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Our Ref: C33284/FL/002

Date: 6 December 2023

To whom it concern

LANSERIA X81 REGISTRATION OF FLOODLINES ON PROPERTY

After conducting a desktop study of the possible floodlines affecting the proposed township Lanseria X81 situated on Portion 72 of the Farm Bultfontein 533-JQ we hereby include a summary our findings for record.

The catchment area contributing to the natural low point on the most eastern side of the townships (Catchment 2) can be confirmed as 0.75 km^2 with an average slope of 3.75%. Refer to **Figure 1** for a layout showing the catchment area.



The anticipated pre-development run-off for major storm events for the catchment is:

1:50 = 7.9 m³/s 1:100 = 10.2 m³/s

With

C = 0.42 $I_{50} = 95 \text{ mm/h}$ $I_{100} = 117 \text{ mm/h}$

Refer to Annexure A for a copy of the hydrological calculations.

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This result in typical flow depths of $y_{50} = 280$ mm over a width of 29m and $y_{100} = 310$ mm over a width of 32m, average flow velocities expected are +/- 1.9m/s. Refer to **Annexure B** for a typical cross section extracted and used for hydraulic calculation purposes.

The calculated flow conditions does not constitute conditions we would associate with floods but rather conform to typical "Sheet flow" conditions. As such we cannot classify the area as a floodline but rather as a "natural low point".

We propose that the stormwater system be designed to cater for a return period of 1:25 years with allowance in terms of freeboard for up to a 1:50 year event.

Yours faithfully

fledin

JP WELMAN Pr Eng (20180172). for: CIVIL CONCEPTS (PTY) LTD

ANNEXURE A

<u>Utility Programs for Drainage</u> <u>Flood calculations</u>



Page 1

Project name:	Lanseria X81	Conchar
Analysed by:	JP Welman	Sinore
Name of river:		
Description of site:	Ptn 72 Bultfontein 533-JQ	
Filename:	W:\CC-Projects\C PROJECTS\C3284 (HW) SMALL PROJECTS 2023	1. Client and Rela
	ted Bodies\1.11 Hydrology, SIA, SMP's\Ptn 72 Bultfontein.fld	
Date:	27 November 2023	

Printed: 27 November 2023

Flood Frequency Analysis: Rational Method 1

Project			=	Lanseri	.a X81					
Analysed by			=	JP Welm	an					
Name of river			-	:						
Description of s	site		-	Ptn 72	Bultfo	ntein 53	3-JQ			
Date			=	2023/11	/27		-			
Area of catchmen	nt		-	0.75 km	1 ²					
Dolomitic area			-	: 0.0 %						
Mean annual rain	fall (MAR	2)	-	700.00	mm					
Length of longes	st waterco	urse	-	1.25 km	ı					
Flow of water			-	• Overlan	d flow	,				
Height difference	e		-	47.0 m						
Value of r for c	ver land	flow	-	Moderat	e gras	s (r=0,4	1)			
Rainfall region			-	Inland	-	. ,	•			
Area distributio	m		=	Rural:	100 %,	Urban:	0 %,	Lakes: 0 %		
6			(0)							
Catchment descri	ption - U	rban	area (%)			Ducince	_			
Lawns	· ·		Residential	and ind	ustry	Business	5 	0		
Sandy, flat (<2%		,	Houses		0	City cer	itre	0		
Sandy, steep (>/	(<0%)	,	Flats	.	0	Suburbar	1	0		
Heavy soll, flat	C (<2%) U)	Light indus	try	0	Streets	61	0		
Heavy soll, stee	ep (>/%) 0)	Heavy indus	try	0	Maximum	11000	0		
Catchment descri	ption - R	Rural	area (%)							
Surface slopes			Permeabilit	у		Vegetati	on			
Lakes and pans	1	.0	Very permea	ble	20	Thick bu	ish & fo	rests	0	
Flat area	4	0	Permeable		50	Light bu	ish & cu	ltivated land	10	
Hilly	5	50	Semi-permea	ble	30	Grasslar	nds		80	
Steep areas	0)	Impermeable	2	0	Bare			10	
Average slope			 =	0.0376	 m/m					
Time of concentr	ration		=	: 56.4 mi	n.,					
Bun-off factor										
Rural - C1			=	0.418						
Urban - C2			=	= 0 000						
Lakes - C3			_	: 0 000						
Combined - C			=	0.418						
The HRU, Report	2/78, Dep	oth-Du	ration-Freq	uency di	agram	was used	l to det	ermine the poir	nt rainfall.	
Return Time	e of	Poi	.nt A	RF	Averag	je I	actor	Runoff	Peak	
Period conc	entration	n rai	nfall		intensity Ft			coefficient	: flow	
(years) (hou	irs)	(mn	ı) (8)	(mm/h)	-		(%)	(m³/s)	

(]0010)	(()	(•)	()			(•)			(/ 2 /	
1:2	0.94	32.5	99.9	34.5	0.75		31.4			2.256	
1:5	0.94	44.2	99.9	47.0	0.80		33.4			3.276	
1:10	0.94	56.0	99.9	59.5	0.85		35.5			4.404	
1:20	0.94	69.1	99.9	73.4	0.90		37.6			5.756	
1:50	0.94	89.9	99.8	95.4	0.95		39.7			7.895	
1:100	0.94	110.6	99.8	117.4	1.00		41.8			10.22	
Run-off	coefficient	percentage includes	adjustme	ent saturation	factors	(Ft)	for	steep	and	impermea	ab

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

Calculated using Utility Programs for Drainage 2.0.0

The software programs were developed for the convenience of its users. Although every reasonable effort has been made to ensure that the programs are accurate and reliable the program developers, Sinotech CC, accept no liability of any kind for any results, interpretation thereof or any use made of the results obtained with these programs. All users of these programs do so entirely at their own risk. Copyright (C) 2009 SINOTECH CC, www.sinotechcc.co.za, software@sinotechcc.co.za

ANNEXURE B

1:50 Year Typical Section Results

Name o	of project			River/channel name			Date	
Lanseria X81			Floodplain		6 December 2023	3 👻		
Descri	ption of site				Designer		,	
Ptn 72	Bultfontein :	533-JQ			JP Welman			9
Chan Irr Frid Ma	nel shape egular section etion calculati nning formula for rmal depth (Yr	n (river) V ion method a V			Results Flow area (A) Wetted perime Hydraulic radiu Top width (B) Critical depth (Critical slope (S Velocity (V)	ter (P) 15 (R) Yc) Sc)	4.467 29.712 0.150 29.689 0.324 0.01566 1.768	m ² m m m m m/m m/s
[Irreg	ular section (river channel)			velocity nead ((HV)	0.159	m
Cros	ss section X-Y	Coordinates (S	tation-Elevation)		Specific energy	7 (Es)	0.437	m
	Station (m)	Elevation (m)	n (s/m^1/3)	Flow rate (Q)	Froude number	r (Fr)	1.4556	
	0	1354.68	0.03	7.9 m ³ /s	Flow type		Supercritical	
-	0.5	1354.68	0.03	Channel stone (S)				
	1.73	1354.7	0.03	0.025 m/m				
	2.06	1354.71	0.03	,				
	3	1354.83	0.03	Normal depth (Yn)				
	4.2	1354.57	0.03	0.278 m				
	5.85	1354.23	0.03					
	8 96	1354 14	0.03					



1:100 Year Typical Section Results

Name of project			River/channel name		Date	
Lanseria X81			Floodplain		6 December 202	3 🖵
Description of si	e			Designer		
Ptn 72 Bultfonte	in 533-JQ			JP Welman		9
Channel shape Irregular sec Friction calcu Manning for Solve for Solve for Irregular section Cross section Station (0 0 0.5 1.73 2.06 3 4.2 5.85 8.96	tion (river) ▼ lation method nula ▼ (Yn) (Yn) (Yn) (Yn) Elevation (m) 1354.68 1354.7 1354.71 1354.83 1354.57 1354.57 1354.23 1354.14	Station-Elevation)	Flow rate (Q) 10.2 m ³ /s Channel slope (S) 0.025 m/m Nomal depth (Yn) 0.308 m E	Results Flow area (A) Wetted perimeter (P) Hydraulic radius (R) Top width (B) Critical depth (Yc) Critical slope (Sc) Velocity (V) Velocity head (Hv) Specific energy (Es) Froude number (Fr) Flow type	5.417 32.415 0.167 32.388 0.359 0.01490 1.883 0.181 0.489 1.4701 Supercritical	m ² m m m m/m m/s m m

