



**ROADS AND STORMWATER -  
SERVICES IMPACT ASSESSMENT:**

**SUB DIVISION OF GARANKUWA  
ERVEN 1427 & 1719**

**APS – 36772**

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## APPENDICES

APPENDIX A      Locality Plan

APPENDIX B      Title Deed

APPENDIX C      Letter of appointment

APPENDIX D      Original Services Agreements

APPENDIX E      Proposed Sub division Layout Drawing.

APPENDIX F      Roads layout drawing

APPENDIX G      Stormwater layout drawing

## 1 PART 1: SERVICES IMPACT ASSESSMENT

### 1.1 General information

#### 1.1.1 Application number (APS)

APS – 36772

#### 1.1.2 Location

The proposed development is located on erven 1427 and 1719 Garankuwa Unit 23 with a total area measuring approximately 21.98 ha

Erf 1427 is bound to the north by erven 1388 – 1426 and erf 1719 is bound to the north by erven 1675 – 1718 Garankuwa Unit 23

Refer to Appendix A for locality plan.

#### 1.1.3 Owner (developer) information

Development Company:	
Company Registration Number:	
Address:	
Contact Person:	
Tel:	
Cell:	
Title Deed:	

#### 1.1.4 Consulting Engineer information

Development Company:	Civil Engineering Developments cc	
Company Registration Number:	2006/090090/23	
Address:	P O Box 674 Newlands Pretoria 0049	Block F Unit 6, Hatfield Gardens 333 Grosvenor Street, Hatfield Pretoria 0081
Professional Engineer:	Eben Beetge, Pr Eng 20060259	
Cell:	082 579 9587	
Tel:	012 342 9200	
Fax:	012 342 9216	
Letter of Appointment:	Refer to Appendix C	

## 1.1.5 Description of the proposed development

Erf 1427 would be sub divided into 368 residential 1 erven and erf 1719 would be subdivided into 384 residential 1 erven as per table below.

The new subdivision would consist of the following:

Zoning	Erf size (m <sup>2</sup> )	No. of erven
Residential 1 (Erf 1427 )	10 806	368
Residential 1 (Erf 1719 )	11 174	384

Refer to Appendix E for the proposed Sub-division Layout Drawing **and Conditions of Establishment.**

## 1.2 Impact Assessment

### 1.2.1 Existing Road network

Access to the development would be from the north of the development through existing Class 4b roads, to be known as Road A and Road C due to lack of road names.

An existing Class 5a road, to be known as Road B, is situated just north of the development.

An existing Class 4b road, to be known as Road C, terminating into Road B at the north-eastern corner of the development.

### 1.2.2 Existing Stormwater network

The proposed development drains towards the north-western corner of the development.

The proposed development has no existing stormwater infrastructure in the vicinity. The internal stormwater network for the development would discharge into the open space to the west of the development.

### 1.2.3 Traffic Impact Study recommendations

The following road upgrades have been identified in the TIA according to the City of Tshwane roads masterplan (refer to Appendix \*\*)

- Extension of Road A (Class 4b) upto the southern boundary of the development
- Extension of Road C (Class 4b) upto the southern boundary of the development

The subdivided erven would be provided with an internal road network intersecting with the extensions of Road A and Road C.

Provision of 1.8m wide walkways along the western and eastern side of Road A extension and western side of Road C extension.

## 1.2.4 Stormwater run-off

### Existing-development

Pre-Developed Stormwater Runoff		
	ERF 1427	ERF 1719
Run Method	Rational method	Rational method
Catchment Area (m <sup>2</sup> )	112 057	115 889
Runoff coefficient	0.30	0.30
1:2 year flood (m <sup>3</sup> /s)	0.529	0.545
10 year flood (m <sup>3</sup> /s)	1.351	1.391

### Post-development

Post-Developed Stormwater Runoff		
	ERF 1427	ERF 1719
Run Method	Rational method	Rational method
Catchment Area (m <sup>2</sup> )	112 057	115 889
Runoff coefficient	0.60	0.60
1:2 year flood (m <sup>3</sup> /s)	0.961	1.007
10 year flood (m <sup>3</sup> /s)	2.454	2.572

## 1.2.5 Proposed stormwater network

The internal roads and erven will be drained via a kerb inlet and pipe stormwater network with various diameter pipes discharging into the open space to the west of the development, via a stormwater headwall and gabion box energy dissipating structure.

## 1.3 Conclusion

The service impact assessment revealed that new municipal township roads and municipal stormwater infrastructure must be provided. Upgrades according to the City of Tshwane Roads Masterplan would be required.

Part 2 of this report provides the details regarding these services.

## 2 PART 2: SERVICES PROVISION DETAILS

### 2.1 General information

#### 2.1.1 Traffic Impact Assessment

A Traffic Impact Assessment has been compiled by Gary Edwards Traffic Engineering. The latest TIA revision dated October 2022 and CoT Approval letter is attached in Appendix E.

#### 2.1.2 Services standards

The proposed services standards for roads and stormwater are based on the minimum standards applicable to road construction and stormwater drainage systems of the department, the Standard Specification for Municipal Civil Engineering Works (CoT, 2005) and the Standard Construction Details and Design Standards for Roads and Stormwater Drainage Infrastructure.

### 2.2 Roads information

#### 2.2.1 Roads to be constructed, upgraded or contributed for

As per the TIA, the following road upgrade has been identified

- Extension of Road A and Road C up to the southern boundary of the development
- 1.8m wide paved walkways along the western and eastern side of Road A and along the western side of Road A

A new internal road network will have to be constructed. This road network will consist of class 5a & b roads.

Refer to Appendix F for the proposed roads layout drawing.

#### 2.2.2 Local Roads Master Plan

As per the CoT Roads masterplan and the approved TIA, Road A and Road C should be extended.

#### 2.2.3 Classification of Roads

**External Roads:** The existing external roads have been classified as follows:

Road A is a Class 4b Road.

Road C is a Class 4b Road.

**Internal Roads:** The internal roads classifications with roadway widths are as follows:

Class No	Function	Reserve Width	Roadway Width
5b	Residential Access Road	13m	5.0m

## 2.2.4 Geometric Design Standards

The geometric design standards will be in accordance with the minimum standards applicable to road construction and stormwater drainage systems of the department, the Standard Specification for Municipal Civil Engineering Works (CoT, 2005) and the Standard Construction Details and Design Standards for Roads and Stormwater Drainage Infrastructure.

## 2.2.5 Pavement Design

Pavement design will be in accordance with the minimum standards applicable to road construction and stormwater drainage systems of the department, the Standard Specification for Municipal Civil Engineering Works (CoT, 2005) and the Standard Construction Details and Design Standards for Roads and Stormwater Drainage Infrastructure.

## 2.2.6 Summary

The total roads scope of works is:

- Extension of Road A
- Extension of Road C
- 1.8m paved walkways along the Road A extension (Western and eastern side) and Road C extension (Western side)
- A new internal road network will have to be constructed. This road network will consist of class 5a & b roads.

## 2.3 Stormwater drainage information

### 2.3.1 Existing stormwater network

The proposed development drains towards the north-western corner of the development.

The proposed development has no existing stormwater infrastructure in the vicinity. The internal stormwater network for the development would discharge into the open space to the west of the development.

### 2.3.2 Stormwater Drainage required

The internal roads and erven will be drained via a kerb inlet and pipe stormwater network with various diameter pipes discharging into the open space to the west of the development.

Refer to Appendix G for the proposed stormwater layout drawing.

### 2.3.3 Hydrology

The following hydrological data was used in the design of the stormwater drainage system:

- |    |                         |  |
|----|-------------------------|--|
| a) | Flood return period     | : 1:2 years for stormwater pipe system (minor system)  |
|    |                         | : 1:20 years for stormwater pipe system (Major system) |
| b) | Average yearly rainfall | : 713mm  |
| c) | Design Method           | : Rational method for smaller catchments               |

### 2.3.4 Stormwater Masterplan

The stormwater masterplan will not be affected by the new development.



## 2.3.5 Design Standards

The following standards were used in the design of the drainage system:

- a) Minimum pipe size : 450mm diameter (OGEE Joints)
- b) Minimum pipe gradient : 0.67%
- c) Typical Details : Tshwane Metropolitan Municipality Standard Details

## 2.3.6 Other services Authorities

None required

## 2.3.7 Floodlines

The site is not affected by any floodlines

## 2.3.8 Summary

The total stormwater scope of work is:

- Internal site stormwater network.

## 2.4 Cost Estimates

### 2.4.1 Roads

#### 2.4.1.1 Internal Roads

The following new road constructions are required for the internal roads:

- A new internal road network will have to be constructed. This road network will consist of class 5b roads.

Refer to Annexure F for the Proposed Roads Layout.

The above is payable by the Developer and the estimated cost is calculated as follows:

Description	Unit	Qty	Rate	Amount (R)	Totals (R)
<b>Internal Roads:</b>					
13m Road reserve @ 5.0m wide	m <sup>2</sup>	24 981	R 550.00	R 13 739 550.00	R 13 739 550.00
Sub-Total for Internal Roads					R 13 739 550.00
<b>Plus:</b>					
P & G's @ 12.5%					R 1 717 443.75
Professional Fees @ 10%					R 1 545 699.38
Contingencies @ 5%					R 686 977.50
<b>Total Estimated Internal Roads Cost (Excl. VAT)</b>					<b>R 17 689 670.63</b>

# GARANKUWA ERVEN 1427 & 1719

## 2.4.1.2 External Roads

The following external road upgrades are required and is payable by the developer:

- Extension of Road A
- Extension of Road C
- 1.8m wide paved walkways along Road A and C

Refer to Annexure F for the Proposed Roads Layout.

The estimated cost for the above is calculated as follows:

Description	Unit	Qty	Rate	Amount (R)	Totals (R)
<b>Road A Extension</b>					
20.0m Road Reserve @ 7.0m wide road	m <sup>2</sup>	1727	R 1 250.00	R 2 158 750.00	R 2 471 300.00
1.8m wide paved walkway	m <sup>2</sup>	893	R 350.00	R 312 550.00	
<b>Road C Extension</b>					
20.0m Road Reserve @ 7.0m wide road	m <sup>2</sup>	1725	R 1 250.00	R 2 156 250.00	R 2 308 850.00
1.8m wide paved walkway	m <sup>2</sup>	436	R 350.00	R 152 600.00	
Sub-Total for External Roads					R 4 780 150.00
<b>Plus:</b>					
P & G's @ 12.5% @ 12.5%					R 597 518.75
Professional Fees @ 10%					R 537 766.88
Contingencies @ 5%					R 239 007.50
<b>Total Estimated External Roads Cost (Excl. VAT)</b>					<b>R 6 154 443.13</b>

## 2.4.1.3 Roads Contributions

No contributions payable (sub division application)

## 2.4.1.4 Developer cost contribution for Roads

Description	Developer Cost
<b>Internal Road</b>	
As per paragraph 2.4.1.1	R 17 689 670.63
<b>External Road</b>	
As per paragraph 2.4.1.2	R 6 154 443.13
<b>Total Developer Cost (Excl. VAT) (Estimate):</b>	<b>R 23 844 113.75</b>

## 2.4.1.5 CoT cost contribution for Roads

None

## 2.4.1.6 Total cost summary for Roads

Description	Developer Cost	CoT Cost	Construction Cost
<b>Internal Road</b>			
As per paragraph 2.4.1.1	R 17 689 670.63		R 17 689 670.63
<b>External Road</b>			
As per paragraph 2.4.1.2	R 6 154 443.13		R 6 154 443.13
<b>Total Cost Summary (Excl. VAT) (Estimate):</b>	<b>R 23 844 113.75</b>	<b>R 0.00</b>	<b>R 23 844 113.75</b>

# GARANKUWA ERVEN 1427 & 1719

## 2.4.2 Stormwater

### 2.4.2.1 Internal Stormwater

The internal roads and erven will have an internal piped stormwater system with an estimated construction cost calculated as follow:

Description	Unit	Qty	Rate	Amount (R)	Totals (R)
<b>Internal Stormwater:</b>					
450mm dia stormwater pipe networks	m	1 980	R 800.00	R 1 584 000.00	
525mm dia stormwater pipe networks	m	700	R 950.00	R 665 000.00	
600mm dia stormwater pipe networks	m	235	R 1 100.00	R 258 500.00	
675mm dia stormwater pipe networks	m	225	R 1 300.00	R 292 500.00	
750mm dia stormwater pipe networks	m	0	R 1 500.00	R 0.00	
825mm dia stormwater pipe networks	m	20	R 1 800.00	R 36 000.00	
900mm dia stormwater pipe networks	m	225	R 2 000.00	R 450 000.00	
1050mm dia stormwater pipe networks	m	340	R 2 250.00	R 765 000.00	
1200mm dia stormwater pipe networks	m	70	R 2 400.00	R 168 000.00	
1350mm dia stormwater pipe networks	m	45	R 2 700.00	R 121 500.00	
Kerb inlets	no	41	R 10 000.00	R 410 000.00	
Junction Manholes, manholes	no	58	R 13 000.00	R 754 000.00	
Gabion energy dissipating structures	no	1	R 10 000.00	R 10 000.00	
Headwall Structures	no	1	R 30 000.00	R 30 000.00	R 5 544 500.00
Sub-Total for Internal Stormwater					R 5 544 500.00
<b>Plus:</b>					
P & G's @ 12.5%					R 693 062.50
Professional Fees @ 10%					R 623 756.25
Contingencies @ 5%					R 277 225.00
<b>Total Estimated Internal Stormwater Cost (Excl. VAT)</b>					<b>R 7 138 543.75</b>

### 2.4.2.2 External Stormwater

No external stormwater construction required.

### 2.4.2.3 Stormwater Contribution

No contributions payable (sub division application)

### 2.4.2.4 Developer Cost Contribution for Stormwater

Description	Developer Cost
<b>Internal Stormwater</b>	
As per paragraph 2.4.2.1	R 7 138 543.75
<b>External Stormwater</b>	
As per paragraph 2.4.2.2	R 0.00
<b>Total Developer Cost (Excl. VAT) (Estimate)</b>	<b>R 7 138 543.75</b>

### 2.4.2.5 CoT Cost Contribution for Stormwater

None

# GARANKUWA ERVEN 1427 & 1719

## 2.4.2.6 Total Cost Summary for Stormwater

Description	Developer Cost	CoT Cost	Construction Cost
<b>Internal Stormwater</b> As per paragraph 2.4.2.1	R 7 138 543.75		R 7 138 543.75
<b>External Stormwater</b> As per paragraph 2.4.2.2	R 0.00		R 0.00
<b>Total Cost Summary (Excl. VAT)(Estimate):</b>	<b>R 7 138 543.75</b>	<b>R 0.00</b>	<b>R 7 138 543.75</b>

## 2.4.3 Cost Summary for Roads & Stormwater Combined

Description	Developer Cost	CoT Cost	Construction Cost
<b>Internal Roads</b> As per paragraph 2.4.1.1	R 17 689 670.63		R 17 689 670.63
<b>External Roads</b> As per paragraph 2.4.1.2	R 6 154 443.13		R 6 154 443.13
<b>Internal Stormwater</b> As per paragraph 2.4.2.1	R 7 138 543.75		R 7 138 543.75
<b>External Stormwater</b> As per paragraph 2.4.2.2	R 0.00		R 0.00
<b>Total Cost Summary (Excl. VAT):</b>	<b>R 30 982 657.50</b>	<b>R 0.00</b>	<b>R 30 982 657.50</b>

## 2.5 General

### 2.5.1 Total Project Construction Value

As per paragraph 2.4.1 and 2.4.2 the total project construction value is **R 30 982 657.50** (Excl. VAT);

### 2.5.2 Construction period

The construction period will be 12 months.

### 2.5.3 Relevant Authorisations

None

### 2.5.4 Servitudes

3m wide stormwater servitudes would be required over the following erven:

- 21/1427
- 73/1427
- 82/1427
- 25/1719
- 34/1719

### 2.5.5 Wayleaves

Before construction of the external roads a City of Tshwane wayleave needs to be obtained.

## GARANKUWA ERVEN 1427 & 1719

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### 2.5.6 Summary

This Services Report is submitted in accordance with the requirements of the City of Tshwane Metropolitan Municipality: Roads & Transportation Division to assist with compiling the relevant Services Agreement/clearance letters for erven 1427 and 1719 Garankuwa.

A retention guarantee for the access roads and stormwater equal to 10% of the final construction value, subject to escalation by the CTMM will be provided by the Developer in favour of the CTMM for the 12-month retention period.

Should more details be required regarding this Services Report, please do not hesitate to contact the undersigned.



.....  
Eben Beetge PrEng  
Civil Engineering Developments cc  
25 April 2022

**Annexure A:**

**Annexure B:**

**Annexure C:**



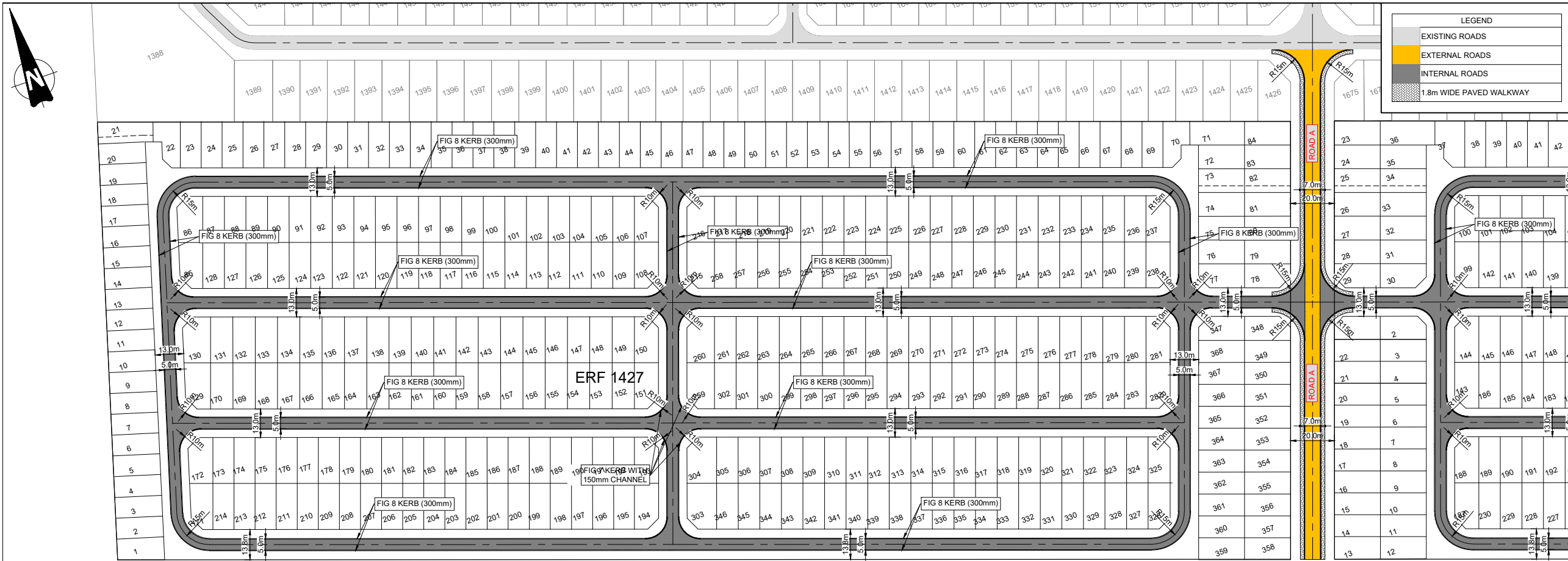
**Annexure D:**

**Annexure E:**

**Annexure F:**

**Annexure G:**





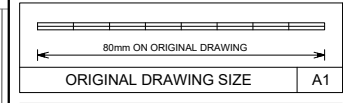
LEGEND	
	EXISTING ROADS
	EXTERNAL ROADS
	INTERNAL ROADS
	1.8m WIDE PAVED WALKWAY

- Notes:**
1. THE COPYRIGHT ON THIS DRAWING, INCLUDING THE DESIGN AND DETAILS SHOWN HEREON, IS RESERVED BY THE CONSULTING ENGINEERS.
  2. ALL MATERIAL AND WORKMANSHIP MUST COMPLY WITH THE REQUIREMENTS OF THE LATEST RELEVANT SABS REQUIREMENTS.
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**GENERAL NOTES:**

No	Date	Details	Checked
Revisions			

	CONCEPT DRAWING	NAME	SIGNATURE	DATE
	TENDER DRAWING	NAME	SIGNATURE	DATE
	APPROVED FOR CONSTRUCTION DRAWING	NAME	SIGNATURE	DATE
	AS BUILT DRAWING	NAME	SIGNATURE	DATE



Client  
**CLIENT**

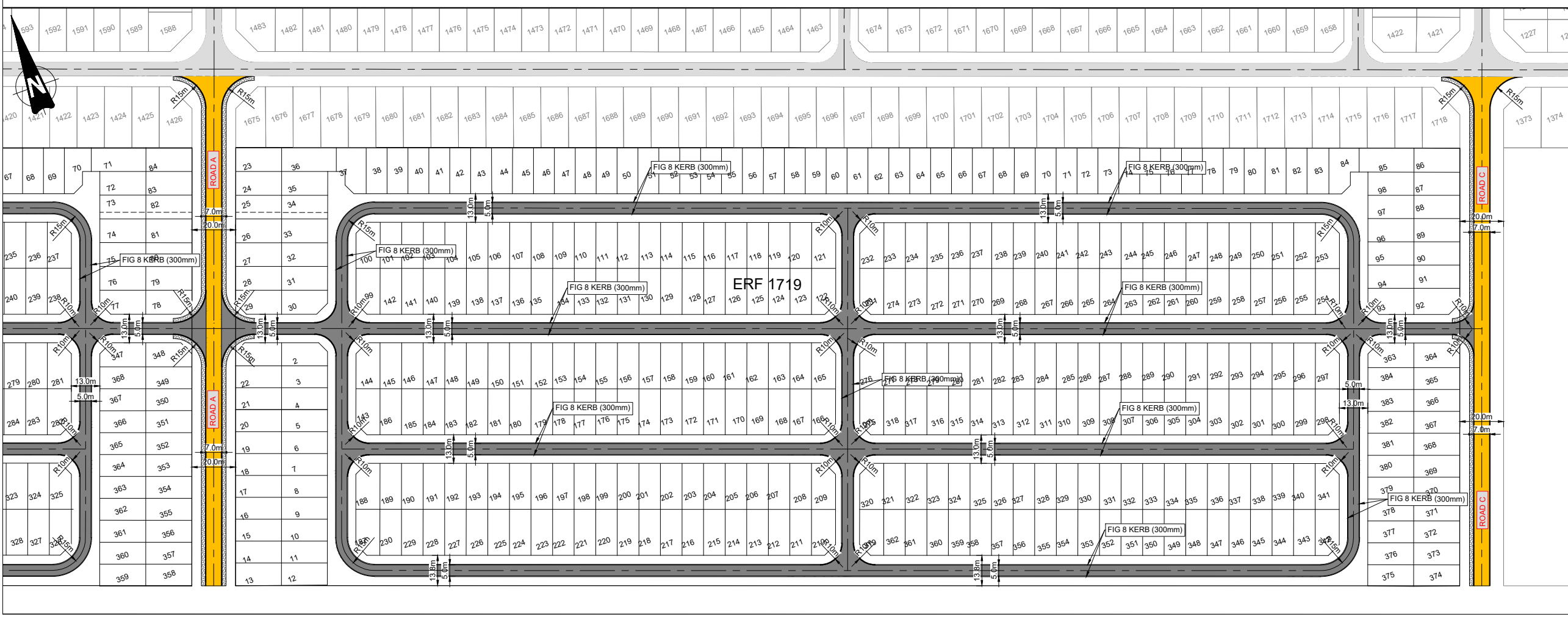


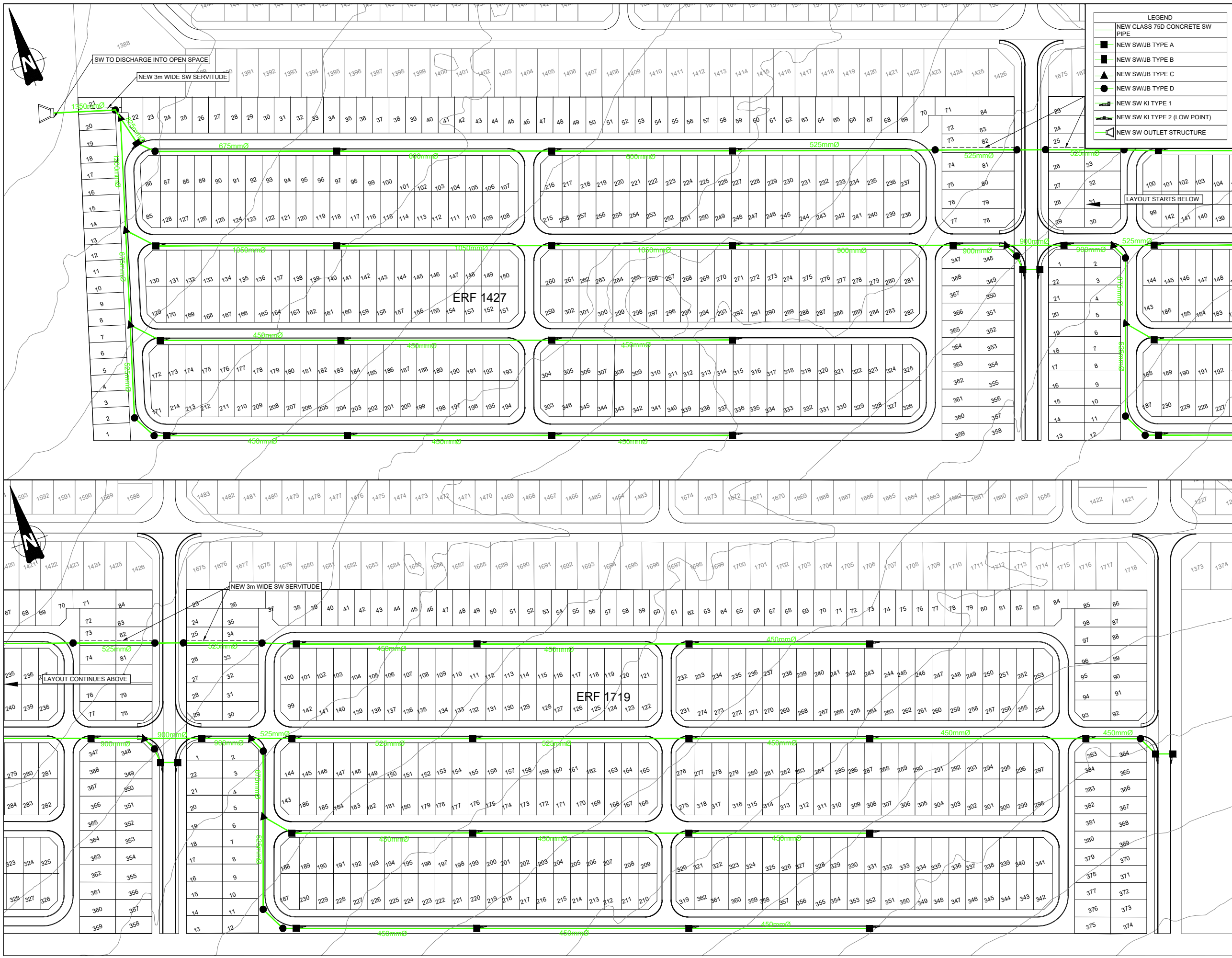
Project Title  
**GA RANKUWA**

Drawing Title  
**PROPOSED ROADS LAYOUT**

Designed Eben Beetteg	Drawn Andre Steyn	Checked
Scale 1:1000	Date 2023-04-25	

Project No <b>3084</b>	Drawing No. <b>3084-SR1-001</b>	Rev. <b>A</b>
---------------------------	------------------------------------	------------------





LEGEND	
	NEW CLASS 7SD CONCRETE SW PIPE
	NEW SW/JB TYPE A
	NEW SW/JB TYPE B
	NEW SW/JB TYPE C
	NEW SW/JB TYPE D
	NEW SW KI TYPE 1
	NEW SW KI TYPE 2 (LOW POINT)
	NEW SW OUTLET STRUCTURE

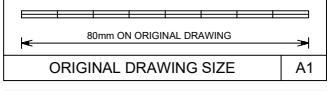
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**GENERAL NOTES:**

LAYOUT STARTS BELOW

No	Date	Details	Checked
Revisions			

	CONCEPT DRAWING	NAME	SIGNATURE	DATE
	TENDER DRAWING	NAME	SIGNATURE	DATE
	APPROVED FOR CONSTRUCTION DRAWING	NAME	SIGNATURE	DATE
	AS BUILT DRAWING	NAME	SIGNATURE	DATE



Client

**CLIENT**



Project Title

**GA RANKUWA**

Drawing Title

**PROPOSED STORMWATER LAYOUT**

Designed	Drawn	Checked
Eben Beetteg	Andre Steyn	
Scale	Date	
1:1000	2023-04-25	

Project No	Drawing No.	Rev.
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