Structural, Civil and Transportation Engineers

LANSERIA AIRPORT EXTENSION 1
SOUTHERN PRECINCT

ROADS & STORMWATER MANAGEMENT REPORT

REPORT 2023-195-02 Rev-1

NOVEMBER 2025

CLIENT: GROWTHPOINT PROPERTIES, APETURE PROPERTIES & LANSERIA INTERNATIONAL AIRPORT

PREPARED BY:
EDS Engineering Design Services (Pty) Ltd
473 Lynnwood Road
Sussex Office Park, Block B Ground Floor
Lynnwood, Pretoria
P.O. Box 33920
GLENSTANTIA
0010
Tel (012) 991 1205
Fax (012) 991 1373

Structural, Civil and Transportation Engineers

EDS Engineering Design Services (Pty) Ltd
473 Lynnwood Road
Sussex Office Park, Block B Ground Floor
Lynnwood, Pretoria
P.O. Box 33920
GLENSTANTIA
0010
Tel (012) 991 1205
Fax (012) 991 1373

Outline Scheme Report Information Sheet

Report number	:	2023-195-02-Rev-1
Local authority	:	City of Johannesburg Metropolitan Municipality
Zoning type	:	Special
Property description	:	Lanseria Extension 1, Southern Precinct

Report undertaken by:

Name	:	D.H. van der Merwe
Signature	:	
Qualifications	:	B.Eng (Civil)
Email address	:	dean@edseng.co.za

Report reviewed by:

Name	:	F.H.B van Eyk Pr. Eng
Signature	:	
Qualifications	:	B.Eng (Civil), B.Eng (Hons) (Water Resources)
ECSA Registration	:	Pr. Eng. 20160826
Email address	:	derik@edseng.co.za

LANSERIA AIRPORT EXTENSION 1 – SOUTHERN PRECINCT ROADS & STORMWATER MANAGEMENT REPORT

CONTENTS

1 INTRODUCTION

EDS Engineering Design Services (Pty) Ltd (EDS Engineers) was appointed to compile a Roads and Stormwater Outline Scheme Report (OSR) for a portion of Erf 183 Lanseria Airport Extension 1 referred to as the southern precinct of Lanseria Airport Extension 1.

The application site is located in Lanseria and falls in the area of jurisdiction of the City of Johannesburg Metropolitan Municipality.

This report describes the existing civil engineering roads and stormwater management in proximity to the application site, the expected demands as a result of the development under the existing land-use rights and evaluates the proposed stormwater networks to accommodate the expected demands from the southern precinct of Lanseria Airport Extension 1.

2 DETAILS OF THE APPLICANT

The details of the applicant:

Company Name:	GROWTHPOINT PROPERTIES
Physical Address:	The place 1 Sandton Drive Sandton Gauteng 2196
Contact Person:	Polla Scholtz
Telephone Number:	(011) 944 6050
Company Name:	APERTURE PROPERTIES
Physical Address:	89 Bute Lane, Sandown Sandton Gauteng 2196
Contact Person:	Hilton Carty
Telephone Number:	(079) 916 3982
Company Name:	LANSERIA INTERNATIONAL AIRPORT
Physical Address:	Airport Road Lanseria 1748 South Africa
Contact Person:	Trevor Teegler
Telephone Number:	(012) 809 2229

3 SITE INFORMATION

3.1 SITE LOCATION

The site is located within the municipal boundaries of the City of Johannesburg.

The site details are as follows:

Site		Erf 138 Lanseria Airport Extension 1 – Southern Precinct
Size		25.5 ha
Boundaries	North	Lanseria Extension 1 - Runway
	East	Extension 11 & 12
	West	Lanseria Ext 35 RE/5/530-JQ
	South	Lanseria Ext 75

The location of the proposed township is shown in **Annexure A**.

3.2 PROPERTY DESCRIPTION

The application site is on the southern precinct portions of Lanseria Airport Extension 1.

The physical combined size of Southern Precinct applicable to the R&SW OSR of Lanseria Airport Extension 1 is 25.5 ha.

For the purposes of this report, the site will hereafter be referred to as Southern Precinct of Lanseria Airport Extension 1.

The proposed layout is included in **Annexure B**.

4 DEVELOPMENT INFORMATION

4.1 EXISTING LAND-USE RIGHTS

Erf 183 Lanseria Airport Extension 1 is currently zoned “Special” permitting land use for purposes necessary and in connection with airport, including aircraft hangers, aircraft maintenance, storage of goods, and accessories related to aircraft maintenance offices which are related to the use of the erf and buildings for the purposes of aircraft operations, including shops, retail and place of refreshment facilities subservient to the main use of the erf (which shall not exceed 2 500m²), aircraft runways, taxi aprons, air traffic control towers, repair and maintenance facilities, and such other associated land uses which the municipality may approve in writing.

A copy of the land use rights certificates is included in **Annexure C**.

Table 4.1.1: Existing land use rights

Erf nr	Existing zoning	Size (ha)	Density	Coverage	FAR	Height
Lanseria Airport X1 Southern Precinct	Special	25.5	N/A	N/A	0.2	5 Storeys

5 ROADS

5.1 Development access

The proposed development is situated within the existing township of Lanseria Airport Extension 1, which is currently provided with established access. An additional access point serving the southern precinct of Lanseria Airport Extension 1 will be introduced via the Lanseria Extension 11 and Lanseria Extension 79 townships. All required servitudes for access and associated services will be registered in accordance with the provisions of the Service Level Agreement. The existing and proposed access locations are illustrated in **Annexure D**.

In accordance with the approved Traffic Impact Assessment (TIA) issued by the Johannesburg Roads Agency for the Lanseria Extension 79 development, the following access arrangements will be introduced:

Interim and Future Airport Access Re-alignment:
The current access to Lanseria International Airport via Airport Road off Preller Drive (Side Avenue) will be retained as an interim arrangement until the implementation of Lanseria Extension 12. Following the completion of the Lanseria Extensions 11, 12, and 79 precinct developments, the primary airport access will be realigned eastwards along Preller Drive (Side Avenue) towards the eastern boundary of the airport. This realignment will entail relocating the Airport Road intersection to the eastern termination of Preller Drive (Side Avenue).

The approved TIA for Lanseria Extension 79 is attached as **Annexure E**.

6 STORMWATER

6.1 OBJECTIVES OF THE STORMWATER MANAGEMENT PLAN

The objectives of the stormwater management plan are as follows:

- To determine the stormwater runoff for the pre-development site conditions.
- To determine the stormwater runoff for the post-development conditions.
- To ensure that the stormwater runoff for a 100-year storm can discharge through a flood escape route to ensure that no flooding on site occurs.
- To ensure that the quantity and the rate of stormwater runoff from the site is controlled as per the requirements of the Johannesburg Roads Agency (JRA).
- Calculate and allow for external stormwater management as no external system is available in the facility of the proposed development.

6.2 REQUIREMENTS OF THE JOHANNESBURG ROADS AGENCY (JRA)

The Stormwater Management Report and design considerations are based on the requirements of the following policies and design guidelines:

- The City of Johannesburg Metropolitan Municipality – *Stormwater Management By-Law*.
- Johannesburg Roads Agency SOC Limited (JRA) – *Roads & Stormwater Manual – Volume 1 Code of Procedure*.
- The South African National Roads Agency SOC Limited – *Drainage Manual*
- Stormwater design manual for the City of Johannesburg 2019.

6.3 CURRENT STORMWATER SYSTEM

The existing stormwater reticulation consists of the following:

- There are no municipal stormwater infrastructure networks in the surrounding area of the application site.

Stormwater information obtained from the Johannesburg Roads Agency (JRA) is included in **Annexure F**.

A natural watercourse is located to the northeast of Lanseria Extension 11. The southern precinct of Lanseria Extension 1 drains via overland flow into this watercourse.

Additionally, Lanseria Extension 75 includes a stormwater attenuation dam, which discharges overland onto the southern precinct of Lanseria Extension 1. From there, the stormwater continues to drain toward the aforementioned natural watercourse.

Lanseria Extension 1 Approved Stormwater management plan indicated two attenuation dams but these dams were never constructed. The unfinished areas created low points were stormwater accumulated and saturated the natural ground. The stormwater discharge from Lanseria Extension 75 also accumulated in these unfinished attenuation areas of Lanseria Extension 1.

The existing site stormwater management flow route is illustrated in **Annexure G** and the approved stormwater management plan included in **Annexure H**.

6.4 PROPOSED STORMWATER SYSTEM

The Stormwater Management By-Laws of the City of Johannesburg mandate that an on-site stormwater drainage facility be provided for every development site. Such facilities must be designed with sufficient capacity to convey stormwater without flooding or causing damage to any existing or proposed structures.

A new stormwater system will be installed for Lanseria Extension 11 (X11) to accommodate upstream stormwater runoff originating from Lanseria Extension 1 (X1) Southern Precinct and Lanseria Extension 75 (X75). This system has been designed to accommodate a 1:100-year flood event, as previously approved as part of the township application for Lanseria X11. This system will hereafter be referred to as the Stormwater Connection Point X11. For detailed culvert design specifications, refer to the flood line study in **Annexure I**.

The new Stormwater Management Plan (SWMP) for Lanseria X1 Southern Precinct will consist of an integrated network of underground stormwater systems, ultimately connecting to the Stormwater Connection Point X11. On-site stormwater attenuation facilities will be implemented to ensure that post-development runoff rates are reduced to match pre-development runoff rates. The main stormwater culvert system will convey both the upstream runoff from Lanseria X75 and the stormwater generated within Lanseria X1 Southern Precinct to the connection point. The proposed stormwater network is included in **Annexure J**.

Lanseria X75 is an approved township and is required to comply with the City of Johannesburg's Stormwater Management By-Laws. Stormwater attenuation facilities within X75 include outlet control structures that regulate discharge to prevent downstream flooding. Lanseria X75 existing attenuation pond positions are included in **Annexure I**.

Lanseria X1 Southern Precinct will now feature an underground piped stormwater system, designed to convey stormwater into the proposed new attenuation facilities. These facilities will control outflow to the main culvert system, which leads to the Stormwater Connection Point X11.

It is important to note that attenuation facilities are generally not recommended at airports, as they attract birdlife, posing a risk to aviation safety. As a mitigation measure, the proposed attenuation facilities will incorporate a concrete-lined channel to direct stormwater efficiently to a controlled outlet structure, thereby preventing standing water and reducing the likelihood of bird attraction.

6.5 DESIGN CALCULATIONS

The area of the application site for the stormwater calculation is **25.5 ha**.

6.5.1 ESTIMATED PRE-DEVELOPMENT STORMWATER RUNOFF

The simplified rational method was used to determine the estimated pre-development runoff for the application site. The design data for determining the stormwater runoff for the 2- to 50-year recurrence interval design storm events for the pre-development conditions are summarised in **Table 9.1.1**.

Table 9.1.1: Pre-development runoff data

		Lanseria Extension 1 Southern Precinct	
Catchment Area (A)		255 000	m²
MAP		750	mm/year
Runoff Factor (C)		0.3	
Time of Concentration (Tc)		52	minutes
Rainfall Intensity (I)	1-2 year	35	mm/hr
	1-5 year	49	mm/hr
	1-10 year	60	mm/hr
	1-20 year	72	mm/hr
	1-25 year	77	mm/hr
	1-50 year	92	mm/hr

The following formula applies:

$$Q = CIA/3.6$$

Where,

Q = Peak flow (m³/s)
C = run-off coefficient
I = Average rainfall intensity over the catchment (mm/hr)
A = Catchment area (m²)

The estimated pre-development stormwater runoff for the 2- to 50-year recurrence interval design storm events is summarised in Table 9.1.2 below.

Table 9.1.2 Estimated pre-development stormwater runoff

		Lanseria Extension 1 Southern Precinct	
Peak Flow (Q)	1-2 year	0.37	m^3/s
	1-5 year	0.57	m^3/s
	1-10 year	0.77	m^3/s
	1-20 year	1.03	m^3/s
	1-25 year	1.14	m^3/s
	1-50 year	1.62	m^3/s

The pre-development stormwater calculations are included in **Annexure K**.

6.5.2 ESTIMATED POST-DEVELOPMENT STORMWATER RUNOFF

The simplified rational method was used to determine the estimated post-development runoff for the application site. The design data for determining the stormwater runoff for the 2- to 50-year recurrence interval design storm events for the post-development conditions are summarised in **Table 9.2.1**.

Table 9.2.1: Post-development runoff data

		Lanseria Extension 1 Southern Precinct	
Catchment Area (A)		255 000	m^2
MAP		750	mm/year
Runoff Factor (C)		0.7	
Time of Concentration (Tc)		15	minutes
Rainfall Intensity (I)	1-2 year	80	mm/hr
	1-5 year	107	mm/hr
	1-10 year	129	mm/hr
	1-20 year	152	mm/hr
	1-25 year	157	mm/hr
	1-50 year	183	mm/hr

The following formula applies:

$$Q = CIA/3.6$$

Where,

Q = Peak flow (m³/s)
C = run-off coefficient
I = Average rainfall intensity over the catchment (mm/hr)
A = Catchment area (m²)

The estimated post-development stormwater runoff for the 2- to 50-year recurrence interval design storm events is summarised in **Table 9.2.2**.

Table 9.2.2 Estimated post-development stormwater runoff

		Lanseria Extension 1 Southern Precinct	
Peak Flow (Q)	1-2 year	3.97	m³/s
	1-5 year	5.31	m³/s
	1-10 year	6.40	m³/s
	1-20 year	7.54	m³/s
	1-25 year	7.78	m³/s
	1-50 year	9.07	m³/s

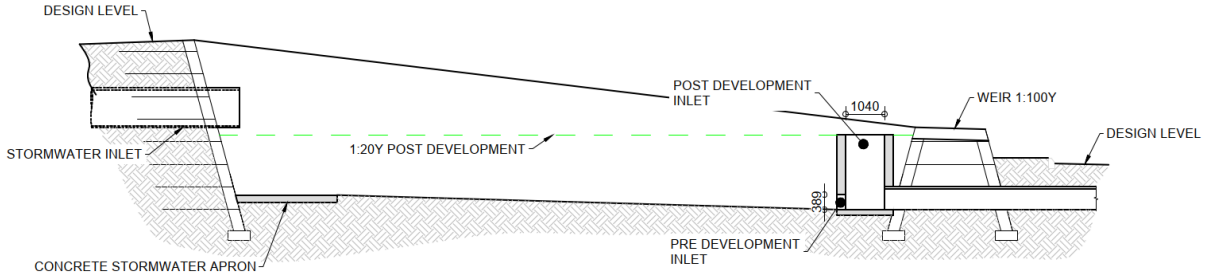
The post-development stormwater calculations are included in **Annexure K**.

6.6 ATTENUATION PONDS

From Tables 9.1.2 and 9.2.2 above, there would be an increase in the stormwater runoff for the pre-development conditions of the application site.

The runoff associated with the development is to be attenuated such that the pre-development flow for the 5- to 25-year storm events is not exceeded. The attenuation facility must also be capable of withstanding the 50-year storm event.

The proposed typical attenuation pond detail is shown below, the final drawings will be submitted with the Site Development application for approval to local authorities.



TYPICAL ATTENUATION POND SECTION
SCALE: 1:100

6.6.1 SIMPLIFIED HYDROGRAPH METHOD

The simplified hydrograph method, as stipulated in the *SANRAL Drainage Manual* was used to calculate the estimated required stormwater attenuation volume for the application site and is summarised in Tables 9.3.1.

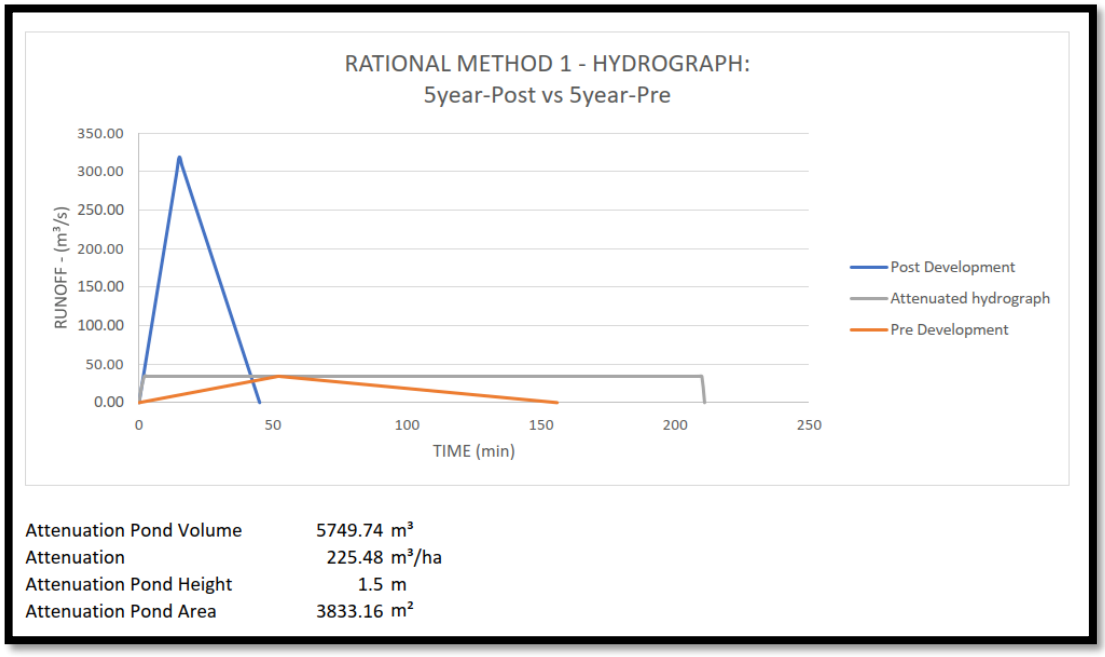


Figure 3: 5y-Pre vs 5y-Post Hydrograph

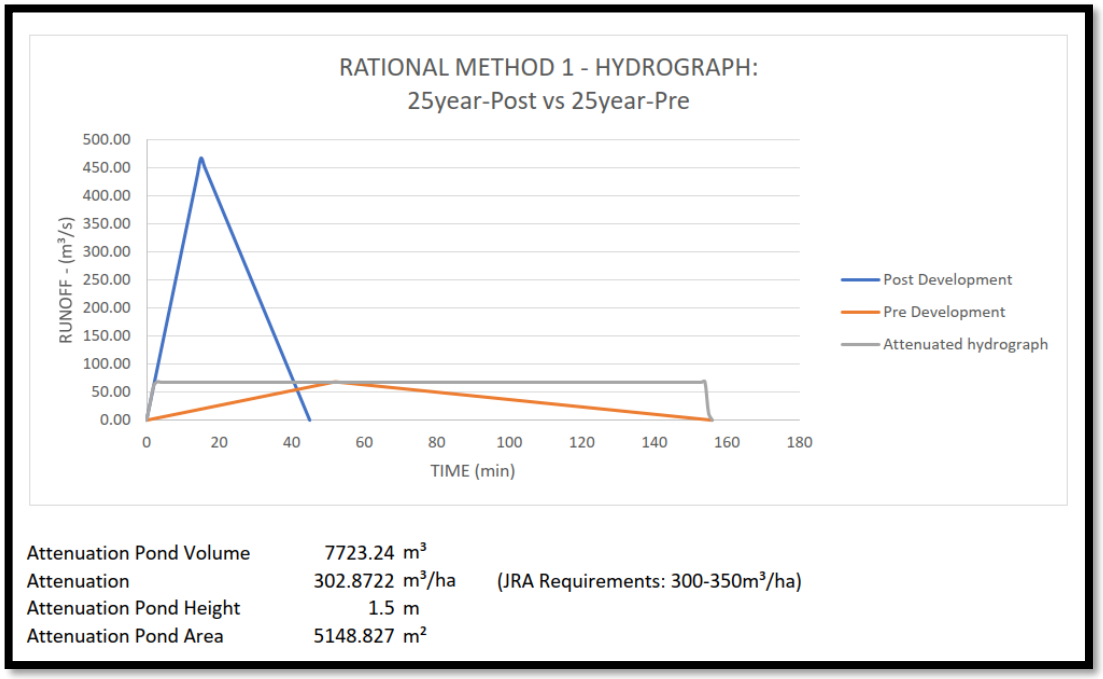


Figure 4: 25y-Pre vs 25y-Post Hydrograph

Table 9.3.1 Estimated stormwater attenuation volumes – Simplified Hydrograph

		Pre-development (m³)	Post-development (m³)	Attenuation Pond Volume (m³)
Lanseria Extension 1 Southern Precinct	**1:5 year**	2667.6	7168.5	4500.9
	1:25 year	5335.2	10 503	5167.8

* Simplified Hydrograph – 3TC

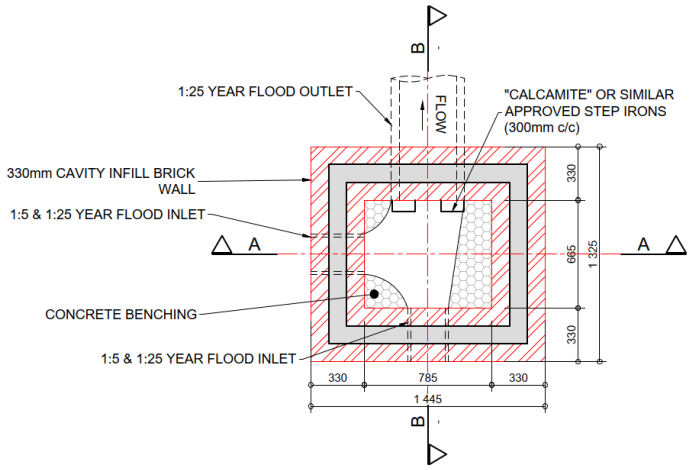
The estimated design summary is included in **Annexure K.**

The designs of the attenuation facilities were done to size the pond for optimum storage volume. The proposed positions of the attenuation facilities are located across the application site and are indicated on the layout in **Annexure J**. The accumulated volume of all the attenuation facilities on the size exceeds the required attenuation volume as indicated in *Table 9.3.1*.

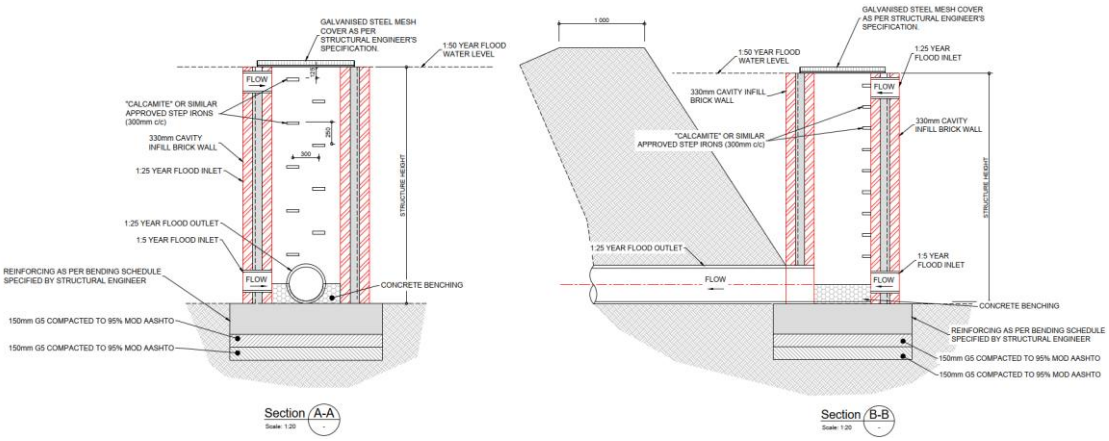
The proposed attenuation facilities will have a concrete-lined channel directing stormwater to the controlled outlet structure to prevent standing water.

6.6.2 ATTENUATION POND OUTLET CONTROL STRUCTURE

The post-development stormwater will be managed and discharged in accordance with pre-development conditions through the attenuation pond outlet structure. This system will effectively control flood events with return periods of 1 in 5 years, and 1 in 25 years and a pond overflow weir structure will accommodate the 1 in 100 years storm event.



PLAN VIEW OF INLET STRUCTURE
SCALE 1:20



7 CONCLUSIONS

It can be concluded that:

- The proposed access arrangements for Lanseria Airport Extension 1 comply with the approved township layout and JRA's TIA requirements. Existing access will remain in use, with additional access via Extensions 11 and 79. The long-term realignment of the primary airport access along Preller Drive (Side Avenue) will adequately support future precinct development.
- The stormwater runoff would increase due to the proposed development.
- Upstream stormwater of Lanseria X75 will be routed and managed through Lanseria X1 southern precinct.
- The stormwater runoff for the 1:100 year storm event can be discharged from the site by means of internal road surface flow that finally discharges into the natural watercourse on the eastern side to ensure no flooding occurs on site.
- The stormwater culvert can also accommodate for the 1:100 year storm event as detailed by the flood line study.
- The quantity and rate of stormwater runoff from the site will be buffered and controlled as per the requirements of the Johannesburg Roads Agency by means of attenuation facilities.
- Lanseria Extension 1 southern precinct attenuation pond outlet will discharge in Lanseria Extension 11 stormwater connection point.

8 RECOMMENDATION

It is recommended that the Roads & Stormwater Outline Scheme Report for the township of Lanseria Extension 1 (Southern Precinct) be supported by the Johannesburg Roads Agency (JRA) as the access is adequate as per the approved TIA and the quantity and rate of stormwater runoff from the site can be controlled as per the requirements of JRA.

F.H.B van Eyk Pr. Eng. (**20160826)**

Annexures:

- Annexure A: Site Location Map
- Annexure B: Proposed Township Layout
- Annexure C: Existing Land-Use Rights
- Annexure D: Development Access
- Annexure E: Approved TIA
- Annexure F: Existing JRA Stormwater Information
- Annexure G: Existing Site Stormwater Management
- Annexure H: Approved SWMP
- Annexure I: Flood line study
- Annexure J: Stormwater Management Layout Drawing
- Annexure K: Stormwater Calculations

ANNEXURE A: SITE LOCATION MAP

GENERAL NOTES:

1. REFER TO ALL RELEVANT DRAWINGS & SPECIFICATIONS, DO NOT SCALE ANY DIMENSIONS.
2. WHERE DISCREPANCIES OCCUR BETWEEN THE PROJECT DRAWINGS OR SPECIFICATIONS, THESE SHOULD BE REPORTED IMMEDIATELY TO THE PRINCIPAL AGENT.
3. ALL DIMENSIONS AND LEVELS TO BE CHECKED ON SITE AND CORRELATED WITH THE ARCHITECTS DRAWING BEFORE CONSTRUCTION COMMENCES.
4. ALL WATERPROOFING AND EARTH POISONING DETAILS TO BE IN ACCORDANCE WITH THE ARCHITECT'S SPECIFICATION AND INSTRUCTIONS.

Rev. No:	Date:	Revision Details:	By:
A	28/03/'25	FOR INFORMATION	KB

Client:

Architect:

e•d•s
Structural, Civil and Transportation Engineers
Sussex Office Park
473 Lynnwood Road
Lynnwood
Pretoria
Tel: 012 991 1205
Fax: 012 991 1373
e-mail: info@edseng.co.za

Project:

LANSERIA AIRPORT EXTENSION1

Description:

LOCALITY PLAN (FIGURE 1)

Paper size:	Drawn:	Checked:	Designed:
A3	KB	D vd M	D vd M

Scale:	Project Number:	Drawing Number:	Revision:
1:5000	2019-094	0080	A

ANNEXURE B: PROPOSED TOWNSHIP LAYOUT

LAND LEASE PORTIONS

Scale 1 : 2000

GENERAL NOTES

ALL WORKS TO COMPLY WITH SANS 10400
OR BY RATIONAL APPROVED DESIGN
TO COMPLY WITH FOLLOWING GUIDELINES

B: Structural Design SANS 10400-B, *Structural design*
C: Dimensions SANS 10400-C, *Dimensions*
D: Public Safety SANS 10400-D, *Public safety*
F: Site Operations SANS 10400-F, *Site operations*
G: Excavations SANS 10400-G, *Excavations*
H: Foundations SANS 10400-H, *Foundations*
J: Floors SANS 10400-J, *Floors*
K: Walls SANS 10400-K, *Walls*
L: Roofs SANS 10400-L, *Roofs*
M: Stairways SANS 10400-M, *Stairways*
N: Glazing SANS 10400-N, *Glazing*
O: Lighting and Ventilation SANS 10400-O, *Lighting and ventilation*
P: Drainage SANS 10400- P, *Drainage*
Q: Non-water-borne Means of Sanitary Disposal
SANS 10400-Q, *Non-water-borne means of sanitary disposal*
R: Stormwater Disposal SANS 10400-R, *Stormwater disposal*
S: Facilities for Persons with Disabilities SANS 10400-S, *Facilities for persons with disabilities.*
T: Fire Protection SANS 10400-T, *Fire protection*
V: Space Heating SANS 10400-V, *Space heating*
W: Fire Installation SANS 10400-W, *Fire installation*

REV #	DATE	BY	DESCRIPTION
N	2025.09.29		ISSUED FOR INFORMATION
M	2025.09.16	DJF	ISSUED FOR INFORMATION
L	2025.09.16	DJF	ISSUED FOR INFORMATION
K	2025.09.08	DJF	ISSUED FOR INFORMATION
J	2025.08.07	DJF	ISSUED FOR INFORMATION
I	2025.08.04	DJF	ISSUED FOR INFORMATION
H	2025.06.17	DJF	ISSUED FOR INFORMATION
G	2025.06.04	DJF	ISSUED FOR INFORMATION
F	2024.11.19	DJF	ISSUED FOR INFORMATION
E	2024.05.02	DJF	ISSUED FOR INFORMATION
D	2024.04.22	DJF	ISSUED FOR INFORMATION
C	2024.04.19	DJF	ISSUED FOR INFORMATION
B	2024-04-17	DJF	ISSUED FOR INFORMATION
A	2023-11-30	DJF	ISSUED FOR INFORMATION

empowered spaces architects
tel: 011 883 8380/6 fax : 086 632 8181 16 Holt Street,Glenadrienne
P.O Box 5178, Rivonia,2128 info@espaces.co.za www.espaces.co.za

client
GROWTHPOINT

signature

project
PROPOSED NEW DEVELOPMENT

stand number
BULTFONTEIN 533-JQ
BOTESDAL 529-JQ

engineer	.
contact	.
signature	

project architect	JONATHAN LEIBOWITZ
contact	011 883 8380
signature	

drawing description
LAND LEASE PORTIONS

job number	drawing number
1625	P012

A1	drawn	DJF
	scale	1 : 2000
	date	Issue Date

revision number	issued for
N	INFORMATION

2025/09/29 10:11:46

ANNEXURE C: EXISTING LAND-USE RIGHTS

DEVELOPMENT PLANNING
LEGAL ADMINISTRATION

Memo

TO : **GIS - J THOMAS**
VALUATION SERVICES

OUR REF : 03-17300

DATE : 12 March 2019

ERF 183 Lanseria Airport Ext.1

Attached, please find copies of approved Map 3 documents as well as the Notice to the Gazette for proclamation, for your records.

DEPUTY DIRECTOR: LEGAL ADMINISTRATION
DEVELOPMENT PLANNING

Phaswana Mulalo J
TEL : 407-7119
FAX : 339-1707

CITY OF JOHANNESBURG
DEVELOPMENT PLANNING
2019 -03- 13
DOCUMENT RECEIVED:.....
ADMIN ASSISTANT: REGISTRATION
LEGAL ADMINISTRATION

PLAASLIKE OWERHEID KENNISGEWING 415 VAN 2019

STAD VAN TSHWANE METROPOLITAANSE MUNISIPALITEIT

KENNISGEWING VAN 'N AANSOEK VIR DIE OPHEFFING VAN BEPERKENDE TITELVOORWAARDES IN DIE TITELAKTE INGEVOLGE ARTIKEL 16(2) VAN DIE STAD TSHWANE GRONDGEBRUIKBESTUURSBYWET, 2016

Ons, The Town Planning Hub cc, synde die gemagtigde agent/aansoeker van **Gedeelte 20 van die plaas Hartebeestfontein 484-JR**, gee hiermee ingevolge Artikel 16(1)(f) van die Stad Tshwane Grondgebruikbestuur Verordening, 2016 kennis dat ons by die Stad van Tshwane Metropolitaanse Munisipaliteit aansoek gedoen het vir die verwydering van sekere voorwaardes soos vervat in die Titel Akte in terme van Artikel 16(2) van die Stad Tshwane Grondgebruikbestuur Verordening, 2016 van die bogenoemde eiendom. Die eiendom is geleë suid van die R495; oos van die stad Rayton op pad na Ekangala in die ooste.

Die aansoek is vir die opheffing van voorwaardes (b)(i), (b)(ii), (b)(iii) in Titelakte T44692/2005 van die eiendom. Die bedoeling van die eienaar is om die bestaande trou venue te wettig deur middel van 'n toestemmingsgebruik aansoek. Daar is egter beperkende voorwaardes vervat in die Titelakte, wat verwyder moet word.

Enige besware en/of kommentare wat duidelik die gronde van die beswaar, asook die persoon(ne) se volle kontakbesonderhede, waar sonder die Munisipaliteit nie met die persoon(ne) kan korrespondeer nie, moet binne 'n tydperk van 28 dae vanaf **6 Maart 2019**, skriftelik by of tot die Strategiese Uitvoerende Direkteur: Stadsbeplanning en Ontwikkeling, ingedien of gerig word by Posbus 3242, Pretoria, 0001, of na CityP_Registration@tshwane.gov.za tot **3 April 2019**.

Volledige besonderhede en planne (as daar is) kan gedurende gewone kantoorure geinspekteer word by die Munisipale kantore soos hieronder uiteengesit, vir 'n tydperk van 28 dae vanaf die datum van eerste publikasie van die kennisgewing in die Provinsiale Koerant, Beeld en Citizen koerante.

Adres van Munisipale Kantore: Munisipale Kantore, Isivuno House, Kamer LG004, 143 Lilian Ngoyistraat, Pretoria.
Sluitingsdatum vir enige besware en/of kommentaar: 3 April 2019
Adres van agent : The Town Planning Hub cc; Posbus 11437, Silver Lakes, 0054; 98 Pony Straat, Tijgervallei Kantoor Park, Silver Lakes, Pretoria. Tel: (012) 809 2229 Faks: (012) 809 2090. Ref: TPH18281
Datums waarop die advertensie geplaas word: 6 en 13 Maart 2019
Verwysing nr: CPD484-JR/1004/00020 **Item nr:** 29894

6-13

LOCAL AUTHORITY NOTICE 416 OF 2019

AMENDMENT SCHEME 03-17300

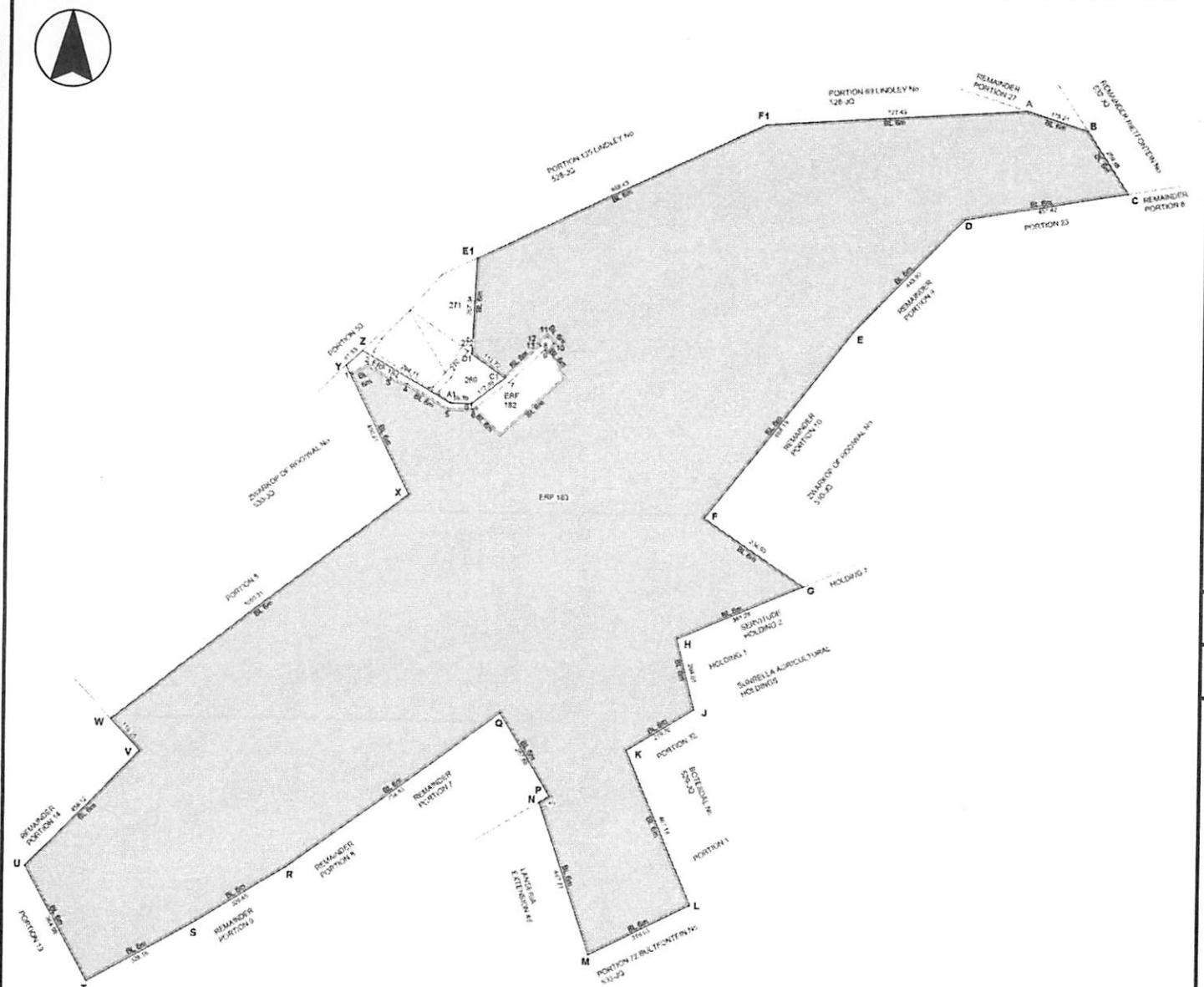
Notice is hereby given in terms of Section 22(4) of the City of Johannesburg Municipal Planning By-Law, 2016, that the City of Johannesburg Metropolitan Municipality has approved the amendment of the Peri-Urban Areas Town Planning Scheme, 1975, by the rezoning of Erf 183 Lanseria Airport Extension 1 from "Special" to "Special", subject to certain conditions as indicated in the approved application, which Amendment Scheme will be known as Amendment Scheme 03-17300 Amendment Scheme 03-17300 will come into operation on the date of publication hereof.

The Amendment Scheme is filed with the Executive Director: Development Planning, 158 Civic Boulevard, Metropolitan Centre, A Block, 8th Floor, Braamfontein 2017 and is open for inspection at all reasonable times.

Hector Bheki Makhubo
Deputy Director: Legal Administration
City of Johannesburg Metropolitan Municipality /
Notice No 187/2019

CODE 111 PERI-URBAN AREAS TOWN PLANNING SCHEME 1975 MAP **3** **A** SERIES AMENDMENT SCHEME 03-17300 • SHEET 1 OF 4

SCALE 1:12500



ERF 183 LANSERIA AIRPORT EXTENSION 1

REFERENCE

USE ZONES

SPECIAL

GENERAL

BUILDING LINE FOR THE PROPERTY BOUNDARY

TOWNSHIP BOUNDARY

APPROVED

EXECUTIVE DIRECTOR: DEVELOPMENT PLANNING (CITY OF JOHANNESBURG)

23/07/18

DATE

USE ZONES

Use Zone:	**XI: Special**
Primary Rights:	**The erf and the buildings thereon shall be used for the purpose necessary and in connection with an airport, including aircraft hangars, aircraft maintenance, storage of goods, and accessories related to aircraft maintenance offices which are related to the use of the erf and buildings for the purpose of aircraft operations, including shops, retail and place of refreshment facilities subservient to the main use of the erf (which shall not exceed 2 500 m²), aircraft runways, taxi aprons, air traffic control towers, repair and maintenance facilities, and such other associated land uses which the municipality may approve in writing.**
Consent Rights:	**As per Scheme**
Height:	**5 Storeys**
Coverage:	**Coverage shall be to the satisfaction of the local authority in accordance with the Site Development Plan**
Floor Area:	**0.2**
Density:	**N/A**
Parking Provision:	**As per Scheme**
Building lines:	**As per scheme, provided that these may be relaxed in accordance with an approved Site Development Plan**
Parking:	**Office – 2 parking spaces per 100 m² of floor area. Aircraft hangars – 1 parking space per 300 m² floor area Place of Refreshment – 1 parking space per 4 seats Other land uses – To the satisfaction of the municipality Provided that these parking requirements may be relaxed in accordance with an approved Site Development Plan**

ERF 183 LANSERIA AIRPORT EXTENSION 1

APPROVED

EXECUTIVE DIRECTOR: DEVELOPMENT PLANNING (CITY OF JOHANNESBURG)

23/07/10

DATE

ERF 183 LANSERIA AIRPORT EXTENSION 1

Building Lines: As Per Scheme.
Provided that the building lines may be relaxed on approval of a Site Development Plan.

General

1. A Site Development Plan, compiled to a scale of 1:500 or such other scale as may be approved by the local authority shall be submitted for approval to the local authority prior to submission of any building plans. No buildings shall be erected on the erf until such Site Development Plan has been approved by the local authority, and the entire development of the erf shall be in accordance with the approved site development plan.

2. Access to and ingress from the erven shall be to the satisfaction of the relevant authorities.

3. All comments from the City's Municipal Owned Entities (MOE's) to be adhered to, to the satisfaction of the council.

4. All conditions stipulated by the Civil Aviation Authority to be adhered to, to the satisfaction of the council.

APPROVED

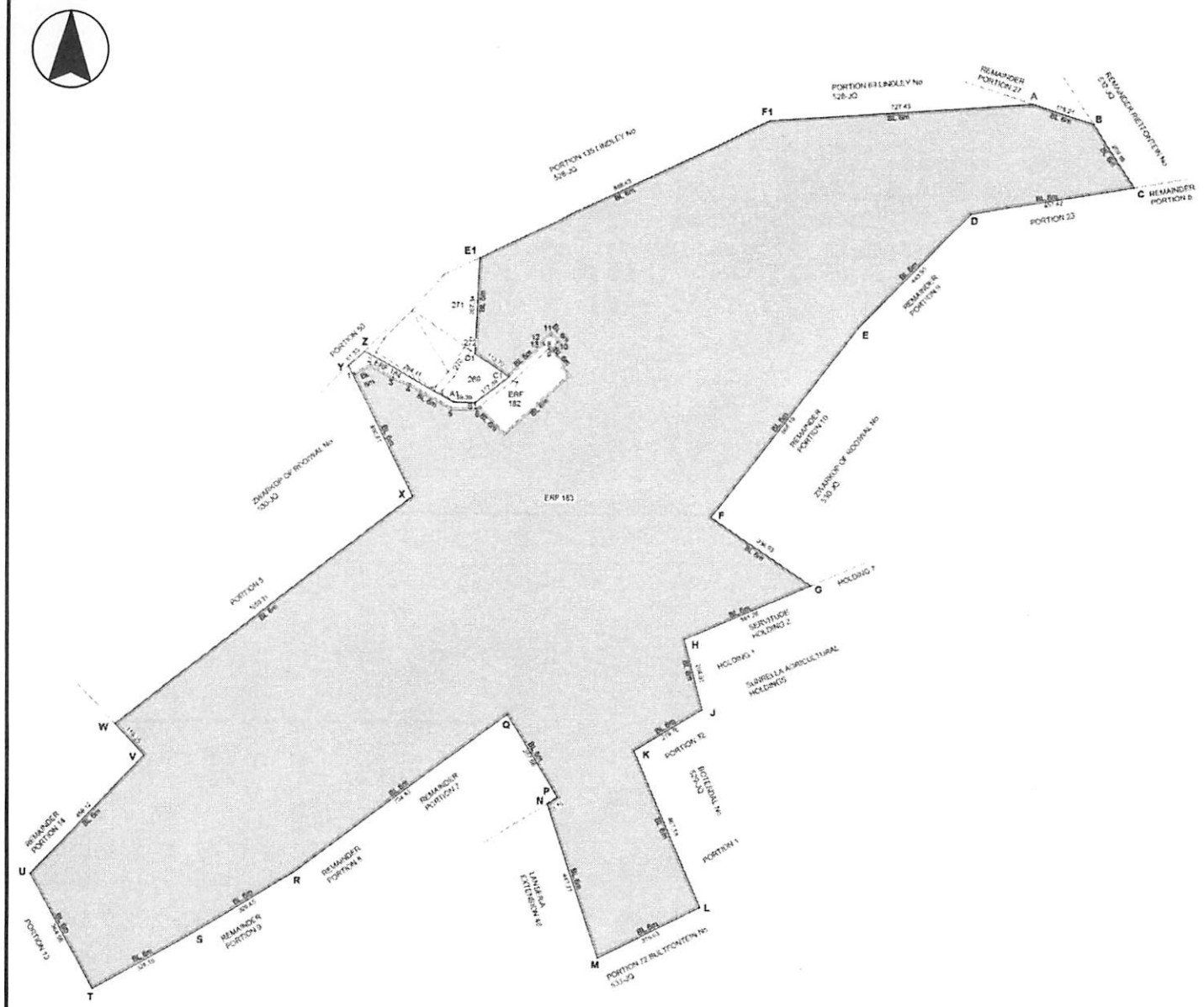
EXECUTIVE DIRECTOR: DEVELOPMENT PLANNING
(CITY OF JOHANNESBURG)

23/07/18

DATE

CODE 111 PERI-URBAN AREAS TOWN PLANNING SCHEME 1975 MAP 3 A SERIES AMENDMENT SCHEME 03-17300 • SHEET 1 OF 4

SCALE 1:12500



ERF 183 LANSERIA AIRPORT EXTENSION 1

REFERENCE

USE ZONES

SPECIAL

GENERAL

BUILDING LINE FOR THE PROPERTY BOUNDARY

TOWNSHIP BOUNDARY

APPROVED

EXECUTIVE DIRECTOR: DEVELOPMENT PLANNING (CITY OF JOHANNESBURG)

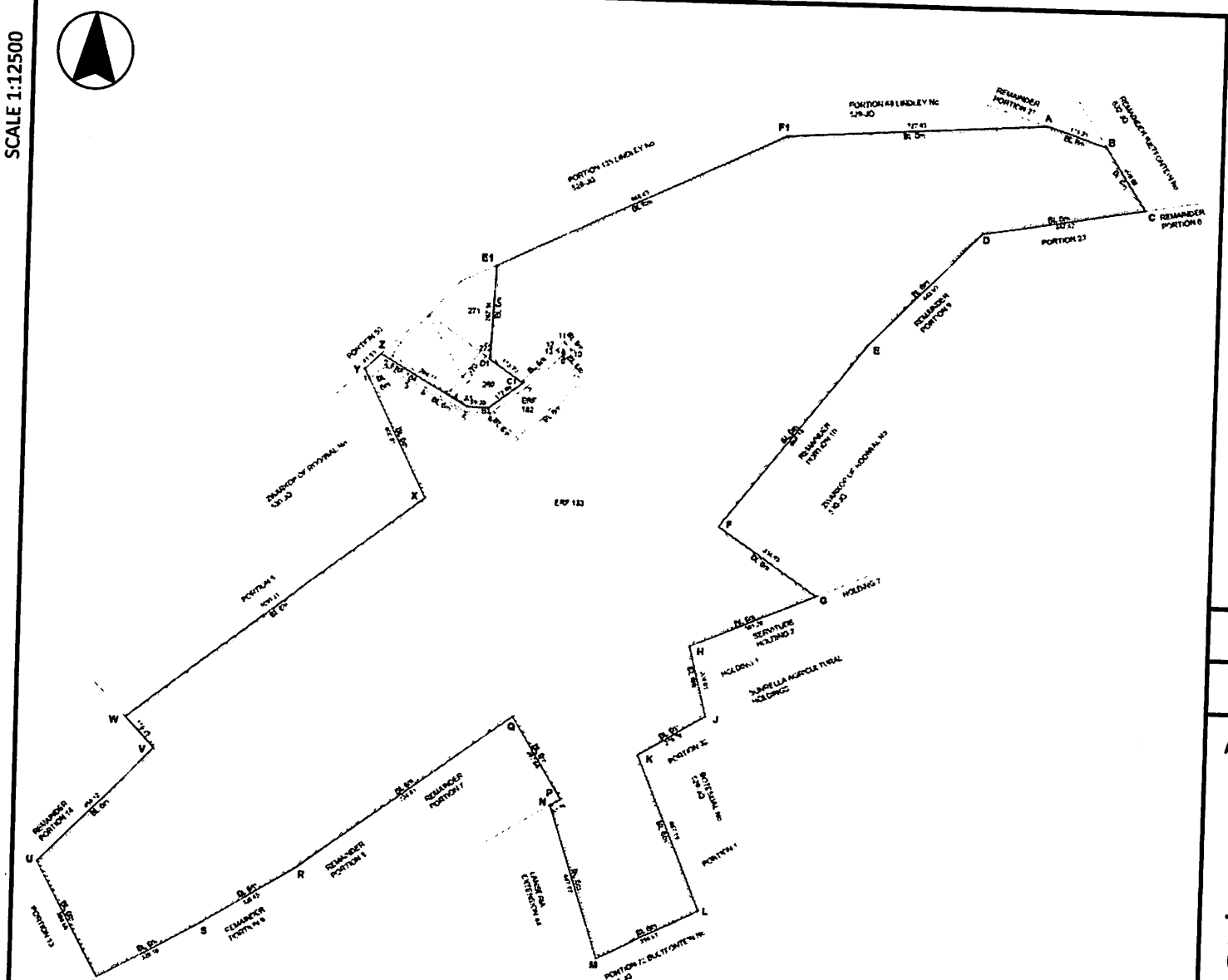
23/07/18

DATE

USE ZONES

CODE 111 PERI-URBAN AREAS TOWN PLANNING SCHEME 1975 MAP 3 A SERIES AMENDMENT SCHEME 03-17300 • SHEET 2 OF 4

SCALE 1:12500



ERF 183 LANSERIA AIRPORT EXTENSION 1

REFERENCE

GENERAL

BUILDING LINE FOR THE PROPERTY BOUNDARY (6 m AS PER SCHEME)

TOWNSHIP BOUNDARY

APPROVED

EXECUTIVE DIRECTOR: DEVELOPMENT PLANNING (CITY OF JOHANNESBURG)

27/07/18

DATE

DENSITY ZONES AND HEIGHT ZONES

Use Zone:	**XI: Special**
Primary Rights:	**The erf and the buildings thereon shall be used for the purpose necessary and in connection with an airport, including aircraft hangars, aircraft maintenance, storage of goods, and accessories related to aircraft maintenance offices which are related to the use of the erf and buildings for the purpose of aircraft operations, including shops, retail and place of refreshment facilities subservient to the main use of the erf (which shall not exceed 2 500 m²), aircraft runways, taxi aprons, air traffic control towers, repair and maintenance facilities, and such other associated land uses which the municipality may approve in writing.**
Consent Rights:	**As per Scheme**
Height:	**5 Storeys**
Coverage:	**Coverage shall be to the satisfaction of the local authority in accordance with the Site Development Plan**
Floor Area:	**0.2**
Density:	**N/A**
Parking Provision:	**As per Scheme**
Building lines:	**As per scheme, provided that these may be relaxed in accordance with an approved Site Development Plan**
Parking:	**Office – 2 parking spaces per 100 m² of floor area. Aircraft hangars – 1 parking space per 300 m² floor area Place of Refreshment – 1 parking space per 4 seats Other land uses – To the satisfaction of the municipality Provided that these parking requirements may be relaxed in accordance with an approved Site Development Plan**

ERF 183 LANSERIA AIRPORT EXTENSION 1

APPROVED

EXECUTIVE DIRECTOR: DEVELOPMENT PLANNING (CITY OF JOHANNESBURG)

23/07/18

DATE

ERF 183 LANSERIA AIRPORT EXTENSION 1

Building Lines: **As Per Scheme.**
Provided that the building lines may be relaxed on approval of a Site Development Plan.

General

1. A Site Development Plan, compiled to a scale of 1:500 or such other scale as may be approved by the local authority shall be submitted for approval to the local authority prior to submission of any building plans. No buildings shall be erected on the erf until such Site Development Plan has been approved by the local authority, and the entire development of the erf shall be in accordance with the approved site development plan.

2. Access to and ingress from the erven shall be to the satisfaction of the relevant authorities.

3. All comments from the City's Municipal Owned Entities (MOE's) to be adhered to, to the satisfaction of the council.

4. All conditions stipulated by the Civil Aviation Authority to be adhered to, to the satisfaction of the council.

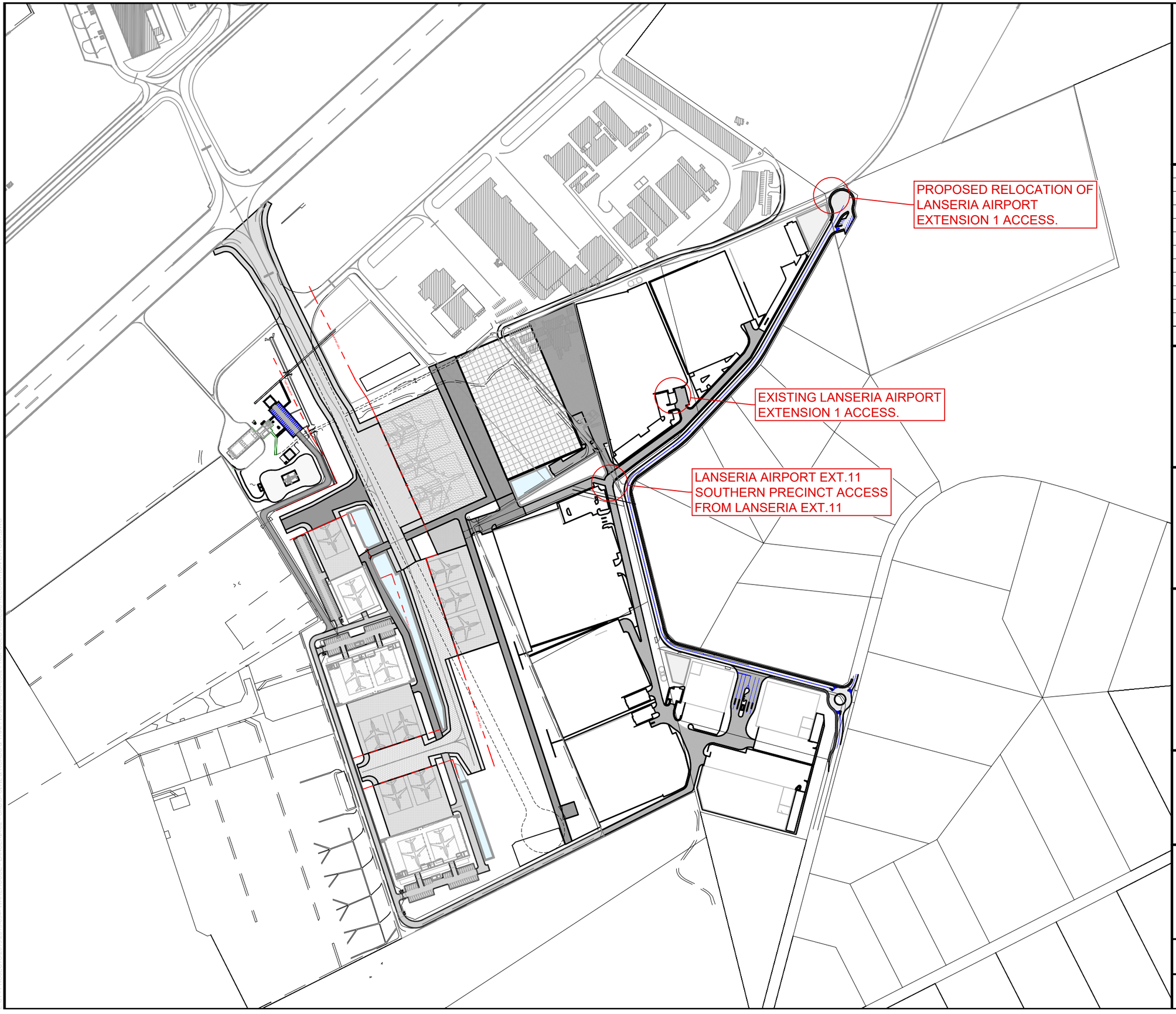
APPROVED

EXECUTIVE DIRECTOR: DEVELOPMENT PLANNING
(CITY OF JOHANNESBURG)

27/07/18

DATE

ANNEXURE D: DEVELOPMENT ACCESS



GENERAL NOTES:

1. REFER TO ALL RELEVANT DRAWINGS & SPECIFICATIONS, DO NOT SCALE ANY DIMENSIONS.
2. WHERE DISCREPANCIES OCCUR BETWEEN THE PROJECT DRAWINGS OR SPECIFICATIONS, THESE SHOULD BE REPORTED IMMEDIATELY TO THE ENGINEER.
3. ALL DIMENSIONS AND LEVELS TO BE CHECKED ON SITE BEFORE CONSTRUCTION COMMENCES.
4. ANY SOFTWARE MODEL SHARED BY EDS ENGINEERS TO ANY EXTERNAL COMPANY OR PARTY TO BE USED FOR INFORMATION ONLY.
5. ALL CONSTRUCTION INFORMATION TO BE USED AS INDICATED ON DRAWINGS THAT WERE ISSUED FOR CONSTRUCTION.

Rev. No:	Date:	Revision Details:	By:
A	09/04/'25	FOR INFORMATION	JDHV

Client:

Architect:

e•d•s

Structural, Civil and Transportation Engineers

Sussex Office Park
473 Lynnwood Road
Lynnwood
Pretoria, Gauteng
Tel: 012 991 1205

20 On Krige Building
20 Krige Road
Stellenbosch
Western Cape
Tel: 021 891 0530

e-mail: info@edseng.co.za

Project:

LANSERIA

Description:

PROPOSED ACCESS
RELOCATION LAYOUT

Paper size:	Drawn:	Checked:	Designed:
A3	JDHV	DvdM	PdL

Scale:	Project Number:	Drawing Number:	Revision:
5000	2019-094	0502	A

ANNEXURE E: APPROVED TIA

a world class African city

City of Johannesburg
Johannesburg Roads Agency

75 Helen Joseph Street
Cnr. Harrison Street
Johannesburg
2001

P/Bag X70
Braamfontein
South Africa
2017

Tel +27(0) 11 298 5000
Fax +27(0) 11 298 5178
www.jra.org.za
www.joburg.org.za

Tel: (011) 491-5624
Email: skgetsi@jra.org.za

Ref: 14/3/2/1/L35-79
S. Kgetsi

EDS Engineering Design Services (Pty) Ltd
Sussex Office Park, Block B
473 Lynnwood Road
Lynnwood

Date: 17 September 2025

Email: info@edseng.co.za

Sir/Madam

SUBJECT : TRAFFIC IMPACT ASSESSMENT: LANSERIA EXTENSION 79 – REV 02: PROPOSED TOWNSHIP LOCATED ON SUNRELLA AGRICULTURAL HOLDINGS 5 & 6:

Revision 2 of the Traffic Impact Assessment (dated August 2025) by EDS Engineering Design Services (Pty) Ltd, was received on 21 August 2021. The following also has reference:

- Original TIA dated February 2025, was received on 12 February 2025.
- JRA comments on Original TIA – 29 May 2025. Additional information requested.
- Meeting between JRA and EDS – 11 June 2025.
- Meeting between JRA and EDS – 1 September 2025.

The report was assessed and the following comments are offered by the Traffic Engineering & Analysis Department:

EDS Engineering Design Services (Pty) Ltd was appointed by Growthpoint Properties (Pty) Ltd to undertake a Traffic Impact Assessment (TIA) as part of the Township Establishment Application for the proposed Lanseria Extension 79. The property is on located on Holdings 5 and 6 of the Sunrella Agricultural Holdings. The proposed Development is intended for warehousing and distribution.

Growthpoint Properties initially planned to develop warehousing and distribution facilities on Lanseria Extensions 11 and 12 only, for which EDS had previously conducted the relevant TIA studies. These assessments formed part of the Township Establishment Applications submitted in October 2022. Approval letters for Extensions 11 and 12 were subsequently obtained from both the Johannesburg Roads Agency (JRA) and the Gauteng Department of Roads and Transport (refer to **Annexure A1)**. Growthpoint has since expanded the scope of the development to also include Lanseria X79.

A **Section 7** report for Extensions 11 and 12 was submitted in February 2023, and concluded that the future K215 alignment would not affect the proposed developments. Gautrans subsequently issued their approval letter in February 2023 (refer to **Annexure B2)**. Similarly, a **Section 7** report for Extension 79 was submitted in March 2025, with approval letters from Gautrans dated April 2025 and 28 August 2025.

The Development site is currently zoned "Agricultural Holding". The existing zoning certificate is attached in **Annexure D.** The proposed rights for Lanseria X79 are "Industrial 3" with the following development constraints (refer to **Annexure E** - Draft Conditions of Establishment for Lanseria X79 located on Holdings 5 & 6 Sunrella A.H.).

- Industrial: 38,786 m²
- Coverage: 60% (F.A.R = 0,6 as per Scheme)
- Permissible Gross Floor Area: 23 272m²
- Offices restricted to 2500m²

The Development is supported from a traffic point of view, subject to the following conditions:

1. ***Road Reserve Widening*:** To accommodate the future K215 and other future road widening, the following provisions must be made:
    a. A 48.4m-wide road reserve has been provided for Middel Road to accommodate the future K215.
    b. A 16m building line is allocated along Middel Road (the future K215).
    c. To facilitate the intersection of Preller Drive (Side Avenue) with the K215, the road reserve is flared to accommodate the intersection bell-mouth.
    d. The Development site access is positioned along Preller Drive (Side Avenue), approximately 188m from the K215 centreline and 164m from the K215 road reserve line, exceeding the 100m minimum requirement set by Gautrans.
    e. A road reserve of 25m along Preller Drive (Side Avenue) from the K215 intersection up to the X79 access point is provided.
    f. A line of no access is designated along the Development site boundary adjacent to the K215 and a portion of Preller Drive (Side Avenue).

2. ***Lanseria Road Master Plan**:* With the proposed development of Lanseria X11, X12, and X79 into an Integrated Secure Cargo Precinct, with a single access point and direct access to the airside operation, this Department agrees that the need for a road link between X11 and X79 is undesirable and unnecessary. It is recommended that Gautrans be requested to undertake the Preliminary Design of K215, as the area is earmarked for significant development in the coming decade.

3. ***Township layout:*** The Revised Township Layout Plan with the provision for road reserve widening, building lines, splays and lines of no access shown, as attached to this letter is supported (please note it is an update from the version contained in **Annexure E** of the report).

4. ***Access**:* The proposed access comprises two key components:
    a. ***Single Consolidated Access for X11, X12, and X79**:* The intention is to establish a single consolidated access point for Lanseria X11, X12, and X79, with access routed directly through Lanseria X79. This access point will also facilitate direct vehicular connectivity to the Lanseria MRO facility on Lanseria Land to the west. A proposed Right of Way Servitude is illustrated on the Amended Township Layout.
    b. ***Interim and Future Airport Access Re-alignment***: The existing access to Lanseria International Airport via Airport Road off Preller Drive (Side Avenue) will be retained as an interim access arrangement until Lanseria X12 is developed. Upon the completion of the X11, X12, and X79 Precinct Developments, the Primary Airport Access will be shifted eastwards along Preller Drive (Side Avenue) towards the eastern boundary of the airport. This will involve the relocation of the Airport Road access to the eastern termination of Preller Drive (Side

Avenue), where a new access control point will be provided. The changes to the existing access to the Lanseria Airport is done and planned in collaboration with the Lanseria Airport, as the Cargo and MRO facilities are a joint development between the Lanseria Airport and Growthpoint.

5. The proposed ***Access Configuration***, along with interim and ultimate arrangements, are illustrated on the layout plans provided in **Annexure G** and consist of the following:
    a. Access point located along Preller Drive (Side Avenue). The access control will be managed through a single-lane roundabout (traffic circle) with one lane per direction, ensuring controlled and safe ingress and egress. Additionally, the eastern leg of the roundabout will include a dedicated left-turn lane into the precinct.
    b. The proposed access design provides a stacking distance of 81m, thereby exceeding the minimum requirement of 15m with 3 entry lanes and 2 exit lanes.
    c. The design of Preller Drive (Side Avenue) is to will comply with Gautrans' requirements, which prescribe a 25m road reserve along the section intersecting with the future K215 alignment.
    d. To enhance the safety of the access, the developer will be responsible for the implementation of the following measures:
        i. Advance warning signage for the road bend with the recommended speed limit of 30km/h **(W205 + IN11.1);**
        ii. Installation of a speed hump prior to the road bend, accompanied by the appropriate advance warning signage (**W416+W417** combination and applicable **W332** signs);
        iii. Placement of traffic circle warning signage **(W201)** in advance of the traffic circles.

6. ***Parking:*** This Department supports the findings of the Parking Demand Studies undertaken by EDS Engineering Design Services (Pty) Ltd for similar warehouse and office developments. These include Equites Jet Park project, which demonstrated that the actual parking demand is significantly lower than the rates prescribed by Municipal Guidelines. These findings support the use of reduced parking rates for similar developments, promoting efficient land use and cost savings, while maintaining operational functionality. Based on these findings, the following parking ratios are supported:
        i. Apply a reduced parking ratio of 0.5 bays per 100 m² Gross Leasable Area (GLA) for warehouses
        ii. Apply a reduced parking ratio of 1 bay per 100 m² GLA for offices

7. ***Public Transport and Freight:*** The final number and configuration of public transport lay-byes and freight loading bays, will be determined during the STA and Site Development Plan (SDP) process. Thus ensuring that the design caters for the anticipated public transport volumes and freight volumes, operational efficiency, and vehicular manoeuvring requirements on site.

8. ***External upgrades:*** The developer will be responsible for the following external road upgrades:
    a. **Upgrading of Preller Drive:**
        i. The developer will be responsible for the upgrading of Preller Drive (Side Avenue) including the proposed traffic circle at the X79 Access.
    b. **Pelindaba Road (R512) / 6th Road (R552**) – subject to approval by Province:
        i. This intersection will be converted into a traffic signal by the Lanseria X11 and X12 Development. The traffic signal will be able to accommodate the 2029 Background Horizon year traffic, latent traffic on X11 and X12 as well as the X79 Development traffic at very acceptable traffic operating conditions. **Should this upgrade not be in place by the time Ext 79 is developed, the Developers of Ext 79 will be responsible for upgrading the intersection.**

c. ***6th Road (R552) / Middel Road:***
    i. The intersection will be converted to a traffic signal by the Lanseria X11 and X12 Development, with the addition of upgraded geometry. The traffic signal and upgraded intersection geometry will be able to accommodate the 2029 Background Horizon year traffic demand, all latent development traffic (i.e.X11, X12, X7, X32, X55 and X81) as well as the X79 Development traffic. **Should this upgrade not be in place by the time Ext 79 is developed, the Developers of Ext 79 will be responsible for upgrading the intersection.**

d. The Developer must establish additional taxi lay-by facilities along Middel Road (future K215), accompanied by a pedestrian sidewalk along the site boundary to ensure safe and efficient access for public transport users.

9. The Developer is required to submit an STA prior to the approval of the SDP.

All road upgrades to be undertaken by the developer or his representatives, the cost thereof, will not be refunded back to the developer by the Johannesburg Roads Agency (JRA) or the City of Johannesburg (CoJ) unless these upgrades were discussed and agreed upon in writing by both parties upfront, before any construction commences. The mere fact that the detail design drawings or Traffic Impact Studies have been approved, does not bind the JRA or the CoJ to any agreement. It is the responsibility of the developer or his representative to always stay up to date with the latest guidelines and Standards. This is especially applicable to Universal Design (UD) principals. JRA Development Control references the following national and municipal standards for minimum compliance, and will require developments conform to them in planning, design and construction, whether included in the original approved drawings or not. These are:

- *Minimum requirements for the preparation of integrated transport plans: 29July 2016 (CoJ CITP) Published under the NLTA. Act No.5 of 2009. Requires the application of minimum standards on UD to transport and public space.*
- *Building Regulations and Building Standards Act 1977, as amended 2008*
- *SANS 10400 Part S: 2011 - Facilities for Persons with Disabilities*
- *National Technical Requirements 1 (NTR1) – Pedestrian Crossings, 2016 (Specification of Tactiles SANS 784: 2008)*
- *JRA standard book of Drawings – 2015 including 2017 UA Update*

Failing to eliminate obstacles that unfairly limit or restrict persons with disabilities from enjoying equal opportunities or failing to take steps to accommodate the needs of such persons can result in litigation.
All road upgrades to be undertaken by the developer or his representatives, the cost thereof, will not be refunded back to the developer by the Johannesburg Roads Agency (JRA) or the City of Johannesburg (CoJ) unless these upgrades were discussed and agreed upon in writing by both parties upfront, before any construction commences. The mere fact that the detail design drawings or Traffic Impact Studies have been approved, does not bind the JRA or the CoJ to any agreement.

It should also be noted that if any upgrades are undertaken by the developer to any roads or storm-water on behalf of CoJ or the JRA, the developer will be entitled to an off-set against their external engineering services contributions as per section 49(4) of SPLUMA, provided these services are required to be upgraded to resolve background capacity problems, and not as a result of his/her impact of the development. These upgrades are to be discussed with the officials of the JRA and agreement in writing is to be obtained from the JRA to the off-set of such contributions, before any construction commences on site. If the amount for the upgrade/construction exceeds the contributions payable, the balance thereof will not be refunded to the developer and the construction is then carried out at the developers own cost.

Should offsetting be required for the work to be undertaken in lieu of contributions payable for roads and stormwater, the following documentation is required to be submitted to the JRA, to enable the JRA to obtain an in-principle approval from the JRA's Executive Team (EMT) for such offsetting:

I. *A tendered bill of quantities for the work to be undertaken, prior to the appointment of the contractor,*
II. *The approval of Traffic Impact Study,*
III. *The approval of the Outline Scheme Report, which includes the stormwater reticulation,*
IV. *An A3 copy of the drawings for the roads and stormwater services to be undertaken. The work to be undertaken is to be clearly highlighted.*
V. *Estimated engineering services contributions payable as calculated by the CoJ.*

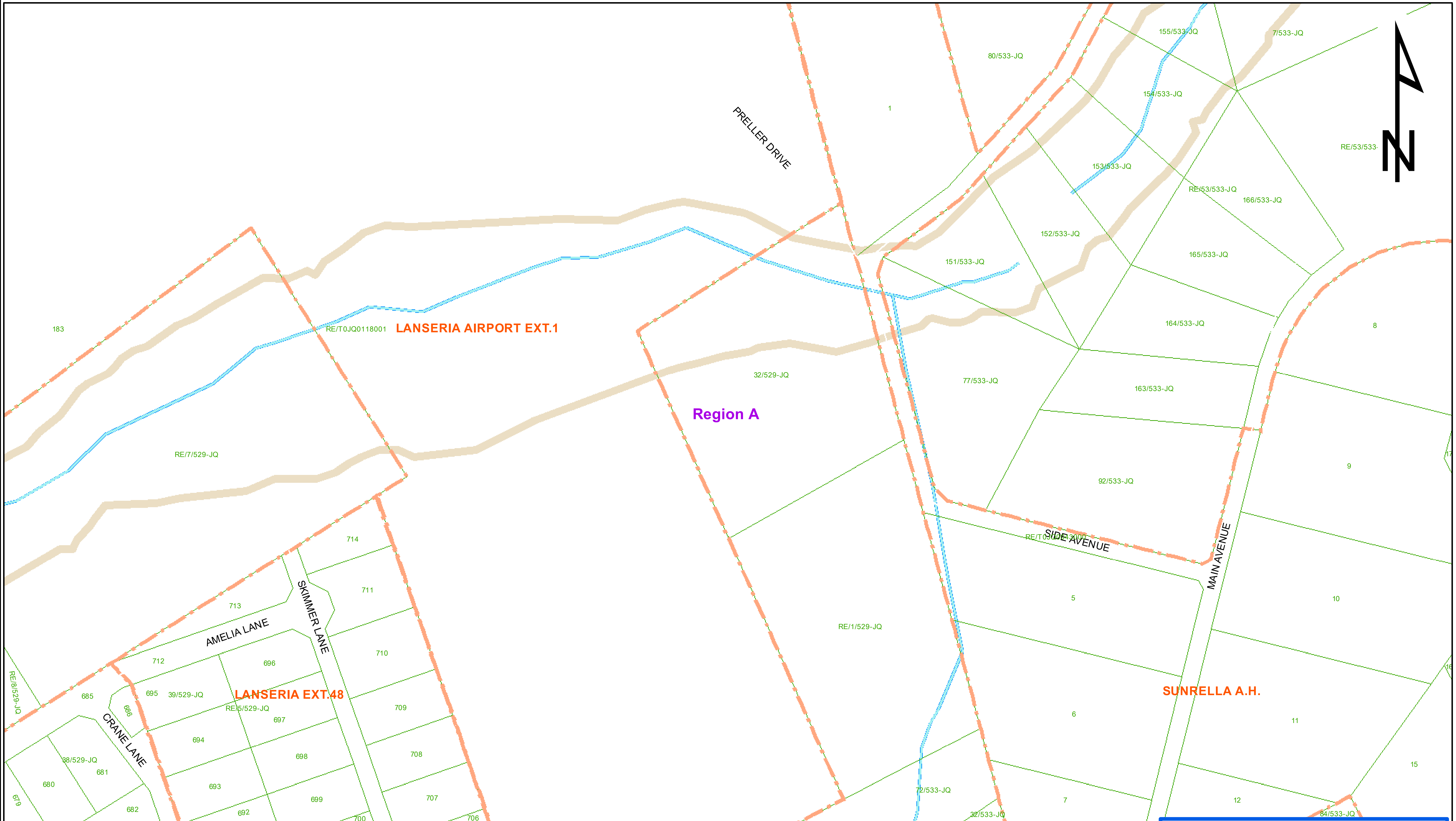
An offsetting report will then be formalised for an in-principle approval by the JRA's EMT of the said work in lieu of the contributions payable. Should the proposed construction work be undertaken by the developer before the report is approved, NO offsetting will be allowed for the construction work already undertaken.

Please note the your Traffic Impact Assessment was independently assessed by the JRA, Traffic Engineering a Analysis Department and for related queries engage Mr. P Peska on (011) 298-5125 or ppeska @jra.org.za.

Yours faithfully,

Engineer: Development Control
sk/jn

ANNEXURE F: EXISTING JRA STORMWATER INFORMATION



JRA Stormwater Reticulation

** PLEASE NOTE:
THIS IS NOT A WAY-LEAVE APPROVAL
INFORMATION SUPPLIED BY THIS OFFICE IS NOT GAURENTEED. ALL INFORMATION MUST BE CONFIRMED ON SITE BEFORE WORK COMMENCES.

Joburg – a world class African City
JRA

1:3,300

Kilometers: 0.05 0.025 0 0.05 0.1 0.15

Legend

ROADS: NATIONAL, PROVINCIAL, MOTORWAY, MAJOR ROADS, INDUSTRIAL, LOCAL ROADS, GRAVEL, PRIVATE

Rea Vaya (BRT) – ROUTECODE: TRUNK ROUTE, COMPLIMENTARY, FEEDER ROUTE, Gauteng_Road_Reserve

S'water Inlets – ASSET: CATCH PIT, END CAP, INLET, GRID, HEADWALL, INLET MANHOLE, JUNCTION BOX, KERB OUTLET, MANHOLE, OUTLET MANHOLE, UNDEFINED

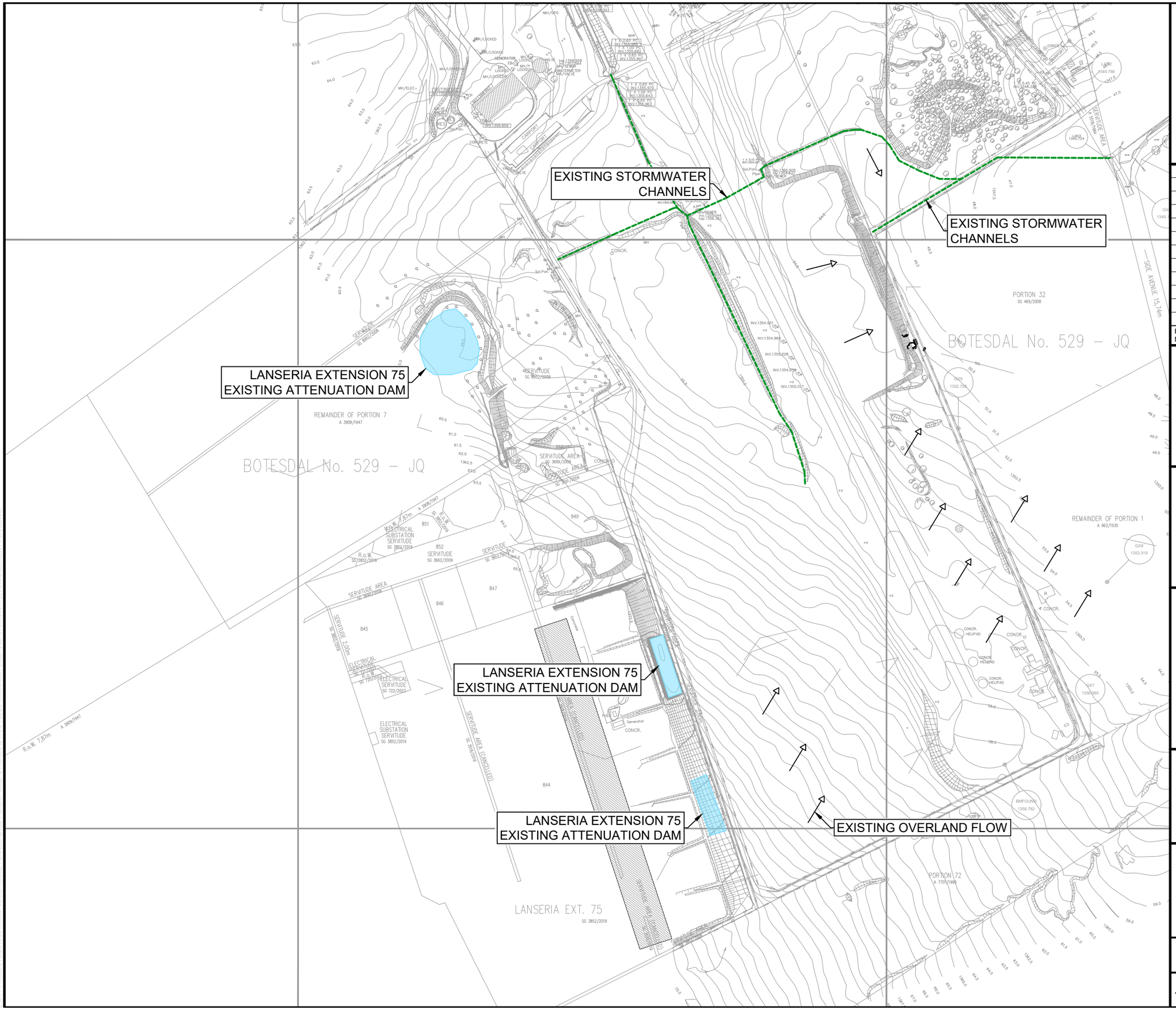
Stormwater_Assets – Category, SubCategory: Channels, Natural Channels, Conduit, Erosion Protection Structure, Inlets, Manholes

CULVERTS: CULVERT, LINED CHANNED, UNLINED CHANNEL, DRAIN, UNDEFINED

Hazards – HAZARD: High Hazard, Medium Hazard, Low Hazard, Floodline_100yr

City of Johannesburg
Johannesburg Roads Agency
Road Asset Management Systems:
Telephone : +2711 298 5019
e-mail : servicesinfo@jra.org.za
Compiler : Ron Segenhout
Projection: Transverse Mercator (Lo 29)
Datum: Hartebeeshoek 94 (WGS84 Ellipsoid)
Map Size: A3
Workspace : L:\GIS\0000 - ArcMap Templates\A3 (landscape) - Way-leaves.mxd
07/10/2022 09:43:15

ANNEXURE G: EXISTING SITE STORMWATER MANAGEMENT



GENERAL NOTES:

1. REFER TO ALL RELEVANT DRAWINGS & SPECIFICATIONS, DO NOT SCALE ANY DIMENSIONS.
2. WHERE DISCREPANCIES OCCUR BETWEEN THE PROJECT DRAWINGS OR SPECIFICATIONS, THESE SHOULD BE REPORTED IMMEDIATELY TO THE ENGINEER.
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5. ALL CONSTRUCTION INFORMATION TO BE USED AS INDICATED ON DRAWINGS THAT WERE ISSUED FOR CONSTRUCTION.

Rev. No:	Date:	Revision Details:	By:

Client:

Architect:

e•d•s

Structural, Civil and Transportation Engineers

Sussex Office Park
473 Lynnwood Road
Lynnwood
Pretoria, Gauteng
Tel: 012 991 1205

20 On Krige Building
20 Krige Road
Stellenbosch
Western Cape
Tel: 021 891 0530

e-mail: info@edseng.co.za

Project:

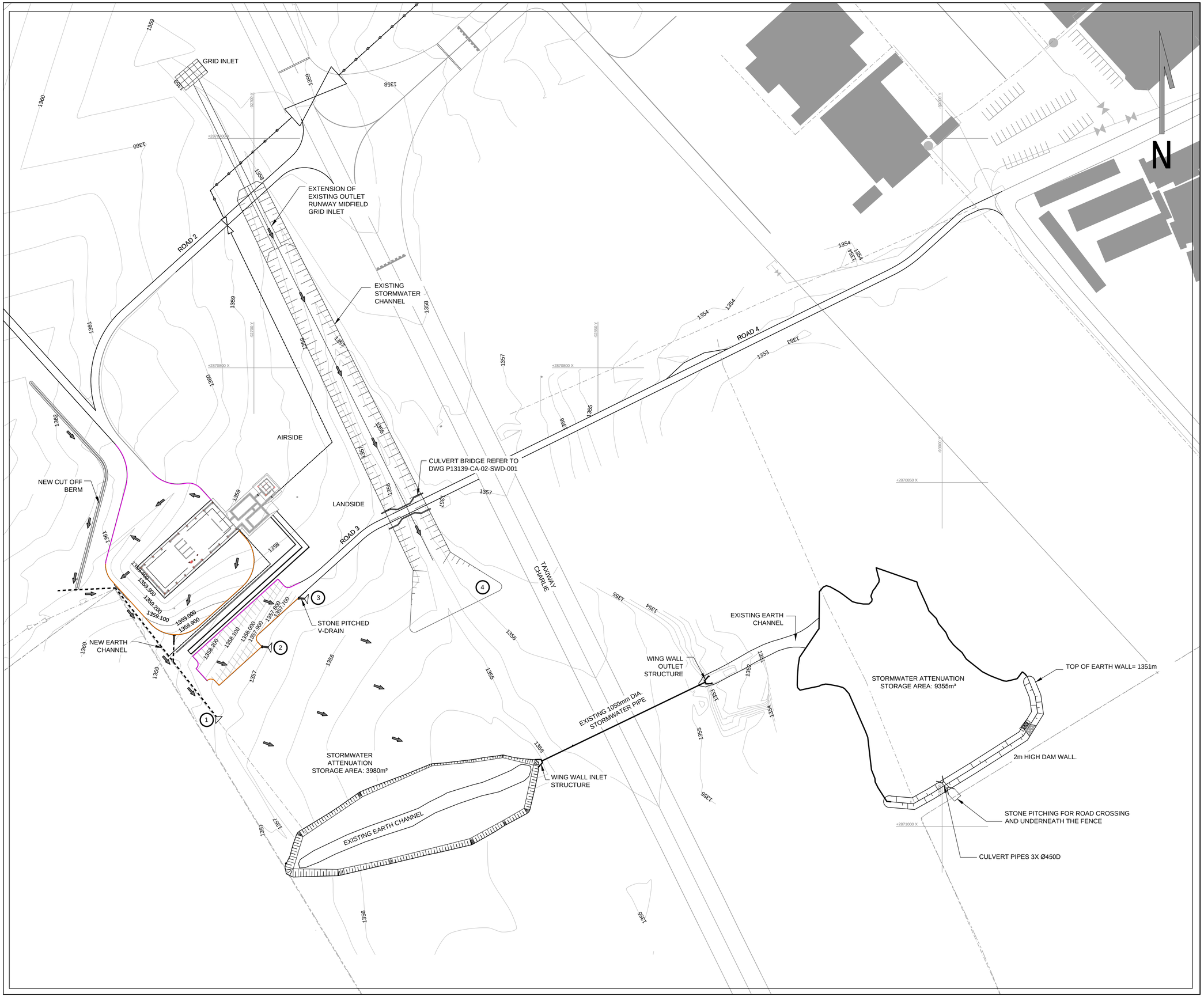
LANSERIA

Description:

EXISTING SITE STORMWATER MANAGEMENT PLAN

Paper size:	Drawn:	Checked:	Designed:
A3	JDHV	DvdM	PdL

Scale:	Project Number:	Drawing Number:	Revision:
10000	2019-094	0501	A



Cad File Name: DBEC-MRPRO-09-06
P13139-CA-02-SW-002 REV A - STORMWATER LAYOUT

GREEN BUILDING COUNCIL SA MEMBER ORGANISATION

CESA Consulting Engineers South Africa

FOR COUNCIL APPROVAL

LEGEND:

NOTE:
THESE DRAWINGS ARE TO BE USED FOR CONSTRUCTION PURPOSES **ONLY** AND **NOT** FOR AERONAUTICAL PURPOSES.

① - ④ OVER LAND STORMWATER SHEET FLOW DISCHARGE WITH EROSION PROTECTION AND ENERGY DISSIPATION

STORMWATER FLOW DIRECTION

Client

LANSERIA INTERNATIONAL AIRPORT

PRIVATE BAG X1
LANSERIA
1748

TEL: +27-11-367-0300
FAX: +27-11-701-3261

Consultant

DELTA built environment consultants

P O BOX 35703
MENLO PARK
0102

TEL: (012) 368 1850
FAX: (012) 348 4738

Project
LANSERIA
INTERNATIONAL AIRPORT

Project Description
LIA FIRE STATION
AND TOWER

Drawing Title
STORMWATER LAYOUT AND MASTER PLAN
OF LIA FIRE STATION AND CONTROL TOWER

Drawing Units
METERS

Date	Scale	Designed By
JUNE 2016	N.T.S	G MCKENZIE
Checked By	Drawn By	Approved By
S LE ROUX	E COETZEE	P DE WET

Drawing No. P13139-CA-02-SW-002 Rev A

ANNEXURE H: APPROVED SWMP

Good day

Herewith a letter for Lanseria extension 1.

Regards
Vincent
Dev control

-----Original Message-----
From: administrator@jra.org.za [mailto:administrator@jra.org.za]
Sent: 31 August 2016 11:01 AM
To: Vincent Mphilo
Subject: Message from "RNP0026734702FE"

This E-mail was sent from "RNP0026734702FE" (Aficio MP 2352).

Scan Date: 31.08.2016 11:01:19 (+0200)
Queries to: administrator@jra.org.za

City of Johannesburg
Johannesburg Roads Agency

66 Pixley Ka Isaka Seme Street
Cnr. Rahima Moosa Street
Johannesburg
2001

P/Bag X70
Braamfontein
South Africa
2017

Tel +27(0) 11 298 5000
Fax +27(0) 11 298 5178
www.jra.org.za
www.joburg.org.za

a world class African city

Tel: (011) 298-5043
Fax: (011) 298-5066

Ref: 17/8/L47-1
N. Chinyowa

Delta Built Environment Consultants
PO Box 35703
Menlo Park
0102

Date: 25 August 2016

Email: piet.dewet@deltabec.com

Attention: Mr Piet de Wet

Sir,

STORMWATER DRAINAGE MASTER PLAN FOR LANSERIA AIRPORT EXTENSION 1

With regards to your revised Stormwater Master Plan received on 18 August 2016 for Lanseria Airport Extension 1, please receive the following comments:

1. The stormwater management plan is acceptable.
2. The total stormwater attenuation for the township as per the report is 36 432m^3. This falls short of the JRA requirement of at least 300m^3/ha which would equate to 79 392m^3. However given that the approved FAR for erf 183 is 0.2 the designed attenuation is adequate. Should the FAR be increased on any stand in the township, the JRA will require stormwater attenuation at the acceptable rate of 300m^3/ha to 350m^3/ha.
3. Your internal stormwater management system will remain private.
4. All municipal servitudes should be protected.
5. The township layout should conform to the JRA comments on the Traffic Impact Study.
6. All upgrades and amendments to the roads network around the site as per the JRA comments should be implemented.
7. Any portion of the airport that is to be developed should conform to this Stormwater Master Plan, and should clearly set out the infrastructure to be installed.
8. Prior to construction, the Detailed Design showing the site layout, stormwater collection point(s), stormwater attenuation pond details, outlet details and erosion control, invert levels and long-sections, should be submitted and approved.

Please note:
All road upgrades to be undertaken by the developer or his representatives, the cost thereof, will not be refunded back to the developer by the Johannesburg Roads Agency (JRA) or the City of Johannesburg (CoJ) unless these upgrades were discussed and agreed upon in writing by both parties

upfront, before any construction commences. The mere fact that the detail design drawings or Traffic Impact Studies have been approved, does not bind the JRA or the CoJ to any agreement.
It should also be noted that if any upgrades are undertaken by the developer to any roads or storm-water on behalf of CoJ or the JRA, the developer will be entitled to an off-set against their external engineering services contributions as per section 49(4) of SPLUMA, provided these services are required to be upgraded to resolve background capacity problems, and not as a result of his/her impact of the development. These upgrades are to be discussed with the officials of the JRA and agreement in writing is to be obtained from the JRA to the off-set of such contributions, before any construction commences on site.
If the amount for the upgrade/construction exceeds the contributions payable, the balance thereof will not be refunded to the developer and the construction is then carried out at the developers own cost.

Yours faithfully

pp Manager: Development Control
nc/nc

ANNEXURE I: FLOOD LINE STUDY

Lanseria Ext 11 Development Floodline study

Report Prepared for:

EDS Engineers

Report Prepared by

M Braune , Pr Eng

March 2023

1:100 Year Floodline study: Lanseria Ext 11 Development

EDS Engineers

Bio Engineering Solutions (Pty) Ltd

440 Kings highway

Lynnwood

Pretoria

mattbraune7@gmail.com

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1 Introduction and Scope of Report

We refer to your request for a floodline study for a development adjacent the Lanseria airport. It is planned to develop a site for usage as a storage facility .There is also a legal requirement in terms of the National Water Act of 1998(Act No 36) that a 1:100-year floodline study be carried out along any watercourse and/ or depression in the vicinity of an existing and planned development. The Locality of the planned development on **Figure 1-1** below

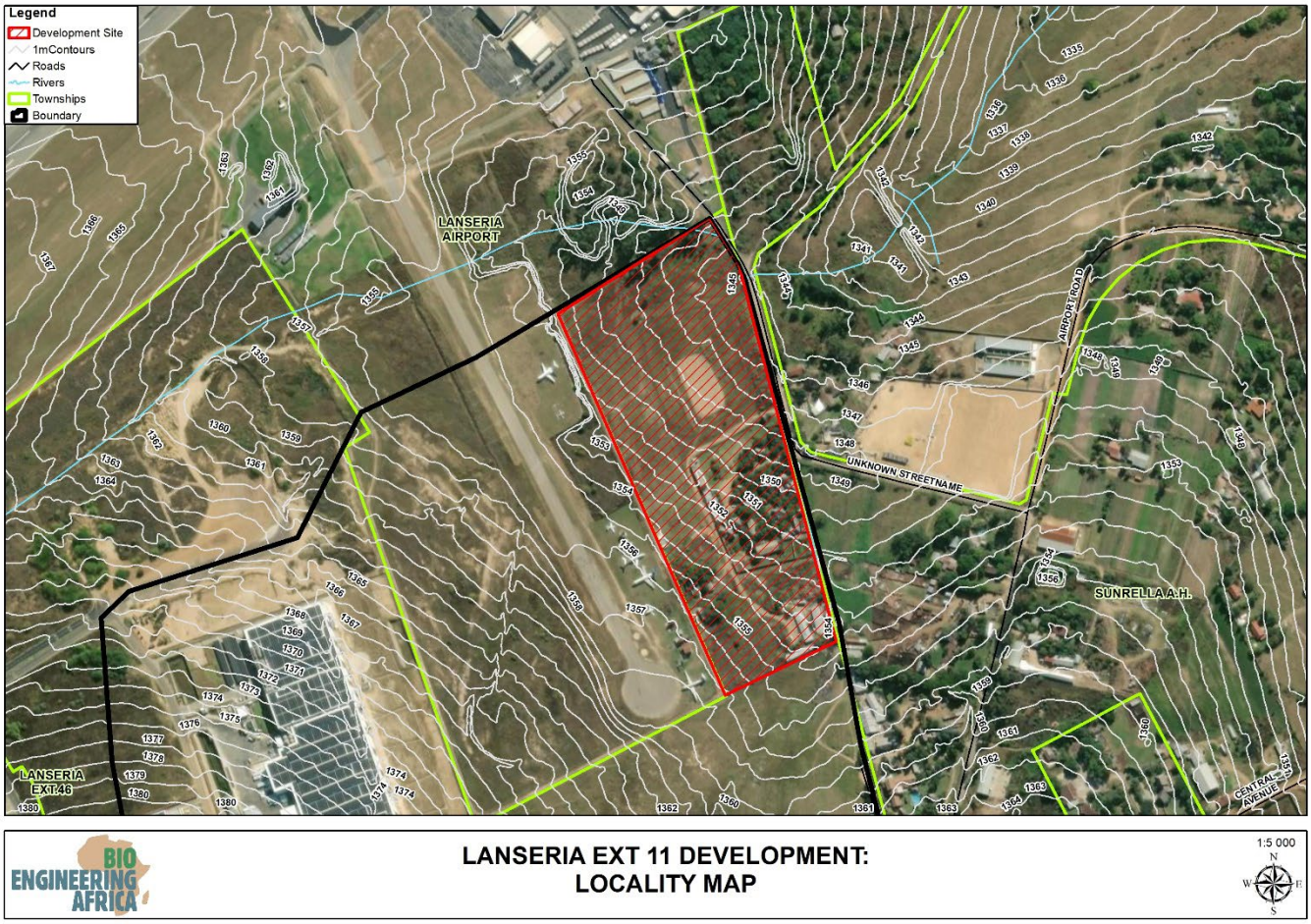


Figure 1-1: Lanseria Ext 11 :Study area locality

2 Description of Study Area and watercourse

The study area is situated within a developing area to the east of the existing Lanseria airport within the city of Johannesburg municipal area . There is a upstream natural watercourse which drains towards the development site .The water course continues over the site and is drained underneath an access road via a culvert structure. Typical details of the watercourse and site are shown in **Figure 2-1** below.

	
Existing fence boundary along eastern site boundary	Existing culvert below access road to the east of the site
	
Development site view towards Lanseria airport	Typical site condition

Figure 2-1: Typical details of the site and watercourse

3 Existing Topographical Details

The general topography was determined using the latest available contour information from the city of Johannesburg . Additional field measurements of the control structures were taken during a site visit and a local detailed survey was forward by EDS Engineers

3.1 Site Visit

A site visit of the study area was conducted to determine any changes within the surrounding area as well as along the watercourse and the development site. From the site visit it was determined that the existing contour information is accurate and reflects the existing topography.

4 Flood Hydrology

A hydrological study was carried out based on the current catchment conditions using the UPD model. The peak flow rates were determined by employing both the RATIONAL and ALTERNATIVE RATIONAL methods. The catchment areas and boundaries are shown on **Figure 4-1** below for the main watercourse to the north of the development site . The catchment measures 0,8 km^2.

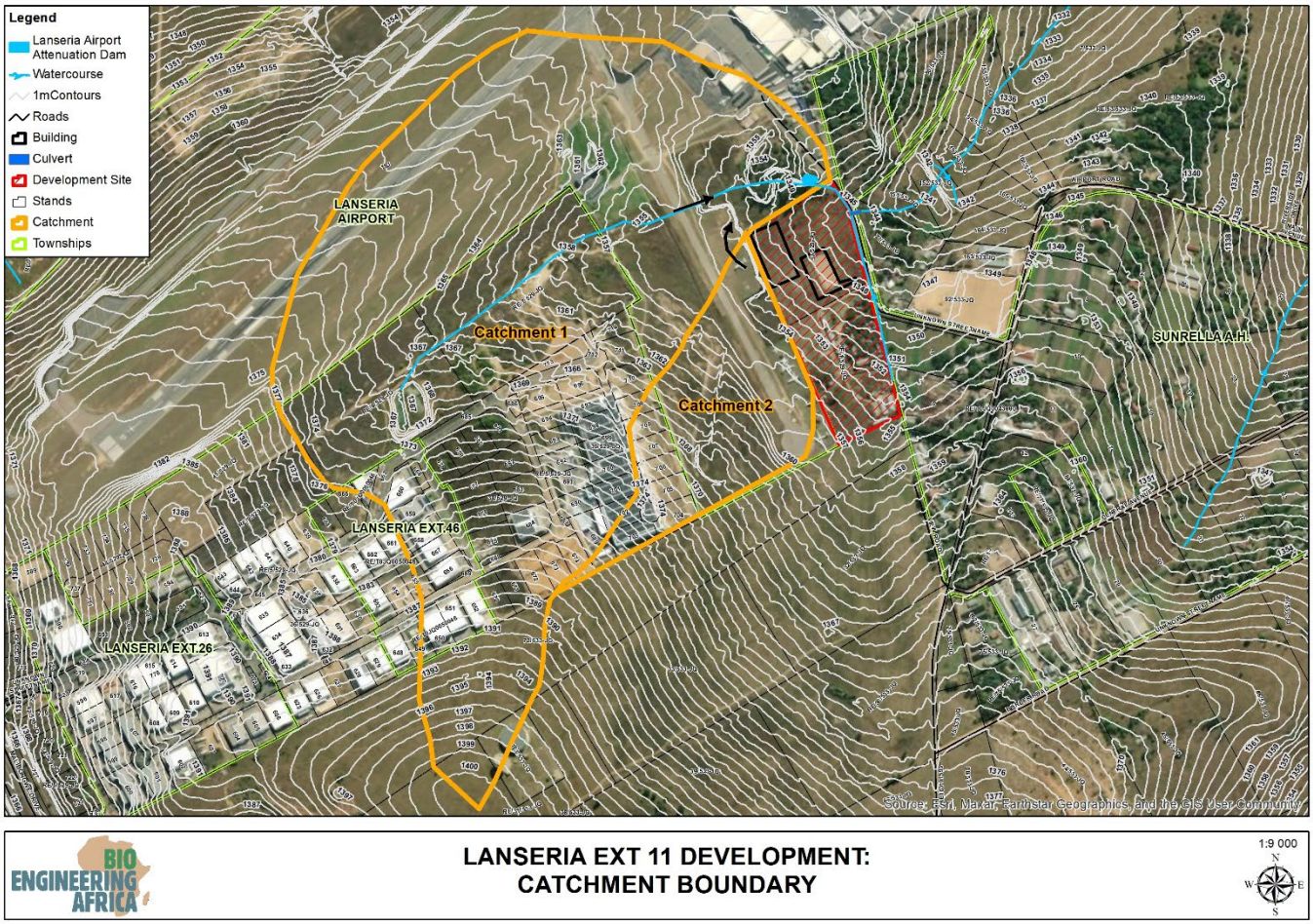


Figure 4-1: Development site and catchment boundary

4.1 Rainfall determination

An important input parameter to the hydrological model is the expected storm rainfall .

The rainfall records were obtained from the South African Weather Services (SAWS) .The rainfall station 0475661 was used for this purpose . The rainfall station has a MAP of 646 mm . A summary of the determined 24-hr storm rainfall is given in Table 4.1 below.

Table 4-1: Storm rainfall

Return period (yrs)	Storm rainfall (mm)
1:50	131

1:100	152

A summary of the peak flows estimated by the various methods is given in Table 4-2 below. Further details of the model parameters are given in **Appendix A.**

4.2 Land-use

Existing and future planned land-use use was obtained from the spatial development framework and is shown in Figure 4-2 below

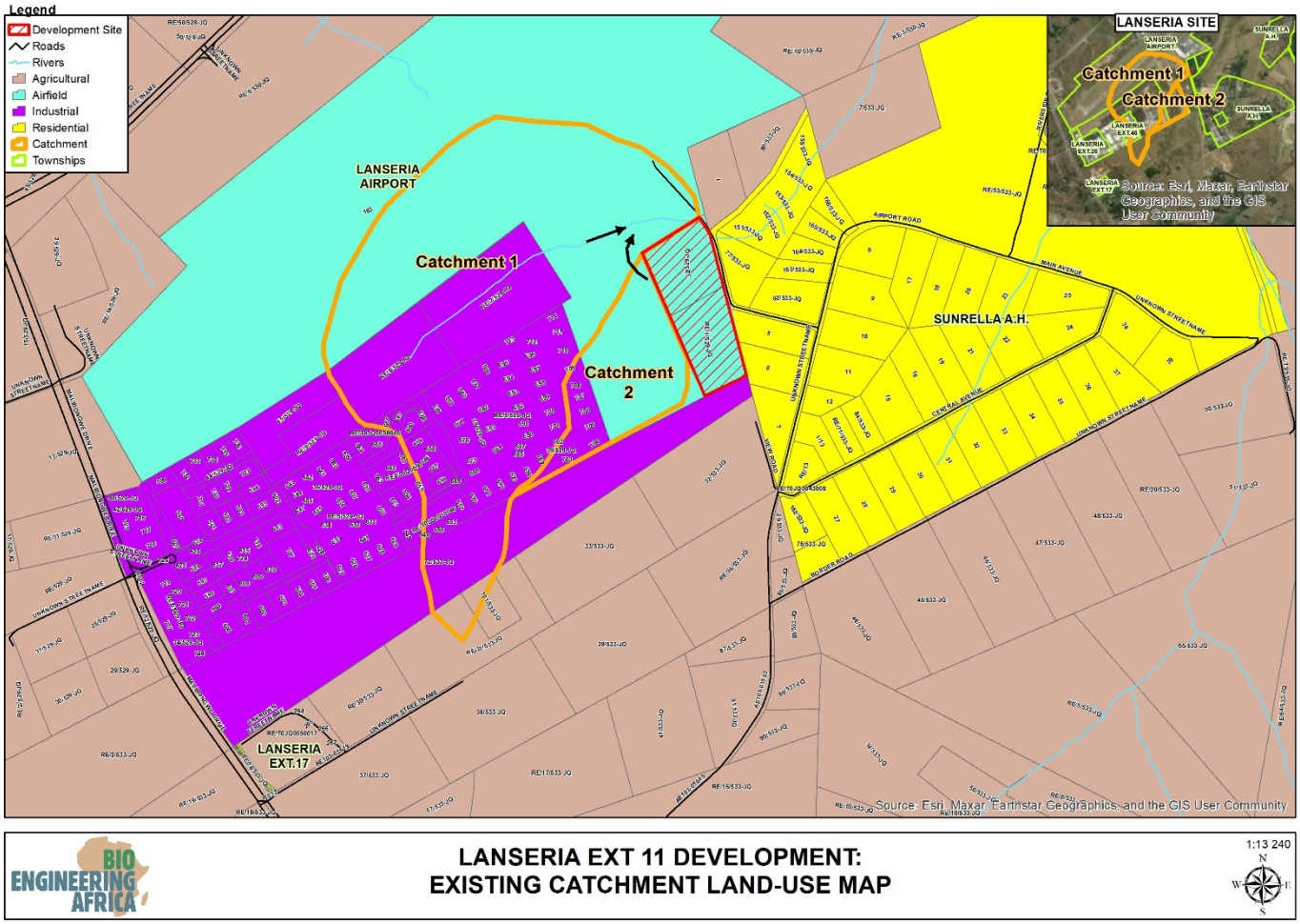


Figure 4-2: Future land-use coverage

It is seen from the above Figure that the catchment coverage consist of a mixture of commercial /industrial and residential development . Based on the above a RATIONAL weighted average coefficient C = 0,70 was obtained.

4.3 Regional geology

A further input parameter to the hydrological model is the current soil condition . It is seen from the regional geological map shown on Figure 4-3 that the catchment is within the Granite Gneiss formation .This gives a shallow soil coverage with underlaying rocks and a medium-high runoff potential .

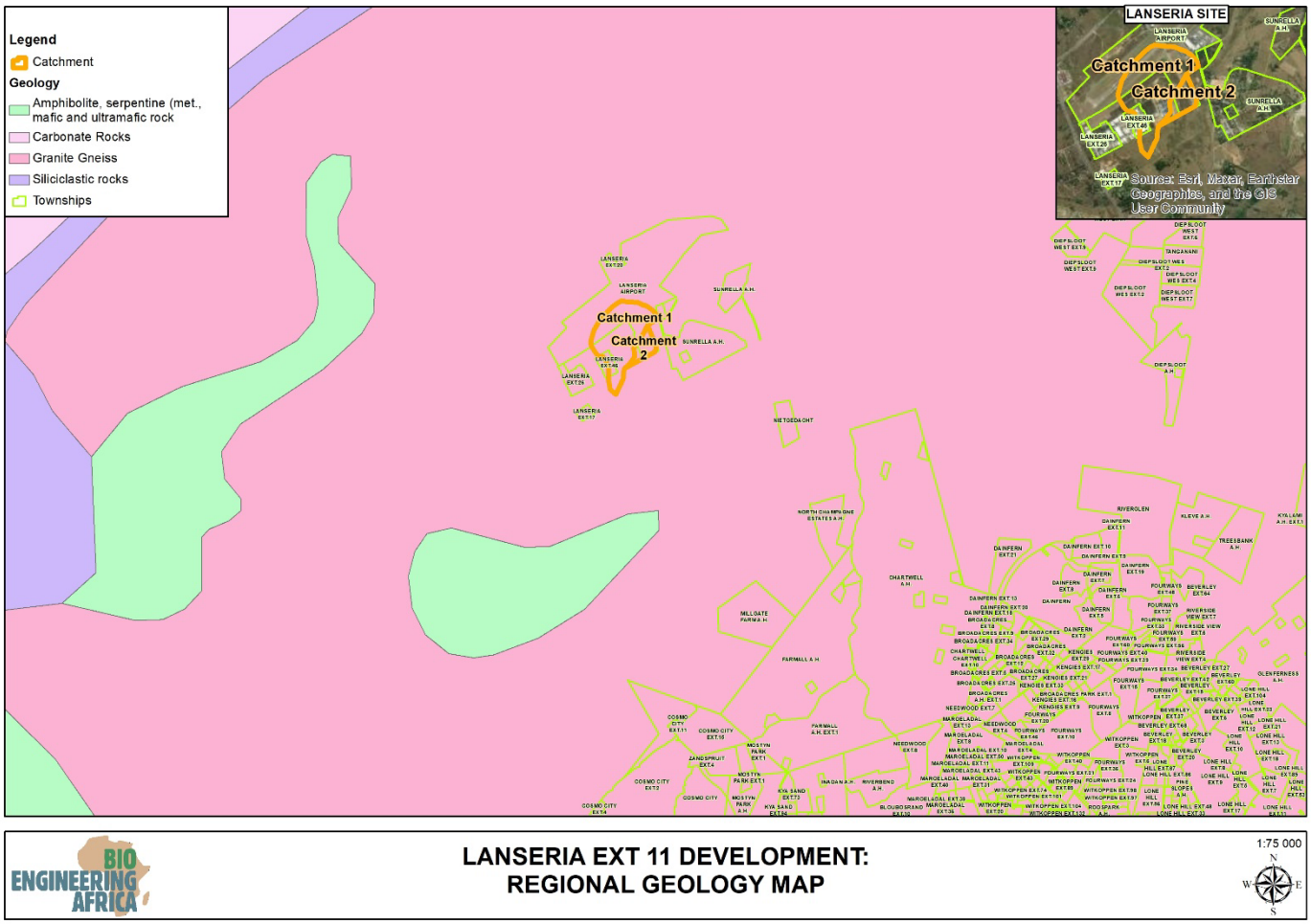


Figure 4-3: Regional Geology

4.4 Peak flow determination

Taking the above catchment as well as model input parameters into account the UPD software was used to determine relevant peak flow rates . A summary of the expected peak flow rates is given below in Table 4-2.

Table 4-2: Summary of peak flows

Method	**1:50 year peak flow (m^3/s)**	**1:100 year peak flow (m^3/s)**
Rational Method	20,0	26,0
Alternative Rational	24,4	28,5
Adopted	**24,4**	**28,5**

Based on recommendations from the Urban Drainage Manual (6th Edition) as well as the UPD program literature the method selected as being most accurate is the Alternative Rational .

5 HECRAS Model Compilation

This program employs detailed channel morphology as well as site-specific hydrological data combined to perform one-dimensional hydraulic calculations for a river network. The HECRAS model employs standard backwater techniques to compute the high-water level for various steady flow conditions, considering structures and controls across a watercourse. A HECRAS model was set up for the following two conditions :

i. Existing natural watercourse ;
ii. Planned new culvert drainage system

The HECRAS model main parameters are summarised in **Table 5-1** below.

Table 5-3: HECRAS Model Main Parameters

Parameter	Average Value/Selection	Reason
Existing Natural watercourse		
Manning 'n'	0.040 (main flow channel)	Defined natural watercourse
	0.030 (floodplains)	Light bush and grassed area
Boundary conditions	Critical flow depth	Inlet and outlet structures
Flow regime	Mixed flow	Slope and cross section changes requiring super and sub-critical flow regimes
New culvert drainage system		
Manning 'n'	0,012	Concrete culvert
Boundary conditions	Critical flow depth	Inlet and outlet structures

6 Findings of the Floodline Study

The 50/100 year flood lines have been determined based on the two conditions listed above .

6.1 Existing watercourse conditions

The determined floodlines for a 1:50 and 1:100-year events for the current natural watercourse are shown in **Figure 6-1** below.

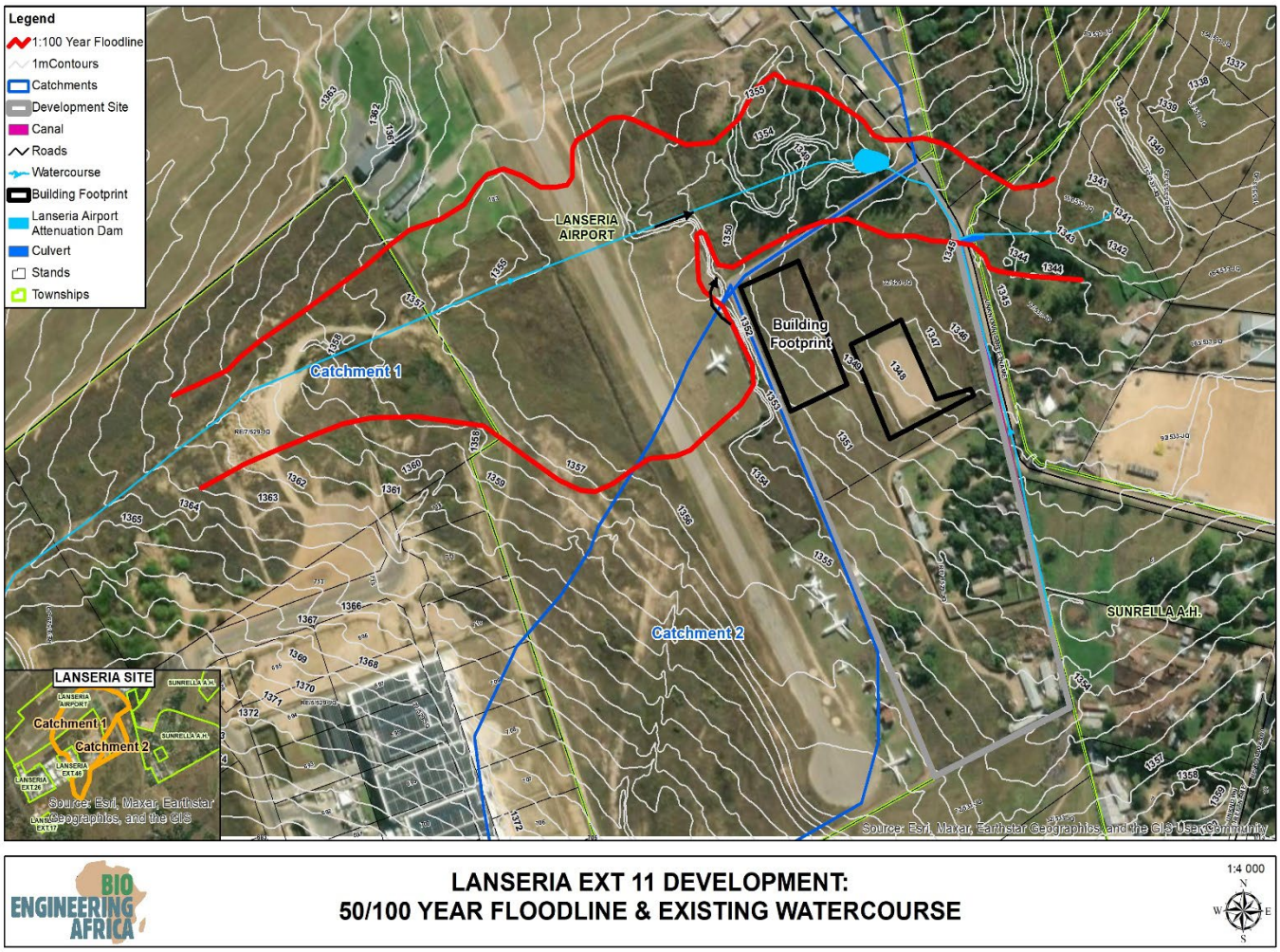


Figure 6-1: 50/100 year floodlines (Existing watercourse condition)

The following is observed from the above figure :

i. A wide area is covered by the floodlines under current watercourse conditions due to the flat topography upstream of the site ;

ii. Only a small portion of the site at the north-eastern corner is affected under current development conditions;

iii. The flow depth and velocity is low due to the wide flood plain hence giving no erosion problems.

6.2 Planned future drainage system condition

As part of the development site it is planned to construct a underground culvert drainage system .The culvert will start at the western boundary of the site and drain all the stormwater along the northern boundary of the site as well as the paved area upstream of the site discharging into the downstream natural watercourse . The Culvert drainage system has been sized to handle up to a 1:100 year flood peak without causing any flooding nor damage to the surrounding area and new

development . A **3,0 m wide by 2,4 m high** portal culvert is required . The culvert inlet works should be designed in relation to the proposed concept design given in Figure 6-2 below .

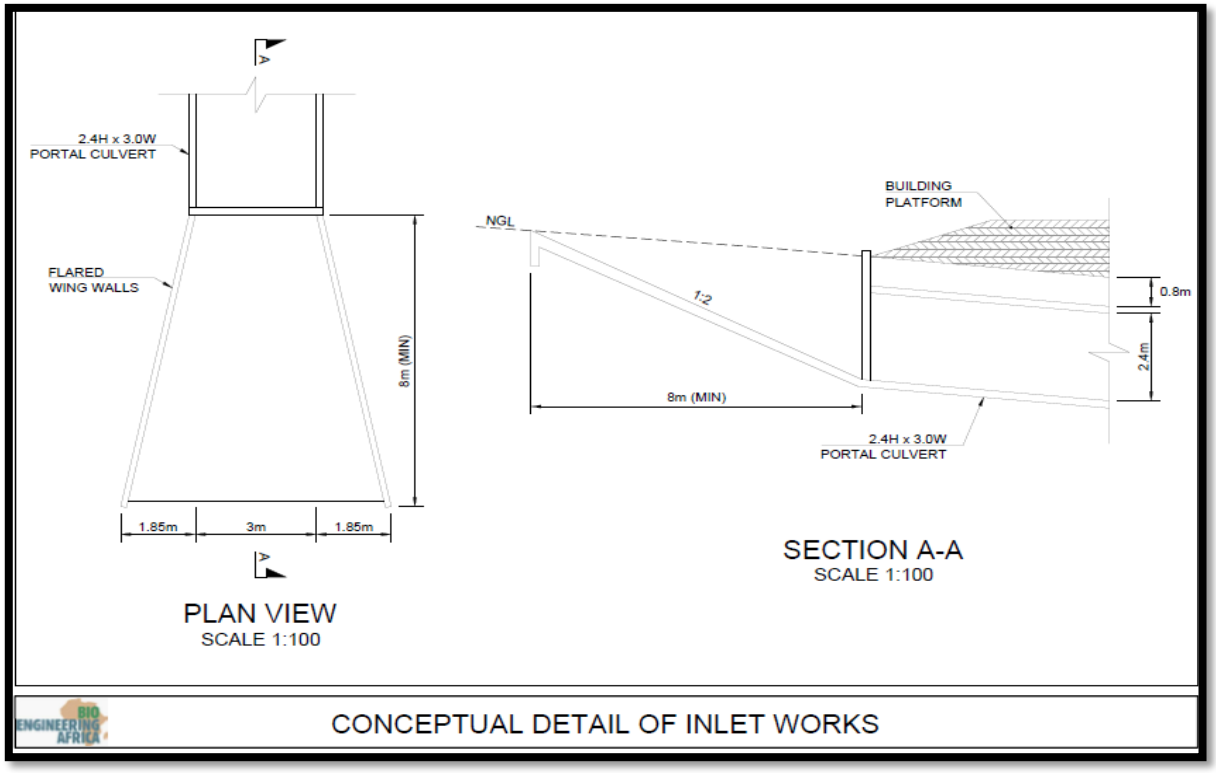


Figure 6-2: Culvert inlet works concept design

It is also planned to implement a side flow channel at the toe of the backfilled building terrace to intercept and drain all overland upstream runoff into the culvert system . The channel should be either lined with concrete or grouted stone pitching . The minimum size would need to be :

- Bottom width :3,0 m
- Depth(min): 1,5 m
- Side slope 1:1,5

The HECRAS model was now again set up with the planned culvert drainage system .The modified floodline is shown on Figure 6-3 below .

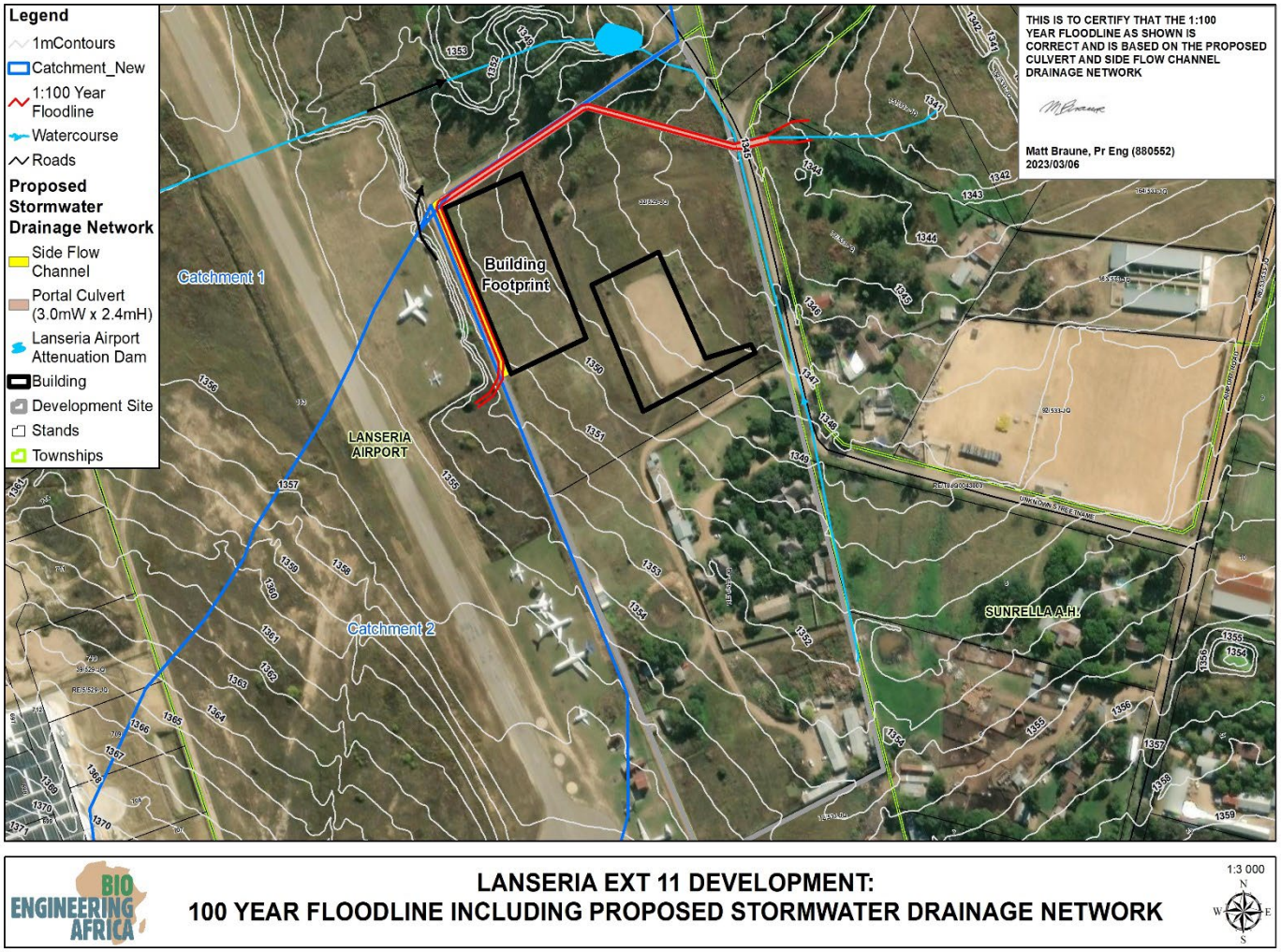


Figure 6-3: 50/100 year floodlines (with planned culvert drainage system)

The following is observed from Figure 6-3 above :

i. The revised floodline will no longer have an impact of the development site ;

ii. The floodline will be contained along the western boundary of the site by a side flow channel which then drains into the planned underground portal culvert along the north site boundary.

7 Conclusions

The following is concluded from the floodline study:

i. The 1:50 and 1:100-year flood floodline encroaches only a small portion of the north-eastern corner of the development site under current water course conditions ;
ii. If a side flow channel and a culvert drainage system is implemented the 100 year floodline will no longer encroach nor have any impact on the development site ;
iii. A 3,0m wide x 2,4 m high portal culvert is required to handle up to a 1:100 year flood event
iv. A side flow channel (bottom width 3m x depth 1,5 m and side slope of 1:1,5) would be required to drain all upstream flow into the culvert system

8 Recommendations

The following is recommended:

i. The floodlines be used for township planning ;
ii. The planned stormwater drainage system be constructed as part of the new development

Prepared by

M. Braune, Pr Eng

(880552)

Appendix A:

UPD model results

Utility Programs for Drainage
Flood calculations

Project name: LANSERIA DEVELOPMENT
Analysed by: J. AKURA
Name of river: LANSERIA STREAM
Description of site: DEVELOPMENT SITE NEXT TO LANSERIA AIRPORT
Filename: C:\Users\User\OneDrive\Projects\02 - Projects\0699-EDS Lanseria Floodlines\04 Design\UPD\FUTURE CONDITIONS\FUTURE CONDITIONS (1.15 RAINFALL)- LANSERIA DEV
Date: 3 March 2023

Flood Frequency Analysis: Alternative Rational Method

Project	= LANSERIA DEVELOPMENT
Analysed by	= J. AKURA
Name of river	= LANSERIA STREAM
Description of site	= DEVELOPMENT SITE NEXT TO LANSERIA AIRPORT
Date	= 2023/03/03
Area of catchment	= 0.72 km²
Dolomitic area	= 40.0 %
Length of longest watercourse	= 1.463 km
Flow of water	= Defined water course
Height difference along 10-85 slope	= 46.4 m
Area distribution	= Rural: 42 %, Urban: 57 %, Lakes: 1 %

Catchment description - Urban area (%)

Lawns		Residential and industry		Business	
Sandy, flat (<2%)	1	Houses	2	City centre	10
Sandy, steep (>7%)	0	Flats	1	Suburban	40
Heavy soil, flat (<2%)	0	Light industry	36	Streets	10
Heavy soil, steep (>7%)	0	Heavy industry	0	Maximum flood	0

Catchment description - Rural area (%)

Surface slopes		Permeability		Vegetation	
Lakes and pans	1	Very permeable	0	Thick bush & forests	0
Flat area	99	Permeable	2	Light bush & cultivated land	0
Hilly	0	Semi-permeable	10	Grasslands	10
Steep areas	0	Impermeable	88	Bare	90

Days on which thunder was heard = 60 days/year
Weather Services station number =
Weather Services station location =
Mean annual precipitation (MAP) = 646 mm

Duration	2	5	10	20	50	100	200
1 day	54	74	90	107	131	152	158
2 days	66	91	111	134	168	199	235
3 days	74	102	126	148	183	214	250
7 days	97	131	157	185	225	259	297

The modified recalibrated Hershfield relationship was used to determine point rainfall.

Average slope	= 0.04229 m/m
Time of concentration	= 10.0 min
Run-off factor	
Rural - C1	= 0.599
Urban - C2	= 0.751
Lakes - C3	= 0.000
Combined - C	= 0.599

Rural run-off coefficient C1 above includes dolomitic factors

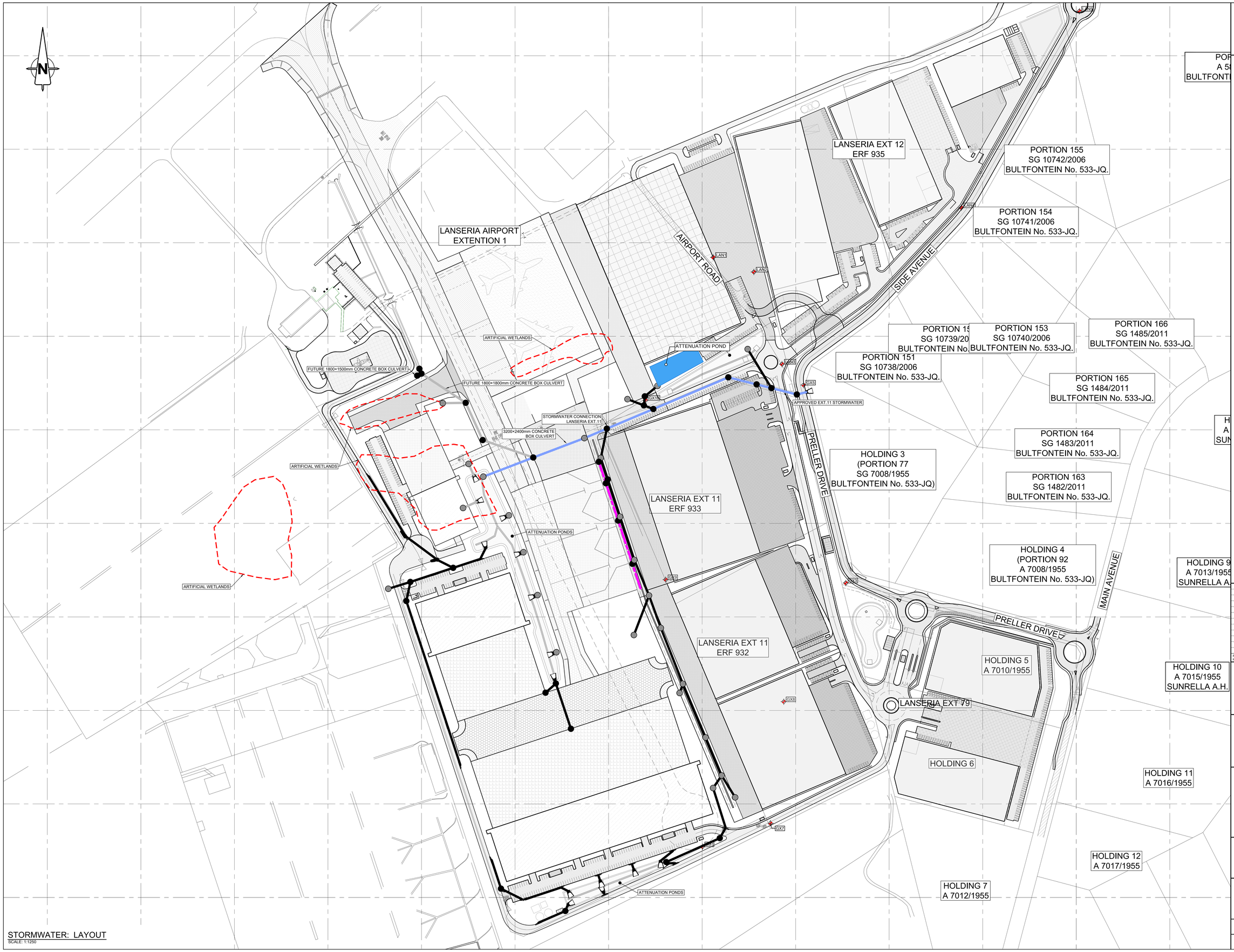
---

Return period (years)	Time of concentration (hours)	Point rainfall (mm)	ARF (%)	Average intensity (mm/h)	Factor Ft	Runoff coefficient (%)	Peak flow (m³/s)
1:2	0.30	18.18	100.0	60.50	0.75	55.6	6.730
1:5	0.30	30.67	100.0	102.05	0.80	56.5	11.53
1:10	0.30	40.12	100.0	133.49	0.85	57.3	15.31
1:20	0.30	49.56	100.0	164.93	0.90	58.2	19.20
1:50	0.30	62.05	100.0	206.49	0.95	59.0	24.39
1:100	0.30	71.50	100.0	237.93	1.00	59.9	28.50
1:200	0.30	80.95	100.0	269.37	1.00	59.9	32.27

Run-off coefficient percentage includes adjustment saturation factors (Ft) for steep and impermeable catchments

Calculated using Utility Programs for Drainage 1.1.0

ANNEXURE J: STORMWATER MANAGEMENT LAYOUT DRAWING



STORMWATER: LAYOUT
SCALE: 1:1250

GENERAL NOTES:
1. REFER TO ALL RELEVANT DRAWINGS & SPECIFICATIONS. DO NOT SCALE ANY DIMENSIONS.
2. WHERE DISCREPANCIES OCCUR BETWEEN THE PROJECT DRAWINGS OR SPECIFICATIONS, THESE SHOULD BE REPORTED IMMEDIATELY TO THE PRINCIPAL AGENT.
3. ALL DIMENSIONS AND LEVELS TO BE CHECKED ON SITE AND CORRELATED WITH THE ARCHITECTS DRAWING BEFORE CONSTRUCTION COMMENCES.
4. ALL WATERPROOFING AND EARTH POSONING DETAILS TO BE IN ACCORDANCE WITH THE ARCHITECT'S SPECIFICATION AND INSTRUCTIONS.

NOTES: STORM WATER

1. THE STANDARD SPECIFICATION SANS 1200 LE, A, D, DB, G AND LB (EXCLUDING PAYMENT CLAUSES) IS APPLICABLE.
2. CONCRETE NON-PRESSURE PIPES TO COMPLY WITH THE RELEVANT REQUIREMENTS OF SANS 677:2010.
3. UNPLASTICIZED POLY (VINYL CHLORIDE) (PVC-U) PIPES TO COMPLY WITH THE RELEVANT REQUIREMENTS OF SANS 791:2014.
4. MINIMUM PIPE DIAMETER TO BE 450mm, UNLESS OTHERWISE SPECIFIED.
5. MINIMUM FALL TO BE 1:150, UNLESS OTHERWISE SPECIFIED.
6. PIPE BEDDING TO BE CLASS B UNLESS OTHERWISE SPECIFIED.
7. ALL EXCAVATIONS AND BEDDING MUST BE INSPECTED AND APPROVED BY THE ENGINEER BEFORE LAYING OF ANY PIPES.
8. CLEAN EXISTING STORM WATER INLETS AND REPAIR WHERE NECESSARY.(IF APPLICABLE)
9. EXISTING INVERTS AND POSITIONS AT CONNECTION POINTS TO BE CONFIRMED ON SITE BEFORE ANY CONSTRUCTION COMMENCE.
10. THE ENGINEER MUST BE NOTIFIED TO DO INSPECTIONS ON ALL PIPE BEDDING PRIOR TO INSTALLATION OF PIPES.
11. THE ENGINEER MUST BE NOTIFIED TO DO INSPECTIONS ON ALL BLANKET AROUND PIPE PRIOR TO BACKFILLING ON TOP OF BLANKET.
12. INSPECTOR FROM LOCAL AUTHORITY TO BE NOTIFIED TO DO INSPECTIONS OF PIPE AND MANHOLES INSTALLED BEFORE ANY BACKFILLING IS DONE.(WHERE APPLICABLE)

STORMWATER LEGEND:

- STORMWATER LINE
- FUTURE LINE
- 3200×2400mm CONCRETE BOX CULVERTS
- STORMWATER CHANNEL
- ARTIFICIAL WETLANDS
- SWXXX(MH) — MANHOLE
- SWXXX(IS/OS) — INLET / OUTLET STRUCTURE
- SWXXX(GI/FI) — GRID INLET / FIELD INLET
- SWXXX (JB) — JUNCTION BOX
- SWXXX(KI) [X/X/X] — KERB INLET CATCHPIT LENGTH [X/X/X]
  - TRANSITION
  - CATCHPIT
  - TRANSITION
- EXISTING STORMWATER LINE
- EXMH — EXISTING STORMWATER MANHOLE
- EXJB — EXISTING JUNCTION BOX
- EXKI — EXISTING KERB INLET

Rev. No.	Date:	Revision Details:	By:
B	14/11/25	FOR INFORMATION	DvdM
A	11/04/25	FOR INFORMATION	JDHV

Client:

Architect:

e•d•s
Structural, Civil and Transportation Engineers
Sussex Office Park
473 Lynnwood Road
Lynnwood
Pretoria
Tel: 012 991 1205
Fax: 012 991 1373
e-mail: info@edseng.co.za

Project:
LANSERIA

Description:
STORMWATER: LAYOUT

Paper size:	Drawn:	Checked:	Designed:
A0	KB	PdL	DvdM

Scale:	Project Number:	Drawing Number:	Revision:
1250	2019-094	3801	B

ANNEXURE K: STORMWATER CALCULATIONS

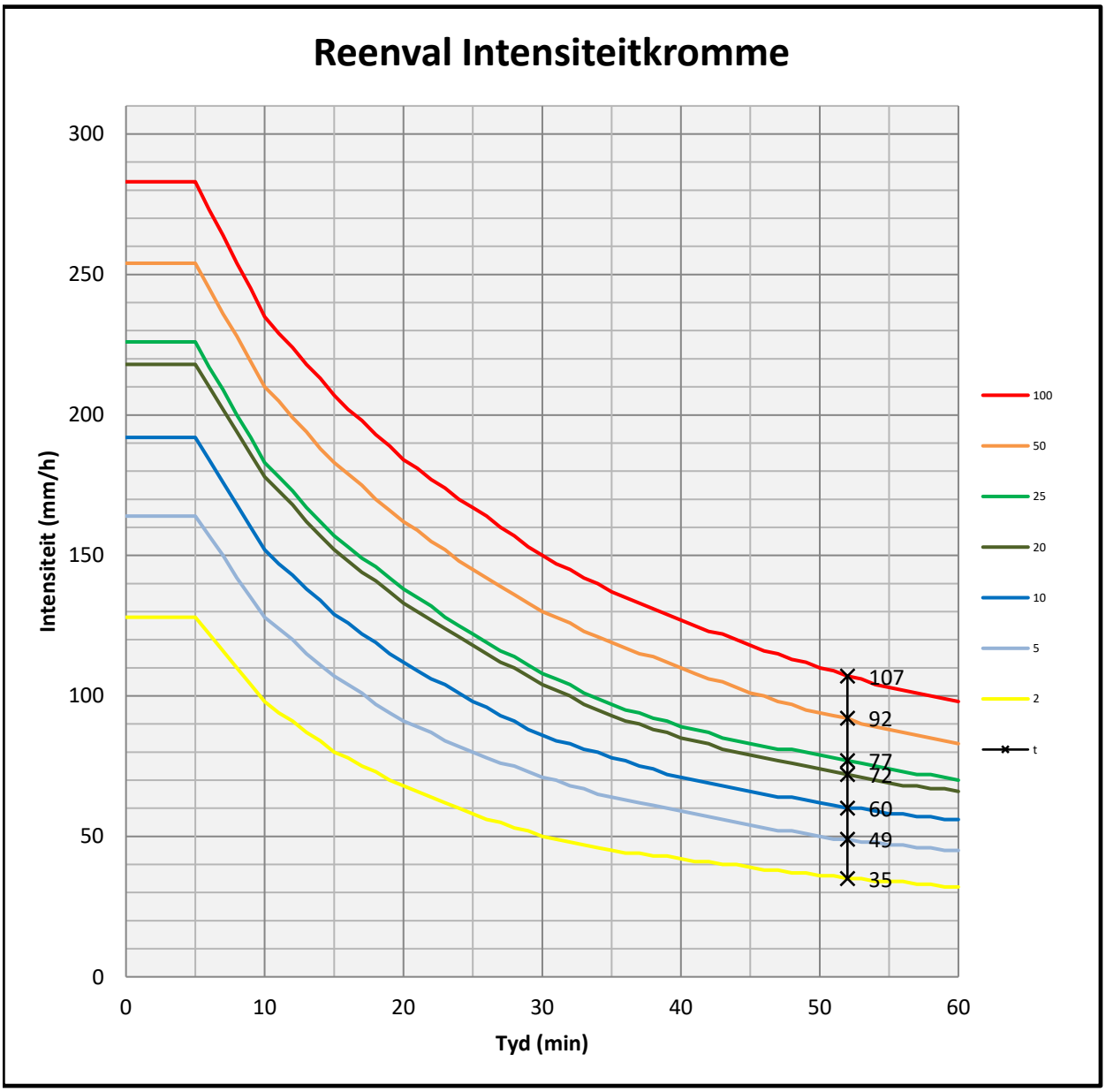
Stormwater - Standaard Intensiteitskrommes

Klas =	B
t =	52

Carolina, Cedara,Estcourt, Jan Smuts, Kokstad, Krugersdorp, Mafeking, Piet Retief, Potchefstroom, Pretoria, Roodeplaat, Rustenburg, Sheeprun, Towoomba

Tyd waarvoor die Intensiteit bepaal word (min)

Herhaalings Periode T	100	50	25	20	10	5	2
Tyd t (min)	52	52	52	52	52	52	52
Reenval Intensiteit I (mm/hr)	107	92	77	72	60	49	35



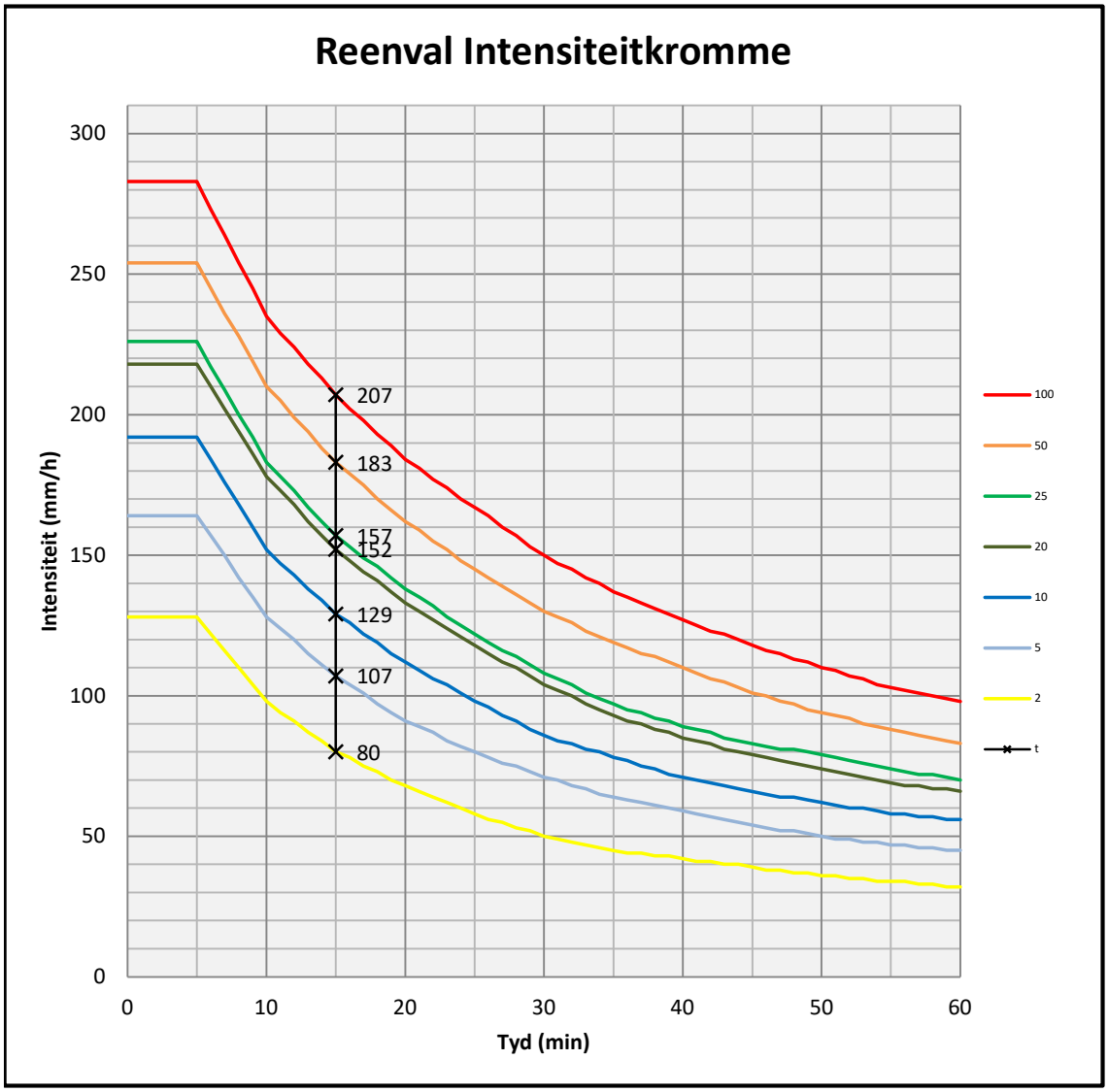
Stormwater - Standaard Intensiteitskrommes

Klas =	B
t =	15

Carolina, Cedara,Estcourt, Jan Smuts, Kokstad, Krugersdorp, Mafeking, Piet Retief, Potchefstroom, Pretoria, Roodeplaat, Rustenburg, Sheeprun, Towoomba

Tyd waarvoor die Intensiteit bepaal word (min)

Herhaalings Periode T	100	50	25	20	10	5	2
Tyd t (min)	15	15	15	15	15	15	15
Reenval Intensiteit I (mm/hr)	207	183	157	152	129	107	80



RATIONAL METHOD (ALTERNATIVE 1)

Description of Catchment		**2019-094 Lanseria X1 Southern Precinct**						
Calculated By		**DvdM**			**Date**	25/03/2025		
PHYSICAL CHARACTERISTICS								
Size of catchment (A)		0.255	km^2	Choose type of flow		Overland flow		
Longest watercourse (L)		0.563	km	Rainfall region		Lanseria - Johannesburg		
Average slope (S_{av})		0.033748	m/m	**AREA DISTRIBUTION FACTORS**				
Dolomite area ($D_{\%}$)		0%		Rural (α)		Urban (β)		
Mean annual precipitation (MAP) ⑨		750	mm	100%		0%		
RURAL①				**URBAN** ②				
Surface Slope	**%**	**Factor**	**C_S**	**Description**	**%**	**Factor**	**C_2**	
Wetlands and pans	0%	0.03	0	**Lawns**				
Flat areas	100%	0.08	0.08	Sandy, flat (<2%)		0.1	0	
Hilly	0%	0.16	0	Sandy, steep (>7%)		0.2	0	
Steep areas	0%	0.26	0	Heavy soil, flat (<2%)		0.17	0	
Total	**100%**	**-**	**0.08**	Heavy soil, steep (>7%)		0.35	0	
Permeability	**%**	**Factor**	**C_P**	**Residential areas**				
Very permeable	50%	0.04	0.02	Houses		0.5	0	
Permeable	50%	0.08	0.04	Flats		0.7	0	
Semi-permeable	0%	0.16	0	**Industry**				
Impermeable	0%	0.26	0	Light Industrial		0.8	0	
Total	**100%**	**-**	**0.06**	Heavy Industrial		0.9	0	
Vegetation	**%**	**Factor**	**C_V**	**Business**				
Thick bush and plantation	0%	0.04	0	City centre		0.95	0	
Light bush and farm-lands	50%	0.11	0.055	Suburban		0.7	0	
Grasslands	50%	0.21	0.105	Streets		0.95	0	
No vegetation	0%	0.28	0	Maximum flood		1	0	
Total	**100%**	**-**	**0.16**	**Total (C_2)**	**0%**	**-**	**0**	

TIME OF CONCENTRATION (T_C)				**Notes:**
Overland flow③		Defined watercourse		If T_C < 0.25 hours, use T_C = 0.25 hours.
r	0.7			
L	0.563	L	0.563	$T_C = 0{,}604(\frac{rL}{\sqrt{S_{av}}})^{0{,}467}$ $T_C = (\frac{0.87L^2}{1000S_{av}})^{0{,}385}$
Sav	0.03374778	Sav	0.03374778	
Tc	51.75963 min	Tc	9.427211 min	
Tc	0.86266 hours	Tc	0.15712 hours	

RUN-OFF COEFFICIENT								
Return period (years), T	**2**	**5**	**10**	**20**	**25**	**50**	**100**	
Run-off coefficient, C_1 ($C_1 = C_S + C_P + C_V$)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Adjusted for dolomitic areas, C_{1D} (= $C_1(1 - D_{\%}) + C_1D_{\%}(\Sigma(D_{factor} \times C_{S\%}))$ ④	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
Adjustment factor for initial saturation, F_1 ⑤	0.50	0.55	0.60	0.67	0.70	0.83	1.00	
Adjusted run-off coefficient, C_{1T} (= $C_{1D} \times F_1$)	0.15	0.165	0.18	0.201	0.209	0.249	0.3	
Coombined run-off coefficiret, C_T (= $\alpha C_{1T} + \beta C_2 + \gamma C_3$)	0.15	0.17	0.18	0.20	0.21	0.25	0.30	
RAINFALL								
Return period (years), T	**2**	**5**	**10**	**20**	**25**	**50**	**100**	
Point rainfall (mm), P_T ⑥								
Point intensity (mm/hour), P_{IT} (= P_T/T_C)	35	49	60	72	77	92	107	Intensity Curve
Area reduction factor (%), ARF_T ⑦	100%	100%	100%	100%	100%	100%	100%	
Average intensity (mm/hour), I_T (= $P_{IT} \times ARF_T$)	35	49	60	72	77	92	107	
Return period (years), T	**2**	**5**	**10**	**20**	**25**	**50**	**100**	
Peak flow (m^3/s), Q=CIA/3.6	0.37	0.57	0.77	1.03	1.14	1.62	2.27	

Types of flow:	
	Overland flow
	Defined watercourse

SLOPE CALCULATION	
Overland flow	
Hhigh (m)	1370
Hlow (m)	1351
H (m)	19
S (m/m)	0.03374778
Defined watercourse	
$H_{0.10L}$ (m)	1355
$H_{0.85L}$ (m)	1367
S (m/m)	0.03

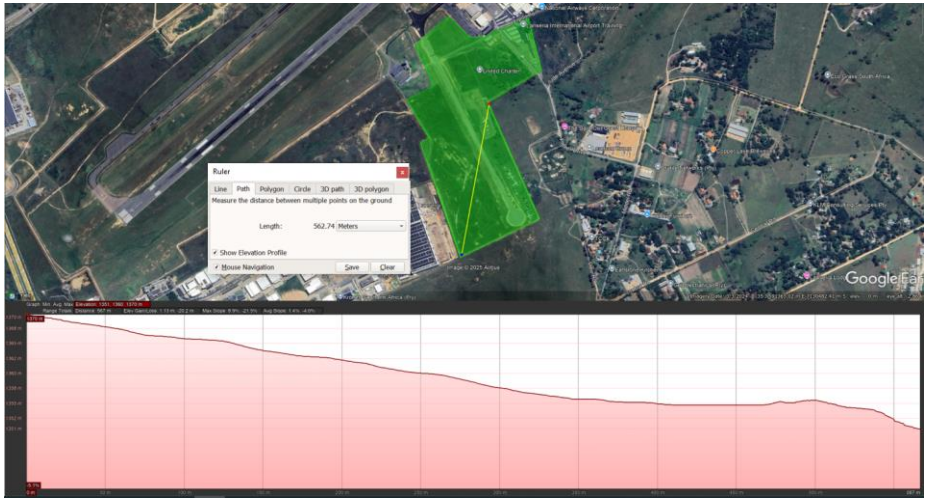
Stormwater - Standaard Intensiteitskrommes

Klas =	B
t =	52

Carolina, Cedara,Estcourt, Jan Smuts, Kokstad, Krugersdorp, Mafeking, Piet Retief, Potchefstroom, Pretoria, Roodeplaat, Rustenburg, Sheeprun, Towoomba

Tyd waarvoor die Intensiteit bepaal word (min)

Herhaalings Periode T	100	50	25	20	10	5	2
Tyd t (min)	52	52	52	52	52	52	52
Reenval Intensiteit I (mm/hr)	107	92	77	72	60	49	35



RATIONAL METHOD (ALTERNATIVE 1)

Description of Catchment		**2019-094 Lanseria X1 Southern Precinct**					
Calculated By		**DvdM**			**Date**	25/03/2025	
PHYSICAL CHARACTERISTICS							
Size of catchment (A)		0.255	km^2	Choose type of flow	Defined watercourse		
Longest watercourse (L)		0.563	km	Rainfall region	Lanceria - Johannesburg		
Average slope (S_{av})		0.028419	m/m	**AREA DISTRIBUTION FACTORS**			
Dolomite area ($D_{\%}$)		0%		Rural (α)	Urban (β)		
Mean annual precipitation (MAP) ⑥		750	mm	0%	100%		
RURAL ①				**URBAN** ②			
Surface Slope	**%**	**Factor**	**C_S**	**Description**	**%**	**Factor**	**C_2**
Wetlands and pans		0.03	0	**Lawns**			
Flat areas		0.08	0	Sandy, flat (<2%)		0.1	0
Hilly		0.16	0	Sandy, steep (>7%)		0.2	0
Steep areas		0.26	0	Heavy soil, flat (<2%)		0.17	0
Total	**0%**	**-**	**0**	Heavy soil, steep (>7%)		0.35	0
Permeability	**%**	**Factor**	**C_P**	**Residential areas**			
Very permeable		0.04	0	Houses		0.5	0
Permeable		0.08	0	Flats		0.7	0
Semi-permeable		0.16	0	**Industry**			
Impermeable		0.26	0	Light Industrial	0%	0.7	0
Total	**0%**	**-**	**0**	Heavy Industrial	100%	0.7	0.7
Vegetation	**%**	**Factor**	**C_V**	**Business**			
Thick bush and plantation		0.04	0	City centre		0.95	0
Light bush and farm-lands		0.11	0	Suburban		0.7	0
Grasslands		0.21	0	Streets		0.95	0
No vegetation		0.28	0	Maximum flood		1	0
Total	**0%**	**-**	**0**	**Total (C_2)**	**100%**	**-**	**0.7**

TIME OF CONCENTRATION (T_C)

Overland flow ⑤			Defined watercourse		
r	0.02				
L	0.563		L	0.563	
Sav	0.028419183		Sav	0.028419183	
Tc	10.2409	min	Tc	10.07203	min
Tc	0.170682	hours	Tc	0.167867	hours

Notes:

If T_C < 0.25 hours, use T_C = 0.25 hours.

$$T_c = 0{,}604\left(\frac{rL}{\sqrt{S_{av}}}\right)^{0.467} \qquad T_c = \left(\frac{0.87L^2}{1000S_{av}}\right)^{0.385}$$

RUN-OFF COEFFICIENT

Return period (years), T	**2**	**5**	**10**	**20**	**25**	**50**	**100**
Run-off coefficient, C_1 ($C_1 = C_S + C_P + C_V$)	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Adjusted for dolomitic areas, C_{1D} ($= C_1(1 - D_{\%}) + C_1D_{\%}(\Sigma(D_{factor} \times C_{S\%}))$ ④	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Adjustment factor for initial saturation, F_1 ⑤	0.75	0.80	0.85	0.90	0.91	0.95	1.00
Adjusted run-off coefficient, C_{1T} ($= C_{1D} \times F_1$)	0.525	0.56	0.595	0.63	0.635833	0.665	0.7
Coombined run-off coefficiret, C_T ($= \alpha C_{1T} + \beta C_2 + \gamma C_3$)	0.70	0.70	0.70	0.70	0.70	0.70	0.70

RAINFALL

Return period (years), T	**2**	**5**	**10**	**20**	**25**	**50**	**100**
Point rainfall (mm), P_T ⑥							
Point intensity (mm/hour), P_{IT} ($= P_T/T_C$)	80	107	129	152	157	183	207
Area reduction factor (%), ARF_T ⑦	100%	100%	100%	100%	100%	100%	100%
Average intensity (mm/hour), I_T ($= P_{IT} \times ARF_T$)	80	107	129	152	157	183	207
Return period (years), T	**2**	**5**	**10**	**20**	**25**	**50**	**100**
Peak flow (m^3/s), Q=CIA/3.6	3.97	5.31	6.40	7.54	7.78	9.07	10.26

Intensity Curve

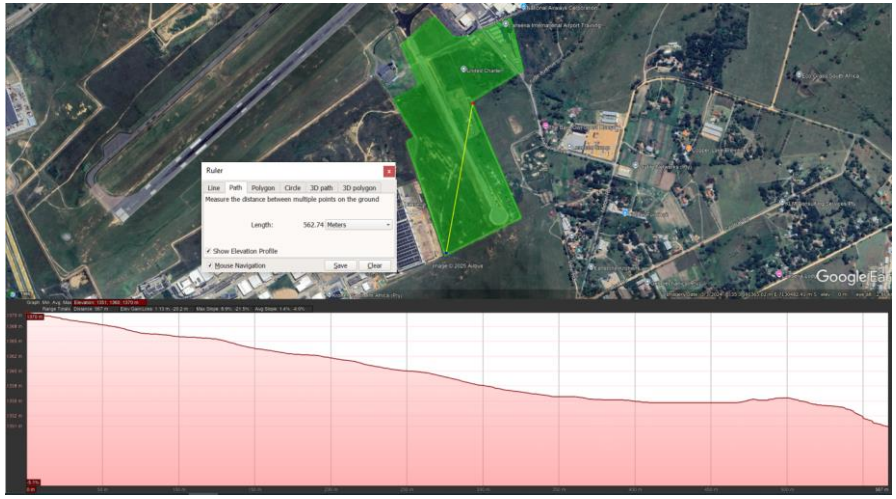
Types of flow:	Overland flow
	Defined watercourse

SLOPE CALCULATION	
Overland flow	
Hhigh (m)	1370
Hlow (m)	1351
H (m)	19
S (m/m)	0.03374778
Defined watercourse	
$H_{0.10L}$ (m)	1355
$H_{0.85L}$ (m)	1367
S (m/m)	0.03

Stormwater - Standaard Intensiteitskrommes

Klas =	B	Carolina, Cedara,Estcourt, Jan Smuts, Kokstad, Krugersdorp, Mafeking, Piet Retief, Potchefstroom, Pretoria, Roodeplaat, Rustenburg, Sheeprun, Towoomba
t =	15	Tyd waarvoor die Intensiteit bepaal word (min)

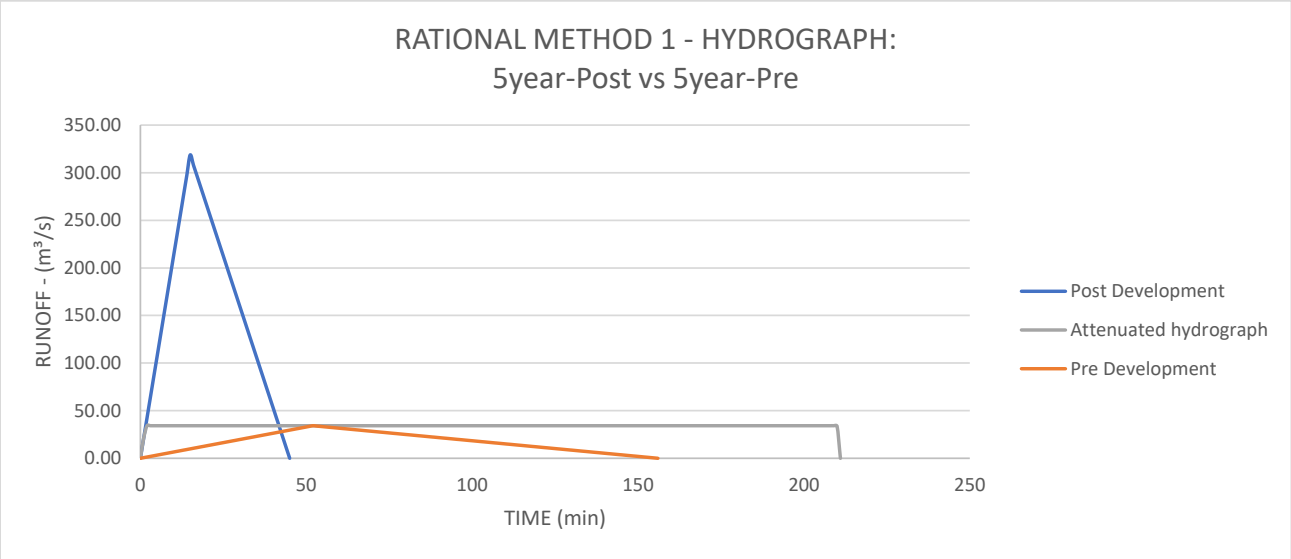
Herhaalings Periode T	100	50	25	20	10	5	2
Tyd t (min)	15	15	15	15	15	15	15
Reenval Intensiteit I (mm/hr)	207	183	157	152	129	107	80



HYDROGRAPH - RATIONAL METHOD 1

Location: 2019-094 Lanseria X1 Southern Precinct
Date: 28/02/2025

Site	25.5	ha
Tc(Pre-development)	52	min
Tc(Post-development)	15	min
Tc Factor	3	

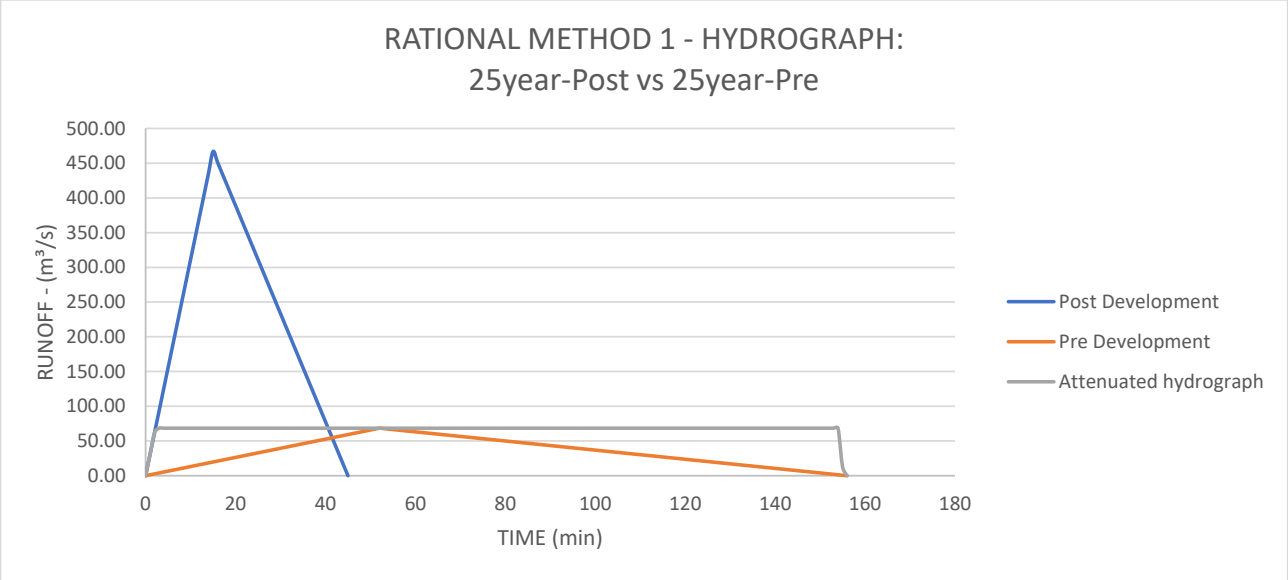


Attenuation Pond Volume	5749.74	m³
Attenuation	225.48	m³/ha
Attenuation Pond Height	1.5	m
Attenuation Pond Area	3833.16	m²

HYDROGRAPH - RATIONAL METHOD 1

Location: 2019-094 Lanseria X1 Southern Precinct
Date: 28/02/2025

Site	25.5	ha
Tc(Pre-development)	52	min
Tc(Post-development)	15	min
Tc Factor	3	



Attenuation Pond Volume	7723.24	m³	
Attenuation	302.8722	m³/ha	(JRA Requirements: 300-350m³/ha)
Attenuation Pond Height	1.5	m	
Attenuation Pond Area	5148.827	m²	