



UBUHLEBEZWE LOCAL MUNICIPALITY

Department of Water and Sanitation

29 Margaret Street

Ixopo

3276

Tel No. (039) 834 7700

Fax No. (039) 834 1168

PROJECT

DESCRIPTION

**PROPOSED OR TAMBO VIEW DEVELOPMENT WATER & SANITATION
INTERNAL INFRASTRUCTURE**

CONCEPT DESIGN REPORT

Revision 02

FEBRUARY 2023

Prepared By:



MXN DEVELOPMENT

3 Latham Street
Irenepark

Klerksdorp
2571

Contact Person: **Ms. TR Nkosi**

Tel No. (018) 011 3405

E-mail: thembeka@mxndevelopment.co.za

PROPOSED OR TAMBO VIEW DEVELOPMENT WATER & SANITATION INTERNAL INFRASTRUCTURE FOR UBUHLEBEZWE LOCAL MUNICIPALITY

CONCEPT DESIGN REPORT
FEBRUARY 2023

Main Author: Thembeke Nkosi (B-Tech, Civil Eng.)

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The undersigned acknowledge that they have reviewed the Concept Design report and agree with the information presented within this document. Changes to this report will be coordinated with and approved by, the undersigned, or their designated representatives.

Approval for Developer.
MXN Development



.....
Ms. TR NKOSI Candidate Technologist (Civil)

26/02/2023

.....
Date



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1. EXECUTIVE SUMMARY

Ubuhlebezwe Local Municipality is one of the local municipalities in Harry Gwala District Municipality, where a new development has been proposed to be known as OR Tambo View.

MXN Development has been appointed by Ubuhlebezwe Local Municipality to develop a 7.3662ha land area. The development is situated on a Portion of the Remainder of Erf 175 Stuartstown as well as a Portion of Erf 174, Stuartstown. The project area is situated along the R56 and is proposed to cater for 88 residential stands with an average sizes between 413m² and 707m² and 4 passive open spaces. Apart from affordable bonded housing this area can also include GAP housing (Finance Linked Individual Subsidies – FLISP).

The proposed development falls within Ixopo, which is a part of Umngeni water, and the existing Water Treatment Plant and Wastewater Treatment Plant in Ixopo has enough capacity to accommodate the proposed development. There is currently no infrastructure servicing the proposed OR Tambo View development, therefore it is proposed that a water reticulation network with varying UPVC pipe diameters of 75mm, 110mm,160mm be constructed on the proposed OR Tambo View for the supply of water on the new development. Also, it is proposed that a sewer reticulation network with a pipe diameter of 160mm be constructed on the proposed OR Tambo View to collect the sanitation on the new development.

The cost estimate will be carried out at a later stage by considering current rates of contracts on recent similar jobs. Although, proposed preliminary design layout plans are included in this report for ease of reference. A life cycle costing for the proposed infrastructure components will be included on the detailed design report.



2. INTRODUCTION

2.1 Background

This report entails the Proposed Concept Design of the water & sanitation internal infrastructure for the Proposed OR Tambo View Development in Ubuhlebezwe Local Municipality (ULM).

Ubuhlebezwe Local Municipality is one of local municipality in Harry Gwala District Municipality. The OR Tambo View area is located within Ixopo Town, which is approximately 2km from Ixopo CBD. The area under consideration will be supplied by Ixopo Region Water Treatment Works which yields approximately 2.7 Mℓ/day.

2.2 Location and Description

The development location is situated on the Portion of the Remainder of Erf 174 and a Portion of the remaining extent of Erf 175 Stuartstown in the Ixopo town, which is under Ubuhlebezwe Local Municipality (ULM). The geographic location of the development is tabulated below:

Table 1- Geographic Location - Proposed OR Tambo View Development

Project Location	Geographic Location	
	Latitude	Longitude
Ixopo Water Treatment Plant	30° 9' 47.05" S	30° 3' 40.71" E
Proposed O.R Tambo View	30° 9' 41.29" S	30° 3' 42.66" E

Access to the development is mostly by Provincial Route (R56) from Pietermaritzburg towards Kokstad by travelling approximately 85 km from Pietermaritzburg, the O.R Tambo View is on the left as you exit Ixopo town towards Kokstad next to the Ixopo Water Treatment Plant, located within Ubuhlebezwe Local Municipality (ULM).



Figure 1- Locality Plan of Proposed OR Tambo View Development

2.3 Terms of reference

MXN Development as the Developer is to provide professional engineering services for the implementation of this project for Ubuhlebezwe Local Municipality. The envisaged professional engineering services include overseeing the source development, preparation of preliminary and detailed designs in compliance with the relevant guidelines, the professional services for the water supply, sanitation supply, roads and stormwater infrastructure. The report takes the following into account:

- Proposed water supply
- Proposed sanitation supply

2.4 Proposed Development

The total site is about 7.3662 hectares. The proposed development will comprise of affordable housing development. The detailed design of OR Tambo View precinct internal layout will only be finalized at a later stage when the proposed development's township rights have been approved, the general layout plans will be circulated to the various departments of the Local Authority. This development consists of approximately 88 affordable stands with stand sizes between 413m² – 707m² as well as 4 open passive spaces.



Table 2-Proposed land-use for OR Tambo View.

Residential	Other Facilities
88 affordable stands (Res 3) (Stands between 413m ² and 707m ²)	4 Open Space

2.5 Topography

A portion of the site is currently vacant, commonly covered by veld grass. Almost a third of the site is covered with the Choc City / Shayamoya informal settlement. The topography of the site is relatively steep to very steep northeastern slope from 1030 at the river to 1140 MASL1qa towards the water reservoir and communication tower. The area is situated at the grassland biome (Mucina & Rutherford, 2006).

2.6 Geotechnical Conditions

A phase 1 engineering geological investigation with reference to GSFH-2 specification was conducted on the proposed development site at Ixopo, KwaZulu-Natal, with the aim to assess aspects such as geology, relief and subsoil conditions which may influence the planned urban development in the area. The site is underlain by dark grey shale, carbonaceous shale or siltstone of the Pietermaritzburg Formation of the Ecca Group, Karoo Super group. Some dolerite intrusion in the form of dykes and sills are also present in the area. Locally the lithology is covered by sand and ferricrete or quartz gravel. The mechanical properties of the soil layers were determined by means of laboratory tests performed on disturbed samples taken during the profiling of trial pits. (Merwe, 2019)

The obtained site information is evaluated with regards to the development of masonry structures by the application of standard evaluation techniques. Development zonation for township development according to the NHBRC and SAIEG guidelines were done, indicating the geotechnical conditions of the site. The potentially slightly to medium collapsible and compressible and medium expansive soil (site class H2-H3/C1 with 15mm and up to 30mm and even in excess of 30mm movement measured at surface) requires modified normal to special construction with proper compaction techniques as described. (Merwe, 2019)

Steep slopes may limit development and major slope failures could be inflated during long periods of consistent rain fall. No problems regarding excavation can be expected on the site



with no refusal of the TLB. These proposed mitigation measures will be sufficient to successfully address the anticipated geotechnical problems and to ensure the sustainable development as planned. (Merwe, 2019)

3. EXISTING INFRASTRUCTURE

3.1 Water Source

According to Umgeni Water's Infrastructure Master Plan Volume 3, Water is abstracted from the Home Farm Dam, located on the IXobho River a tributary of the UMkhomazi River, and a borehole, located on the local Ixopo Golf Course and supplied to the Ixopo WTP for treatment. The Home Farm Dam catchment is situated within U10K quaternary catchment. U10K has a natural Mean Annual Runoff (MAR) of 40 million m³/a and an area of 364 km². However, only 30.93% flows into Home Farm Dam. The dam has a limited incremental catchment area, viz. 78 km², with the majority of the runoff being intercepted by the upstream farm dams. (Umgeni Water Amanzi - Planning Services, 2022)

The water resources that support the Ixopo System comprise the Home Farm Dam (Figure 2, Figure 4.4, Table 3 and Table 4.2) and a production borehole. These two sources are used to supply the current Ixopo town demand of 2.5 Mℓ/day. The yield of the Ixopo system can be augmented by the existing St. Isidore Dam. (Umgeni Water Amanzi - Planning Services, 2022)

The Home Farm Dam has a full supply capacity of 0.55 million m³ and a firm yield of 2.6 Mℓ/day. The production borehole is capable of a sustainable yield of approximately 400 kℓ/day using a pump cycle of 16 hours/day at a rate of 25 kℓ/hour. A silt survey of Home Farm Dam need only be undertaken every 10 years as the sedimentation impact is regarded as minimal with most sediment being trapped in the two upstream farm dams. If the Home Farm Dam, Boreholes and Isidore Dam combined will have got sufficient capacity to supply the proposed development with raw water. (Umgeni Water Amanzi - Planning Services, 2022)



Figure 2- Home Farm Dam (Umgeni Water Amanzi - Planning Services, 2022)

Table 3-Characteristics of Home Farm Dam (Umgeni Water Amanzi - Planning Services, 2022)

Catchment Details	
Incremental Catchment Area:	77.53 km ²
Total Catchment Area:	77.53 km ²
Mean Annual Precipitation:	793 mm
Mean Annual Runoff:	5.25 million m ³
Annual Evaporation:	1 200 mm
Dam Characteristics	
Gauge Plate Zero:	935.8 mASL
Full Supply Level:	939.8 mASL
Spillway Height:	4 m
Net Full Supply Capacity:	0.555 million m ³
Dead Storage:	0.0 million m ³
Total Capacity:	0.555 million m ³
Surface Area of Dam at Full Supply Level:	0.20 km ²
Original Measured Dam Capacity	0.555 million m ³ (January 2000)
Second Measured Dam Capacity	0.555 million m ³ (January 2006)
Dam Type:	Earth embankment
Crest Length:	Spillway Section: 20m (approx.) Non-Spillway Section: 140m
Type of Spillway:	Uncontrolled
Capacity of Spillway:	Not Available
Date of Completion:	1977
Date of Area Capacity Survey:	2006
Date of next Area Capacity Survey:	2021



Table 4- Existing Dams in the Ixopo Region (Umgeni Water Amanzi - Planning Services, 2022)

Impoundment	River	Capacity (million m ³)	Purpose
Home Farm Dam	iXobho	0.55	Domestic

a) St. Isidore to Home Farm Dam Emergency Raw Water Transfer Scheme

The drought experienced in 2014/15 reduced the level of Home Farm Dam to 12% of full supply. As a result of the drought a 50% restriction was imposed on the demands in the area. A further mitigation measure was to augment the Home Farm Dam via an emergency raw water transfer scheme from the St. Isidore Dam. This mitigation measure provided the resilience needed until sufficient rainfall was experienced to increase the level of the Home Farm Dam. This emergency raw water transfer scheme has been decommissioned.

3.1.1 Supply pipelines and pump systems

As discussed above, the Ixopo Dam is the primary source of raw water supply to Ixopo. As shown in Figure 3, raw water is gravity-fed from the dam (FSL = 939.84 MASL) a distance of 418.4 m to the raw water pump station (located at the entrance to the Ixopo Wastewater Works) and then pumped a distance of 1.382 km to the WTP (approximately 1104 MASL; Figure 4).

The Ixopo Golf Course borehole is a single production borehole situated on the local golf course. This borehole is used conjunctively with the Ixopo Dam to meet the water requirements at the WTP. The raw water from the borehole feeds directly into the chlorination contact chamber. At times, as much as 15 to 20% of the total supply at the WTP is obtained from the borehole. Water is pumped from this production borehole (approximately 997 m ASL) via a 1.38 km rising main to the WTP. Details of the raw water pipeline from the dam and the pipeline from the borehole are shown in Table 6 details of the pump station. (SBG INNOVATED SOLUTION, 2019)

The Ixopo Raw Water Rising Main has a pipe diameter of 250mm diameter and a capacity of 6.37Ml/day. It conveys water from Ixopo Raw Water Pump Station to Ixopo Water



Treatment Plant. The pipeline has sufficient capacity to cater for the water demand of OR Tambo View Development.

Table 5-Pipeline details: Ixopo System (Umgeni Water Amanzi - Planning Services, 2022)

System	Pipeline Name	From	To	Length (km)	Nominal Diameter (mm)	Internal Diameter (mm)	Material	Capacity* (ME/day)	Age (years)
Ixopo	Ixopo Raw Water Gravity Pipeline	Ixopo Dam	Ixopo Raw Water Pump Station	0.42	250	Unknown	FBE Coated, Cement Mortar Line, Bell and Spigot, Welded Steel	1.79	24
Ixopo	Ixopo Raw Water Gravity Pipeline	Ixopo Dam	Ixopo Raw Water Pump Station	0.42	300	Unknown	uPVC	2.83	9
Ixopo	Ixopo Raw Water Rising Main	Ixopo Raw Water Pump Station	Ixopo WTP	1.38	250	Unknown	FBE Coated, Cement Mortar Line, Bell and Spigot, Welded Steel	6.37	24
Ixopo	Ixopo Golf Course Borehole Pipeline	Ixopo Golf Course Borehole	Ixopo WTP	1.50	110	Unknown	uPVC	1.23	>20

* Capacity based on a velocity of 1.5 m/s.

Table 6- Pump details: Ixopo System. (Umgeni Water Amanzi - Planning Services, 2022)

System	Pump Station Name	Number of Duty Pumps	Number of Standby Pumps	Pump Description	Supply From	Supply To	Static Head (m)	Duty Head (m)	Duty Capacity (ME/day)
Ixopo	Ixopo Raw Water	1	1		Ixopo Dam	Ixopo WTP	170.36	172.123	2.7
Ixopo	Borehole	1		22kw	Golf Course BH	Ixopo WTP	82 (approx.)	90.7	0.4

The proposed development falls within the Umngeni Water system which is one of the largest systems within the uMkhomazi Water Resource Region. The Umngeni Water System is owned and operated by Ixopo System. Water is abstracted from the Home Farm Dam, located on the IXobho River a tributary of the UMkhomazi River, and a borehole, located on the local Ixopo Golf Course and supplied to the Ixopo Water Treatment Plant for treatment. (Figure 2, Figure 3 and Figure 4). (Umngeni Water Amanzi - Planning Services, 2022)

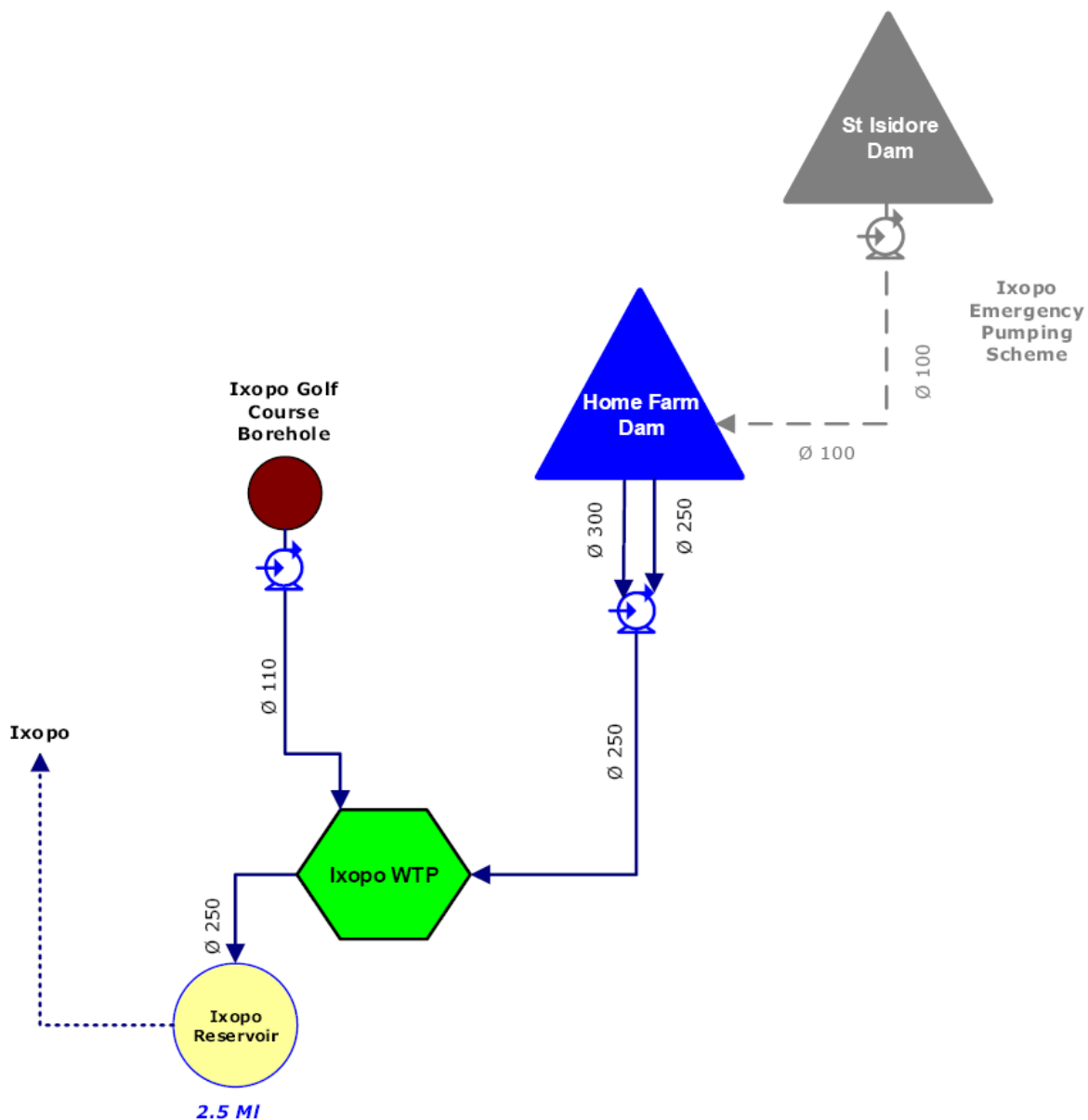


Figure 3-Schematic of the Ixopo System (Umngeni Water Amanzi - Planning Services, 2022)

The proposed OR Tambo View housing development will get its raw water from Ixopo Dam, potable water from Ixopo WTP.

3.1.2 Service Reservoirs, Distribution Networks and Supply Pipelines

According to Umgeni Water`s Infrastructure Master Plan Volume 3, The Ixopo Potable Water Reservoir is located at the Water Treatment Plant and acts as a balancing and service reservoir. It has a storage capacity of 2.5ML and sits at an elevation of 1001.23m ASL. Besides the above-mentioned reservoir, there is currently no water distribution networks in the proposed OR Tambo View area.



Figure 4-Ixopo Water Treatment Plant (Umgeni Water Amanzi - Planning Services, 2022)

3.2 Sanitation Infrastructure -Status Quo

The Proposed OR Tambo View settlement falls within an area serviced by the Ixopo Wastewater Works (WWW). The Ixopo WWW is owned and operated by Umgeni Water. The Ixopo WWW operations use aeration basins for biological nutrient removal and clarifiers for the separation process. The proposed OR Tambo View will discharge its sewer into the exiting Ixopo WWW. (SBG INNOVATED SOLUTION, 2019)

According to Umgeni Water`s Infrastructure Master Plan Volume 10, Ixopo WWW serves the town of Ixopo in the Harry Gwala District Municipality and is a Class D accredited WWW. It is located next to the R612 regional road and downstream of the Home Farm Dam, which supplies the raw water to Umgeni Water`s Ixopo WTP (Figure 5). (Umgeni Water Amanzi - Planning Services, 2022)

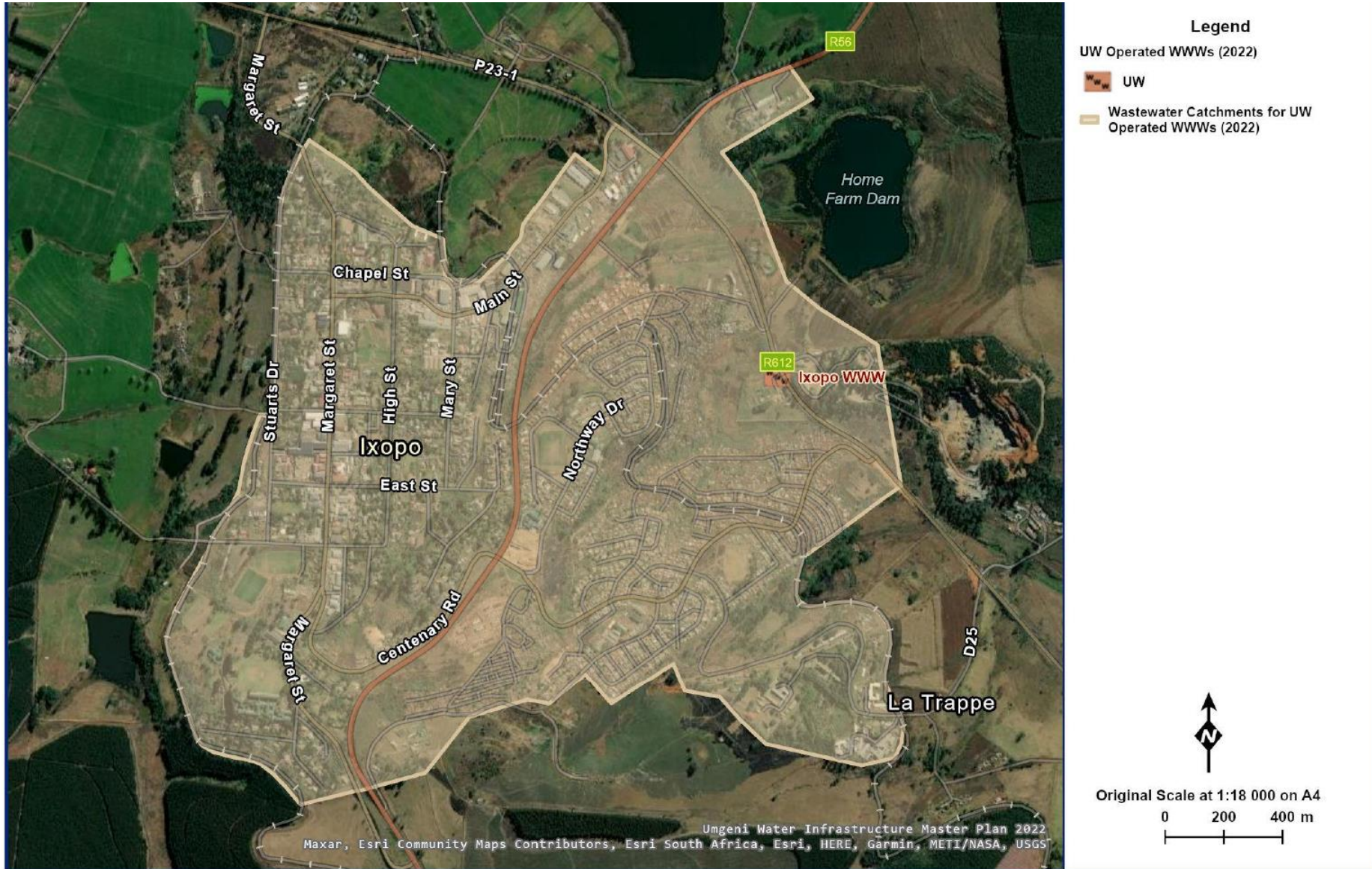


Figure 5- Ixopo Wastewater Works (WWW) (Umgeni Water Amanzi - Planning Services, 2022)



According to Umgeni Water’s Infrastructure Master Plan Volume 7, The Ixopo WWW process train follows a typical extended aeration process consisting of an inlet works, one reactor with three aerators on timers and two clarifiers (Figure5), five drying beds and chlorine contact channels. Sludge is dried on beds and disposed of on a local farm owned by Harry Gwala District Municipality. The characteristics of the Ixopo WWW are shown in Table 7.

Table 7-Ixopo WWW infrastructure (Umgeni Water Amanzi - Planning Services, 2022)

WWW Name:	Ixopo WWW
System:	uMkhomazi System
Maximum Design Capacity:	1 Mℓ/day
Current Utilisation:	0.2 Mℓ/day
Balancing Ponds:	3 Mℓ
Raw Sewage Pump Station:	
Screens:	1 x Hand raked, 2.5 cm gaps
Grit Chambers:	2 x Constant velocity grit channel
Aeration Basin Area:	
Aeration Basin Capacity:	1150 m ³
Aerators:	3 x 18.5 kW slow speed aerators
Clarifier Type:	1 x scraped floor (12.5 m), 1 x suction lift (14.5 m)
Number of Clarifiers:	2
Total Area of all Clarifiers:	274 m ²
Total Capacity of Clarifiers:	6.6 Mℓ/day
Upflow Velocity:	1 m/h
RAS Pump Station Capacity:	
Chlorine Storage Capacity:	8 x 68 kg cylinders
Chlorine Dosing Capacity:	0 – 1 kg/h
Total Capacity of Chlorine Contact Tanks:	62 m ²
Total Capacity of Sludge Treatment Plant:	
Anaerobic Ponds:	None

According to Umgeni Water’s Infrastructure Master Plan 2022 Volume 10, the maximum design capacity of Ixopo WWW is 1MI/day. Flows to the WWW have been reduced as a result of blockages in the Ixopo sewer network and non-operational pump stations. The flows dropped to <0.2MI/day. The anticipated return flows are approximately 1.3MI/day. Therefore, there is a spare capacity of 0.7MI/d. The Ixopo



WWWP has sufficient capacity to meet the current waste water demand of OR Tambo View Development.

4 PROPOSALS FOR WATER SUPPLY FOR OR TAMBO VIEW

4.1 Design Criteria

The bulk and internal infrastructure development will be designed taking into account all regulatory requirements as well as the conventional design standards used in the civil engineering industry. The following design standards will be utilized for this project:

- Standard Specifications for Civil Engineering Construction: SANS 1200 series
- The Neighbourhood Planning and Design Guide: Department of Human Settlements 2019
- Guidelines for Human Settlement Planning and Design: CSIR 2000
- General Conditions of Contract for Construction GCC 2015 3rd Edition
- SABS 0162: Code of Practice for structural use of Steel: SABS 1984
- SABS 241: Specification for Water for Domestic Use: SABS 2001
- National Building Regulations and Building Standard Act: SANS 10400, 1977
- SANS 815 / SABS 815:1978 - Shouldered-end pipes and fittings, and couplings
- SANS 10112 / SABS 0112:2003 - The installation of polyethylene and Poly (vinyl chloride) (PVC-U and PVC-M) pipes
- National Water Act 1997, and Regulations
- National Environmental Management Act 1998, and Regulations
- Occupational Health and Safety Act 1993, and Regulations
- DWS Design Specifications
- Specifications which are project specific

4.2 Water Reticulation

The Harry Gwala District Municipality as the Water Service Authority has confirmed the existing water services in the immediate area to the proposed development have



enough capacity to service the new development. The Water Service Authority (Harry Gwala District Municipality) confirmed that they will provide the proposed OR Tambo View development with a new bulk water pipe with a pipe diameter of 160mm uPVC close to the development to supply portable water. (See attached **Appendix B** – layout plan showing the connection point.)

All calculations are based on Redbook “The Neighbourhood Planning and Design Guide: as developed by the Department of Human Settlements in 2019.

Table 8- Design Criteria

Item No.	Design Element	Criteria
1	Average Annual Daily Demand (AADD) for High density stand Size 400m ² -670m ² .	1200l/d
2	Gross Average Annual Daily Demand (GAADD)	Allow 15% losses
3	Instantaneous Peak Factor Demand (IPF)	4
4	Design Peak Flow Rate (DPFR)	GDAAD x IPF
5	Maximum static head	90m
6	Minimum residual head under conditions of domestic peak flows	10m
7	Maximum liner flow velocity under conditions of domestic peak flows	3.6m/s
8	Pipe type	uPVC
9	Minimum pipe class	Class 9
10	Fire Category	Moderate Risk 1 risk category
11	Fire flow at any one hydrant under the condition of domestic peak flows (one hydrant at a time)	50l/s
12	Minimum residual head (fire plus domestic peak flows)	15m
13	Maximum linear flow velocity under conditions of fire fighting	3.5m/s
14	Boundary roughness (K-Value)	0.1mm
15	Flow Formulae	D’Arcy Weissbach
16	Minimum pipe diameter	75mm



Water Demand Calculation

Assumptions

Design period: 20 years

Population growth rate: 0.95% (Standardised Regional 2015 & 2018, Quantec (2019))

Future Water Demand (F): $= P (1 + GR)^N$

P = present water demand

GR = growth rate (% per year) divided by 100

N = number of years between F and P

Calculations

The initial and ultimate water demands for OR Tambo View Area are as follows;

- Initial water demand – 291.46 kl/day,
- Ultimate water demand – 352.13 kl/d,

5 PROPOSALS FOR SANITATION FOR OR TAMBO VIEW

5.1. Design Criteria

The bulk and internal infrastructure development will be designed taking into account all regulatory requirements as well as the conventional design standards used in the civil engineering industry. The following design standards will be utilized for this project:

- Standard Specifications for Civil Engineering Construction: SANS 1200 series
- The Neighbourhood Planning and Design Guide: Department of Human

Settlements

2019

- Guidelines for Human Settlement Planning and Design: CSIR 2000
- General Conditions of Contract for Construction GCC 2015 3rd Edition
- SABS 0162: Code of Practice for structural use of Steel: SABS 1984
- SABS 241: Specification for Water for Domestic Use: SABS 2001
- National Building Regulations and Building Standard Act: SANS 10400, 1977
- SANS 815 / SABS 815:1978 - Shouldered-end pipes and fittings, and couplings
- SANS 10112 / SABS 0112:2003 - The installation of polyethylene and poly (vinyl



Chloride) (PVC-U and PVC-M) pipes

- National Water Act 1997, and Regulations
- National Environmental Management Act 1998, and Regulations
- Occupational Health and Safety Act 1993, and Regulations
- DWS Design Specifications
- Specifications which are project specific

5.2. Proposed Bulk Sewer Supply

The proposed OR Tambo View Development will discharge its sewer effluent into an existing bulk sewer pipeline which is connected to the existing Ixopo WWW. Umgeni Water has confirmed that there is a newly constructed existing bulk sewer pipe with a pipe diameter of 250 mm uPVC close to the development to discharge sanitation on MH60. In the interim it should be noted however, that the diameter and depth of the sewer pipeline will be determined during detail design stage. The proposed bulk sewer pipeline will be uPVC and will cross below any watercourse should there be any, gabions mattresses, dump rock and crusher stones as bedding and blanket to protect the pipe will be utilized.

5.3. Proposed Sewer Reticulation Internal Services

A full water borne sanitation system is proposed connecting into the existing bulk/link sewer pipes. Materials used should be PVC with the minimum sizes of 160mm diameter with house connections to be 160mm diameter. Maximum manhole distances of 80m. For the benefit of this report a layout plan showing the mid-block sewer pipeline as well as the connection point on MH60 is attached on **Appendix C**.

Design standards will be as per The Neighbourhood Planning and Design Guide: as developed by the Department of Human Settlements in 2019. The following design standards are proposed:



Table 9- Sewer Design Criteria

Item No.	Design Element	Criteria
1	High density, small sized (413m ² to 707m ²)	%AADD = 92.5%, 0.325kl/unit/d
2	Peak Factor	2.5
3	Allowance for infiltration	15%
4	Capacity of Sewer	Pipes may run full at the Total Design Flow, which includes the peak and infiltration flows
5	Sewer pipe type	uPVC Class 34 solid wall
6	Minimum velocity	0.7m/s
7	Minimum	160mm
8	Minimum depth of cover	0,6m minimum at head, 1,2m generally
9	Minimum gradients	1:120 for 100mm dia. 1:200 for 150mm dia.
10	Maximum	100m
11	Manholes	Precast concrete rings at 80 meters c/c

Wastewater Demand Calculations

Assumptions

Design period: 20 years

Population growth rate: 0.95% (Standardised Regional 2015 & 2018, Quantec (2019))

Future Water Demand (F): $= P (1 + GR)^N$

P = present wastewater demand

GR = growth rate (% per year) divided by 100

N = number of years between F and P

Calculations

The initial and ultimate wastewater demands for OR Tambo View Area are as follows;

- Initial wastewater demand – 109.638kl/day (1.27l/s),
- Ultimate wastewater demand – 132.46kl/day (1.53l/s),

NB: The peak flow from the businesses (after 08:00 and before 16:00), does not flow at the same time as the peak flow from the erven (before 08:00 and after 16:00) and therefore no provision needs to be made for simultaneous peak flows.



6 RECOMMENDATIONS

This report provides conceptual details of the proposed internal water & sanitation services, key infrastructure components, design guidelines and other key aspects of the envisioned works. Over-and-above the normal design criteria that must be approved, the information of existing infrastructure close to the development for existing water supply network and sanitation network infrastructure to service the proposed OR Tambo View from Water Service Authority and Umgeni Water should be verified. It is therefore recommended that:

- A new water reticulation network of uPVC pipes with varying pipe diameters 75mm, 110mm, 160mm to be designed and constructed within the proposed OR Tambo View development. *(See attached **Appendix B**)*
- A 160mm diameter (ID) pipe will have sufficient capacity to service the proposed development. The Water Service Authority (Harry Gwala District Municipality) confirmed that they will provide the proposed OR Tambo View development with a new bulk water pipe with a pipe diameter of 160mm close to the development to supply portable water. *(See attached **Appendix B**)*
- A new sewer reticulation network of uPVC pipes with pipe diameter 160mm to be designed and constructed within the proposed OR Tambo View development. *(See attached **Appendix C**)*
- There is currently a newly constructed existing 250mm diameter bulk sewer line that will be capable to discharge the development sanitation into the wastewater treatment plant. Umgeni Water has provided the existing bulk sewer line layout and the proposed OR Tambo development will be connected into existing MH60 then conveyed by the existing 250mm diameter uPVC pipe to the wastewater treatment plant. *(See attached **Appendix C**)*

The Client should note that the information provided in this concept design report will enable Ubhlebezwe Local Municipality to approve the proposed concepts for servicing the OR Tambo View Development. Upon approval of the concept design, each component of the proposed infrastructure will be developed further to detail. Any other additional information will also be obtained at detailed design stage. We,



therefore, recommend that this report be approved to enable the finalization of the detailed designs. Such approval shall also provide guidance on the proposed infrastructure.

7 REFERENCES

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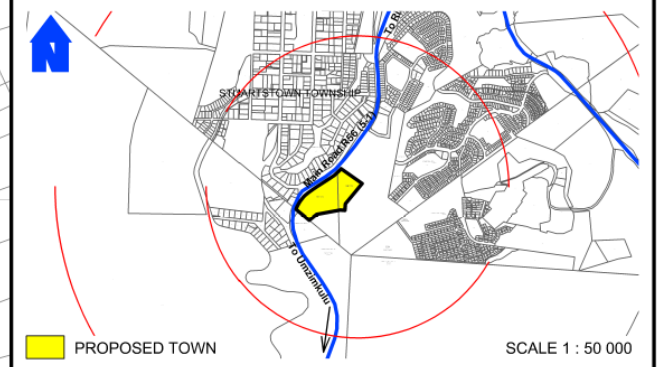


8. APPENDIX

- APPENDIX A: LOCALITY PLAN
- APPENDIX B: PROPOSED WATER SUPPLY NETWORK LAYOUT
- APPENDIX C: PROPOSED SEWER NETWORK LAYOUT



APPENDIX A: LOCALITY PLAN



LEGEND

Land Use	Number of Erven	Erff Number	Area in Ha	% of Area
Residential 3 (Finance linked individual housing subsidy) (Min. 413m ² (Max. 707m ²))	88	*	4.3335ha	58.83%
Passive Open Space	4	*	0.9828ha	13.34%
Street			2.0499ha	27.83%
TOTAL	92		7.3662ha	100%

STREETS

Reserve Width	Length in Metre	% of Street Length
16metre	472m	28.89%
13metre	444m	27.17%
10metre	718m	43.94%
TOTAL	1634m	100%

NOTES:
 The figure A-B-C-D-E-F-G-H-I-J-K-L-M-N-O-P-Q-R-S-T-U-V-W-X-Y-Z-A1-B1-C1-D1-E1-A represents a portion of the Remaining Extent of Erf 175, Stuartstown.
 The figure U-V-W-X-Y-Z-A1-B1-U represents a portion of the Remaining Extent of Erf 174, Stuartstown.
 16m Building Restriction along the line(s) lettered A-B-C-D-E-F-G-H-I-J-K-L-M-N-O-P-Q-R-S-T-U-V-W as indicated on the layout plan.
 No ingress to or egress from Main Road R56 (5-1) along the line(s) lettered A-B-C-D-E-F-G-H-I-J-K-L-M-N-O-P-Q-R-S-T-U-V-W as indicated on the layout plan.

SERVITUDE NOTES:
 The line(s) lettered a-b and c-d-e-f represents a proposed water pipeline servitude 6m wide as indicated on the layout plan.

Proposed water pipeline

Minimum Residential Erven Size : 400m²
 Erf sizes and dimensions subject to final survey.

1: 100 YEAR FLOODLINE
 It is hereby certified in terms of the provisions of Section 144 of the National Water Act, 1998 (Act No.36 of 1998) that the township is not affected by a public stream.

PR ENGINEER
 It is hereby certified that the town layout complies with the conditions and recommendations as stated in the Geotechnical Report.

PR ENGINEER

STREETS:
 Maximum slope 1 : 1
 Minimum slope 1 : 25

DESIGN OF TOWN LAYOUT
 Maxim Planning Solutions (Pty) Ltd
 K. Raubenheimer Pr. Pin A924/1996
 Tel. (018) 468 6366

CONTOURS
 The contour survey is in accordance with the standards laid down by the Regulations relating to Township Establishment and Land Use.

Digital Orthophoto by: *Azur*
 Tel: (012) 8030346
 Date of Photography: May 2019
 System: WGS84 Central Meridian: Lu31

GEOTECHNICAL REPORT
 Compiled by: GEOSSET cc
 Consulting Environmental and Engineering Geologists
 David S van der Merwe, Cnr (082) 925 4075
 Date: June 2019
 Engineering Geological Zonation

Modified Normal to Special Development:
 Site Class H112: A medium expansive and compressible soil, with thickness of more than 0.75m, and an expected range of more than 10mm of total soil movement measured at surface, underlain by a competent fossiliferous pebble marker or hard rock sandstone or rhyolite from the zone. Foundations will therefore require modified normal to special foundation techniques such as stiffened strip footings, stiffened or cellular rafts, lightly reinforced strip footings or reinforced bored piles in slightly widened strip foundations. The use of cast construction techniques or articulation points at all internal and external doors and openings with light reinforcement (circled) in masonry, or soil replacement by an engineered fill soil with by removing all or part of the expansive horizon to 1.0m beyond the perimeter of the structure and replacing with inert backfill, compacted to 97% MOD ASHTO density at or near optimum moisture content, where other normal strip footing foundations can be used. Site drainage, a concrete apron of 1.0m around all structures and plumbing and service penetrations are advised. It is classified as C1F in terms of the NBRC guidelines (1995) or the SANS Code of practice (1995) and 1A1F as per the classification for urban development (Partridge, Wood & Binks).
 Site Class L2: Steep slopes in excess of 12 degrees may require special cut and fill operations during construction.
 Site Class P2: Areas used for surface mining of construction material will need to be rehabilitated and properly backfilled to engineer's specification before any development can be allowed.

Undetectable
 Site Class P2L2: Drainage features intersect the site and the 100 year flood line must be used to specify the allowable distance of development from this possible flooded areas, with a minimum distance of 20m from the main stream.

Test Position and Number: x11
 Inferred zone boundary

PROPOSED SUBDIVISION & REZONING OF A PORTION OF THE REMAINING EXTENT OF ERF 174 AND A PORTION OF THE REMAINING EXTENT OF ERF 175, STUARTSTOWN. (OR TAMBO VIEW)

30m 20m 10m 5m 0m 20m
 1cm = 10m SCALE 1 : 1 000

LIBULHEBEZWE LOCAL MUNICIPALITY KWAZULU-NATAL PROVINCE

Drawing
 Compiled by: A. Rossouw
 Drawings Nr.: 8/76/2
 Date: 2020/01/15
 Revision:
 Caddie File: Z:\8-PROJECTS\8-76-2-61-D.R. Tambo (Impo)\Map\CAD

Tel (018) 468-6366
 Fax (018) 468-6375
 adelfee@maxim.co.za

MAXIM
 planning solutions
 ACCREDITED TOWN AND REGIONAL PLANNERS



Proposed O.R Tambo View Development





APPENDIX B: PROPOSED WATER SUPPLY NETWORK LAYOUT

MUNICIPAL
5292m²

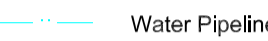




CASSINGTON No. 4287 - ET

MUNICIPAL
17620m²

STUARTSTOWN TOWNSHIP

NOTES

LEGEND

-  Water Pipeline
-  Fire Hydrant
-  Gate Valves
-  Existing Concrete Reservoir
-  Existing 110mm dia. Water Pipeline

REVISIONS

No	Date	Title
01	30/01/2023	Water Reduculation Network Layout Plan

Drawing Purpose:		
Preliminary:	For Planning Phase	X
Approval:	For Construction	
Report:	For As-Built Records	
Drawing Approval		Date
Designed by:	Ms. T.R. Nkosi	12/08/2022
Drawn by:	Ms. T.R. Nkosi	12/08/2022
Checked by:		
Engineer:		
Client Approval:		Signature

MXN
Development
Construction

3 Latham Street
Innespark
Klerksdorp
2571
Tel: 018 011 3405
e-mail: thembekas@mxndevelopment.co.za

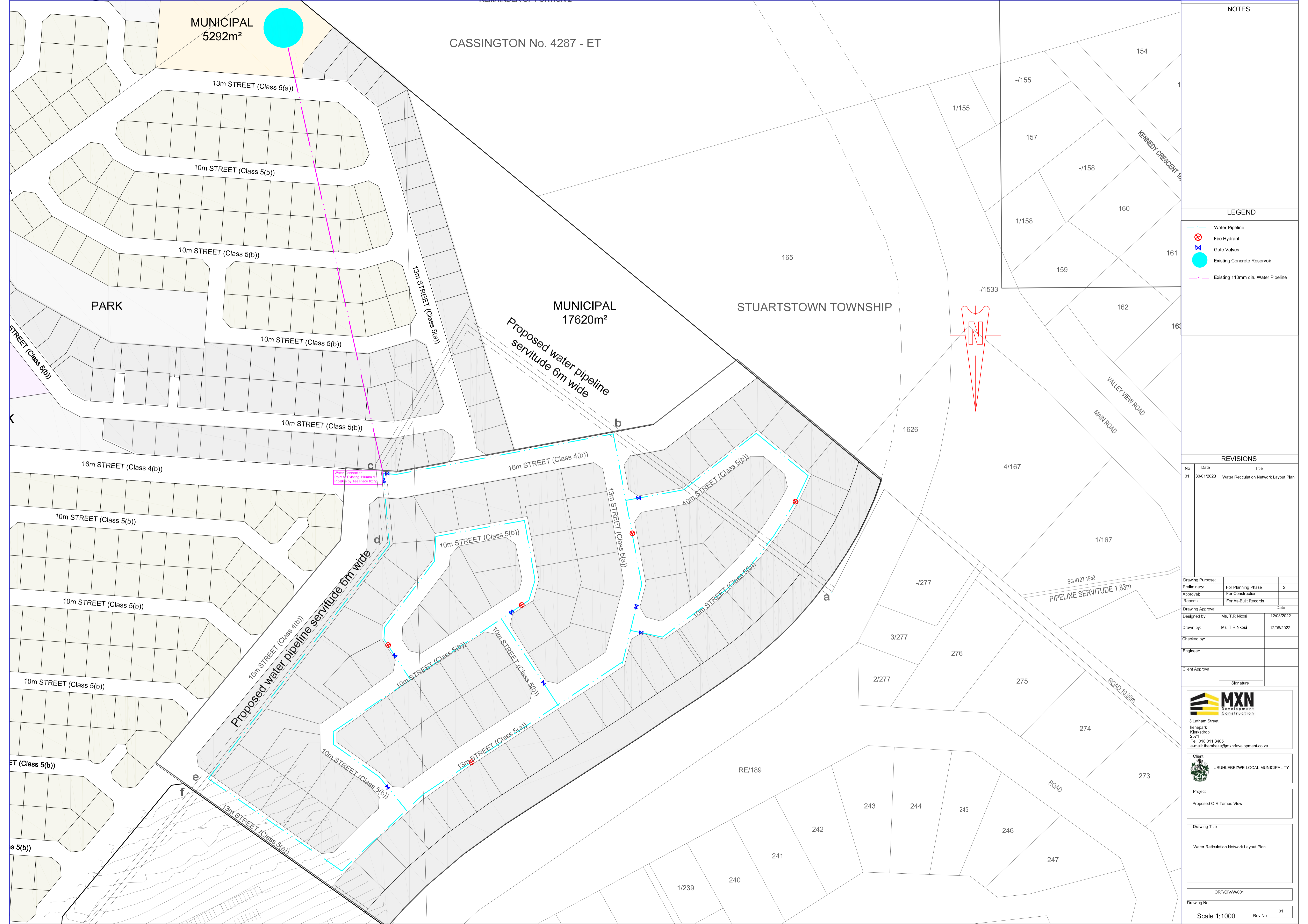
Client
 UBUHLBEZWE LOCAL MUNICIPALITY

Project
Proposed O.R. Tambo View

Drawing Title
Water Reduculation Network Layout Plan

Drawing No
ORT/CIVW/001

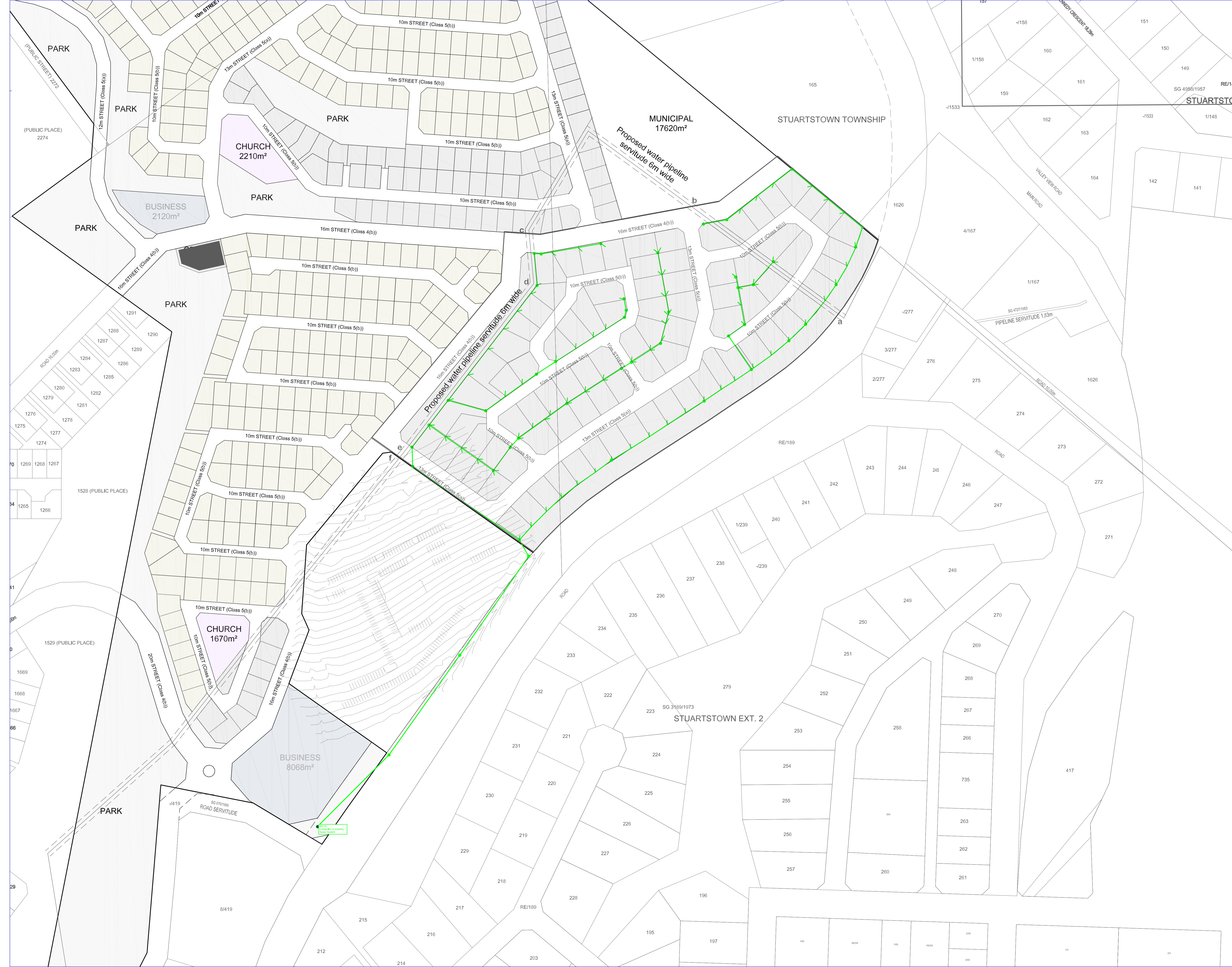
Scale 1:1000 Rev No 01



Water Connection
Point to Existing 110mm dia.
Pipeline by Tee Piece fitting

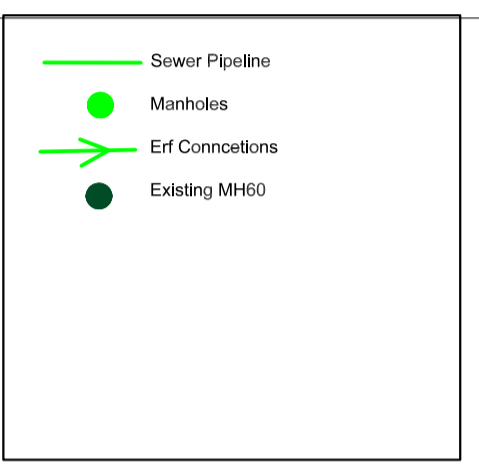


APPENDIX C: PROPOSED SEWER NETWORK LAYOUT



NOTES

LEGEND



REVISIONS

No	Date	Title
01	30/01/2023	Sewer Reticulation Network Layout Plan

Drawing Purpose:	For Planning Phase	X
Approval:	For Construction	
Report:	For As-Built Records	
Drawing Approval	Date	
Designed by:	Ms. T.R Nkosi	12/08/2022
Drawn by:	Ms. T.R Nkosi	12/08/2022
Checked by:		
Engineer:		
Client Approval:	Signature	

Developer

 3 Latham Street
 Irenepark
 Klerksdorp
 2571
 Tel: 018 011 3405
 e-mail: thembeka@mxndevelopment.co.za

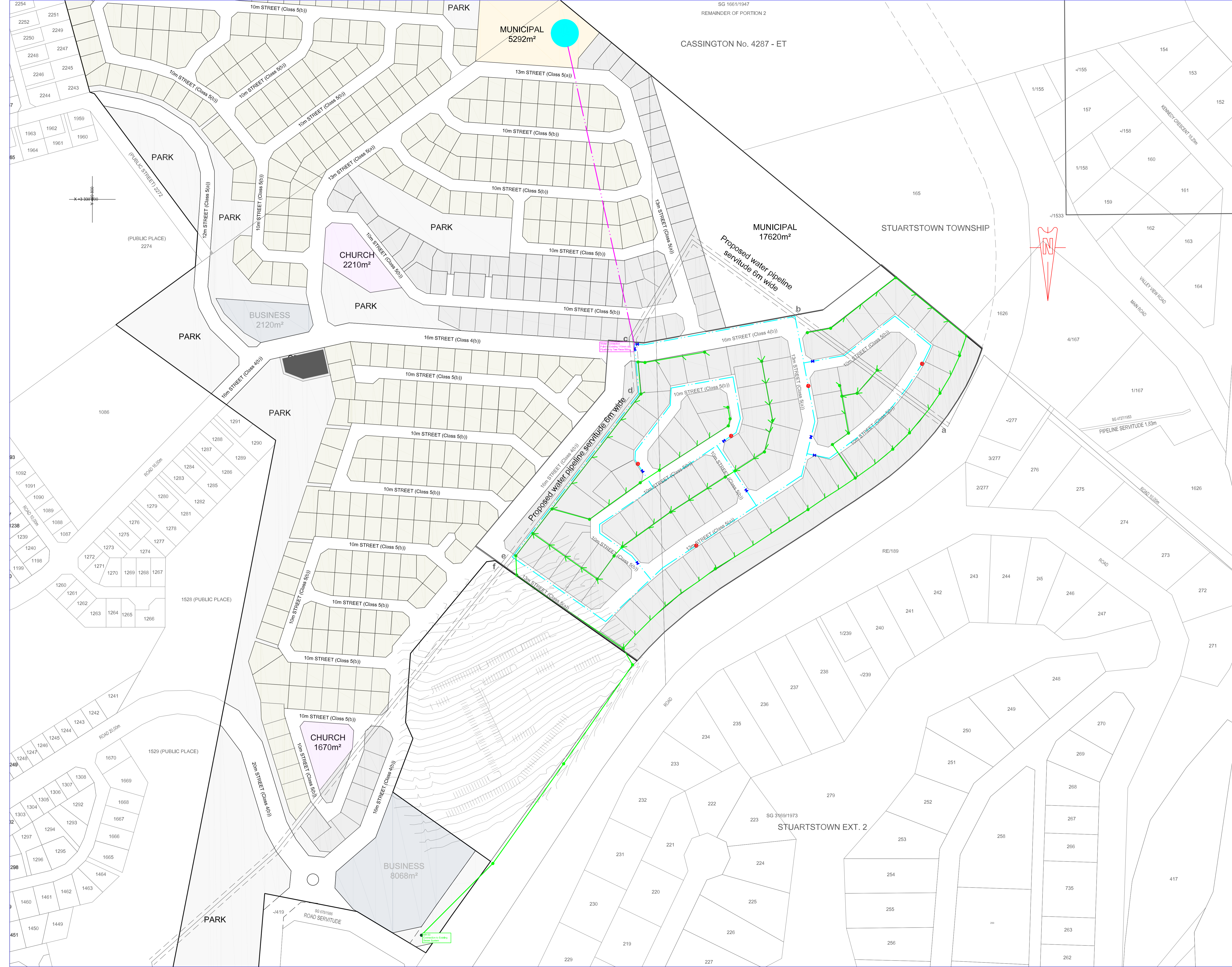
Client

 UBULHEBEZWE LOCAL MUNICIPALITY

Project
 Proposed O.R Tambo View

Drawing Title
 Sewer Reticulation Network Layout Plan

ORT/CIV/SW/001
 Drawing No
 Scale 1:1500
 Rev No 01

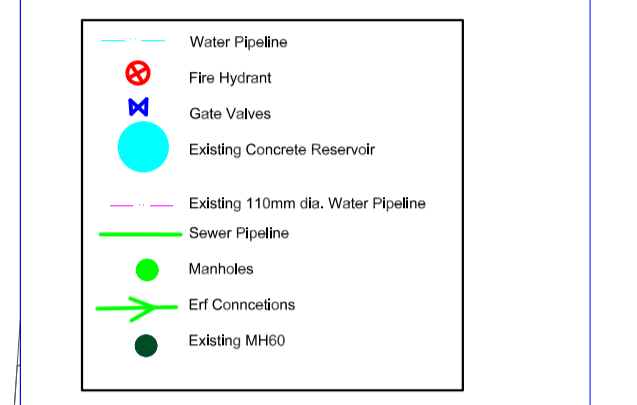


NOTES

REVISIONS

No	Date	Title
01	30/01/2023	Water & Sewer Reticulation Network Layout Plan

LEGEND



Client Approval:

Signature

Drawing Purpose:

Preliminary:	For Planning Phase	X
Approval:	For Construction	
Report:	For As-Built Records	

Drawing Approval: _____ Date: _____

Designed by: Ms. T.R. Nkosi 12/08/2022

Drawn by: Ms. T.R. Nkosi 12/08/2022

Checked by: _____

Engineer: _____

Developer

3 Latham Street
Irenepark
Klerksdorp
2571
Tel: 018 011 3405
e-mail: thembekas@mdevelopment.co.za

Client

UBUHEBEZWE LOCAL MUNICIPALITY

Project

Proposed O.R Tambo View

Drawing Title

Water & Sewer Reticulation Network Layout Plan

ORT/CIV/WSW001

Drawing No

Scale 1:1500

Rev No 01