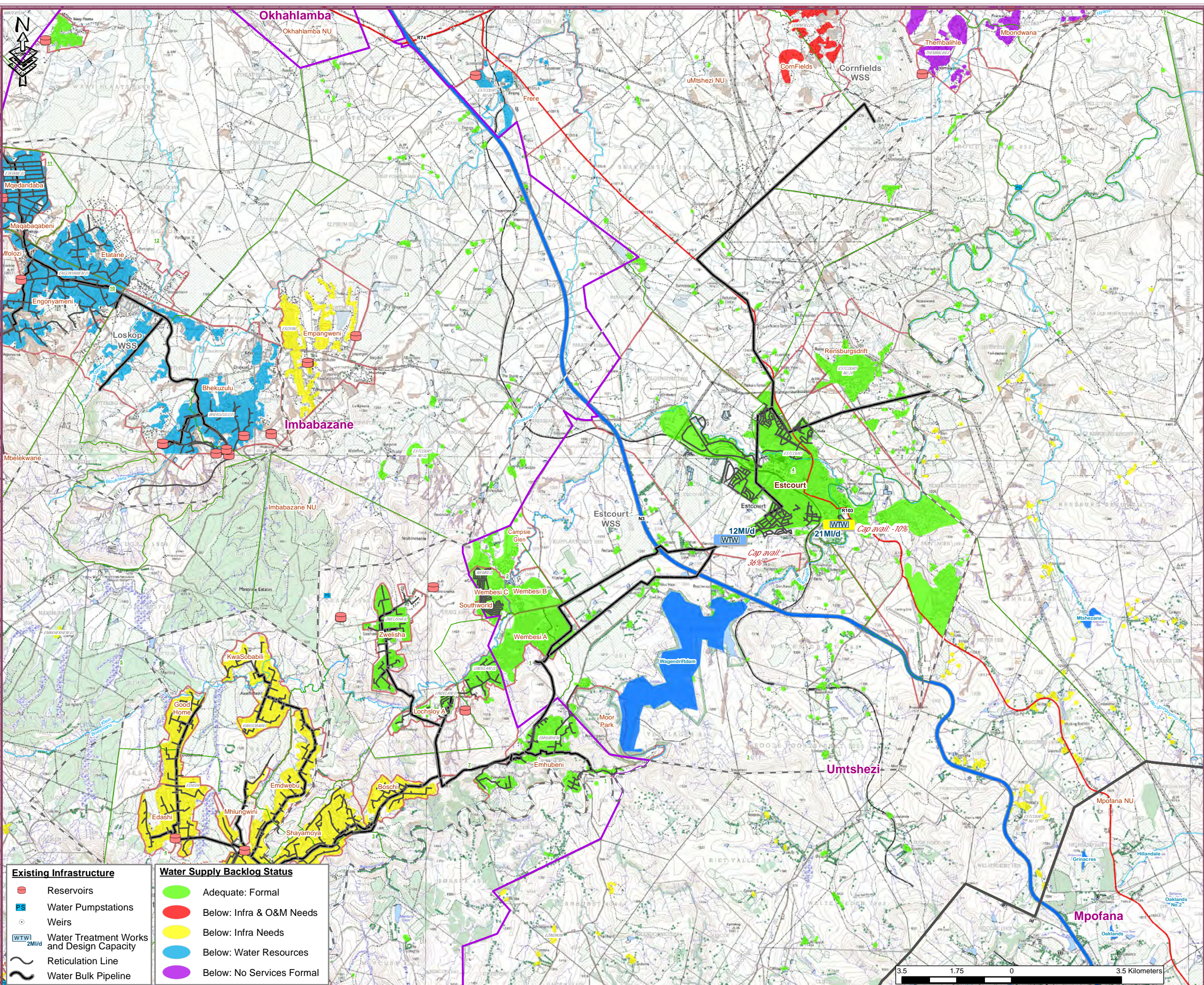
Existing Infrastructure

- Reservoirs
- Water Pumpstations
- Weirs
- Water Treatment Works and Design Capacity
- Reticulation Line
- Water Bulk Pipeline

Water Supply Backlog Status

- Adequate: Formal
- Below: Infra & O&M Needs
- Below: Infra Needs
- Below: Water Resources
- Below: No Services Formal



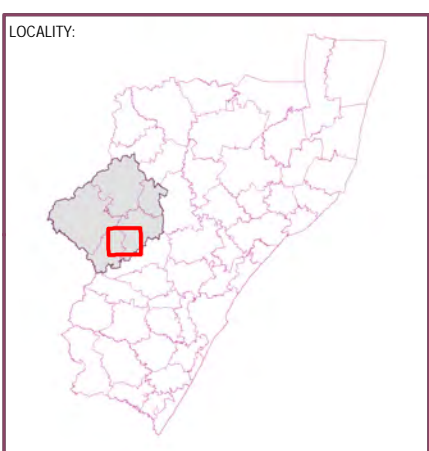


Existing Infrastructure		Water Supply Backlog Status	
	Reservoirs		Adequate: Formal
	Water Pumpstations		Below: Infra & O&M Needs
	Weirs		Below: Infra Needs
	Water Treatment Works and Design Capacity		Below: Water Resources
	Reticulation Line		Below: No Services Formal
	Water Bulk Pipeline		

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

UTHUKELA DISTRICT MUNICIPALITY

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Water Supply Areas (All Towns Clusters)
Estcourt WSS

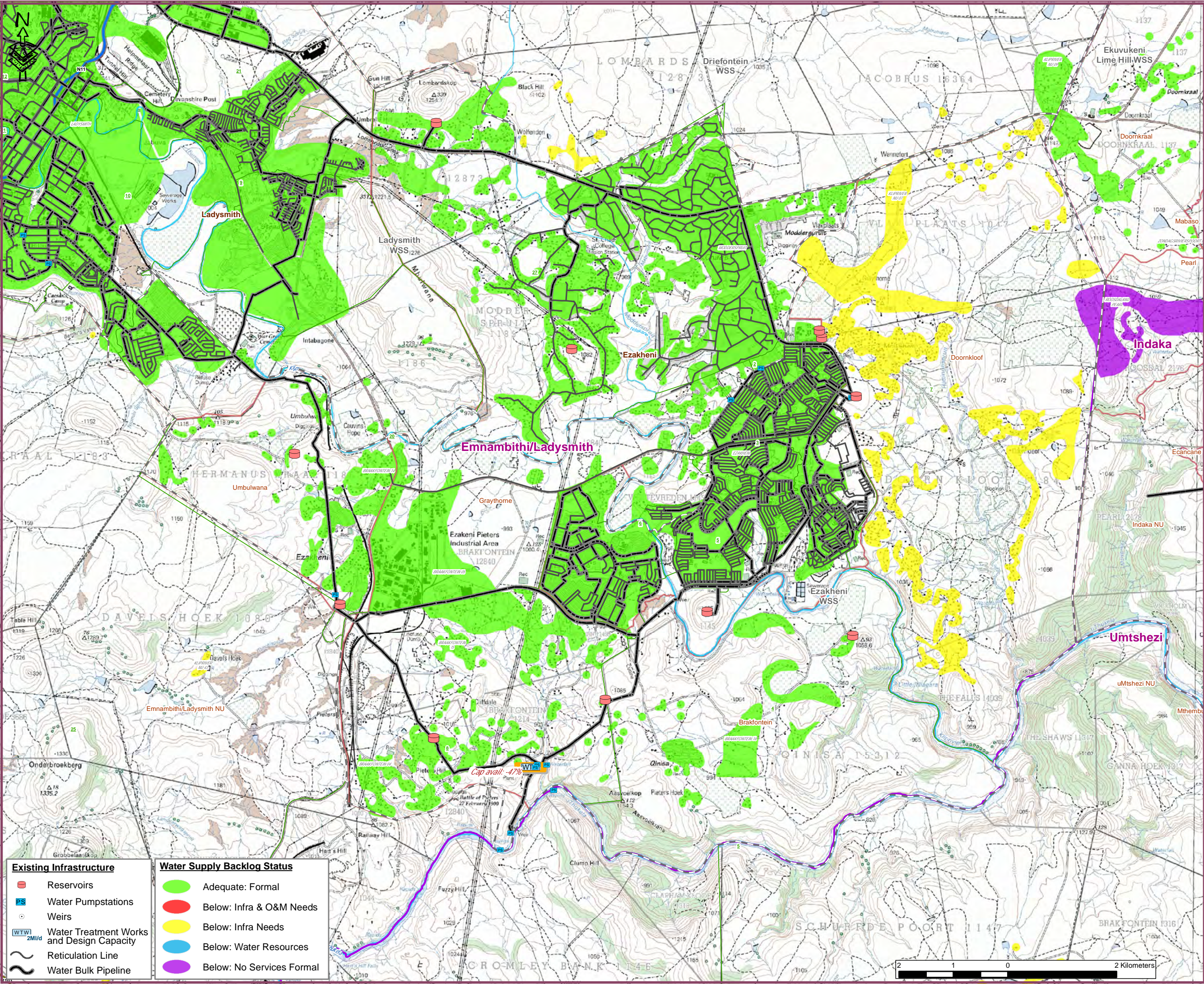
DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0739





Existing Infrastructure	Water Supply Backlog Status
Reservoirs	Adequate: Formal
Water Pumpstations	Below: Infra & O&M Needs
Weirs	Below: Infra Needs
Water Treatment Works and Design Capacity	Below: Water Resources
Reticulation Line	Below: No Services Formal
Water Bulk Pipeline	

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

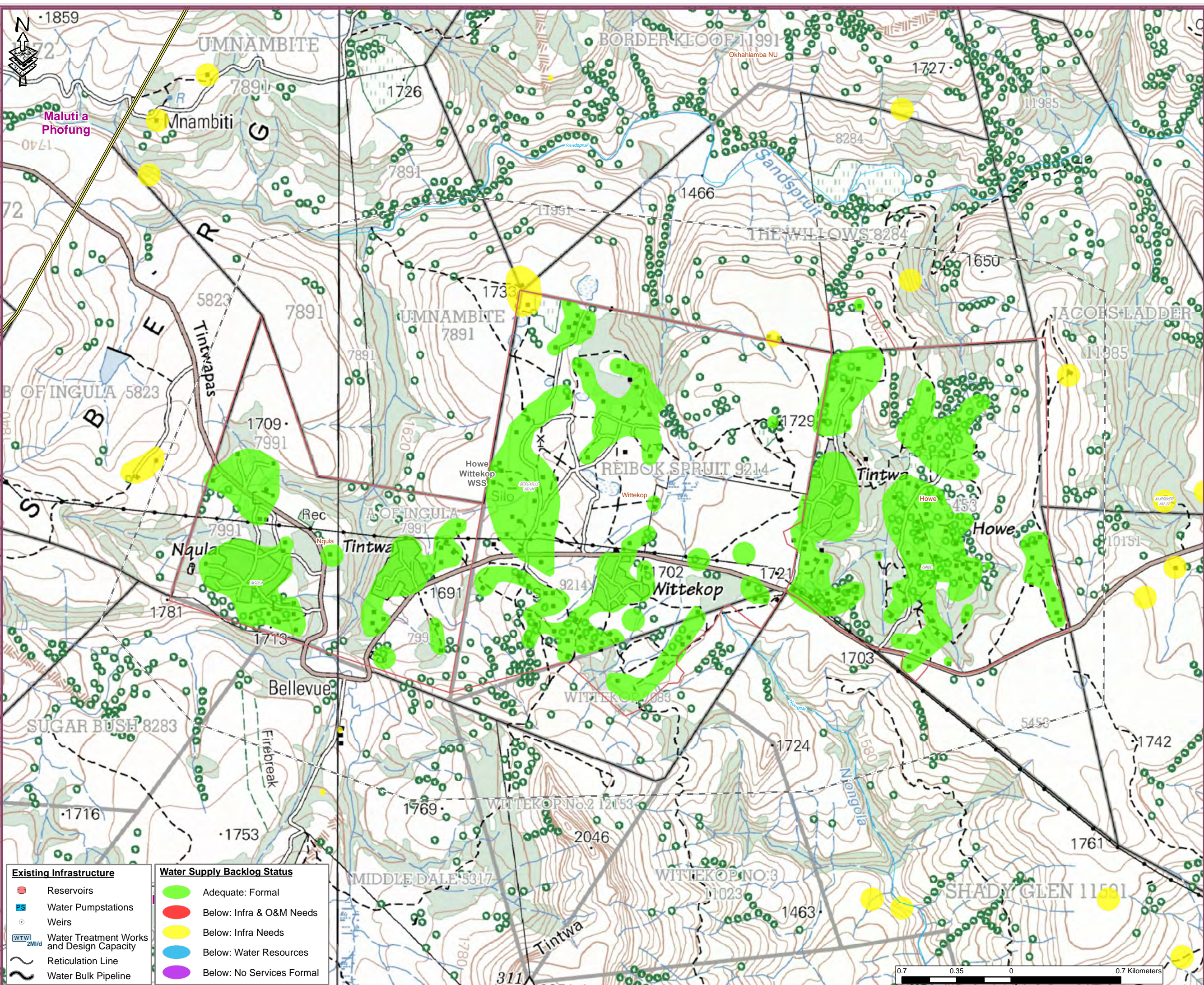
Water Supply Areas (All Towns Clusters)
Ezakheni WSS

DATE COMPLETED:

2016/06/02

MAP NO.:

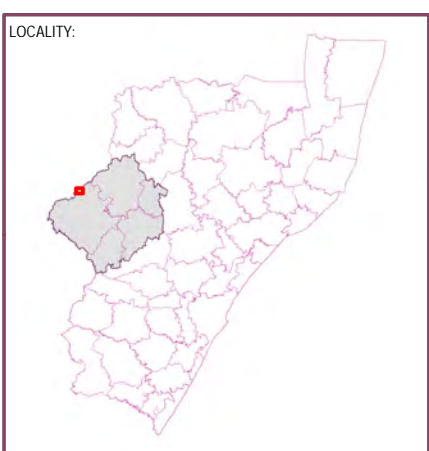
DC23_Figure 7/TK0740



Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



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DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

**uThukela DM: Universal Access
 Plan Phase 2 - Progressive
 Development of a Regional Water
 Supply Master Plan**

MAP TITLE:

**Water Supply Areas
 (All Towns Clusters)
 Howe Wittekop WSS**

DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0795

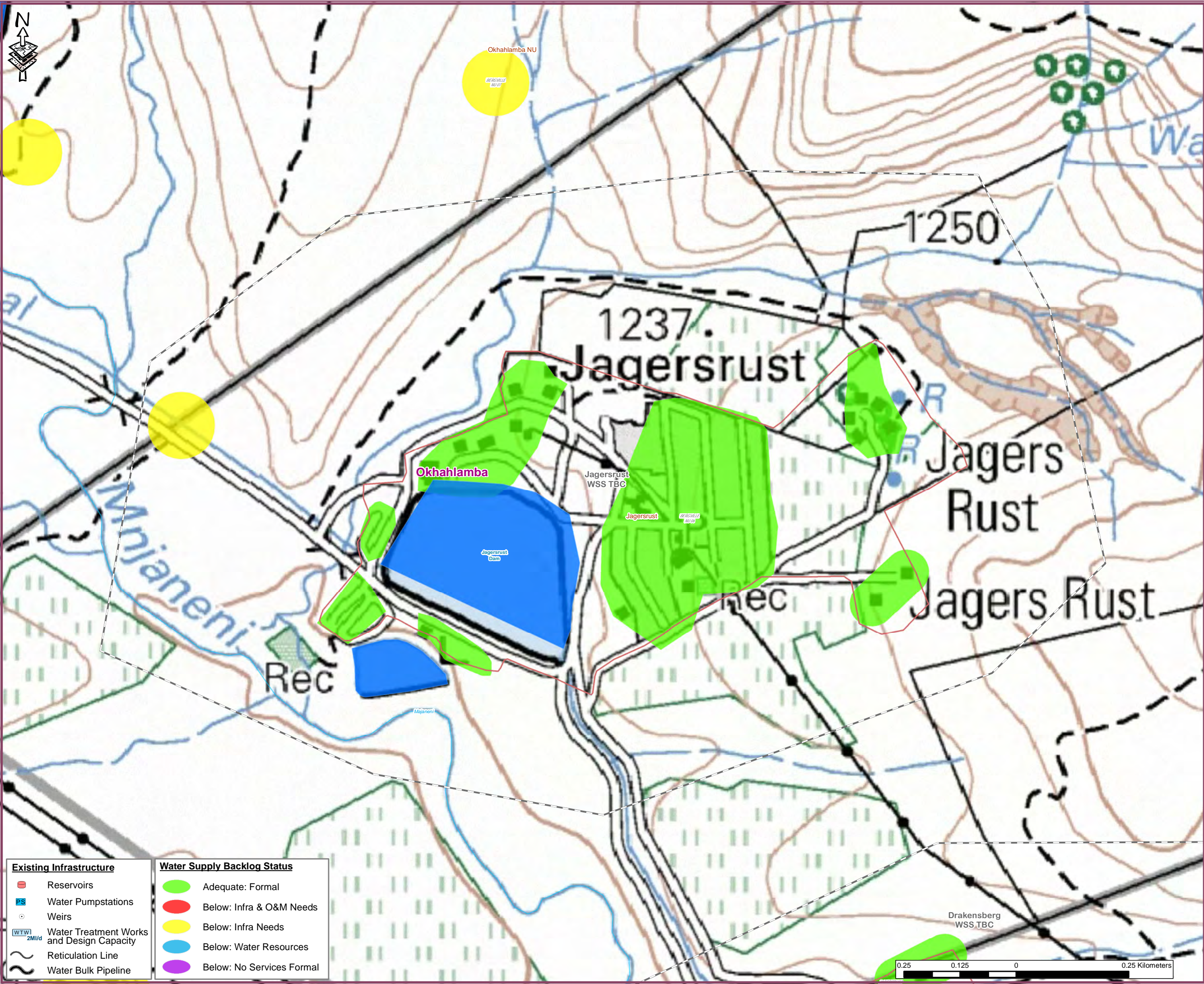
Existing Infrastructure

- Reservoirs
- Water Pumpstations
- Weirs
- Water Treatment Works and Design Capacity
- Reticulation Line
- Water Bulk Pipeline

Water Supply Backlog Status

- Adequate: Formal
- Below: Infra & O&M Needs
- Below: Infra Needs
- Below: Water Resources
- Below: No Services Formal



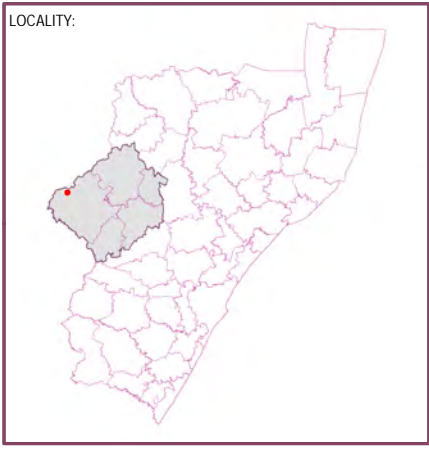


Existing Infrastructure		Water Supply Backlog Status	
	Reservoirs		Adequate: Formal
	Water Pumpstations		Below: Infra & O&M Needs
	Weirs		Below: Infra Needs
	Water Treatment Works and Design Capacity		Below: Water Resources
	Reticulation Line		Below: No Services Formal
	Water Bulk Pipeline		

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

UTHUKELA DISTRICT MUNICIPALITY

CONSULTANTS:

UWP Consulting
PO Box 25549, Monument Park
Pretoria, 0105

ZIYANDA CONSULTING

Project No.: 27811
Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

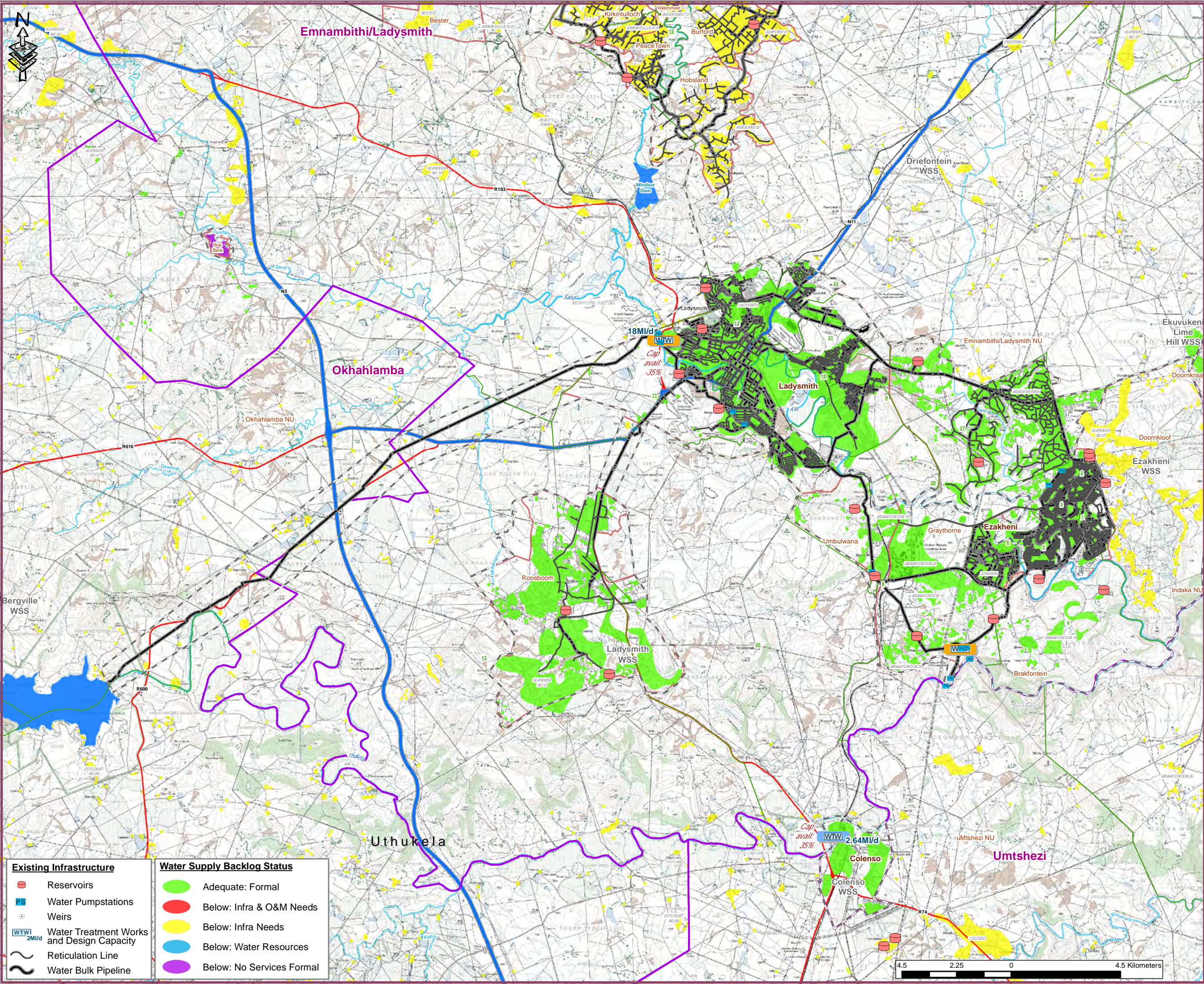
Water Supply Areas (All Towns Clusters)
Jagersrust WSS TBC

DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0789



Existing Infrastructure	Water Supply Backlog Status
Reservoirs	Adequate: Formal
Water Pumpstations	Below: Infra & O&M Needs
Weirs	Below: Infra Needs
Water Treatment Works and Design Capacity	Below: Water Resources
Reticulation Line	Below: No Services Formal
Water Bulk Pipeline	

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP
UWP Consulting
PO Box 25549, Monument Park
Pretoria, 0105

ZIYANDA
ZIYANDA CONSULTING

Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Water Supply Areas (All Towns Clusters)
Ladysmith WSS

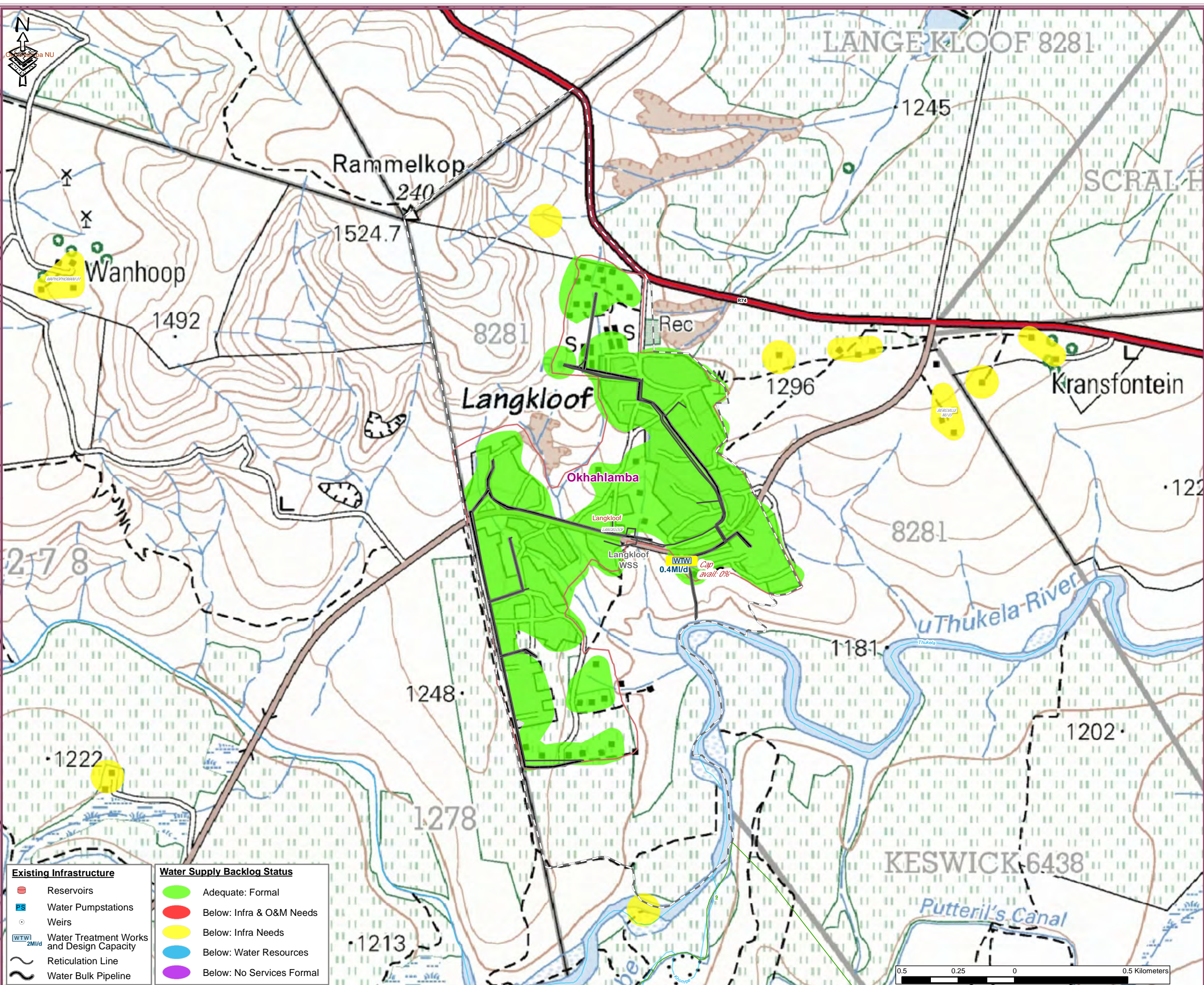
DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0747



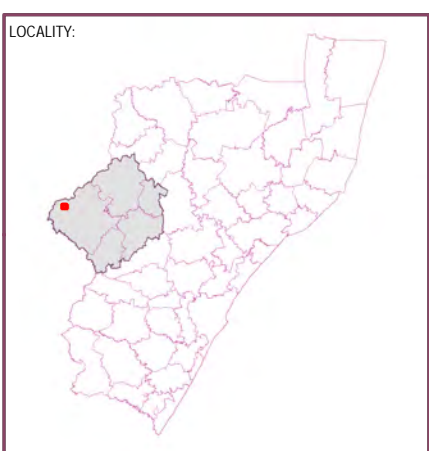


Existing Infrastructure		Water Supply Backlog Status	
	Reservoirs		Adequate: Formal
	Water Pumpstations		Below: Infra & O&M Needs
	Weirs		Below: Infra Needs
	Water Treatment Works and Design Capacity		Below: Water Resources
	Reticulation Line		Below: No Services Formal
	Water Bulk Pipeline		

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

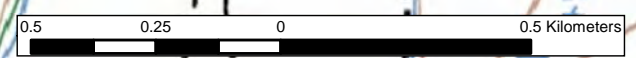
Water Supply Areas (All Towns Clusters)
Langkloof WSS

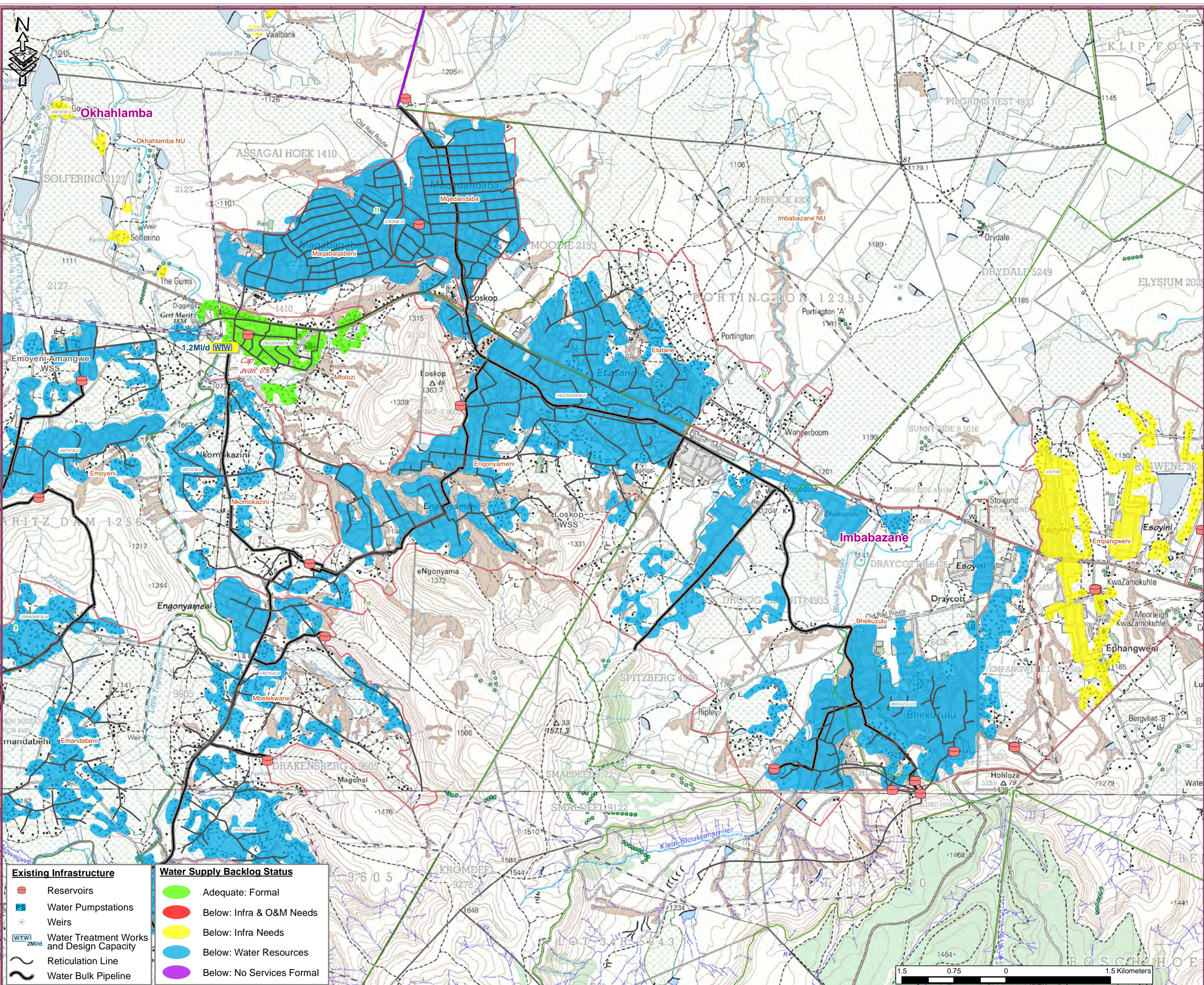
DATE COMPLETED:

2016/06/02

MAP NO.:

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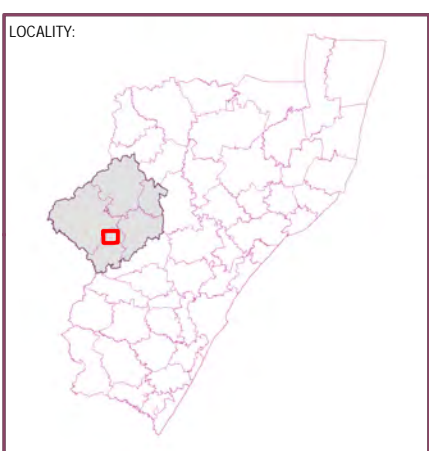


Existing Infrastructure		Water Supply Backlog Status	
	Reservoirs		Adequate: Formal
	Water Pumpstations		Below: Infra & O&M Needs
	Weirs		Below: Infra Needs
	Water Treatment Works and Design Capacity		Below: Water Resources
	Reticulation Line		Below: No Services Formal
	Water Bulk Pipeline		

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

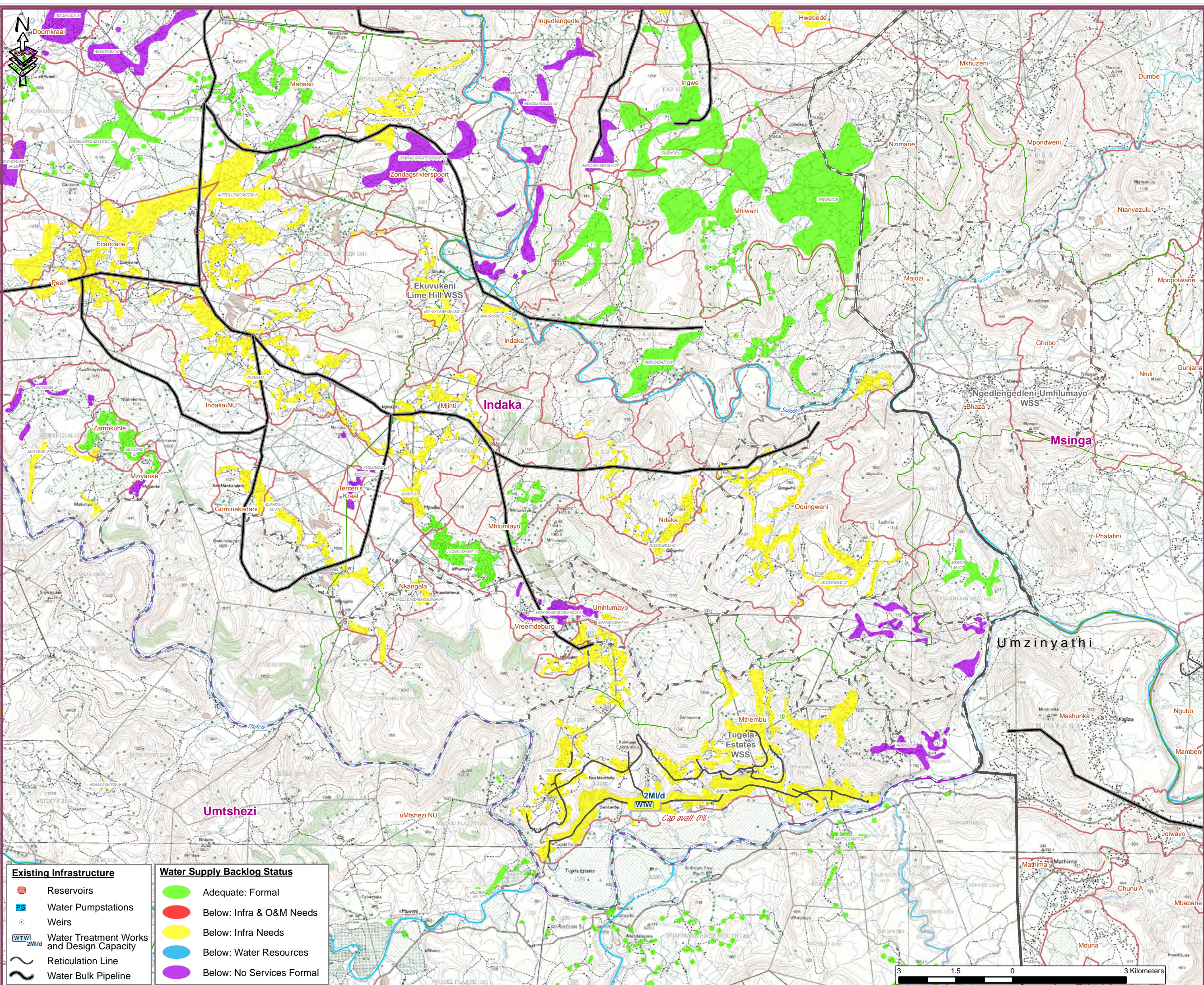
Water Supply Areas (All Towns Clusters)
Loskop WSS

DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0749

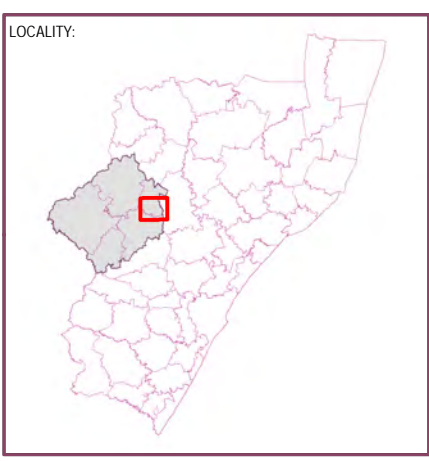


Existing Infrastructure		Water Supply Backlog Status	
	Reservoirs		Adequate: Formal
	Water Pumpstations		Below: Infra & O&M Needs
	Weirs		Below: Infra Needs
	Water Treatment Works and Design Capacity		Below: Water Resources
	Reticulation Line		Below: No Services Formal
	Water Bulk Pipeline		

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



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DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP
UWP Consulting
PO Box 25549, Monument Park
Pretoria, 0105

ZIYANDA
ZIYANDA Consulting

Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

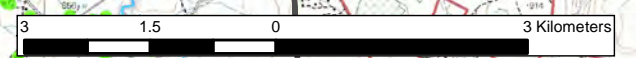
Water Supply Areas (All Towns Clusters)
Ngedlengedleni-Umhlumayo WSS

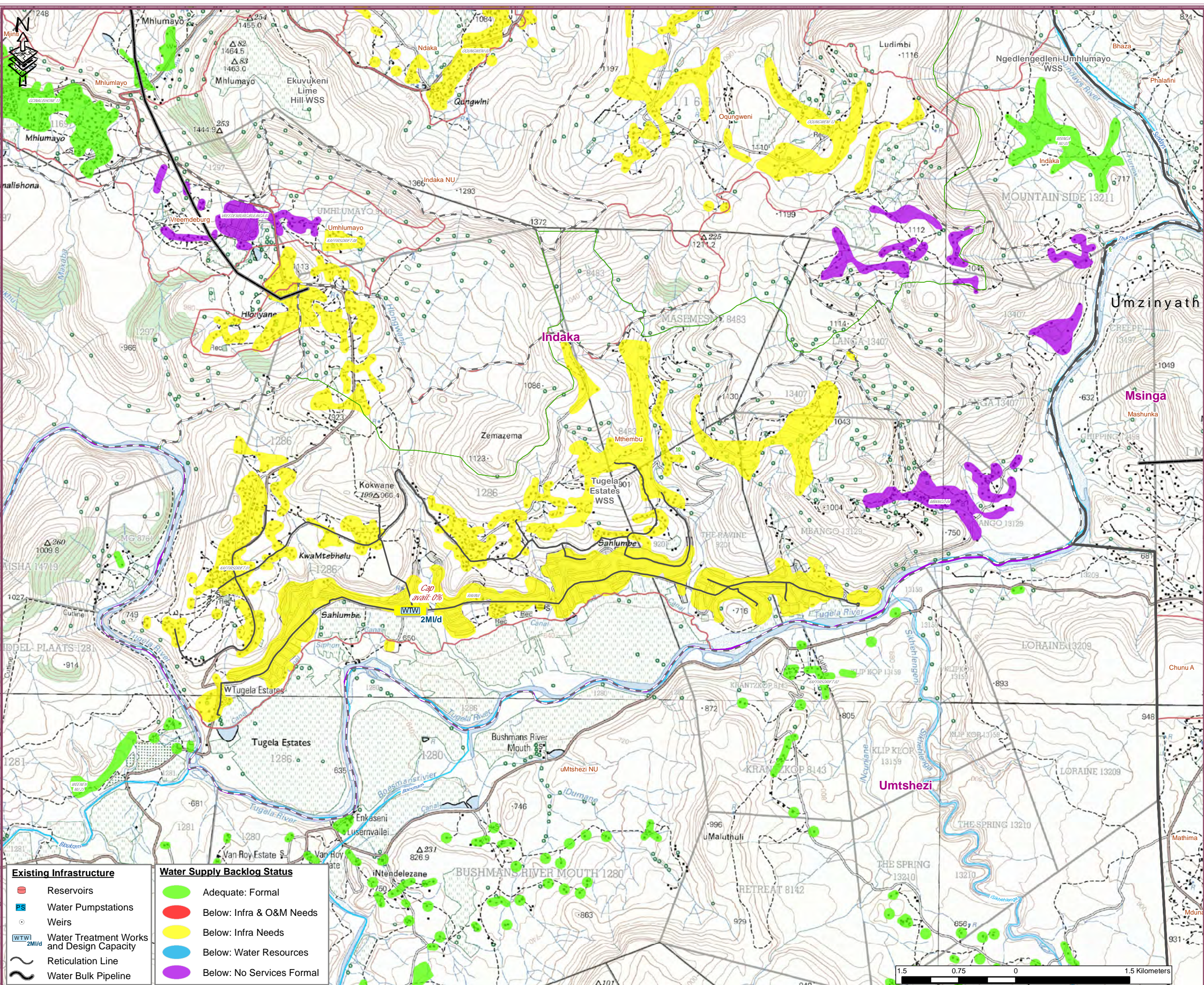
DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0757





Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP
UWP Consulting
PO Box 25549, Monument Park
Pretoria, 0105

ZIYANDA
Ziyanda Consulting

Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

**Water Supply Areas (All Towns Clusters)
Tugela Estates WSS**

DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0764

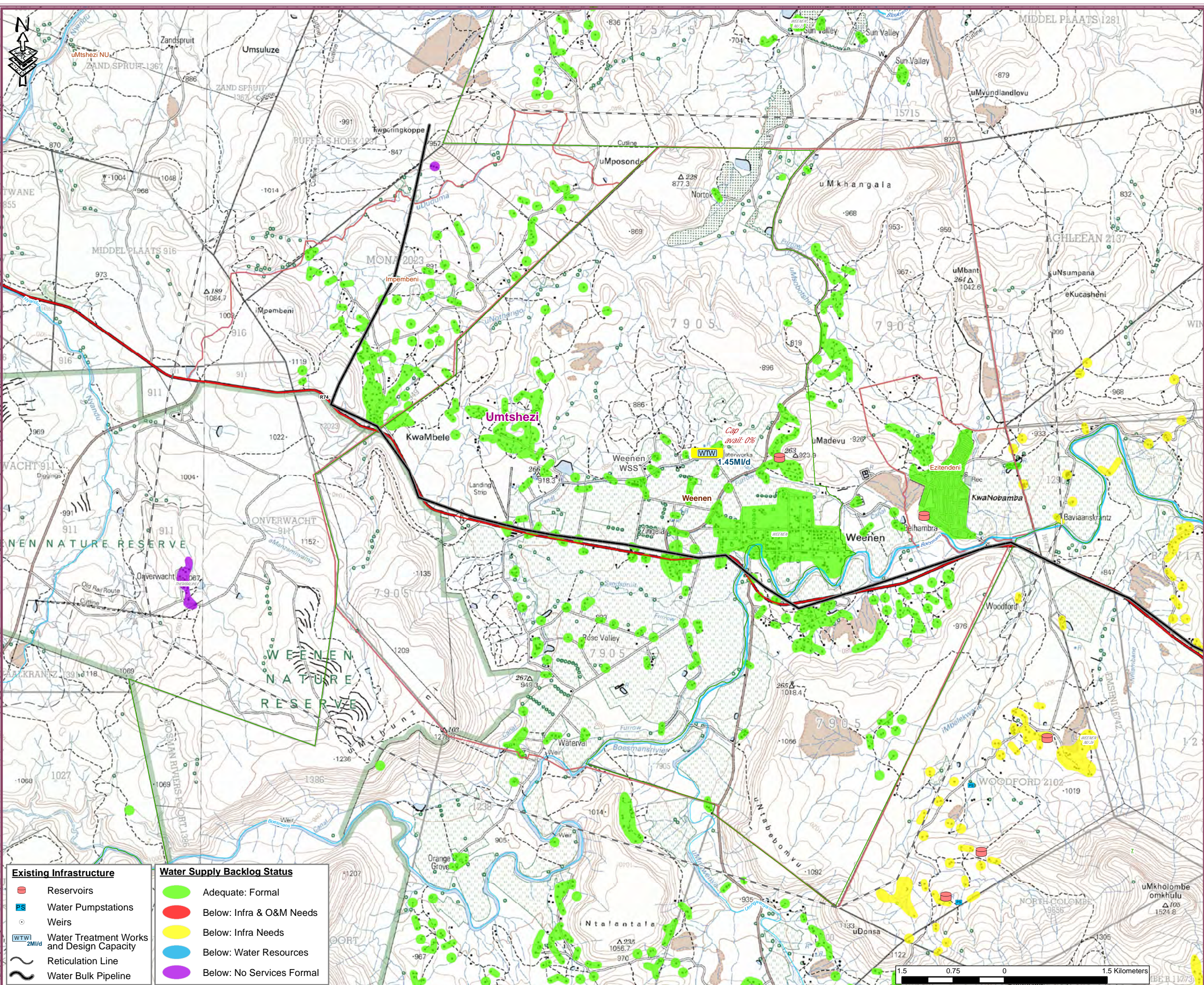
Existing Infrastructure

- Reservoirs
- Water Pumpstations
- Weirs
- Water Treatment Works and Design Capacity
- Reticulation Line
- Water Bulk Pipeline

Water Supply Backlog Status

- Adequate: Formal
- Below: Infra & O&M Needs
- Below: Infra Needs
- Below: Water Resources
- Below: No Services Formal

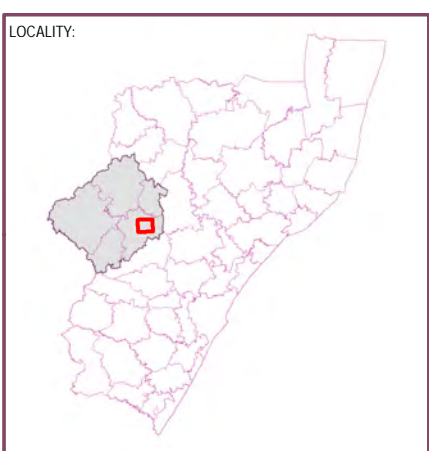




Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

**uThukela DM: Universal Access
 Plan Phase 2 - Progressive
 Development of a Regional Water
 Supply Master Plan**

MAP TITLE:

**Water Supply Areas
 (All Towns Clusters)
 Weenen WSS**

DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0770

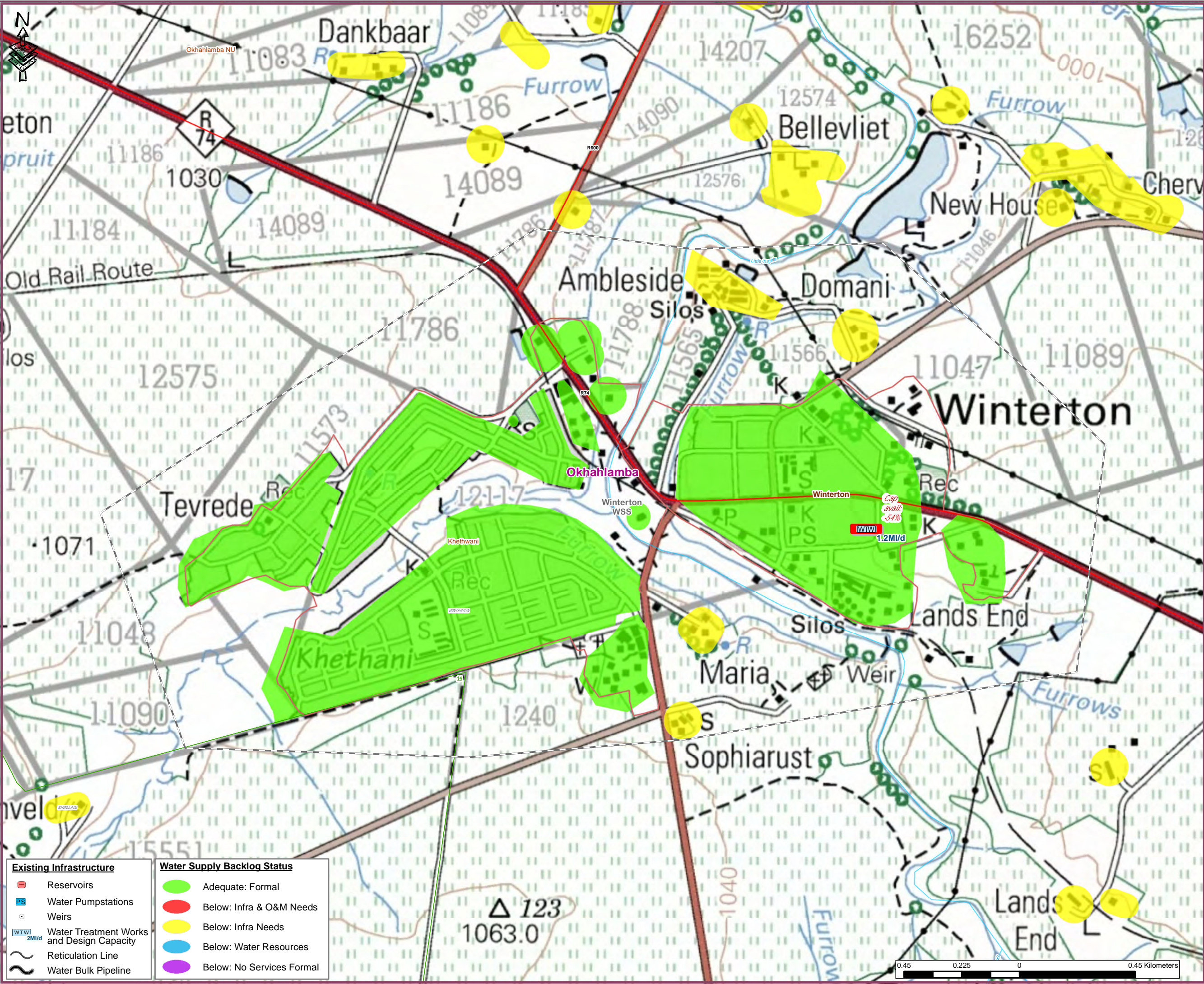
Existing Infrastructure

- Reservoirs
- Water Pumpstations
- Weirs
- Water Treatment Works and Design Capacity
- Reticulation Line
- Water Bulk Pipeline

Water Supply Backlog Status

- Adequate: Formal
- Below: Infra & O&M Needs
- Below: Infra Needs
- Below: Water Resources
- Below: No Services Formal

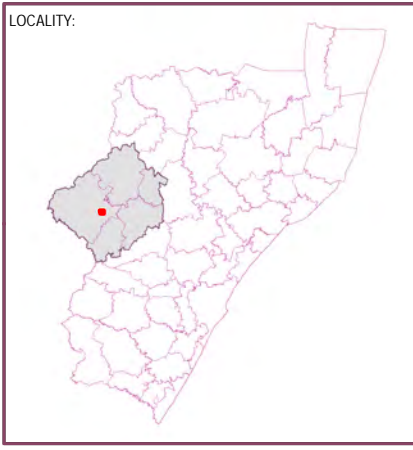




Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

ZIYANDA Consulting

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Water Supply Areas (All Towns Clusters)
Winterton WSS

DATE COMPLETED:

2016/06/02

MAP NO.:

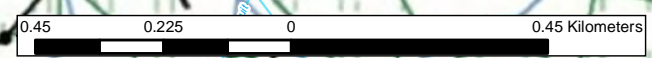
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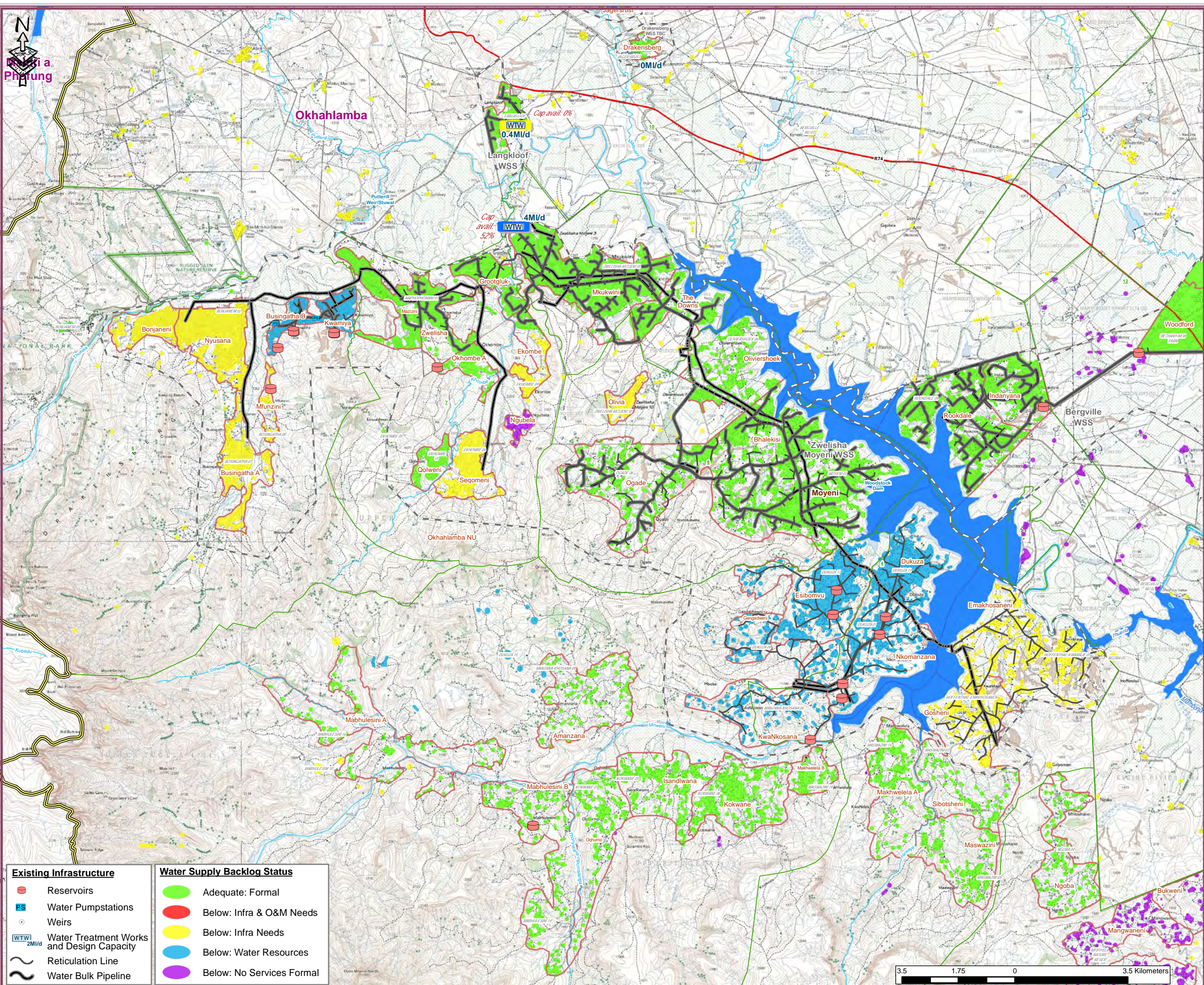
Existing Infrastructure

- Reservoirs
- Water Pumpstations
- Weirs
- Water Treatment Works and Design Capacity
- Reticulation Line
- Water Bulk Pipeline

Water Supply Backlog Status

- Adequate: Formal
- Below: Infra & O&M Needs
- Below: Infra Needs
- Below: Water Resources
- Below: No Services Formal



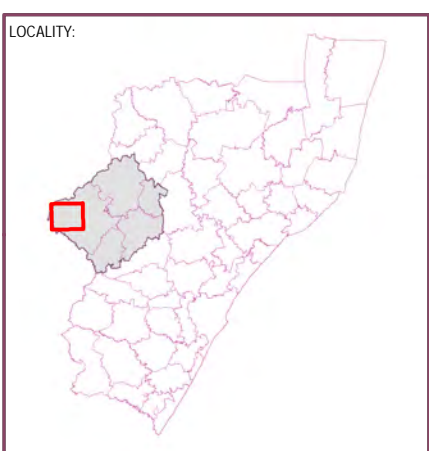


Existing Infrastructure		Water Supply Backlog Status	
	Reservoirs		Adequate: Formal
	Water Pumpstations		Below: Infra & O&M Needs
	Weirs		Below: Infra Needs
	Water Treatment Works and Design Capacity		Below: Water Resources
	Reticulation Line		Below: No Services Formal
	Water Bulk Pipeline		

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

UTHUKELA DISTRICT MUNICIPALITY

CONSULTANTS:

UWP
UWP Consulting
PO Box 25549, Monument Park
Pretoria, 0105

ZIYANDA
ZIYANDA Consulting

Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Water Supply Areas (All Towns Clusters)
Zwelisha Moyeni WSS

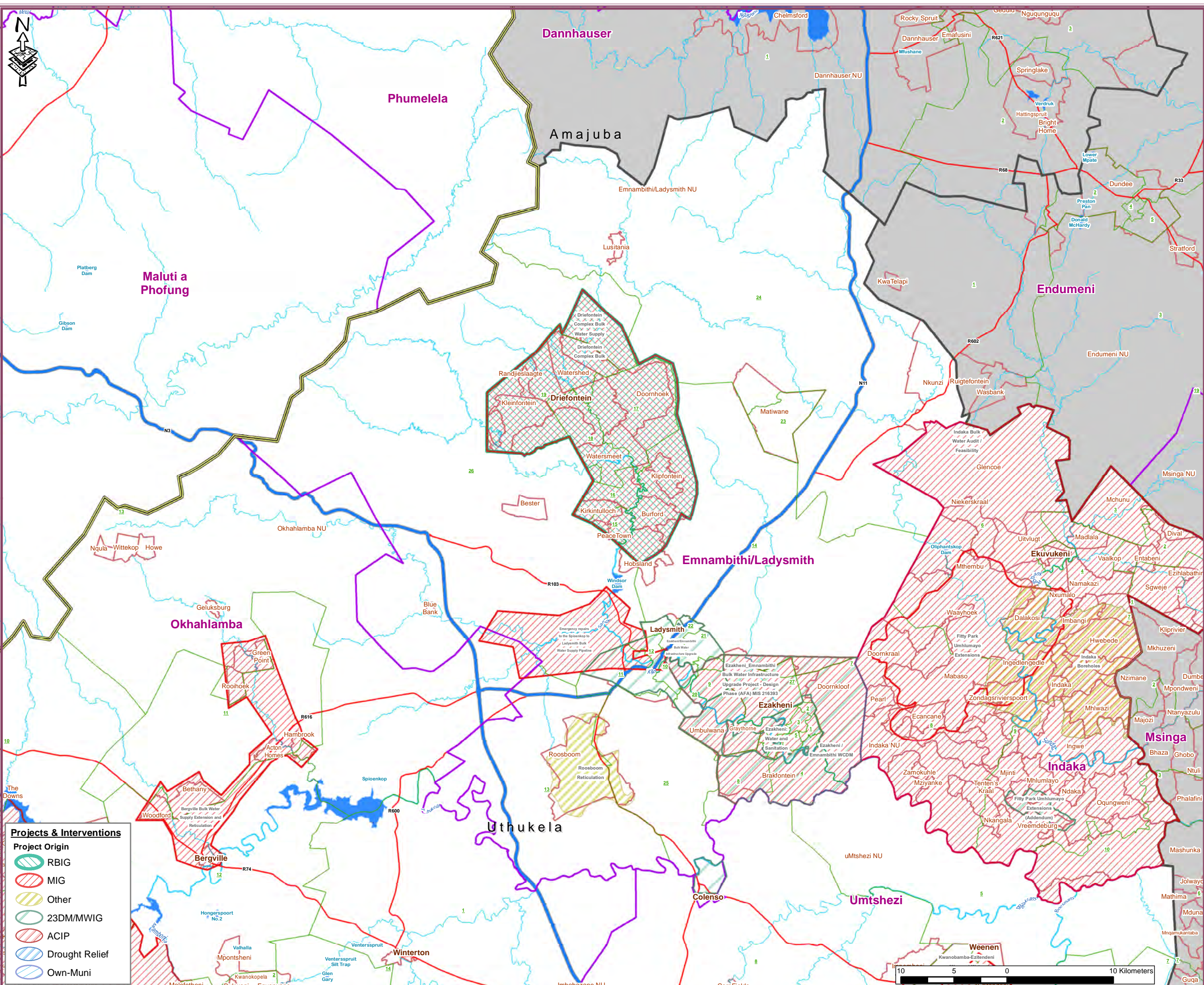
DATE COMPLETED:

2016/06/02

MAP NO.:

DC23_Figure 7/TK0772





Projects & Interventions

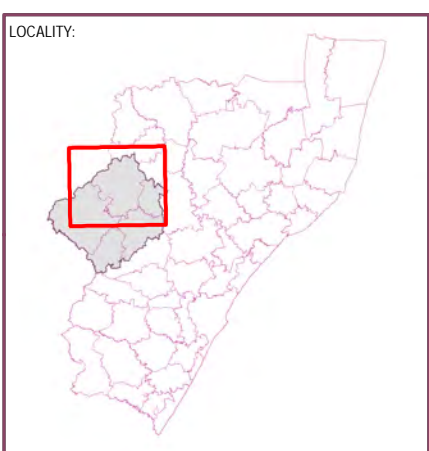
Project Origin

- RBIG
- MIG
- Other
- 23DM/MWIG
- ACIP
- Drought Relief
- Own-Muni

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

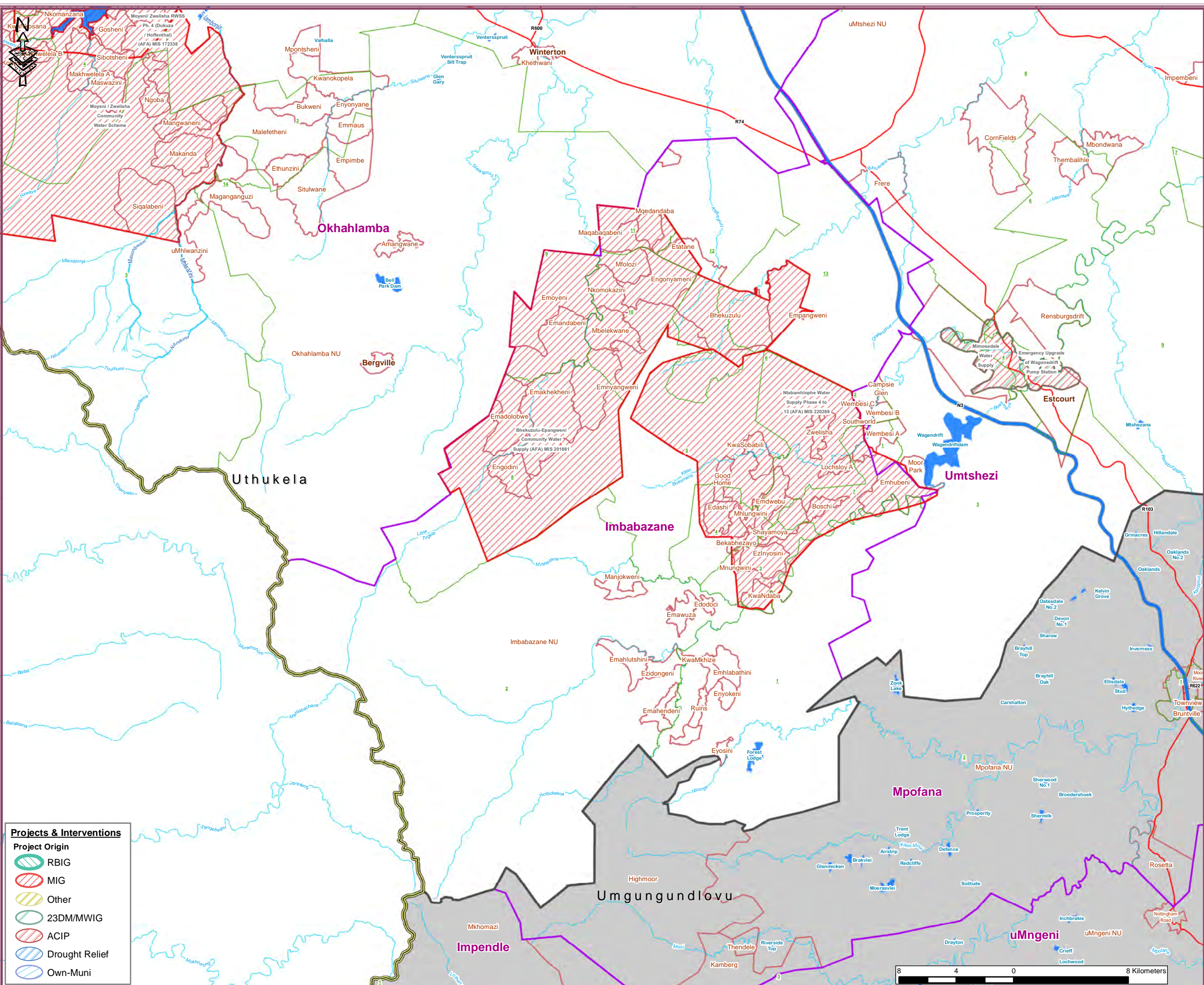
uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

**Projects and Interventions
 Emnambithi/Ladysmith**

DATE COMPLETED: 2016/03/06

MAP NO.: DC23_Figure 8/KZN232



Projects & Interventions

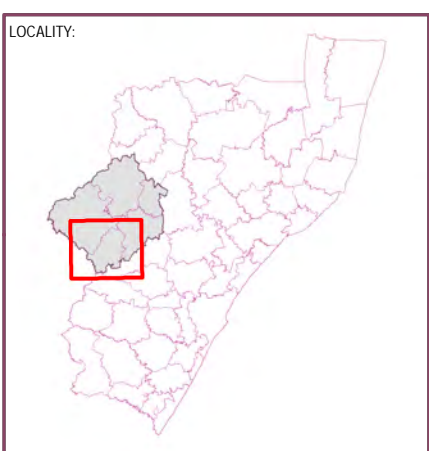
Project Origin

- RBIG
- MIG
- Other
- 23DM/MWIG
- ACIP
- Drought Relief
- Own-Muni

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

ZIYANDA Consulting

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

**uThukela DM: Universal Access
 Plan Phase 2 - Progressive
 Development of a Regional Water
 Supply Master Plan**

MAP TITLE:

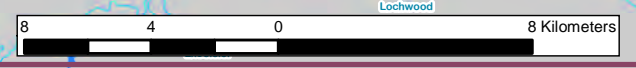
**Projects and Interventions
 Imbabazane**

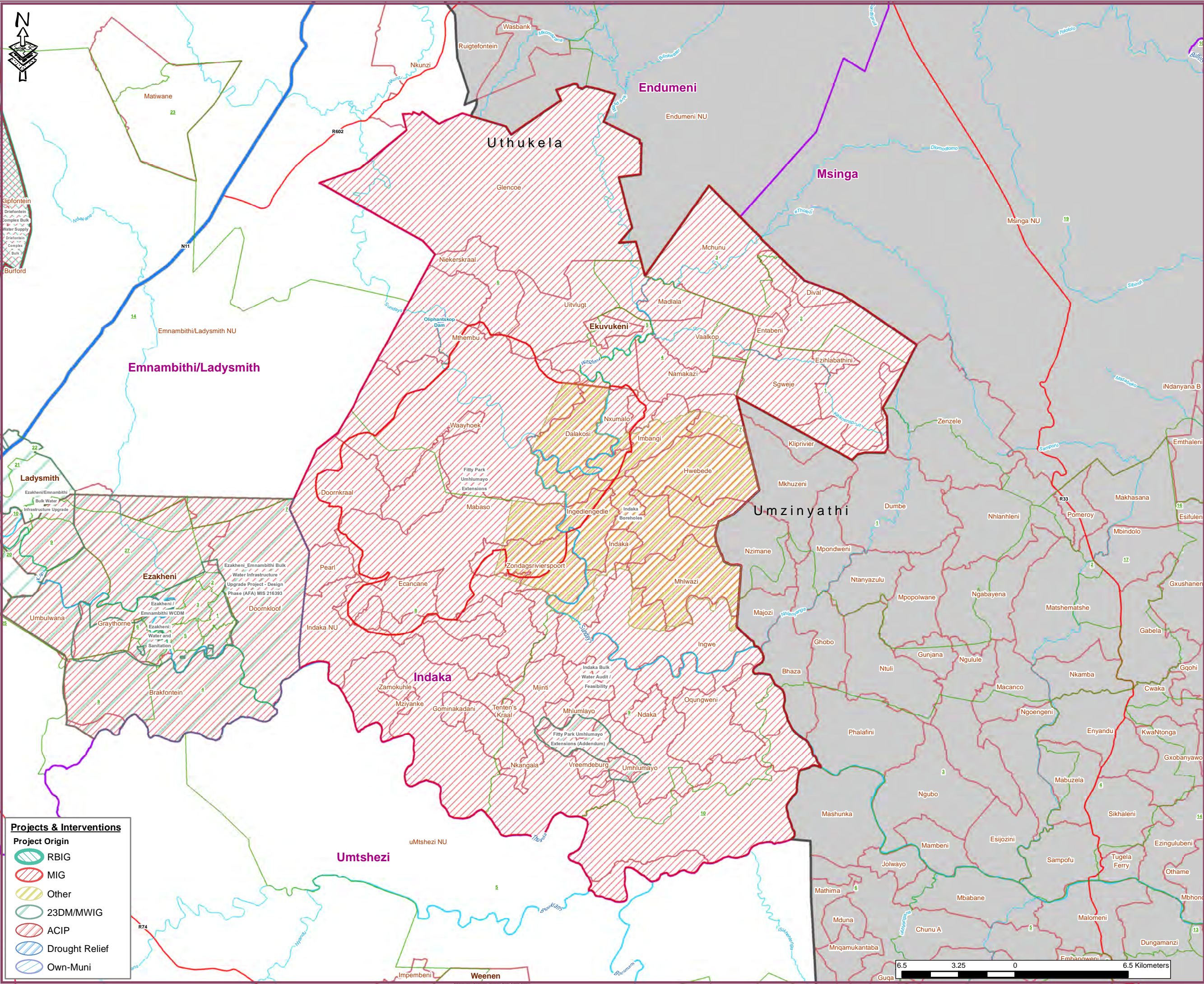
DATE COMPLETED:

2016/03/06

MAP NO.:

DC23_Figure 8/KZN236





Projects & Interventions

Project Origin

- RBIG
- MIG
- Other
- 23DM/MWIG
- ACIP
- Drought Relief
- Own-Muni

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP
UW Consulting
PO Box 25549, Monument Park
Pretoria, 0105

ZIYANDA
Consulting

Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Projects and Interventions

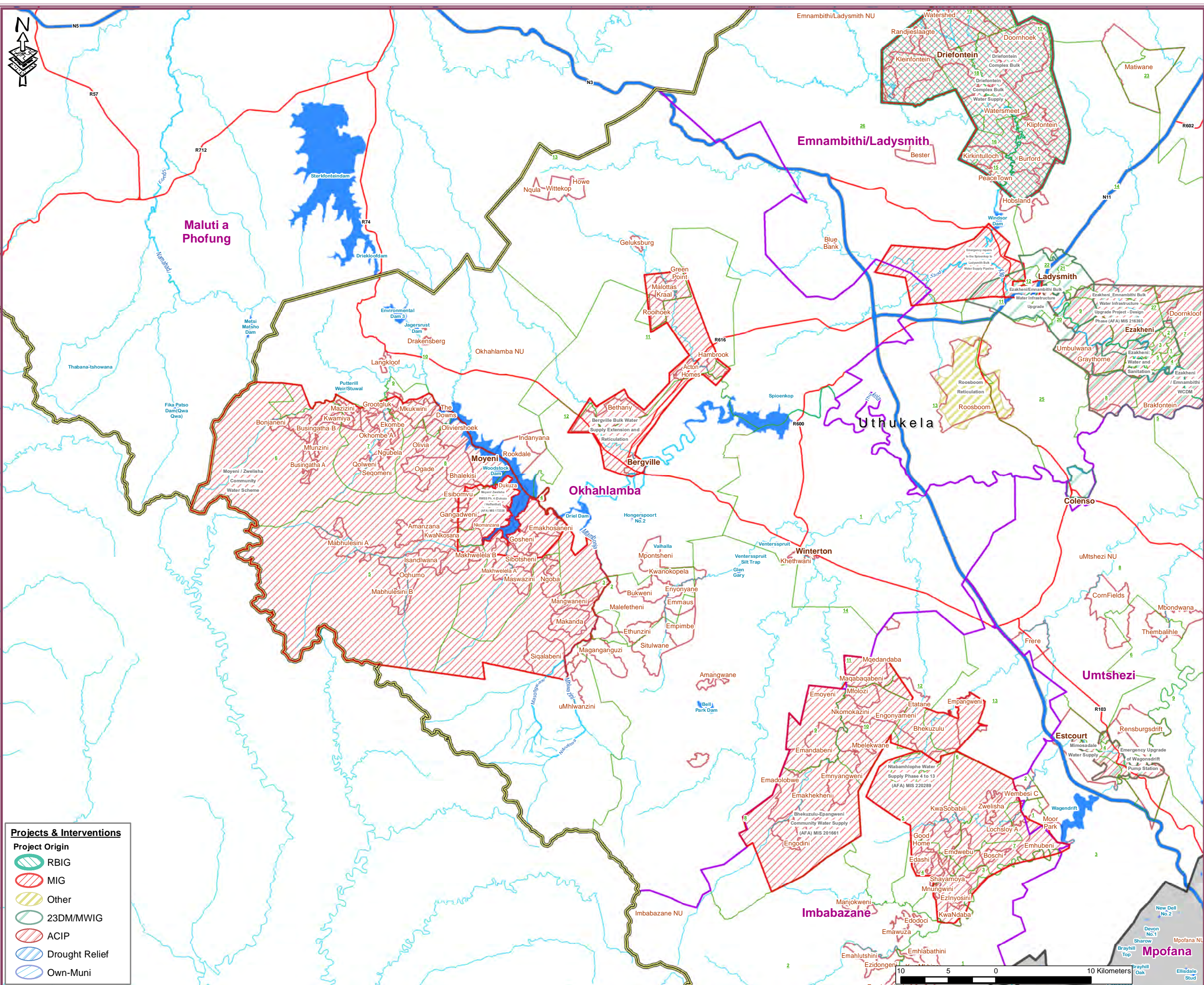
Indaka

DATE COMPLETED:

2016/03/06

MAP NO.:

DC23_Figure 8/KZN233



Projects & Interventions

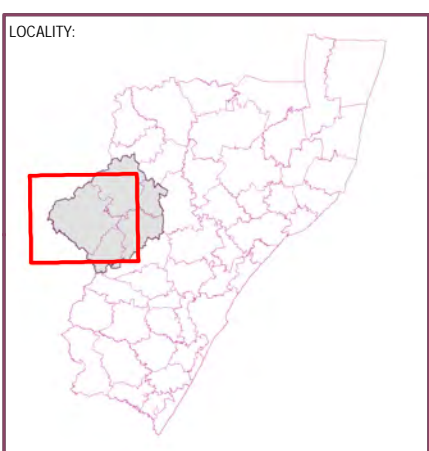
Project Origin

- RBIG
- MIG
- Other
- 23DM/MWIG
- ACIP
- Drought Relief
- Own-Muni

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

UTHUKELA DISTRICT MUNICIPALITY

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Projects and Interventions
Okhahlamba

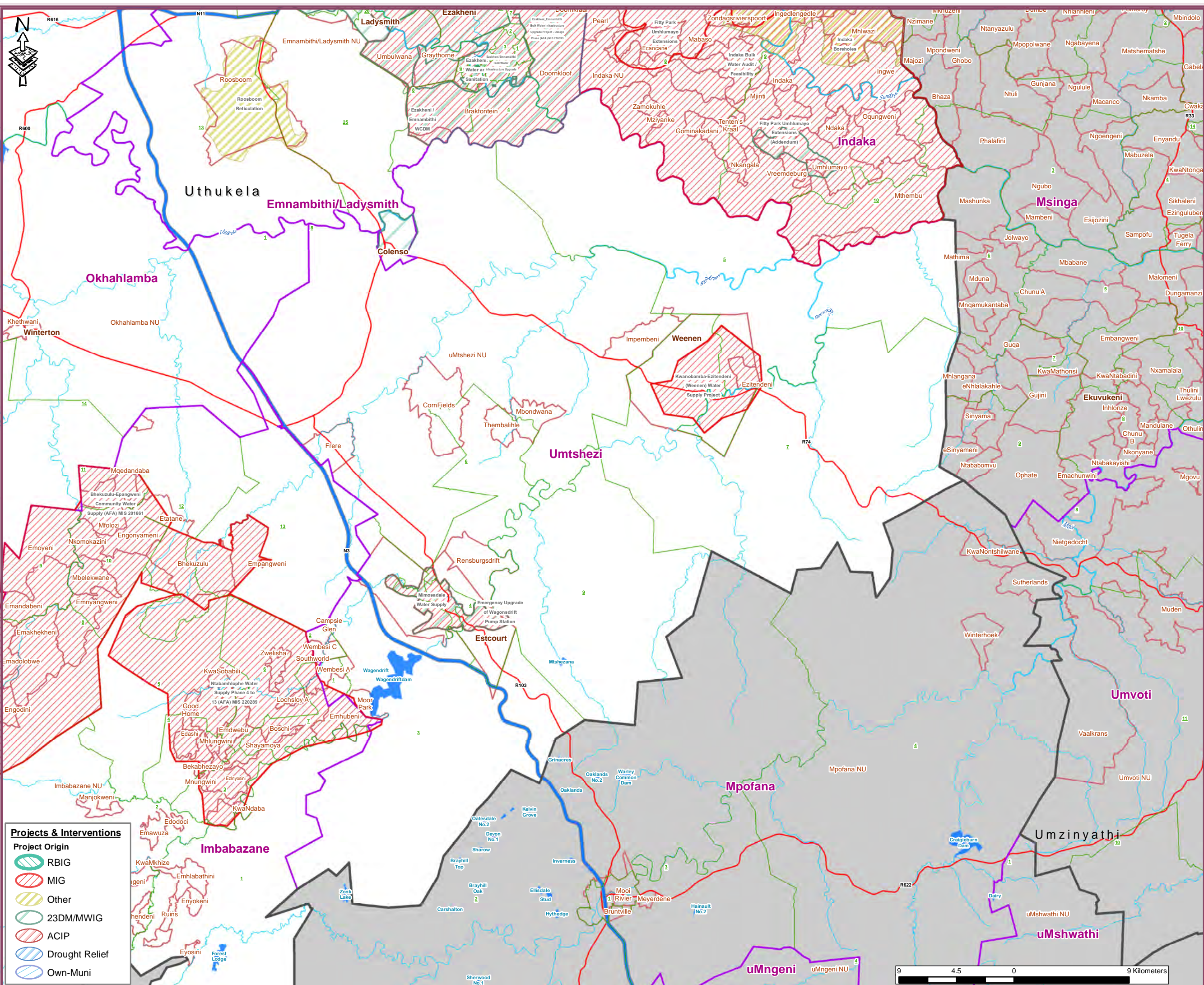
DATE COMPLETED:

2016/03/06

MAP NO.:

DC23_Figure 8/KZN235





Projects & Interventions

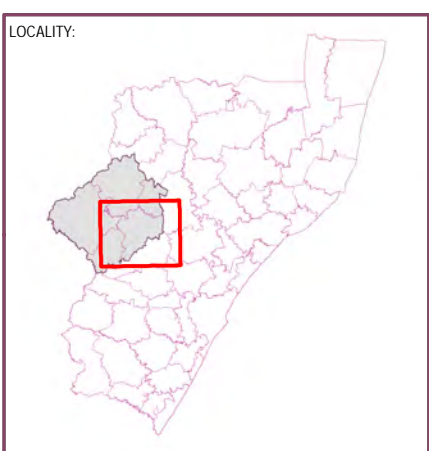
Project Origin

- RBIG
- MIG
- Other
- 23DM/MWIG
- ACIP
- Drought Relief
- Own-Muni

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

ZIYANDA Consulting

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

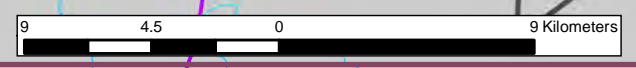
Projects and Interventions
Umtshezi

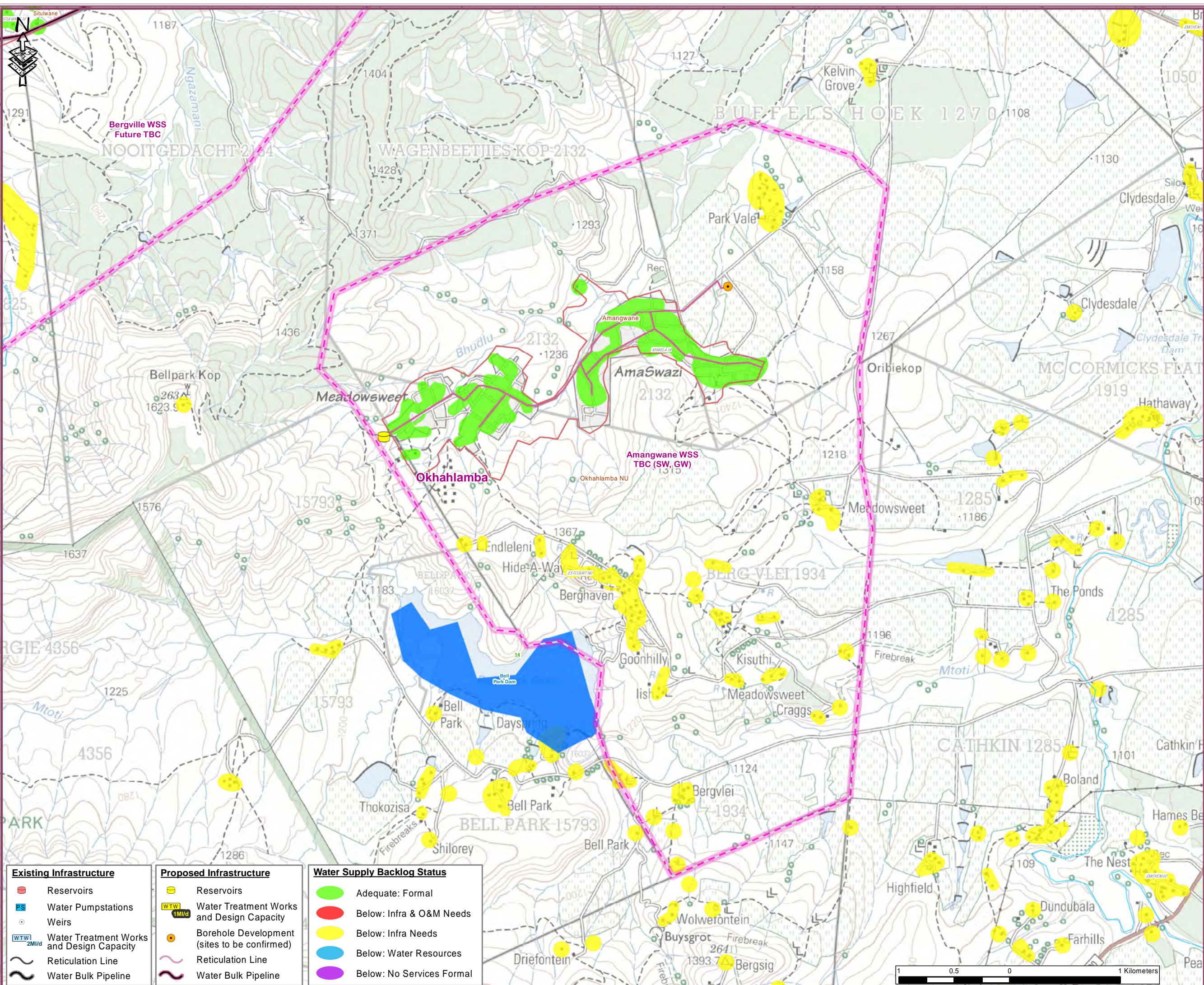
DATE COMPLETED:

2016/03/06

MAP NO.:

DC23_Figure 8/KZN234



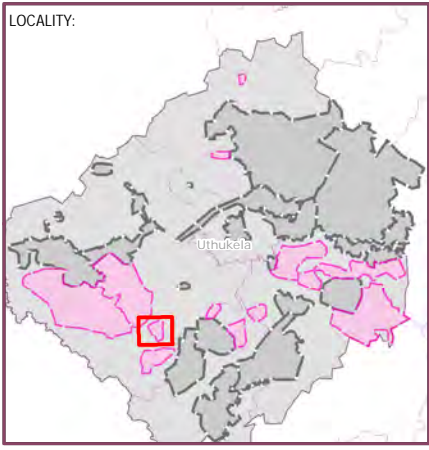


Existing Infrastructure		Proposed Infrastructure		Water Supply Backlog Status	
	Reservoirs		Reservoirs		Adequate: Formal
	Water Pumpstations		Water Treatment Works and Design Capacity		Below: Infra & O&M Needs
	Weirs		Borehole Development (sites to be confirmed)		Below: Infra Needs
	Water Treatment Works and Design Capacity		Reticulation Line		Below: Water Resources
	Reticulation Line		Water Bulk Pipeline		Below: No Services Formal
	Water Bulk Pipeline				

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Conceptual Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

UTHUKELA DISTRICT MUNICIPALITY

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

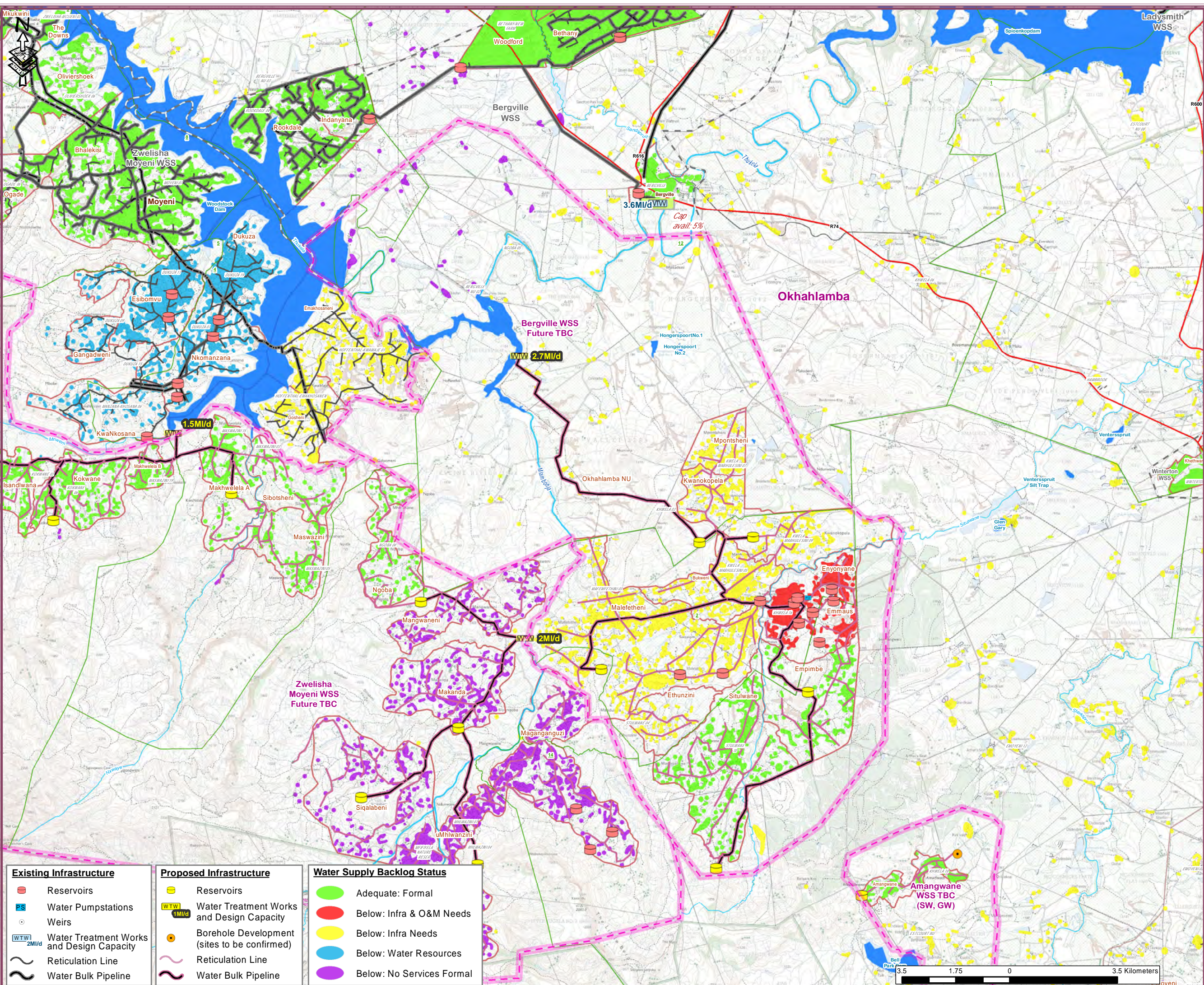
uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Conceptual Water Supply Areas
Amangwane WSS TBC (SW, GW)

DATE COMPLETED: 2016/06/01

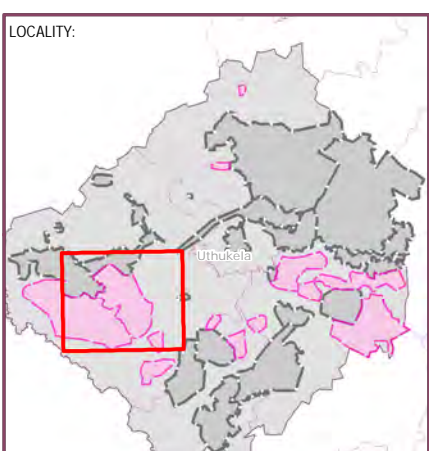
MAP NO.: **DC23_Figure 9/TK0793**



Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Conceptual Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

UTHUKELA DISTRICT MUNICIPALITY

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Conceptual Water Supply Areas
Bergville WSS Future TBC

DATE COMPLETED:

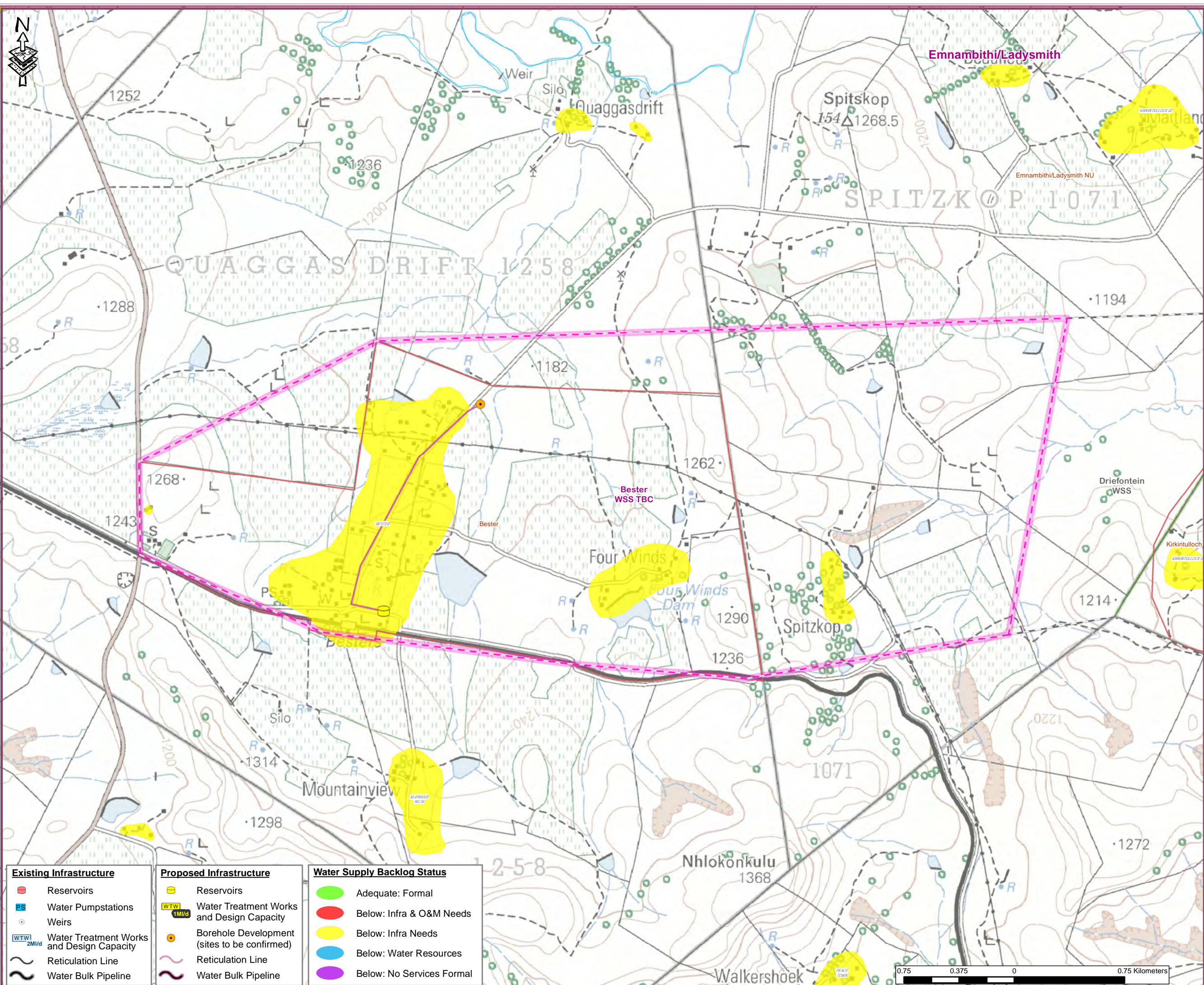
2016/06/01

MAP NO.:

DC23_Figure 9/TK0775

Existing Infrastructure	Proposed Infrastructure	Water Supply Backlog Status
Reservoirs	Reservoirs	Adequate: Formal
Water Pumpstations	Water Treatment Works and Design Capacity	Below: Infra & O&M Needs
Weirs	Water Treatment Works and Design Capacity	Below: Infra Needs
Water Treatment Works and Design Capacity	Borehole Development (sites to be confirmed)	Below: Water Resources
Reticulation Line	Reticulation Line	Below: No Services Formal
Water Bulk Pipeline	Water Bulk Pipeline	



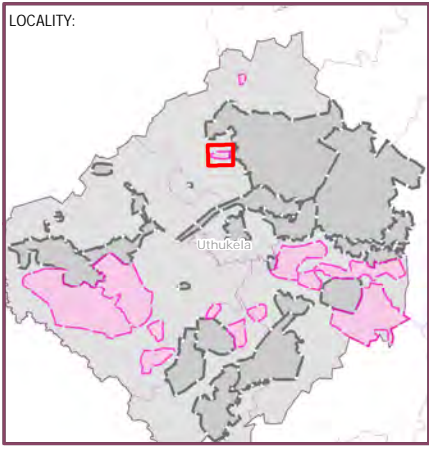


Existing Infrastructure		Proposed Infrastructure		Water Supply Backlog Status	
	Reservoirs		Reservoirs		Adequate: Formal
	Water Pumpstations		Water Treatment Works and Design Capacity		Below: Infra & O&M Needs
	Weirs		Borehole Development (sites to be confirmed)		Below: Infra Needs
	Water Treatment Works and Design Capacity		Reticulation Line		Below: Water Resources
	Reticulation Line		Water Bulk Pipeline		Below: No Services Formal
	Water Bulk Pipeline				

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Conceptual Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

UTHUKELA DISTRICT MUNICIPALITY

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

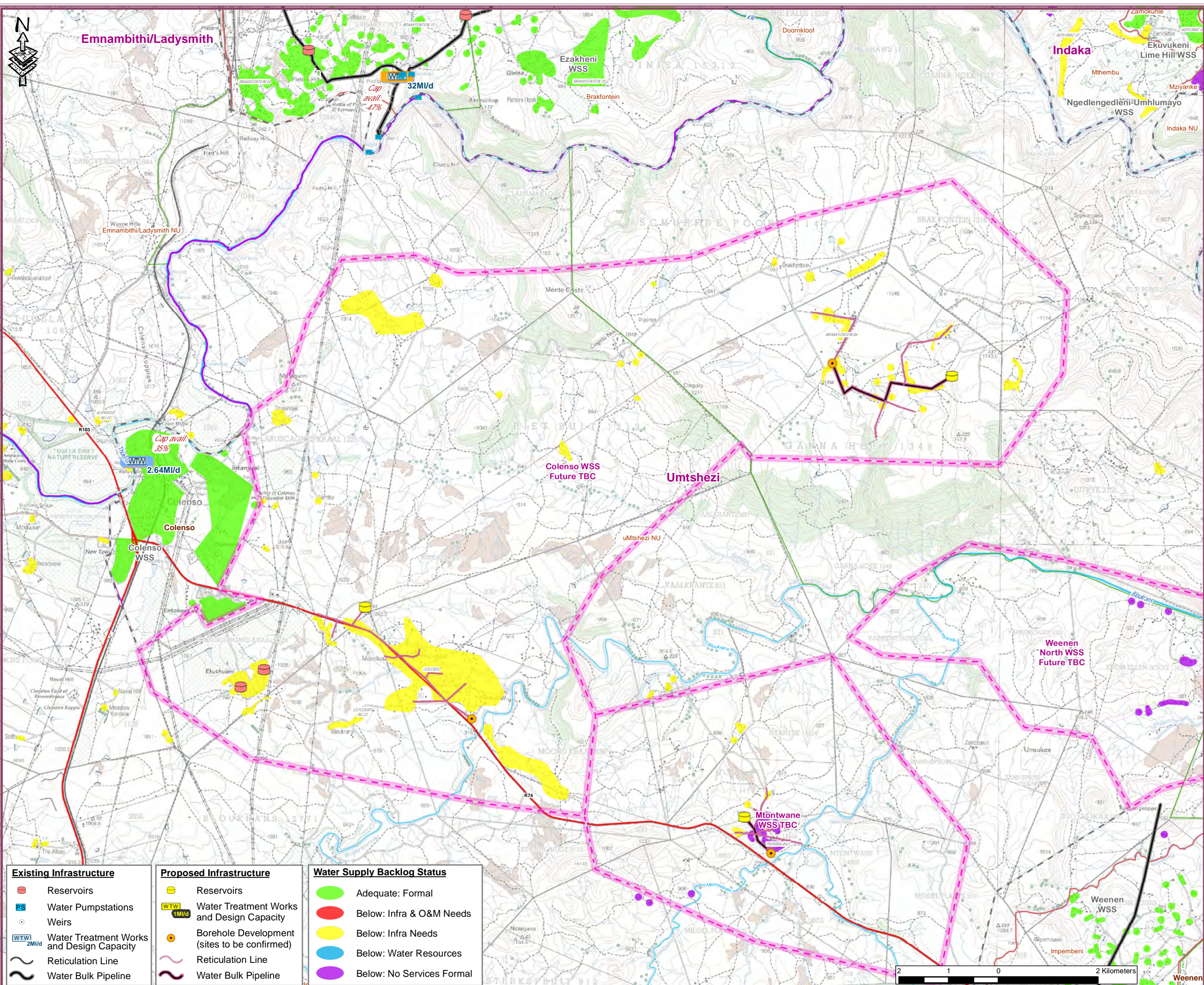
MAP TITLE:

Conceptual Water Supply Areas
Bester WSS TBC

DATE COMPLETED: 2016/06/01

MAP NO.: **DC23_Figure 9/TK0777**



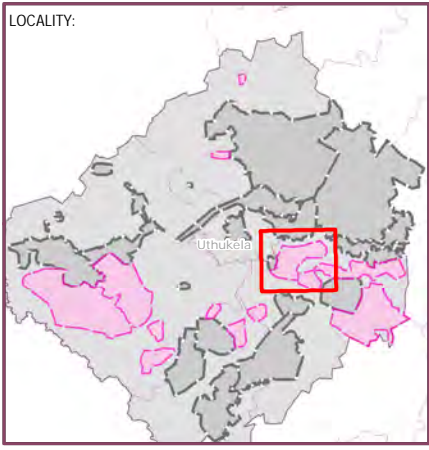


Existing Infrastructure	Proposed Infrastructure	Water Supply Backlog Status
Reservoirs	Reservoirs	Adequate: Formal
Water Pumpstations	Water Treatment Works and Design Capacity	Below: Infra & O&M Needs
Weirs	Borehole Development (sites to be confirmed)	Below: Infra Needs
Water Treatment Works and Design Capacity	Reticulation Line	Below: Water Resources
Reticulation Line	Water Bulk Pipeline	Below: No Services Formal
Water Bulk Pipeline		

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Conceptual Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

UTHUKELA DISTRICT MUNICIPALITY

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

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 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

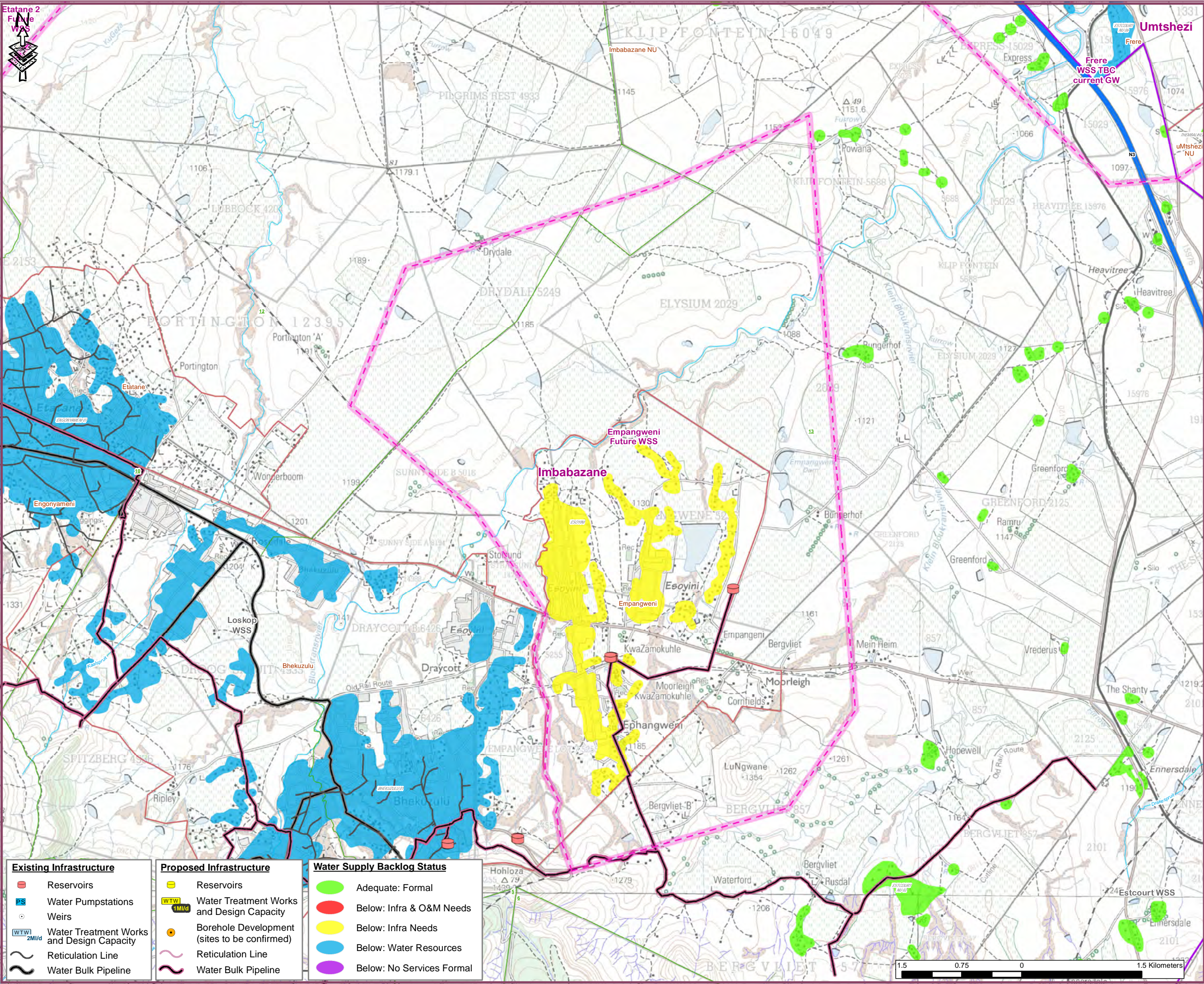
uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Conceptual Water Supply Areas
Colenso WSS Future TBC

DATE COMPLETED: 2016/06/01

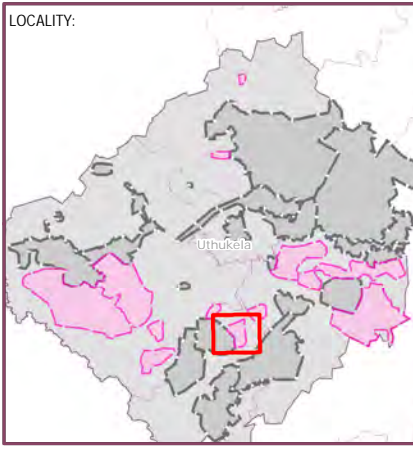
MAP NO.: DC23_Figure 9/TK0776



Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Conceptual Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

ZIYANDA Consulting

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Conceptual Water Supply Areas
Empangweni Future WSS

DATE COMPLETED:

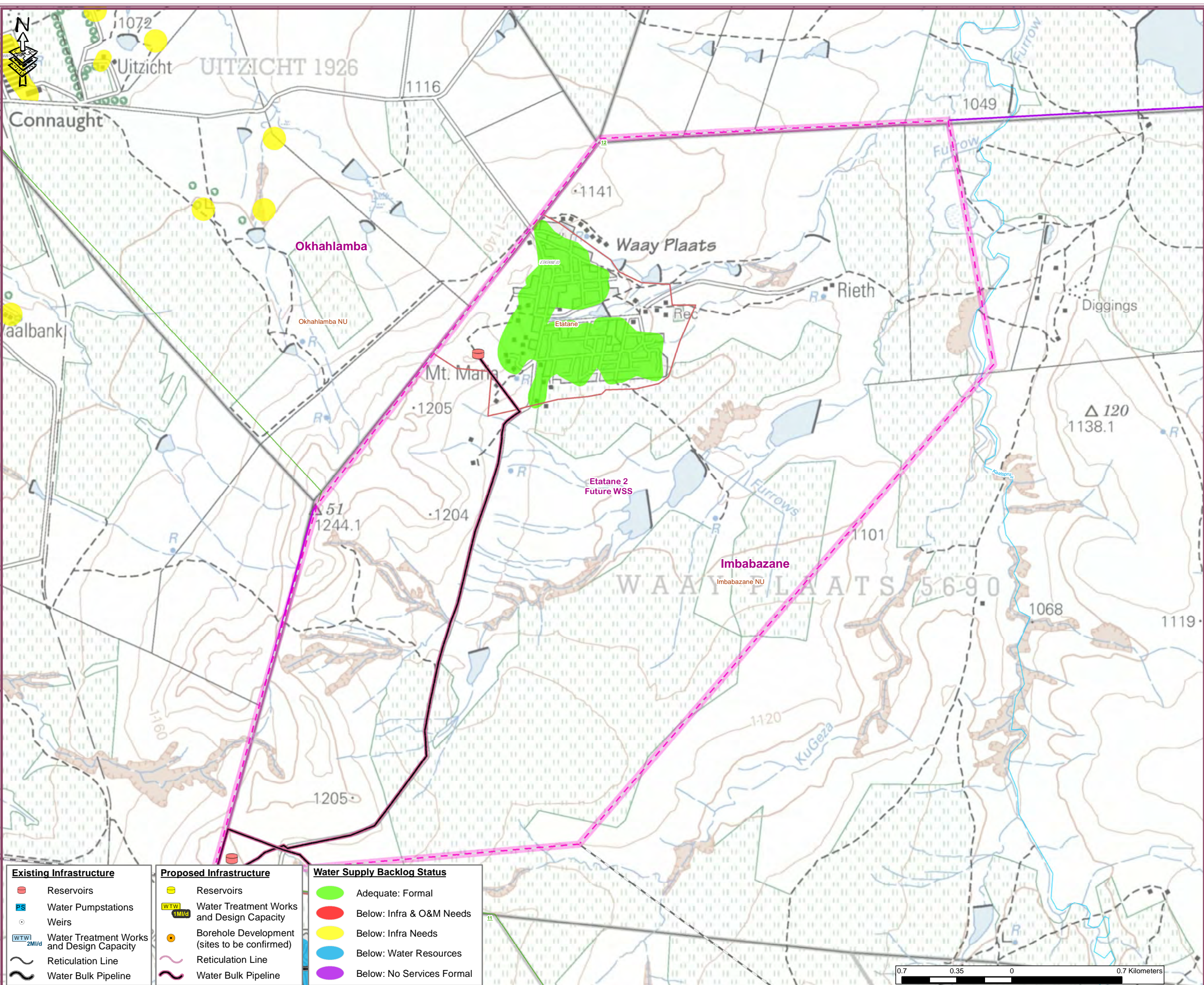
2016/06/01

MAP NO.:

DC23_Figure 9/TK0797

Existing Infrastructure	Proposed Infrastructure	Water Supply Backlog Status
Reservoirs	Reservoirs	Adequate: Formal
Water Pumpstations	Water Treatment Works and Design Capacity	Below: Infra & O&M Needs
Weirs	Borehole Development (sites to be confirmed)	Below: Infra Needs
Water Treatment Works and Design Capacity	Reticulation Line	Below: Water Resources
Reticulation Line	Water Bulk Pipeline	Below: No Services Formal
Water Bulk Pipeline		

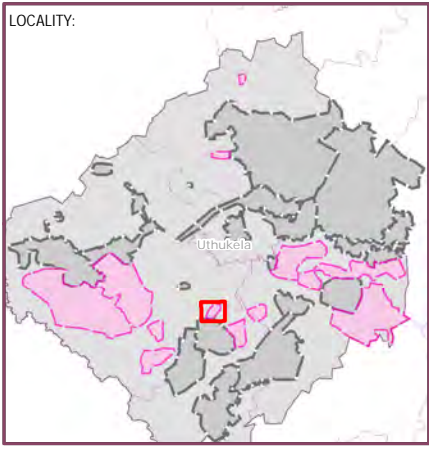




Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Conceptual Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

ZIYANDA Consulting

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Conceptual Water Supply Areas

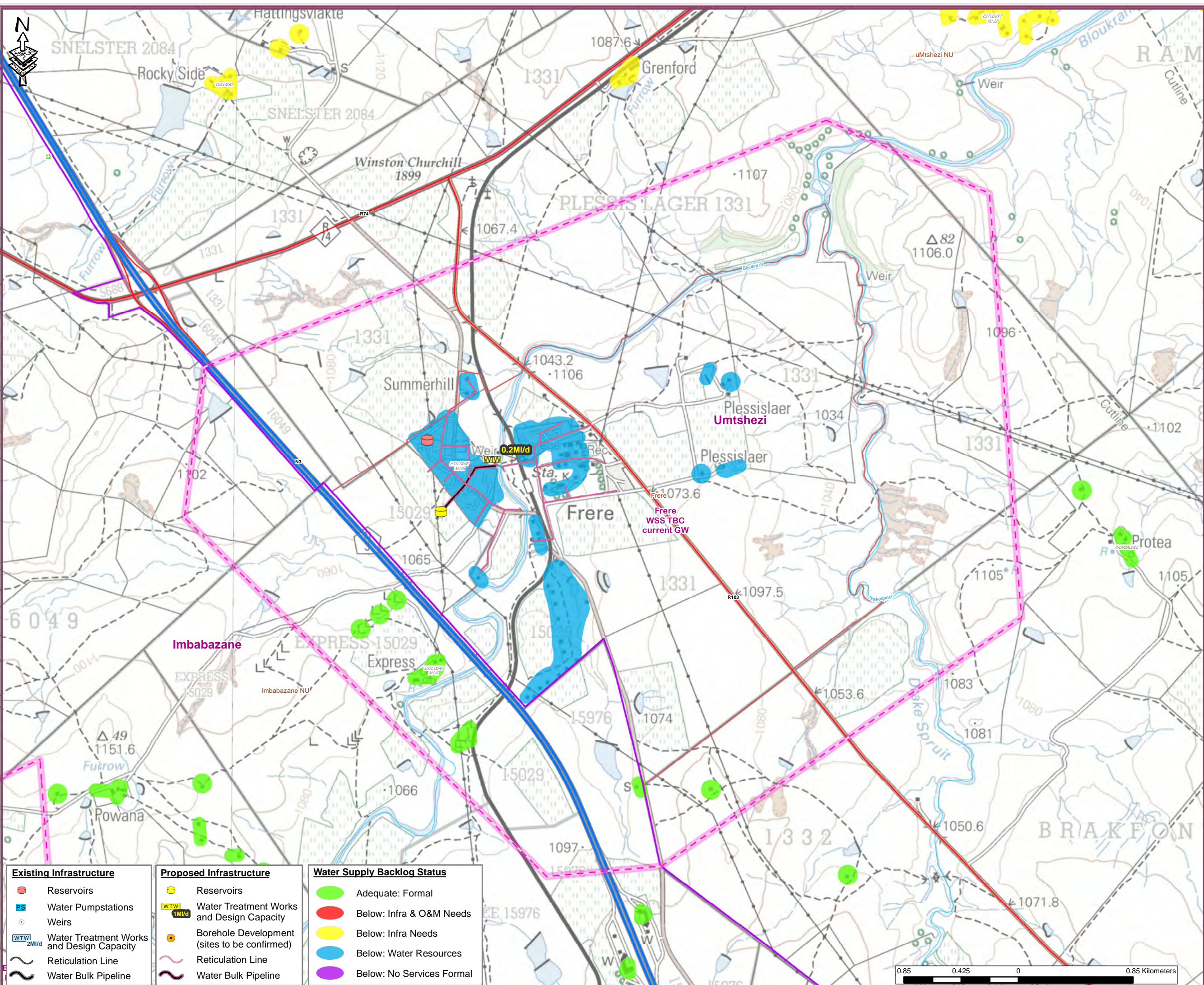
Etatane 2 Future WSS

DATE COMPLETED: 2016/06/01

MAP NO.: **DC23_Figure 9/TK0796**

Existing Infrastructure		Proposed Infrastructure		Water Supply Backlog Status	
	Reservoirs		Reservoirs		Adequate: Formal
	Water Pumpstations		Water Treatment Works and Design Capacity		Below: Infra & O&M Needs
	Weirs		Borehole Development (sites to be confirmed)		Below: Infra Needs
	Water Treatment Works and Design Capacity		Borehole Development (sites to be confirmed)		Below: Water Resources
	Reticulation Line		Reticulation Line		Below: No Services Formal
	Water Bulk Pipeline		Water Bulk Pipeline		

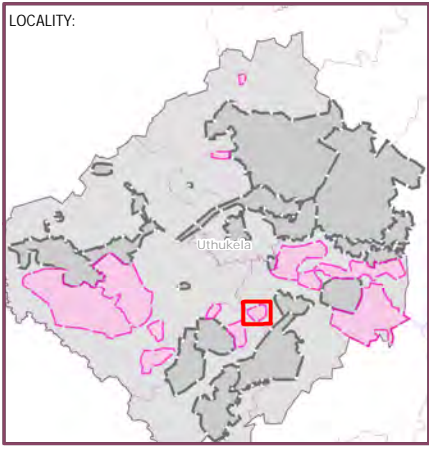




Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Conceptual Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

ZIYANDA Consulting

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

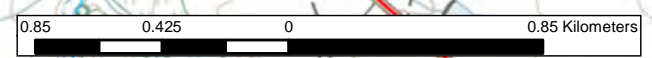
Conceptual Water Supply Areas

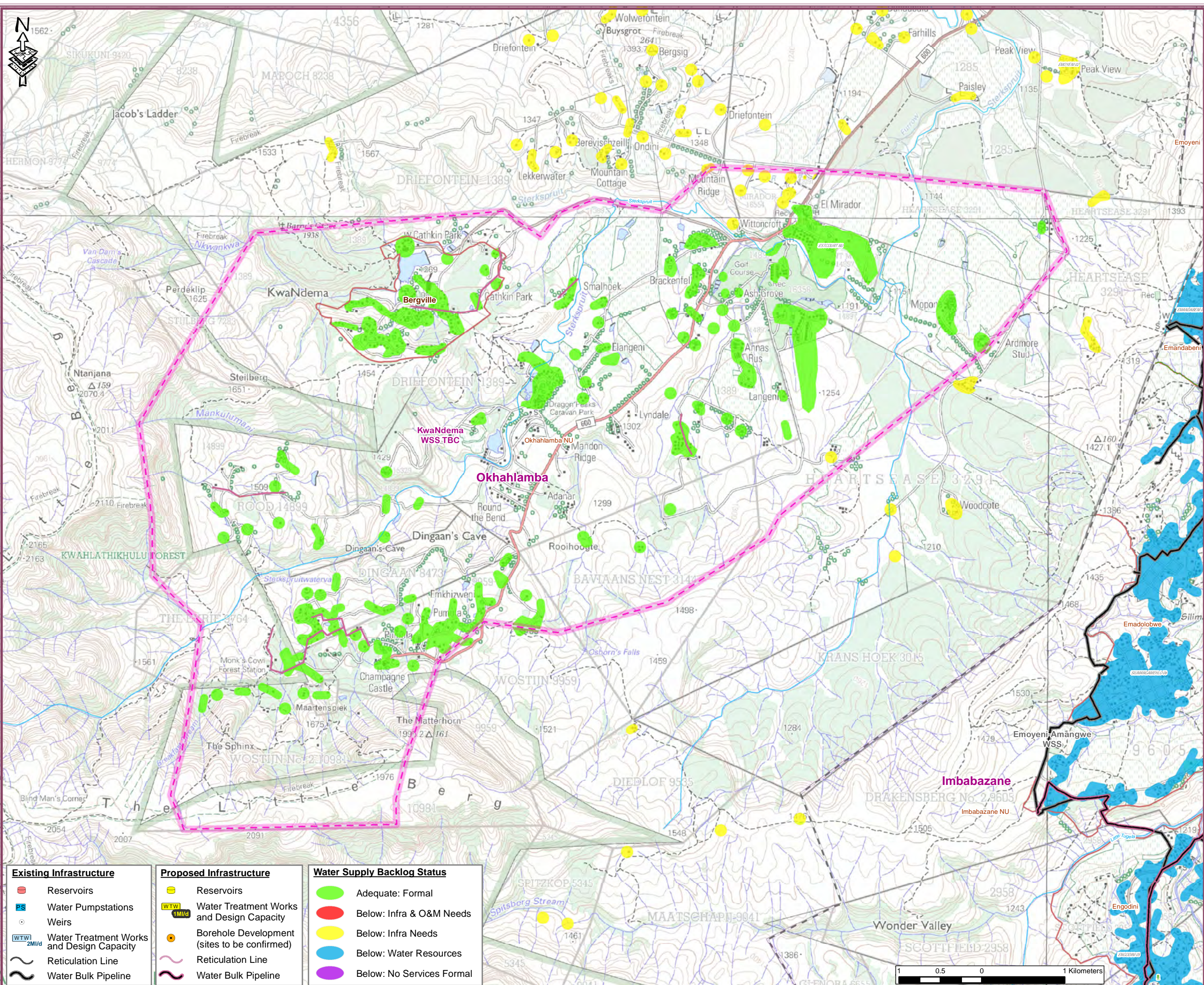
Frere WSS TBC current GW

DATE COMPLETED: 2016/06/01

MAP NO.: **DC23_Figure 9/TK0794**

Existing Infrastructure	Proposed Infrastructure	Water Supply Backlog Status
Reservoirs	Reservoirs	Adequate: Formal
Water Pumpstations	Water Treatment Works and Design Capacity	Below: Infra & O&M Needs
Weirs	Borehole Development (sites to be confirmed)	Below: Infra Needs
Water Treatment Works and Design Capacity	Reticulation Line	Below: Water Resources
Reticulation Line	Water Bulk Pipeline	Below: No Services Formal
Water Bulk Pipeline		



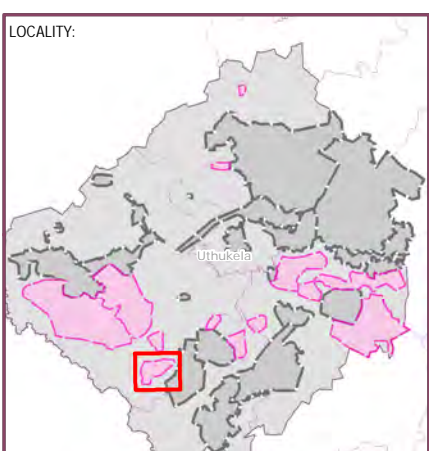


Existing Infrastructure	Proposed Infrastructure	Water Supply Backlog Status
Reservoirs	Reservoirs	Adequate: Formal
Water Pumpstations	Water Treatment Works and Design Capacity	Below: Infra & O&M Needs
Weirs	Borehole Development (sites to be confirmed)	Below: Infra Needs
Water Treatment Works and Design Capacity	Reticulation Line	Below: Water Resources
Reticulation Line	Water Bulk Pipeline	Below: No Services Formal
Water Bulk Pipeline		

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
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- Main Roads
- Existing Water Supply Areas
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- Dams & Dam Names
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CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

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PROJECT TITLE

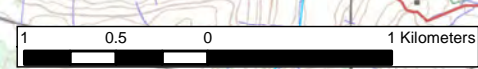
uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

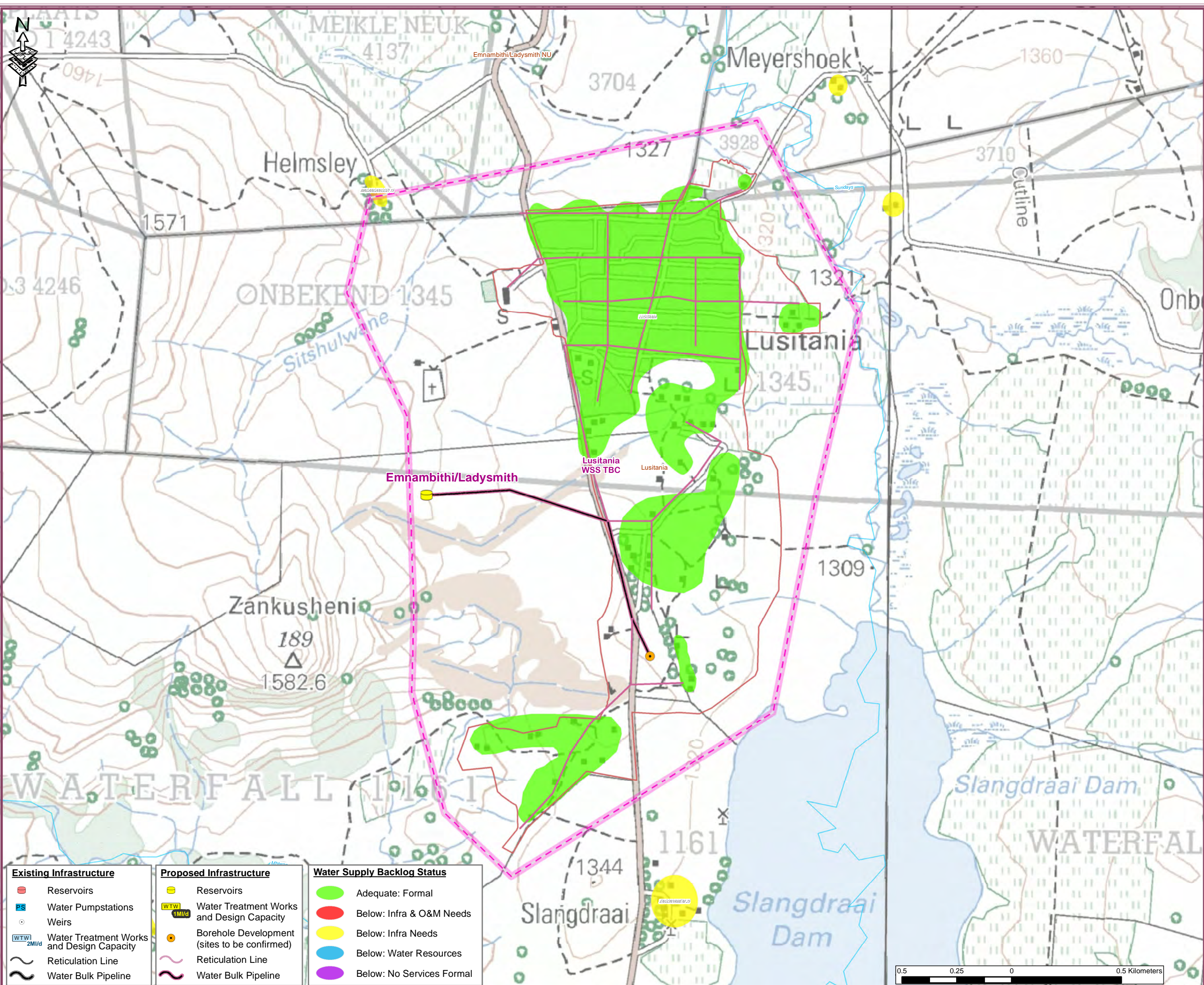
MAP TITLE:

Conceptual Water Supply Areas
KwaNdeima WSS TBC

DATE COMPLETED: 2016/06/01

MAP NO.: **DC23_Figure 9/TK0791**



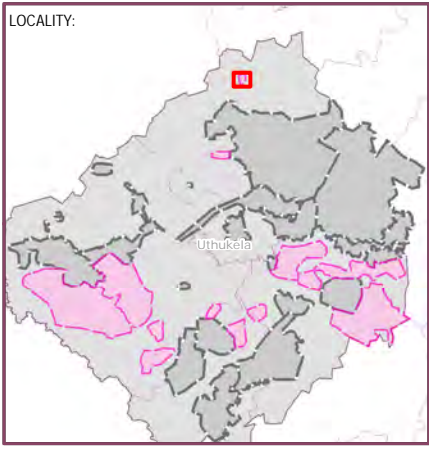


Existing Infrastructure		Proposed Infrastructure		Water Supply Backlog Status	
	Reservoirs		Reservoirs		Adequate: Formal
	Water Pumpstations		Water Treatment Works and Design Capacity		Below: Infra & O&M Needs
	Weirs		Borehole Development (sites to be confirmed)		Below: Infra Needs
	Water Treatment Works and Design Capacity		Reticulation Line		Below: Water Resources
	Reticulation Line		Water Bulk Pipeline		Below: No Services Formal

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Conceptual Water Supply Areas
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- Primary Rivers
- Secondary Rivers

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CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

ZIYANDA Consulting

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

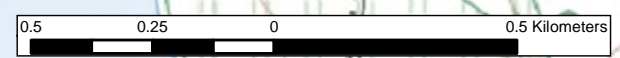
Conceptual Water Supply Areas
Lusitania WSS TBC

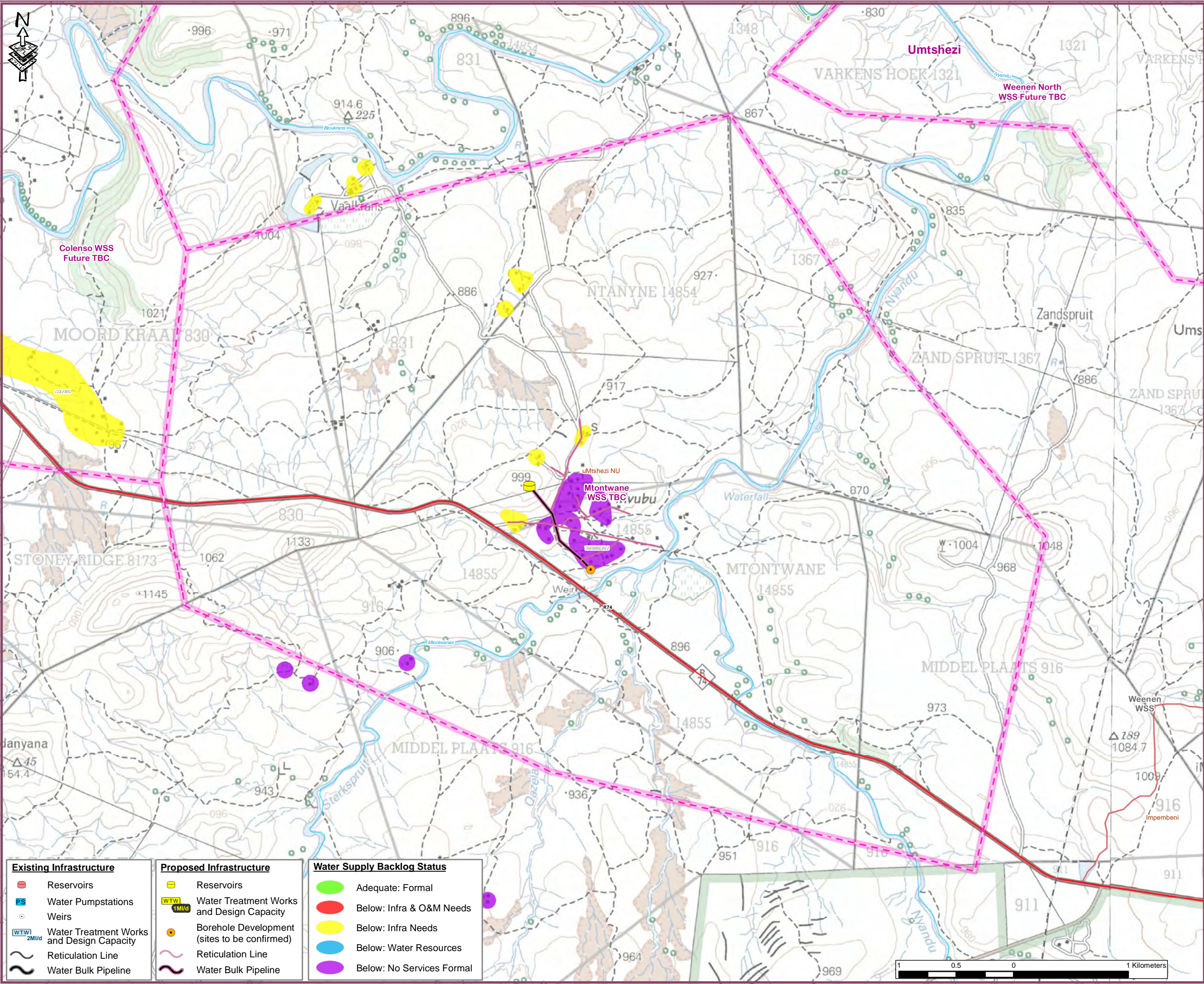
DATE COMPLETED:

2016/06/01

MAP NO.:

DC23_Figure 9/TK0778



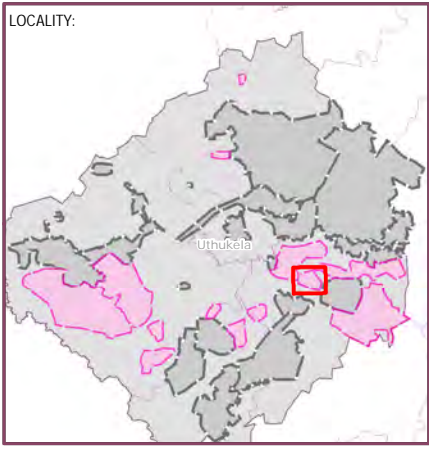


Existing Infrastructure		Proposed Infrastructure		Water Supply Backlog Status	
	Reservoirs		Reservoirs		Adequate: Formal
	Water Pumpstations		Water Treatment Works and Design Capacity		Below: Infra & O&M Needs
	Weirs		Borehole Development (sites to be confirmed)		Below: Infra Needs
	Water Treatment Works and Design Capacity		Reticulation Line		Below: Water Resources
	Reticulation Line		Water Bulk Pipeline		Below: No Services Formal
	Water Bulk Pipeline				

Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Conceptual Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

UTHUKELA DISTRICT MUNICIPALITY

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

ZIYANDA Consulting

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

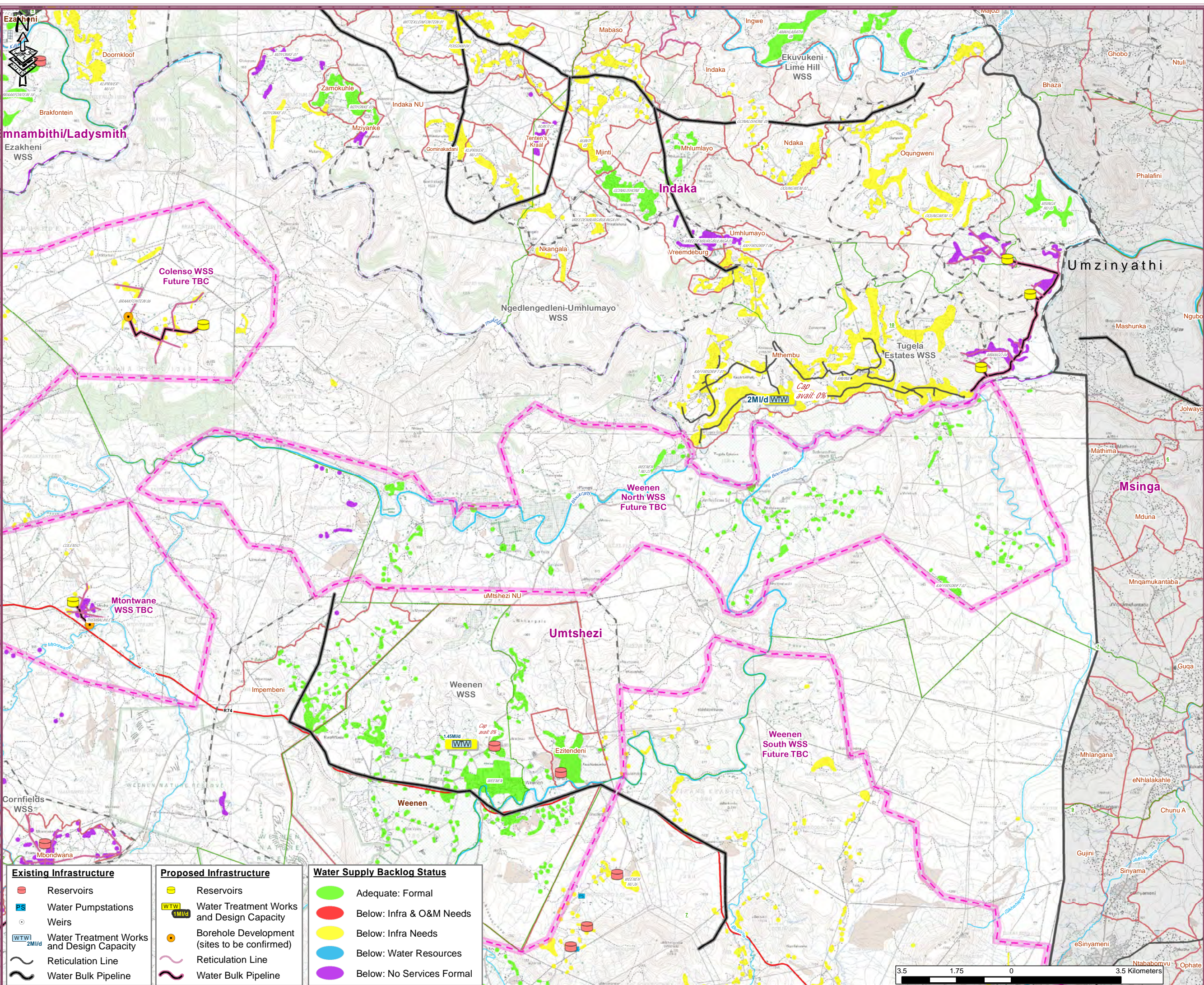
uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Conceptual Water Supply Areas
Mtontwane WSS TBC

DATE COMPLETED: 2016/06/01

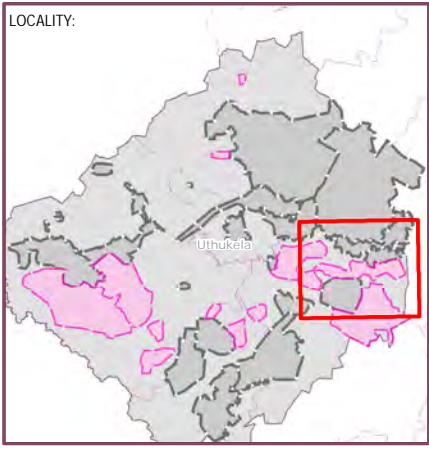
MAP NO.: **DC23_Figure 9/TK0780**



Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Conceptual Water Supply Areas
- Dams & Dam Names
- Primary Rivers
- Secondary Rivers

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CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP
UWP Consulting
PO Box 25549, Monument Park
Pretoria, 0105

ZIYANDA
Ziyanda Consulting

Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

Conceptual Water Supply Areas
Weenen North WSS Future TBC

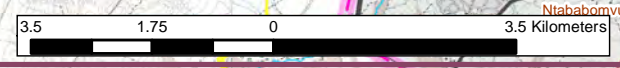
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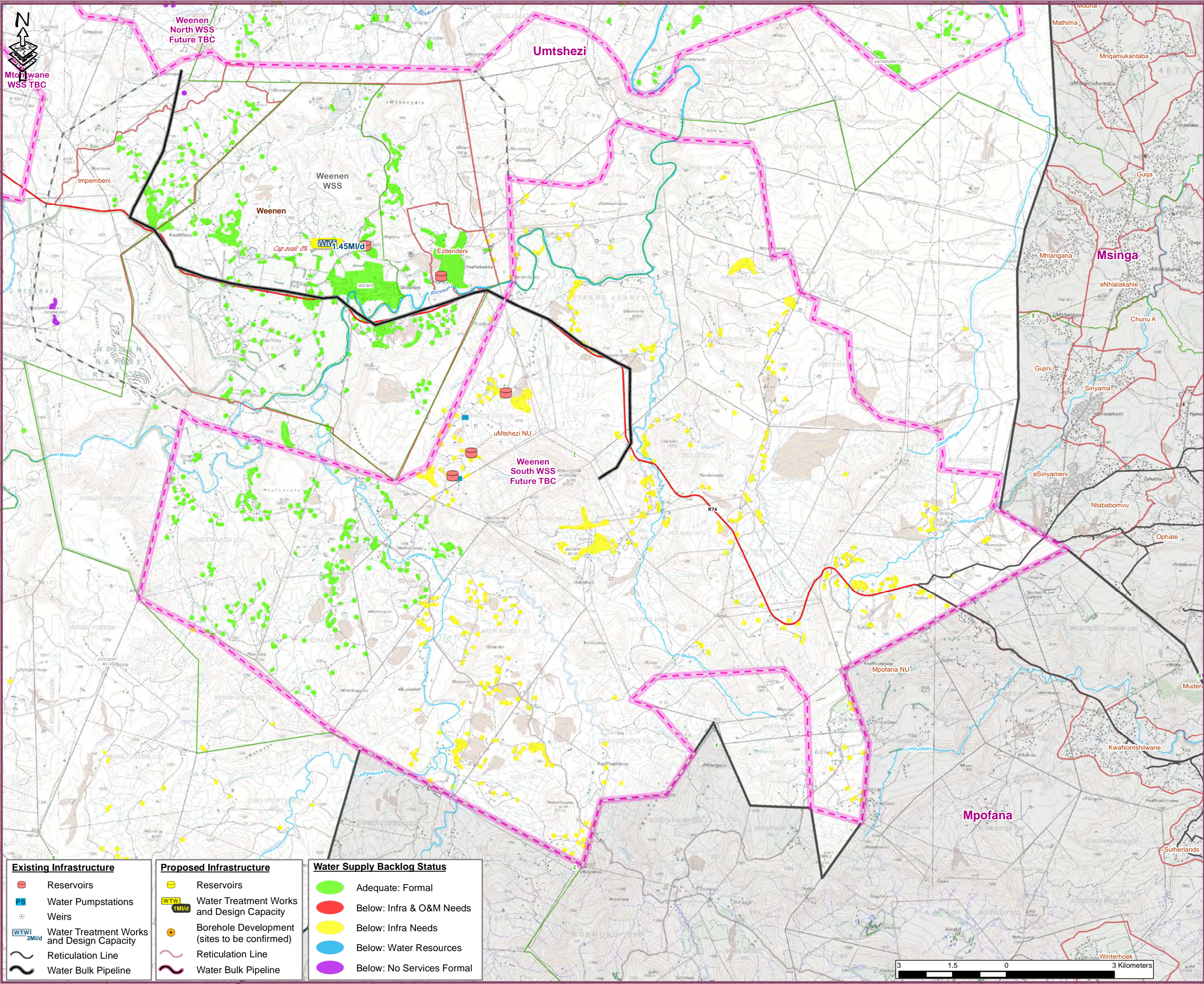
2016/06/01

MAP NO.:

DC23_Figure 9/TK0781

Existing Infrastructure		Proposed Infrastructure		Water Supply Backlog Status	
	Reservoirs		Reservoirs		Adequate: Formal
	Water Pumpstations		Water Treatment Works and Design Capacity		Below: Infra & O&M Needs
	Weirs		Borehole Development (sites to be confirmed)		Below: Infra Needs
	Water Treatment Works and Design Capacity		Reticulation Line		Below: Water Resources
	Reticulation Line		Water Bulk Pipeline		Below: No Services Formal

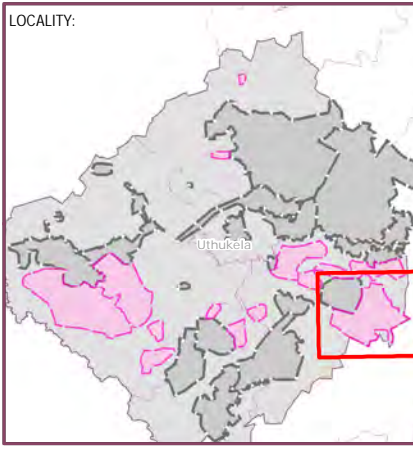




Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Conceptual Water Supply Areas
- Dams & Dam Names
- Primary Rivers
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DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP Consulting
 PO Box 25549, Monument Park
 Pretoria, 0105

Tel: + 27 (0) 12 424 9700
 Fax: + 27 (0) 12 460 4071
 Email: pretoria@uwp.co.za

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PROJECT TITLE

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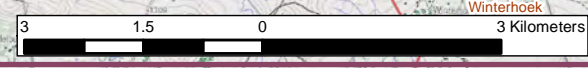
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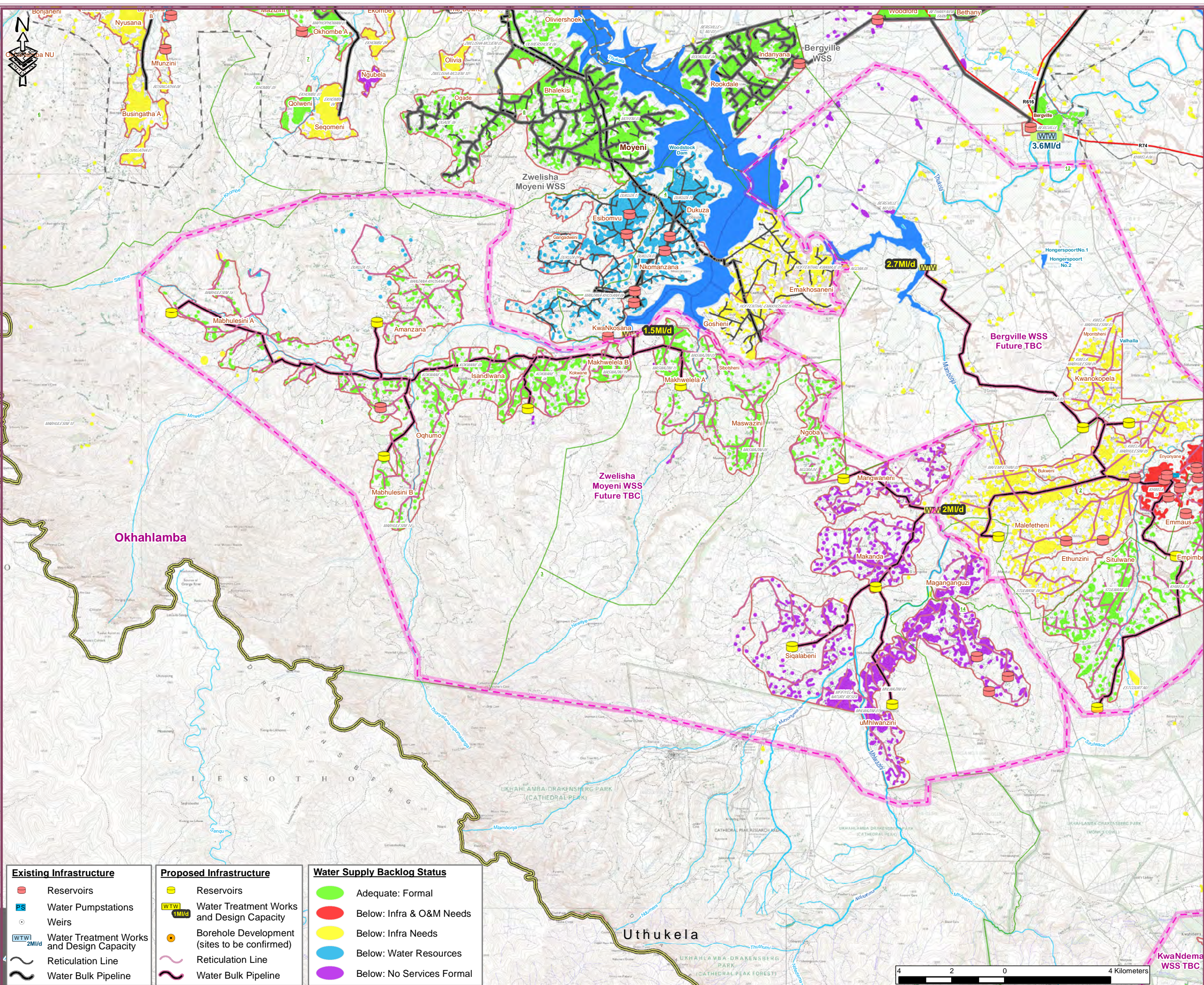
Conceptual Water Supply Areas
Weenen South WSS Future TBC

DATE COMPLETED: 2016/06/01

MAP NO.: **DC23_Figure 9/TK0782**

Existing Infrastructure	Proposed Infrastructure	Water Supply Backlog Status
Reservoirs	Reservoirs	Adequate: Formal
Water Pumpstations	Water Treatment Works and Design Capacity	Below: Infra & O&M Needs
Weirs	Borehole Development (sites to be confirmed)	Below: Infra Needs
Water Treatment Works and Design Capacity	Reticulation Line	Below: Water Resources
Reticulation Line	Water Bulk Pipeline	Below: No Services Formal
Water Bulk Pipeline		

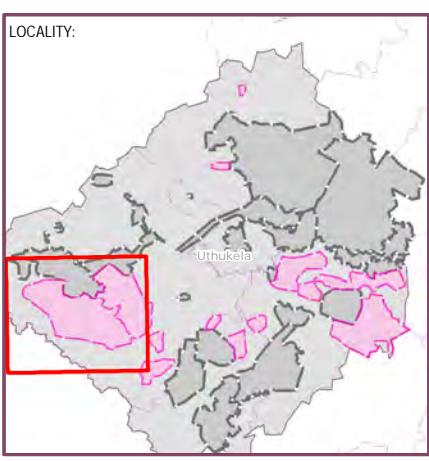




Legend

- Provincial Boundaries
- District Municipality Boundaries
- Local Municipality Boundaries
- Ward Boundaries & Numbers
- Census Main Places
- National Roads
- Main Roads
- Existing Water Supply Areas
- Conceptual Water Supply Areas
- Dams & Dam Names
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- Secondary Rivers

DWS: Dept. of Water & Sanitation



CLIENT:

DISTRICT MUNICIPALITY:

CONSULTANTS:

UWP
UWP Consulting
PO Box 25549, Monument Park
Pretoria, 0105

ZIYANDA
ZIYANDA Consulting

Tel: + 27 (0) 12 424 9700
Fax: + 27 (0) 12 460 4071
Email: pretoria@uwp.co.za

Project No.: 27811

PROJECT TITLE

uThukela DM: Universal Access Plan Phase 2 - Progressive Development of a Regional Water Supply Master Plan

MAP TITLE:

**Conceptual Water Supply Areas
Zwelisha Moyeni WSS Future TBC**

DATE COMPLETED: 2016/06/01

MAP NO.: **DC23_Figure 9/TK0783**

Existing Infrastructure	Proposed Infrastructure	Water Supply Backlog Status
Reservoirs	Reservoirs	Adequate: Formal
Water Pumpstations	Water Treatment Works and Design Capacity	Below: Infra & O&M Needs
Weirs	Borehole Development (sites to be confirmed)	Below: Infra Needs
Water Treatment Works and Design Capacity	Reticulation Line	Below: Water Resources
Reticulation Line	Water Bulk Pipeline	Below: No Services Formal
Water Bulk Pipeline		

