ENGINEERING SERVICES REPORT FOR: PORTION OF ERF 9445, IDAS VALLEY, STELLENBOSCH

FEBRUARY 2017 – REV F

Prepared By:

DECA Consulting Engineers
P.O. Box 1273
Hermanus
7200

Tel : (028) 312 2292
Fax: (028) 312 2325

Prepared For:

ASLA Magwebu Civils/Shatel Property Development JV
P.O. Box 118
GORDON'S BAY
7151

Tel: (021) 845 8335
Fax: (021) 845 8552

TABLE OF CONTENTS

ANNEXURE A	**-**	**Locality Plan**
ANNEXURE B	**-**	**Proposed Development Layout**
ANNEXURE C	**-**	**Existing and Proposed Sewerage Reticulation**
ANNEXURE D	**-**	**Existing and Proposed Water Reticulation**
ANNEXURE E	**-**	**Stormwater Catchment Areas and Nodes**
ANNEXURE F	**-**	**Existing and Proposed Stormwater Reticulation**
ANNEXURE G	**-**	**Upgrading of Stream**
ANNEXURE H	**-**	**GLS Report**

1. INTRODUCTION

DECA Consulting Engineers were appointed by the developer ASLA Magwebu Civils to compile a preliminary engineering services report for the provision of engineering services required for the proposed development i.e. Portion of Erf 9445, Idas Valley, Stellenbosch. Portion of Erf 9445, Idas Valley, Stellenbosch will therefore; for the purpose of this report hereinafter be referred to as "the site".

2. AVAILABLE INFORMATION

The following information was made available to DECA:

a) 1:10 000 ORTHOPHOTO MAPS of the study area;

b) Existing applications for development in the study area;

c) Proposed layout plans for the proposed development by Nuplan Africa Town and Regional Planners;

d) Existing cadastral information of the study area;

e) Topographical survey of the site by messers Rene Pesch Land Surveyors;

f) Geotechnical site investigation of the site by Core Geotechnical Consultants;

g) Aerial photographs of the study area obtained from Surveys and Mapping;

h) Traffic Impact Assessment (TIA) by DECA Consulting Engineers;

i) Stormwater Management Plan by DECA Consulting Engineers;

j) Bulk Water and Sewer Services Masterplan by Messers GLS Consulting Engineers

3. SITE DESCRIPTION

The site is situated west of Lindida and north of Idas Valley. Please find the locality plan attached hereto as **Annexure A**.

The site is approximately 5.16ha in extent and the natural drainage pattern is from north to south at a gradient of approximately 3%. The proposed land use for the site is as follows: (Please find the proposed layout plan attached herewith as **Annexure B**)

	Description	Area	Units
a)	Single Residential (Gap & Affordable Housing)	2.000ha	166
b)	Public Open Space	2.192ha	3
c)	Sub-station	24m²	1
d)	Roads	0.961ha	1

4. GEOTECHNICAL INFORMATION

4.1 General

According to the Phase 1 geotechnical investigation report compiled by Core Geotechnical Consultants, the general profile may be described as follows:

"*Regionally, the area is underlain from surface by recent unconsolidated sandy and gravelly deposits or colluvial (transported) origin. Weathered residual granites of the Cape Granite Suite underlie the transported soil.*

From ground surface, soils consist of transported clayey sands, silty sands and clayey silts between 0.6m and 1.3m thick. The colluvial soils are underlain by residual granites, consisting of clayey sands that are intersected below approximately 1.3m across the site".

4.2 Water Table

"The residual granite is expected to have a low permeability. The permeability of the overlying transported soils is also expected to be higher and thus infiltrated surface water becomes perched above the less permeable granites. Surface water will tend to run-off down slope towards the southern and south-eastern parts of the site. A Perched water table is expected to develop within 0.5m of ground surface in the lower lying, flatter areas towards the south. Ponding of water on surface may also occur in areas close to the wetland located in the central northern part of the site.

The groundwater relies mainly on recharge from direct infiltration of rainfall, as well as from up-slope recharge of the groundwater via horizontal flow in the transported soils. As such, this water table will be best developed during winter, with water table elevations dropping over the dry summer seasons.

The main water table is expected to occur close to the contact of granite rock and sedimentary horizons at depth."

5. SERVICES

The extent of the existing services was obtained from Stellenbosch Municipality, and through various site investigations. The position of the existing services is indicated on the plans attached hereto as **Annexure C, D & F**.

The design of services will be in accordance with the "Guidelines for the provision of Engineering Services for Residential Townships" (Blue book), the UTG7 publication "Geometric Design of Urban Local Residential Streets", the TRH4 and the specific standards of the Local Authority.

5.1 SEWERAGE

The proposed internal sewerage reticulation system will consist of a 160mm dia. conventional gravity uPVC piped system, which will be connected to the existing sewerage reticulation system, as indicated on **Annexure C**.

The following design criteria will be applicable to the envisaged sewerage reticulation system requirements:

ESTABLISHMENT	**NO OF UNITS**	**ADD**	**ADD**
		(l/day/unit)	**(l/day)**
Group Housing	149	700	104 300
Subsidised Housing	17	500	8 500
TOTAL ADD			112 800
Peak Factor			2.5
Peak Dry Weather Flow			282 000
Extraneous Flow			30%
Peak Wet Weather Flow (l/day)			366 600
Peak Wet Weather Flow (l/s)			**4.243**

5.1.1 Drainage Area

The proposed development falls within the existing Adam Tas drainage area. It is proposed that the internal sewerage reticulation system be connected to the existing 160mm dia. Sewerage system as indicated on the plan attached hereto as **Annexure C**.

5.1.2 Sewer Flow

The maximum Peak Day Dry Weather Flow (PDDWF) is calculated at 282.0kl/day

5.1.3 Present Situation

According to the sewerage reticulation master plan of Stellenbosch Municipality, prepared by messers GLS Consulting engineers, there is insufficient capacity in the sewerage reticulation system to accommodate the proposed development.

5.1.4 Upgrading Required

According to the sewerage reticulation master plan of Stellenbosch Municipality, prepared by messers GLS consulting engineers, the following master plan items will be required to reinforce the existing Stellenbosch sewer reticulation system in order to accommodate the proposed development together with other future development areas:

Bulk Sewer Upgrades

Phase 1 – R29 000 000)
SSS1.1 : 2 482m x 1 200mm dia. New Main Sewer
SSS1.2 : New diversion Structure
SSS1.3 : New Diversion Structure
SSS1.4 : New Diversion Structure
SSS1.5 : 162m x 750mm dia. New Diversion sewer (including river crossing)

Phase 2 (R12 000 000)
SSS1.6 : 1 008m x 1 200mm dia. New Main Sewer
SSS1.7 : New Diversion Structure
SSS1.8 : Modify existing diversion structure
SSS1.9 : 48m x 750mm dia. New Diversion Sewer (including railway crossing)

Network Upgrades

Phase 3 (R5 000 000)
SSS1.14 : 578m x 450mm dia. Upgrade existing outfall sewer
SSS1.15 : 1 407m x 355mm dia. Upgrade existing outfall sewer

Phase 4 (R1 500 000)
SSS1.43 : Modify existing diversion structure
SSS1.44 : 685m x 250mm dia. Upgrade existing outfall sewer
SSS1.45 : Modify existing diversion structure

NOTE:
The cost estimates for the various phases are preliminary estimates and includes preliminary and general, contingencies and fees but excludes VAT.

It is our proposal that the Bulk Infrastructure Contribution Levies of the proposed development, together with that from other applicable developments be utilized to provide the above four Phases of the sewerage upgrades required.

5.2 WATER

The proposed internal water reticulation system will consist of a 110mm dia. uPVC water reticulation system and be connected to the existing water reticulation system as indicated on the plan attached hereto as **Annexure D**.

The following design criteria will be applicable to the envisaged water reticulation system requirements:

ESTABLISHMENT	**NO OF UNITS**	**AAD**	**ADD**
		(l/day/unit)	**(l/day)**
Group Housing	149	900	134 100
Subsidised Housing	17	800	13 600
TOTAL ADD			147 700
EU			148
Peak Factor			9
Instantaneous Peak Flow (l/day)			1 332 000
Instantaneous Peak Flow (l/s)			**15.417**
Fire-risk Category			Low-Group 3
Hydrant Flow-rate (l/min)			350
Hydrant Flow-rate (l/s)			**5.833**
Fire hydrant spacing			240m

5.2.1 Distribution Zone

The proposed development will be accommodated in the existing Arbeidslus reservoir zone. The TWL of the Arbeidslus reservoir is 273.1 m and the general level of the proposed development is approximately 170m.

It is proposed that the water reticulation system of the proposed development be connected to the existing reticulation system as indicated on the plan attached herewith as **Annexure D**.

5.2.2 Network Conveyance

According to the water reticulation master plan of Stellenbosch Municipality, compiled by messers GLS Consulting Engineers, accommodation of the proposed development in the present system will require no upgrading of the existing system.

5.3 STORMWATER

The study area is situated in the winter rainfall region of the Western Cape. No extreme rainfall intensities occur. A representative mean annual rainfall (MAP) of **660mm** has been obtained from the Cape Town International Airport's Weather Office.

5.3.1 Storm Rainfall

The "Design Rainfall Estimation in South Africa" computer program which accompanies the Water Research Commission Report titled "Design Rainfall and Flood Estimation in South Africa" by JC Smithers and RE Schiltze, was used to complete a rainfall station search and to obtain storm rainfall depth data.

A summary of the rainfall station search and related storm rainfall data is given in the table below:

	Station Name	Stellenbosch – TNK	Stellenbosch (TNK)	NIVV Proef	Klapmuts	Elsenburg	Accepted
Location	SAWA Station No.	0021625_A	0021655_W	0021655_A	0021621_W	0021591_A	
	Latitude	33˚55'	33˚55'	33˚55'	33˚51'	33˚51'	
	Longitude	18˚51'	18˚52'	18˚52'	18˚51'	18˚50'	
	Mean annual Precipitation (mm)	685	647	647	734	658	660
	Altitude	122	116	183	187	169	
	Distance from Catchment Centroid (km)	0	1.8	1.8	7.2	7.4	
	Length of Record (years)	48	86	83	47	875	
1 Day Storm Rainfall Depths							
Return Period	1 in 2 year	47.5	43.2	42.6	40.6	40.0	
	1 in 5 year	63.7	57.9	57.2	54.4	53.6	
	1 in 10 year	75.6	68.7	67.8	64.5	63.6	
	1 in 20 year	87.9	79.8	78.8	75.1	73.9	
	1 in 50 year	105.2	95.6	94.3	89.8	88.5	98.4
	1 in 100 year	119.3	108.4	107.0	101.9	100.4	111.6

Table 1 – Rainfall records from nearby weather stations

5.3.2 Calculations

The general norm is that storm peak flow runoff may be conveniently computed for small catchments (up to 8km²) by means of the Rational or the SCS methods (Rooseboom et al), and Schmidt, E.J. and Schultze, R.E. (1987a and b). For larger catchments the area should be subdivided into sub-catchments and the peaks lagged and summed. A simple lag time method may be employed, based on estimated flow velocities in the river channels.

These methods are open to criticism of being over-simplistic and for assuming that storm event probability equals runoff event probability, e.g. James (1992). If calibration data (rainfall with corresponding flow data) is available and the proposed development is large and must accommodate runoff from upstream and/or may have consequences downstream, then a modeling approach is justified.

Hydrological calculations are executed according to various approved methods (Rational, SCS and Time Area Methods), with each based on its own set of data. The results of each method can only be assumed as an approximation of actual events and a relatively large variation between these methods could occur.

Due to the variation in the characteristics of the catchment area (residential developments in the lower portion), the catchment area was sub-divided and the PCSWMM model with a Type 1, 24 hour SCS storm was used to determine the peak flow runoff. The 1:50 year RI storm event peak flow runoff from the sub-catchment areas were compared with the Rational/Alternative Rational Method. The Time of Concentration was calculated with a combination of the following methods:

- Bransby Williams
- Dyck/Peshcke
- Kerby
- SCS

The storm intensity with the Rational/Alternative Rational Method was calculated with a combination/comparison of the following methods:

- Op-Ten-Noordt
- TR102
- Hershfield

5.3.3 Risks cost estimate and design flood frequencies

Although run-off calculations are performed with great care, it is still possible that the capacity of a system could be exceeded because of non-hydrological reasons. There has to be a limit to the elimination of probabilities as costs could become unrealistically high in comparison with the benefit of lower risks.

Although the relationship between function, risk, original cost and maintenance cost plays a major role in determining the design flood frequency, it is assumed in general that the flood frequencies as discussed in Table 2 below should be provided for under normal circumstances.

The applicable analysis; assessment and design standard will be those given in table 6.1 and 6.2 of the “Red Book” and are as follows:

Land Use	Design Storm Return Period (Major storm events)
Residential	50 years
Institutional (e.g.) schools	50 years
General Commercial and Industrial	50 years
High Value Central Business Districts	50 - 100 years

Land Use	Design Storm Return Period (Minor storm events)
Residential	1 - 5 years
Institutional (e.g.) schools	2 - 5 years
General Commercial and Industrial	5 years
High Value Central Business Districts	5 - 10 years

Table 2 – Typical Stormwater analysis requirements based on land-uses

In the light of the general application and support of the above-mentioned guidelines, it is accepted as minimum acceptable standards for stormwater drainage. Any deviation from these standards should be justified on the basis of economical and risk analysis.

For the purpose of this report these guidelines will thus apply throughout as reference and any deviation from that will be motivated.

5.3.4 Characteristics of Catchment Area

The characteristics of the various catchment areas can be described as follows (Please refer to the external stormwater layout plan attached hereto as **Annexure E**):

Catchment Area	Area (ha)	L (m)	H (m)	Save (%)	C	Tc (hours)	I (mm/h)	Q50 Rational (m^3/s)	Q50 PCSWMM (m^3/s)
CA 1	51.089	1 155	175	14.0	0.343	0.400	83	3.85	4.04
CA 2	2.315	284	23	7.5	0.310	0.183	110	0.21	0.21
CA 3	4.676	378	16	4.2	0.343	0.345	89	0.38	0.32
CA 3 – Post Dev	4.676	410	17	4.0	0.550	0.236	108	0.73	0.72
CA 4	6.495	593	130	21.9	0.390	0.222	108	0.72	0.72
CA 5	4.441	489	24	4.8	0.550	0.295	98	0.63	0.60

TABLE 3: Characteristics of Catchment Areas

5.3.5 Analysis of Existing Drainage Systems

The peak flow runoff expected during pre- and post-development conditions during the 1:50 year and 1:100 year recurrence interval storm events can be summarized as follows (Please refer to the External Stormwater Layout Plan Attached hereto as **Annexure E**):

NODE	LINK	Pre- Development Runoff (m^3/s)		Post-Development Runoff (m^3/s)	
		1:50	**1:100**	**1:50**	**1:100**
10	10 – 20	3.922	4.687	3.922	4.687
20	20 – 30	5.127	6.106	5.127	6.106
40	40 – 20	0.702	0.827	0.702	0.827
50	50 – 60	0.198	0.235	0.198	0.244
30	30 – 60	5.131	6.109	5.131	6.109
60	60 - Of	**5.247**	**6.294**	**5.963**	**7.081**

TABLE 4: Peak Flow Runoff

Taking above into consideration, it is proposed that an attenuation facility be provided between Nodes 50 and 60 in order to maintain pre-development runoff.

5.3.6 Attenuation Facility

The attenuation facility is proposed to be in the form of a detention pond with the following characteristics:

Pond Area	600m²
1:50 Inflow	0.891m³/s
1:100 Inflow	1.048m³/s
Max. depth – 1:50	1.33m
Max. depth – 1:100	1.56m
Pond storage volume – 1:50	533m³
Pond storage volume – 1:100	732m³
1:50 Outflow	0.313m³/s
1:100 Outflow	0.325m³/s
Orifice (Pipe dia.)	1 x 300mm
1:50 Freeboard	0.37m
1:100 Freeboard	0.14m

The effect of the proposed attenuation facility on the post-development runoff is as follows:

NODE	**LINK**	**Pre- Development Runoff (m³/s)**	
		1:50	**1:100**
10	10 – 20	3.922	4.687
20	20 – 30	5.127	6.106
40	40 – 20	0.702	0.827
50	50 – SU	0.206	0.245
SU	SU – 60	0.313	0.325
30	30 – 60	5.124	6.104
60	60 - Of	**5.393**	**6.378**

5.3.7 Proposed Upgrading of Stream

Due to the sedimentation of the existing stream, it is our proposal that the 1:100 year recurrence interval storm event be contained within its banks by means of the construction of a berm/gabions/retaining wall along the stream where required as indicated on the plan attached hereto as **ANNEXURE G**.

5.4 ROADS

The proposed development will gain access from the extension of the existing Starking Road, as indicated in the TIA by DECA Consulting Engineers**.**

The access roads will be 6.0m wide within a 10.0m wide road reserve and the internal roads will be 5.0m/4.5m wide within a 10.0m wide road reserve.

All internal roads and parking areas will be surfaced with 25mm Asphalt and the following road sub-structure will be provided (according to the TRH 4):

- 125mm G4 Base course compacted to 98% Mod AASHTO density
- 125mm G5 Sub-base compacted to 97% Mod AASHTO density
- 150mm G7 Upper selected sub-grade compacted to 95% Mod-AASHTO density (100% for sand)
- 200mm G9 Lower selected sub-grade compacted to 93% Mod AASHTO density (100% for sand)

The access roads will be surfaced with 30mm Asphalt and the following road sub-structure will be provided (according to the TRH 4):

- 150mm G4 Base course compacted to 98% Mod AASHTO density
- 150mm C5 Sub-base compacted to 97% Mod AASHTO density
- 150mm G7 Upper selected sub-grade compacted to 95% Mod-AASHTO density (100% for sand)
- 200mm G9 Lower selected sub-grade compacted to 93% Mod AASHTO density (100% for sand)

The road verges will be shaped, trimmed and a 75mm ferricrete gravel will be provided as a surface.

5.5 TELKOM

Telkom reticulation is available adjacent to the site. The Telkom network will be installed and be connected to the existing external system.

Telkom uPVC service ducts will be installed with regular inspection chamber/draw boxes, according to the required specifications and connected to the existing network.

5.6 ELECTRICITY

The reticulation system will be installed underground in accordance with the provisions of the relevant supply authority.

According to Stellenbosch Municipality, sufficient electricity supply is available for the proposed development.

kVA connections will be provided to each erf/dwelling unit. The MV and LV electrical reticulation shall comprise underground cabling and the Municipality will indicate the point of supply at the time of submission of reticulation designs for approval.

The external reticulation will comprise the following:

- MV cabling to each mini-sub.
- Provision of mini-subs.
- LV supply cables to each distribution kiosk.
- Single phase connections to each erf/dwelling unit.
- 75 kVA connection to Community Centre.
- Street lighting cabling together with street poles and light fittings.

The internal reticulation will comprise the following:

- Lighting and power.
- Telephone point.
- Pre-payment metering.
- General lighting where applicable.
- For the flats, one TV aerial per block is advised.

6. CONCLUSION

The following can be concluded/recommended:

- That the sewerage reticulation system of the proposed development be connected to the existing reticulation system as indicated on the plan attached herewith as **ANNEXURE C**;
- That the Bulk Infrastructure Contribution Levies of the proposed development together with other developments in the area be utilized to provide the upgrading required in the existing sewerage reticulation system as indicated in Paragraph 5.1.4.
- That the houses of the proposed development only be occupied subsequent to the required upgrading of the Stellenbosch sewerage treatment works.
- That the water reticulation system of the proposed development be connected to the existing reticulation system as indicated on the plan attached herewith as **ANNEXURE D**.
- That there is sufficient capacity in the existing water reticulation system to accommodate the proposed development.
- That an attenuation facility be provided in order to maintain the pre-development runoff, as discussed in Paragraph 5.3.6 and as indicated on the plan attached herewith as **ANNEXURE F**.
- That the existing stream that crosses the property be upgraded as indicated on the plan attached herewith as **ANNEXURE G**.
- That access to the development be gained according to the proposed development according to the TIA prepared by DECA Consulting Engineers.

Prepared By:

Pieter Engelbrecht
DECA Consulting Engineers

ANNEXURE A

ANNEXURE B

ANNEXURE C

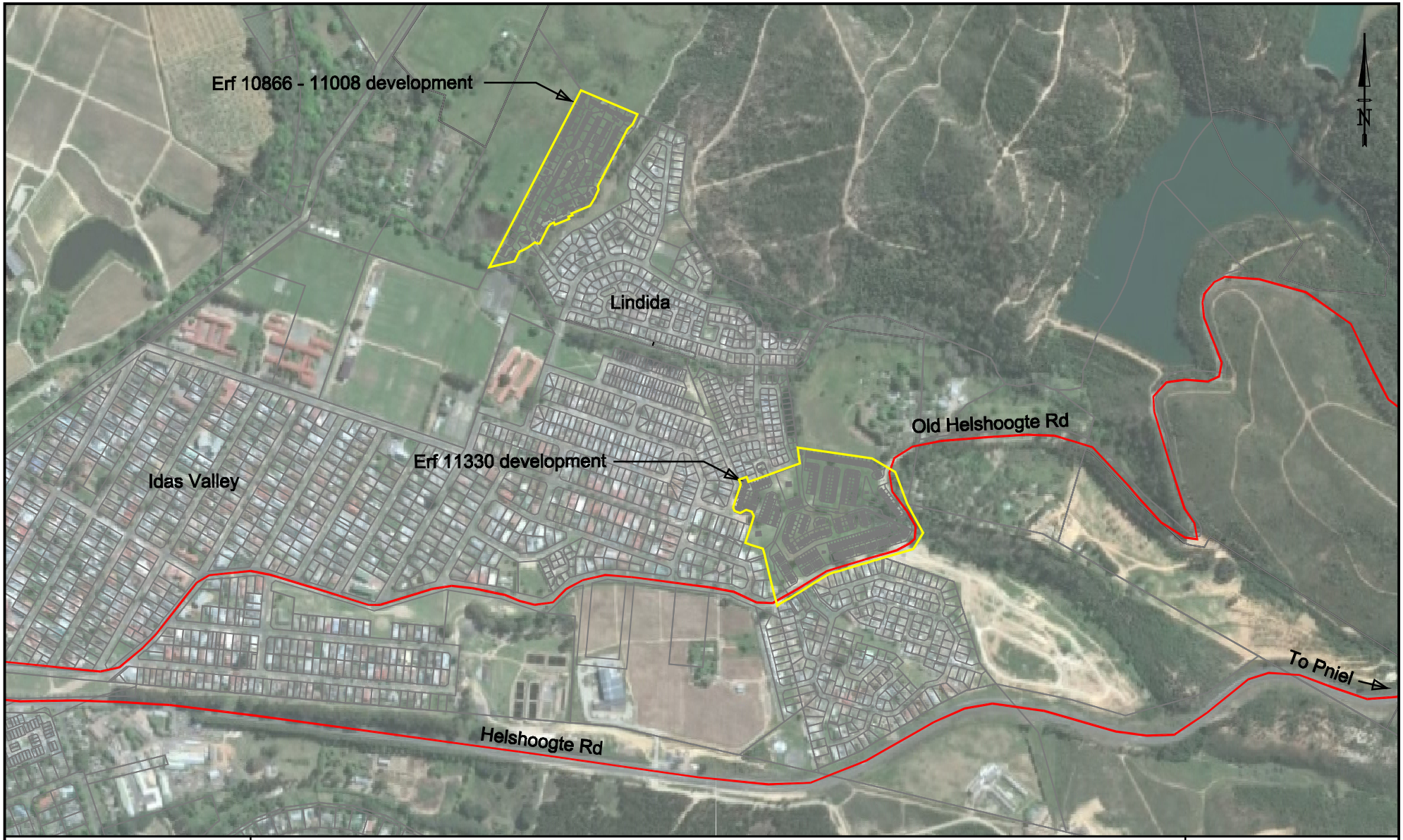
ANNEXURE D

ANNEXURE E

ANNEXURE F

ANNEXURE G

ANNEXURE H



PO Box 1273
Hermanus 7200

7 Paterson St
Hermanus 7200

deca CONSULTING ENGINEERS

Tel. : 028 - 321 2292
Fax : 028 - 312 2325
e-mail : pieter@d-e-c-a.co.za

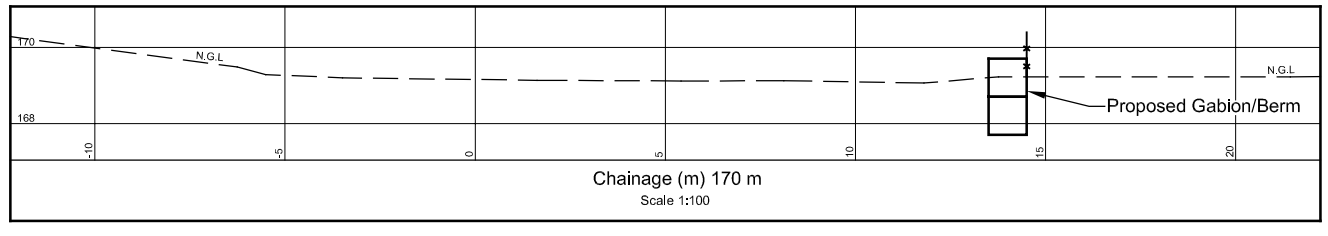
ANNEXURE A
LOCALITY PLAN

SCALE
1 : 10 000 (A4)

LEGEND	
Subdivisional area	
Flood line - 1:100 year	
Gabion Berm	
Possible future connection	

LAYOUT
Scale 1:500

ZONING	LAND USE	PTN'NR	N	AREA (ha)	%
Single Residential	Subsidy housing	166	166	19 251	37,32
Public open space	Public open space	167 - 169	3	21 936	42,53
Local authority	Sub-station	170	1	24	0,05
Local authority	Roads	171	1	10 371	20,10
TOTAL			171	51 582	100



OORSPRONKLIKE SKAAL IN mm/ORIGINAL SCALE IN mm

Wysiging Amend.	Datum Date	Beskrywing-Description

Posbus / P. O. Box 1273
Hermanus 7200

Patersonstraat / Street 7
Hermanus 7200

Tel. : 028 - 312 2292
Faks / Fax : 028 - 312 2325
E-pos / Mail : pieter@d-e-c-a.co.za

Opgemeet Surveyed		Ingenieur - Engineer
Ontwerp Designed	P. E.	Geteken Signed / Pr.Ing. Pr. Eng.
Geteken Drawn	R Bester	Datum Date
Nagesien Checked		Kliënt - Client
		Geteken Signed
		Datum Date

Kliënt - Client

P. O. Box 118
Gordons Bay
7151

Tel :021 - 845 8335
Faks :021 - 845 8552

ASLA DEVCO

Projek - Project

IDAS VALLEY

Planbeskrywing - Plan Description

PORTION OF ERF 9445: PROPOSED UPGRADING OF STREAM

Skaal Scale	**AS SHOWN**
Datum Date	**FEBRUARY 2017**
Plan Nr. Plan No.	**ANNEXURE G**
Wysiging Amendment	

LEGEND		
DESCRIPTION	EXISTING	NEW
Sewer pipe		
Sewer erf connection		
Sewer manhole	○	●

Connect to existing

Ø150 Sewer

Road A
Road B
Road C
Road D
Road E
Road F
Road G
Road H
Road J
Road K

Tydeman Court
Cornice Crescent
Lindina Drive
Packham Road
Connelly Close
Bartlett Road
Teerpad
POS

10865 10862 10863 10864 10859 10860 10861 10942 10943 10944 10945 10946 10947 10948 10949 10938 10939 10940 10941 10935 10936 10937 10650 10651 10652 10653 10654 10655 10956 10957 10958 10962 10963 10964 10965 10966 10967 10968 10969 10970 10971 10972 10973 10974 10975 10976 10977 10978 10979 10980 10981 11014 11015 11016 11017 11018 11019 11025 11026 11042 11043 11044 11045 11048 11049 11050 11051 11052 11053 11054 11055 11009 11010 11011 11012 11013

0 10 20 30 40 50 100
ORSPRONKLIKE SKAAL IN mm/ORIGINAL SCALE IN mm

Wysiging Amend.	Datum Date	Beskrywing-Description

Posbus / P. O. Box 1273
Hermanus 7200

Patersonstraat / Street 7
Hermanus 7200

Tel. : 028 - 312 2292
Faks / Fax : 028 - 312 2325
E-pos / Mail : pleter@d-e-c-a.co.za

Opgemeet Surveyed		
Ontwerp Designed	P. E.	
Geteken Drawn	R Bester	
Nagesien Checked		

Ingenieur - Engineer
Geteken / Sign: Pr.Ing. / Pr. Eng.
Datum / Date:

Kliënt - Client
Geteken / Sign:
Datum / Date:

Kliënt - Client
P. O. Box 118
Gordons Bay
7151
Tel :021 - 845 8335
Faks :021 - 845 8552

ASLA DEVCO

Projek - Project
IDAS VALLEY

Planbeskrywing - Plan Description
PORTION OF ERF 9445: SEWER LAYOUT

Skaal Scale	N.T.S
Datum Date	FEBRUARY 2017
Plan Nr. Plan No.	ANNEXURE C
Wysiging Amendment	

LEGEND		
DESCRIPTION	EXISTING	NEW
Water pipe		
Water erf connection		

Road A
Road B
Road C
Road D
Road E
Road F
Road G
Road H
Road J
Road K
Road G
Connect to existing
Tydeman Court
Tydeman
Lindina Drive
Comice Crescent
Packham Road
POS
Teerpad
Bartlett Road
Comelly Close

0 10 20 30 40 50 100
OORSPRONKLIKE SKAAL IN mm/ORIGINAL SCALE IN mm

Wysiging Amend.	Datum Date	Beskrywing-Description

Posbus / P. O. Box 1273
Hermanus 7200

Patersonstraat / Street 7
Hermanus 7200

Tel. : 028 - 312 2292
Faks / Fax : 028 - 312 2325
E-pos / Mail : pleter@d-e-c-a.co.za

Opgemeet Surveyed		Ingenieur - Engineer
Ontwerp Designed	P. E.	Geteken Signed / Pr.Ing Pr. Eng
Geteken Drawn	R Bester	Datum Date
Nagesien Checked		Kliënt - Client
		Geteken Signed
		Datum Date

Kliënt - Client

P. O. Box 118
Gordons Bay
7151

Tel :021 - 845 8335
Faks :021 - 845 8552

ASLA DEVCO

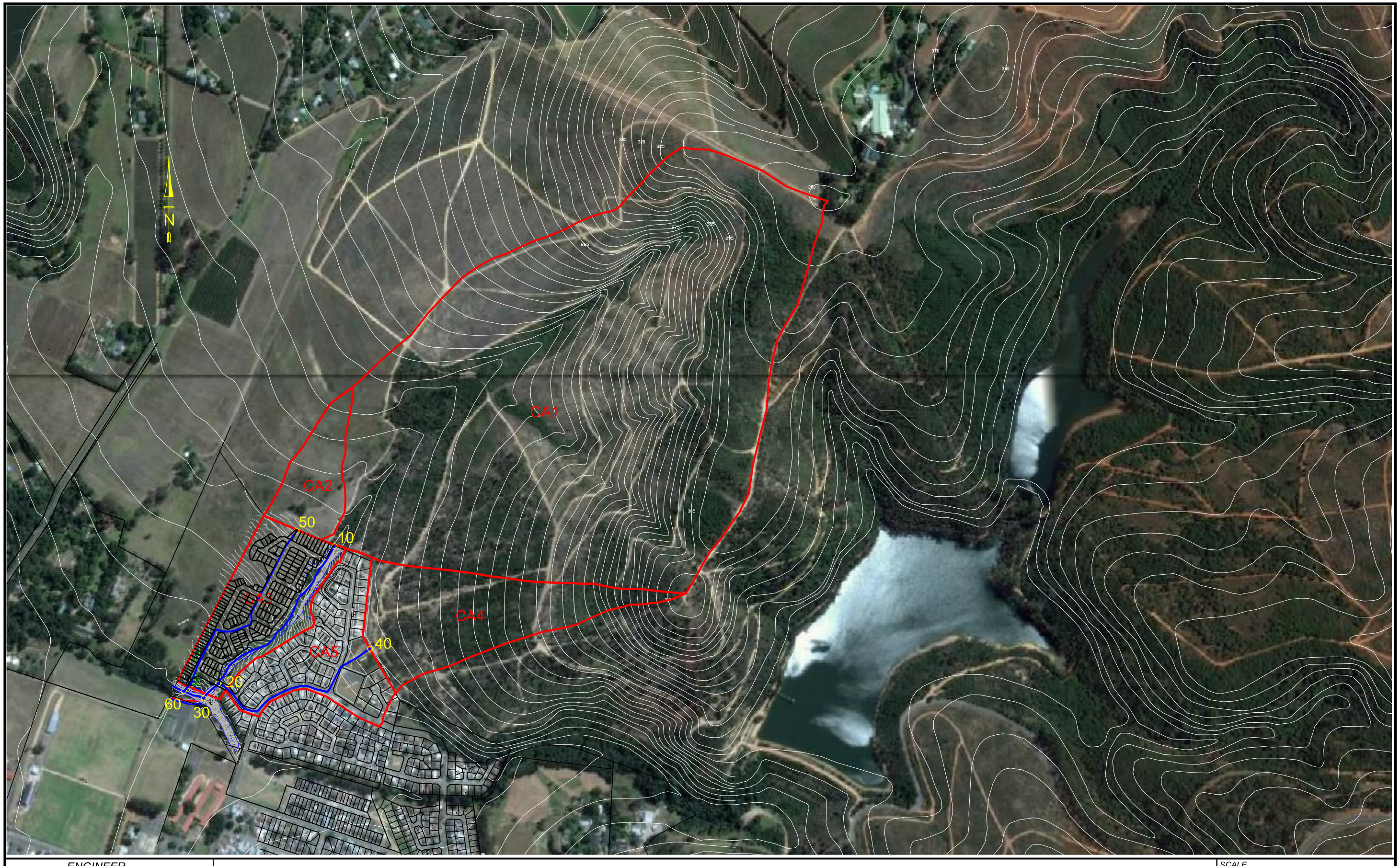
Projek - Project

IDAS VALLEY

Planbeskrywing - Plan Description

PORTION OF ERF 9445: WATER LAYOUT

Skaal Scale	N.T.S
Datum Date	FEBRUARY 2017
Plan Nr. Plan No.	ANNEXURE D
Wysiging Amendment	



ENGINEER

deca
CONSULTING ENGINEERS

PO Box 1273
7 Paterson Street
Hermanus
7200

Tel: 028 312 2292
Fax: 028 312 2325
E-mail: pieter@d-e-c-a.co.za

PORTION OF ERF 9445,
IDAS VALLEY:
NODES AND CATCHMENT AREAS

SCALE	N.T.S (A3)
DATE	FEBRUARY 2017
PLAN NUMBER	ANNEXURE E

LEGEND		
DESCRIPTION	EXISTING	NEW
Stormwater pipe		
1200 x 900 box culvert		
Stormwater manhole		
Stormwater catchpit		

Proposed 600m² Retension pond

Gabion mattress protection

Proposed 1200 x 900 Box culvert

400 SW

Road A
Road B
Road C
Road D
Road E
Road F
Road G
Road H
Road J
Road K
Road L

Tydeman Court
Comice Crescent
Lindina Drive
Packham Road
Bartlett Road
Cornelly Close
Teerpad

POS

10865 10864 10863 10862 10861 10860 10859
10902 10903 10904 10935 10936 10937 10938 10939 10940 10941 10942 10943 10944 10945 10946 10947 10948 10949 10950 10951 10952 10953 10954 10955 10956 10957 10958 10962 10963 10964 10965
11014 11016 11017 11026 11015 11018 11025 11019
11075 11046 11049 11050 11051 11052 11053 11054 11055 11043 11044 11042
10966 10967 10968 10969 10970 10971 10972 10973 10974 10975 10976 10977 10978 10979 10980 10981
11009 11010 11011 11012 11013

0 10 20 30 40 50 100
OORSPRONKLIKE SKAAL IN mm/ORIGINAL SCALE IN mm

Wysiging Amend.	Datum Date	Beskrywing-Description

Posbus / P. O. Box 1273
Hermanus 7200

Patersonstraat / Street 7
Hermanus 7200

Tel. : 028 - 312 2292
Faks / Fax : 028 - 312 2325
E-pos / Mail : pieter@d-e-c-a.co.za

Opgemeet Surveyed		
Ontwerp Designed	P. E.	
Geteken Drawn	R Bester	
Nagesien Checked		

Ingenieur - Engineer
Geteken Signed Pr.Ing. Pr. Eng.
Datum Date

Kliënt - Client
Geteken Signed
Datum Date

Kliënt - Client
P. O. Box 118
Gordons Bay
7151
Tel :021 - 845 8335
Faks :021 - 845 8552

ASLA DEVCO

Projek - Project

IDAS VALLEY

Planbeskrywing - Plan Description

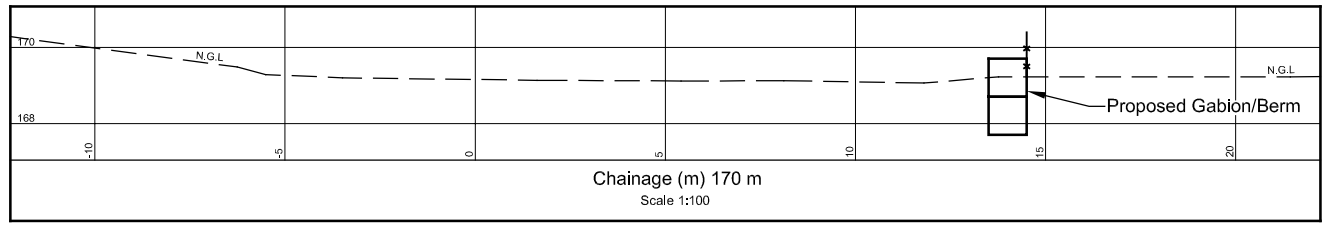
PORTION OF ERF 9445: STORMWATER LAYOUT

Skaal Scale	N.T.S
Datum Date	FEBRUARY 2017
Plan Nr. Plan No.	ANNEXURE F
Wysiging Amendment	

LEGEND	
Subdivisional area	
Flood line - 1:100 year	
Gabion Berm	
Possible future connection	

LAYOUT
Scale 1:500

ZONING	LAND USE	PTN'NR	N	AREA (ha)	%
Single Residential	Subsidy housing	166	166	19 251	37,32
Public open space	Public open space	167 - 169	3	21 936	42,53
Local authority	Sub-station	170	1	24	0,05
Local authority	Roads	171	1	10 371	20,10
TOTAL			171	51 582	100



OORSPRONKLIKE SKAAL IN mm/ORIGINAL SCALE IN mm

Wysiging Amend.	Datum Date	Beskrywing-Description

Posbus / P. O. Box 1273
Hermanus 7200

Patersonstraat / Street 7
Hermanus 7200

Tel. : 028 - 312 2292
Faks / Fax : 028 - 312 2325
E-pos / Mail : pieter@d-e-c-a.co.za

Opgemeet Surveyed		Ingenieur - Engineer
Ontwerp Designed	P. E.	Geteken Signed / Pr.Ing. Pr. Eng.
Geteken Drawn	R Bester	Datum Date
Nagesien Checked		Kliënt - Client
		Geteken Signed
		Datum Date

Kliënt - Client

P. O. Box 118
Gordons Bay
7151

Tel :021 - 845 8335
Faks :021 - 845 8552

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Projek - Project

IDAS VALLEY

Planbeskrywing - Plan Description

PORTION OF ERF 9445: PROPOSED UPGRADING OF STREAM

Skaal Scale	**AS SHOWN**
Datum Date	**FEBRUARY 2017**
Plan Nr. Plan No.	**ANNEXURE G**
Wysiging Amendment	

25 1989 - 2014 celebrating 25 years of excellence

26 February 2016

Deca Consulting Engineers
P. O. Box 1273
HERMANUS
7200

Attention: Mr Pieter Engelbrecht

Dear Sir

DEVELOPMENT OF ERVEN 10866 - 10931 & 10998 - 11008 AND ERF 11330 (IDAS VALLEY DEVELOPMENT), STELLENBOSCH : BULK WATER & SEWER SERVICES

Your request regarding comments on the bulk water and sewer supply to the proposed development (affordable housing development on erven 10866 - 10931 & 10998 - 11008 and Erf 11330, Idas Valley), refers.

This document should inter alia be read in conjunction with the Water Master Plan (performed for the Stellenbosch Municipality) dated December 2011 and the Sewer Master Plan dated December 2011.

Future development areas S29 and S31, which includes the proposed development areas, were conceptually taken into consideration for the master plans for the water and sewer networks.

1. WATER DISTRIBUTION SYSTEM

1.1 *Distribution zone*

The master planning indicated that the proposed development on Erf 11330 (development area A as shown on Figure 1) should be accommodated in the existing Arbeidslus reservoir zone and the proposed development on erven 10866 - 10931 & 10998 - 11008 (development area B as shown on Figure 1) should be accommodated in the existing Arbeidslus PVR 1 zone. The connection to the existing system should be done on the 250 mm diameter supply pipe from the Arbeidslus reservoir zone for development area A and on the 100 mm diameter pipe in Starking Street within the Arbeidslus PRV 1 zone for development area B, as shown on Figure 1 attached.

The proposed development is situated inside the water priority area.

1.2 *Water demand*

The original water analysis for the master plan was done with a total annual average daily demand (AADD) for development on erven 10866 - 10931 & 10998 - 11008 (future area S29 in the December 2011 master plan) and Erf 11330 (future area S31 in the December 2011 master plan) of 44,4 kℓ/d and 93,8 kℓ/d respectively.

GLS Consulting (Pty) Ltd
Tel +27 21 880 0388 **| email:** info@gls.co.za
PO Box 814, Stellenbosch, 7599, South Africa
13 Elektron Street, Techno Park, Stellenbosch
www.eoh.co.za | www.gls.co.za
Reg no: 2007/003039/07

For this re-analysis, the AADD and fire flows for the proposed development was calculated as follows:

Development area A

- 205 Affordable housing units @ 450 ℓ/d/unit = 92,3 kℓ/d
- 60 Flat units @ 400 ℓ/d/unit = 24,0 kℓ/d

Total = 116,3 kℓ/d

Development area B

- 196 Affordable housing units @ 450 ℓ/d/unit = 88,2 kℓ/d
- Fire flow criteria (Low risk) = 15 ℓ/s @ 7 m

1.3. *Present situation*

1.3.1 Network conveyance

Accommodation of the development in the present system will require no upgrading of the existing system to comply with the pressure and fire flow criteria as set out in the master plan.

The following link services items will, however, be required to connect development area A to the proposed connection point on the existing 250 mm diameter supply pipe from the Arbeidslus reservoir:

Link services

• Item 1	: 370 m x 160 mm Ø supply pipe		R	330 000 *
• SSW.8.4	: 265 m x 160 mm Ø supply pipe		R	163 000 *
		Total	R	493 000 *

It is proposed that development area B connects to the existing water system at the 100 mm diameter pipe in Starking Street.

Note:

- Existing raw water pipelines from Stellenbosch Municipality between the Idas Valley dams and the Idas Valley Water Treatment Plant (WTP) are crossing development area A and provision should be made for a pipeline servitude (in favour of Stellenbosch Municipality) to accommodate these pipes.
- The existing Stellenbosch water model shows that existing network pipes are already constructed in development area B (erven 10866 - 10931 & 10998 - 11008). This should however be verified by Stellenbosch Municipality.
- (* Including P & G, Contingencies and Fees, but excluding VAT – Year 2015/16 Rand Value. This is a rough estimate, which does not include major unforeseen costs).
- Take note that the routes of the proposed pipelines are schematically shown on Figure 1 attached, but have to be finalised subsequent to detail pipeline route investigations.

1.3.2 Reservoir capacity

The existing Arbeidslus reservoir has sufficient spare capacity to accommodate the proposed development.

2. SEWER NETWORK

2.1 *Drainage area*

The development falls within the existing Adam Tas drainage area. The recommended position for the sewer connection for the proposed development is at the existing 150 mm diameter outfall sewer in Merton Street for development A and for development B at the north western corner of the development area, as shown on Figure 2 attached.

The development is inside the sewer priority area.

2.2 *Sewer flow*

For the original sewer master plan, the peak day dry weather flow (PDDWF) for future areas S29 and S31 was calculated at 28,9 kℓ/d and 74,6 kℓ/d.

For this re-analysis, the PDDWF's for the proposed development areas were calculated as 81,4 kℓ/d and 61,7 kℓ/d for development areas A and B respectively.

2.3 *Present situation*

There is insufficient capacity in the sewer network reticulation system to accommodate the proposed developments.

2.4 *Implementation of the master plan*

The following master plan items will be required to reinforce the existing Stellenbosch sewer system in order to accommodate the proposed developments together with other future development areas.

Bulk sewer upgrades

Phase 1: (Minimum requirement)

• SSS1.1	: 2 482 m x 1 200 mm Ø New main sewer		R 23 304 000 *
• SSS1.2	: New diversion structure		R 321 000 *
• SSS1.3	: New diversion structure		R 213 000 *
• SSS1.4	: New diversion structure		R 366 000 *
• SSS1.5	: 162 m x 750 mm Ø New diversion sewer (including river crossing)		R 1 519 000 *
		Sub-total	R 25 723 000 *

Phase 2: (Minimum requirement)

• SSS1.6	: 1 008 m x 1 200 mm Ø New main sewer		R 9 263 000 *
• SSS1.7	: New diversion structure		R 289 000 *
• SSS1.8	: Modify existing diversion structure		R 366 000 *
• SSS1.9	: 48 m x 750 mm Ø New diversion sewer (including railway crossing)		R 1 056 000 *
		Sub-total	R 10 974 000 *
		Total	R 36 697 000 *

Network upgrades

Phase 3: (Minimum requirement)

• SSS1.14	: 578 m x 450 mm Ø Upgrade existing outfall sewer		R 1 618 000 *
• SSS1.15	: 1 407 m x 355 mm Ø Upgrade existing outfall sewer		R 2 851 000 *
		Sub-total	R 4 469 000 *

Phase 4: (Minimum requirement)

• SSS1.43	: Modify existing diversion structure		R	137 000 *
• SSS1.44	: 685 m x 250 mm Ø Upgrade existing outfall sewer		R	1 083 000 *
• SSS1.45	: Modify existing diversion structure		R	144 000 *
		Sub-total	R	1 364 000 *

Phase 5: (Medium term requirement: 7 - 10 years)

• SSS1.41	: 221 m x 200 mm Ø Upgrade existing outfall sewer		R	346 000 *
• SSS1.42	: 406 m x 200 mm Ø Upgrade existing outfall sewer		R	590 000 *
		Sub-total	R	936 000 *

Phase 6: (Medium term requirement: 7 - 10 years)

• SSS1.16	: 422 m x 315 mm Ø Upgrade existing outfall sewer		R	813 000 *
		Total	R	7 582 000 *

Notes:

- (* Including P & G, Contingencies and Fees, but excluding VAT – Year 2015/16 Rand Value. This is a rough estimate, which does not include major unforeseen costs).

- Take note that the routes of the proposed pipelines are schematically shown on Figures 3 & 4 attached, but have to be finalised subsequent to detail pipeline route investigations.

- The existing Stellenbosch sewer model shows that existing network pipes are already constructed in development area B (erven 10866 - 10931 & 10998 - 11008). This should however be verified by Stellenbosch Municipality.

The minimum requirements to accommodate the proposed development in the existing sewer system are all the master plan items related to the phase 1, 2, 3 & 4 upgrades.

4. CONCLUSION

The developer of erven 10866 - 10931 & 10998 - 11008 and Erf 11330 in Stellenbosch will be liable for the Bulk Services Levy (as calculated by the Stellenbosch Municipality) as a contribution towards water infrastructure and the Bulk Services Levy (as calculated by the Stellenbosch Municipality) as a contribution towards sewer infrastructure.

There is sufficient capacity in the existing water reticulation system to accommodate the proposed development. Link services items 1 and SSW8.4 will, however, be required to connect the proposed development A to the existing water system.

There is insufficient capacity in the existing sewer reticulation system to accommodate the proposed development.

The minimum requirements to accommodate the proposed development in the existing sewer system are master plan items SSS1.1 - SSS1.9, SSS1.14, SSS1.15 & SSS1.43 - SSS1.45.

The existing Stellenbosch water and sewer models show that existing network pipes are already constructed in development area B (erven 10866 - 10931 & 10998 - 11008). This should however be verified by Stellenbosch Municipality.

We trust you find this of value.

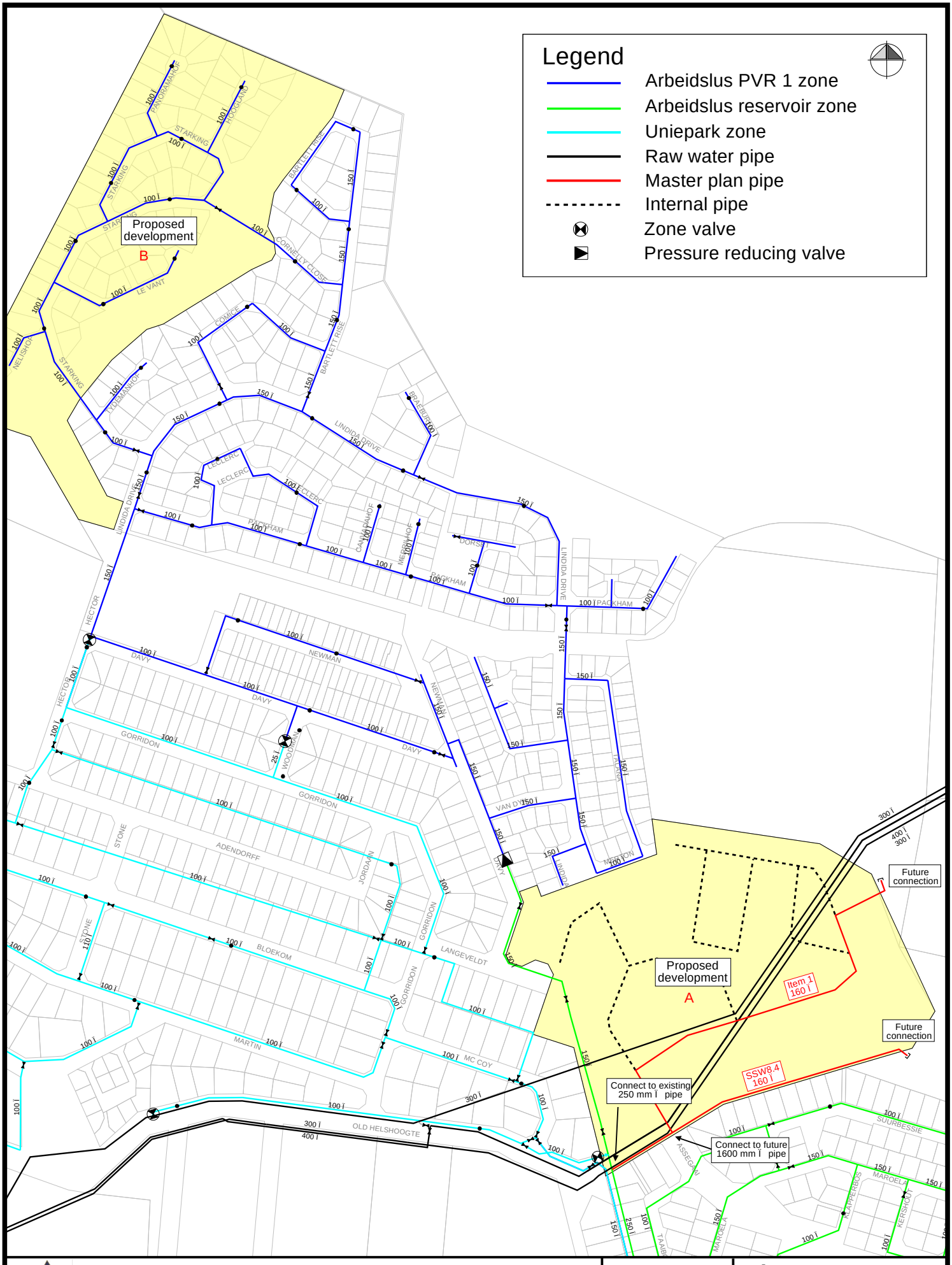
Yours sincerely

GLS CONSULTING (PTY) LTD
REG. NO.: 2007/003039/07

_____
Per: JJ STREICHER (Director)

cc. The Director
Directorate: Public Works
Stellenbosch Municipality
P. O. Box 17
STELLENBOSCH
7599

Attention: Mr Dries van Taak



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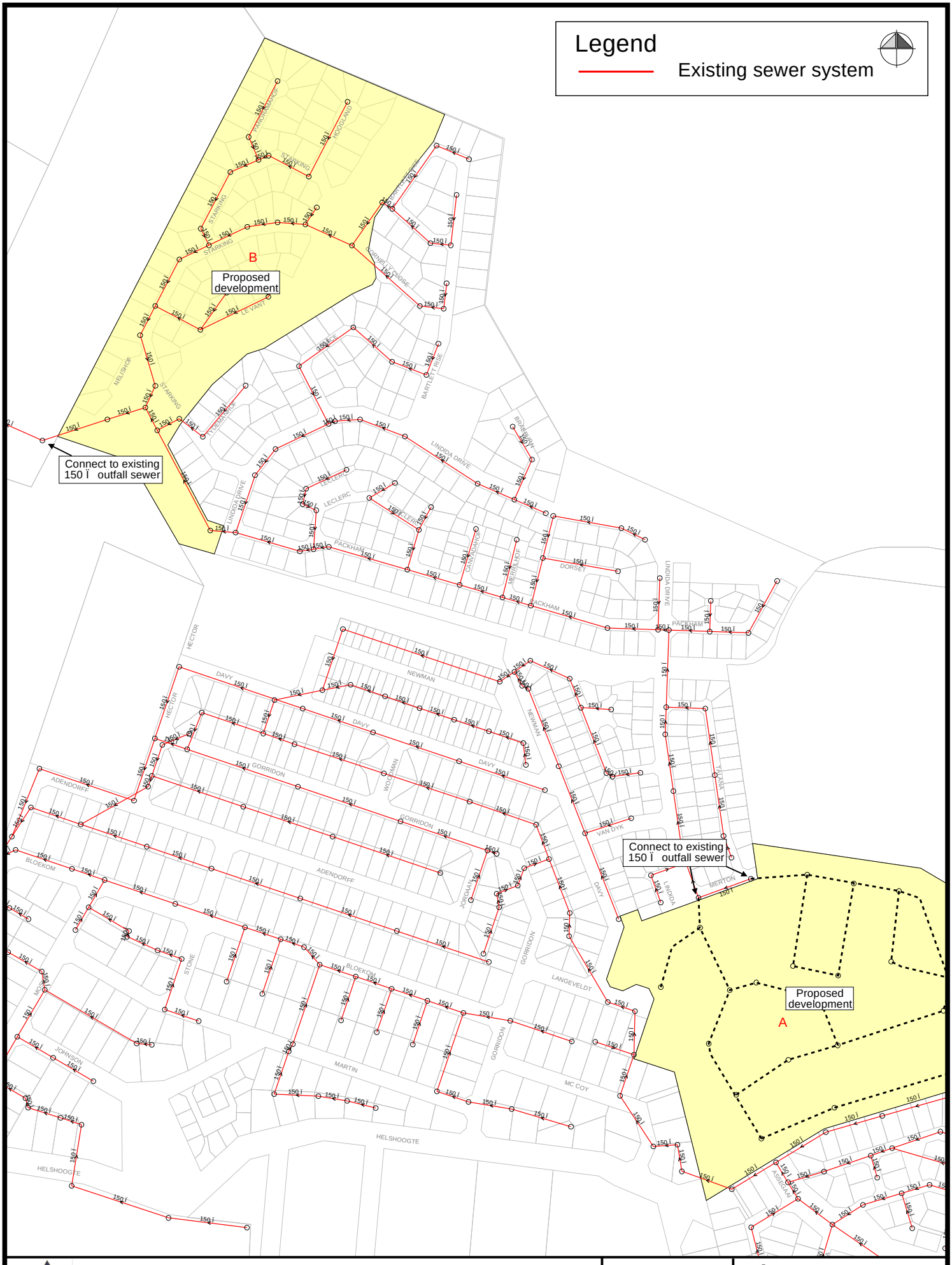
Idas Valley development - Stellenbosch

Figure 1

Proposed Development
Idas Valley - Stellenbosch
Existing Water System



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Idas Valley development - Stellenbosch

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Figure 2

Proposed Development
Idas Valley - Stellenbosch
Existing Sewer System

Legend

- Existing sewer system
- Master plan pipe (phase 1)
- Master plan pipe (phase 2)
- Master plan pipe (phase 3)
- Master plan pipe (phase 4)
- Master plan pipe (phase 5)
- Master plan pipe (phase 6)
- Diversion structure

SSS1.16
315 ⌀

SSS1.15
355 ⌀

SSS1.15
355 ⌀

SSS1.14
450 ⌀

SSS1.9
750 ⌀

SSS1.7

SSS1.8

SSS1.6
1200 ⌀

SSS1.6
1200 ⌀

SSS1.5
750 ⌀

SSS1.4

SSS1.2

SSS1.3

SSS1.1
1200 ⌀

SSS1.1
1200 ⌀

STELLENBOSCH
WWTP

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Idas Valley development - Stellenbosch

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Figure 3

Proposed Development
Idas Valley development
Sewer Master Plan

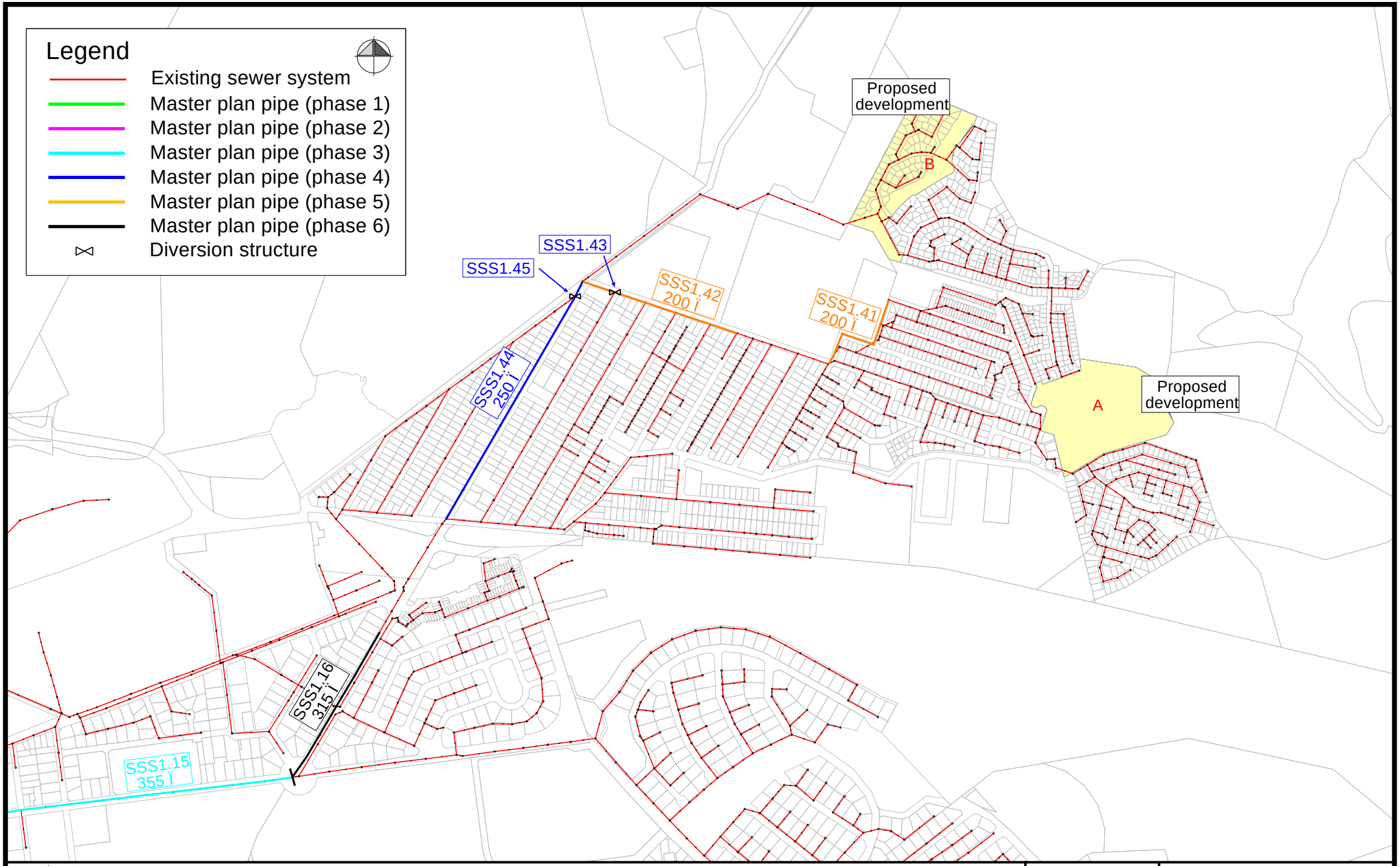

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Figure 4

Proposed Development
Idas Valley - Stellenbosch
Sewer Master Plan