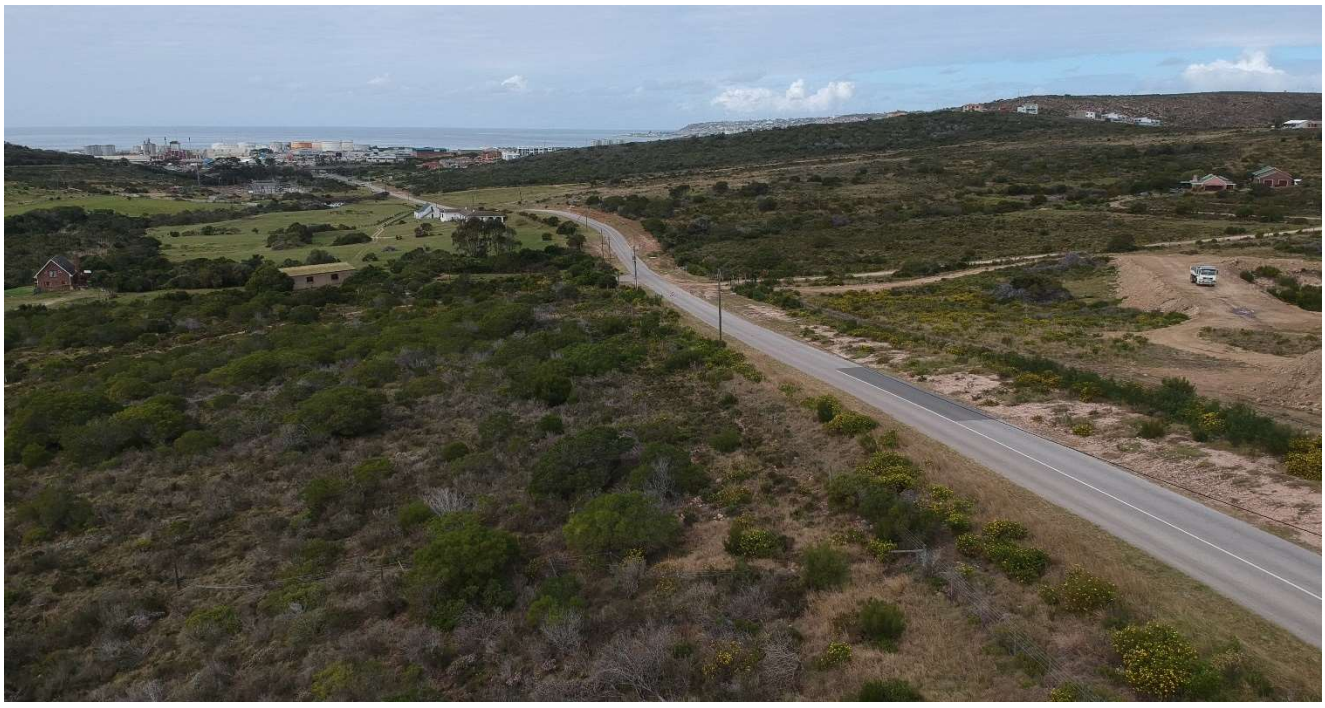
URBAN ENGINEERING
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

ENGINEERING SERVICES REPORT

PROPOSED DEVELOPMENT OF AALWYNDAL FARM 220/209, MOSSEL BAY, WESTERN CAPE

Report Number 22-085_CES



Date: July 2024 Revision (4)

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on behalf of Urban Engineering (Pty) Ltd

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LIST OF ABBREVIATIONS

msl	Mean Sea Level
WCG	Western Cape Government
WGS	World Geodetic System
HDPE	High Density Polyethylene
uPVC	Unplasticised Polyvinyl Chloride
SDP	Site Development Plan
Mℓ	Mega Litre (1,000,000 litres)
GHPSD	Guidelines for Human Planning and Settlement Design

1 INTRODUCTION

Urban Engineering (Pty) Ltd was appointed by NN Busdiens (Pty) Ltd to prepare a Civil Engineering Service Report pertaining to the proposed development of Portion 209 of Vyf Brakkefonteinen, No 220. The site is located approximately 1km West of the N2/Voorbaai Interchange and is approximately 7km Northwest from the Mossel Bay CBD. The nearby Langeberg Mall and Voorbaai areas are located to the East of the proposed development.

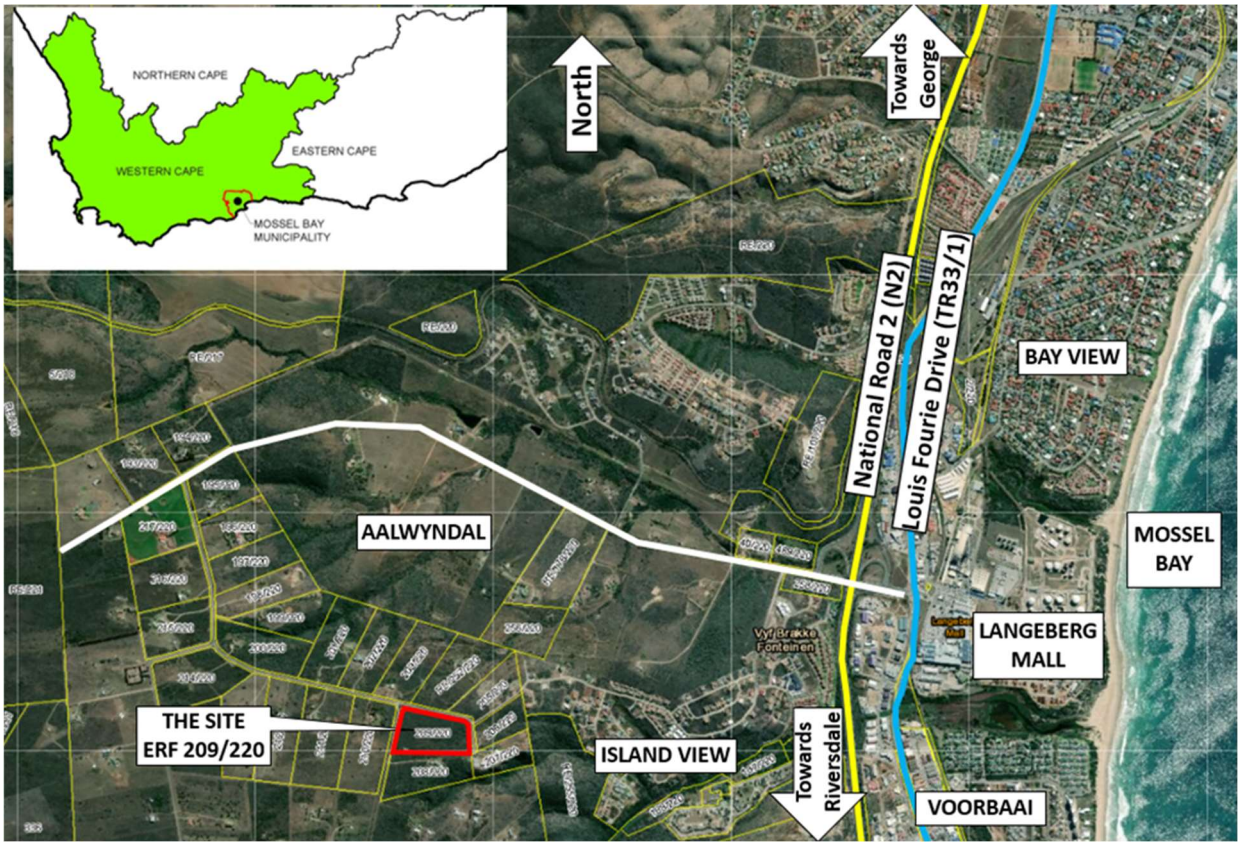


Figure 1-1 - Locality Plan

1.1 BACKGROUND

The site is currently zoned as Single Residential Zone I. There are no current land uses on the Erf as seen in Figure 1-2.

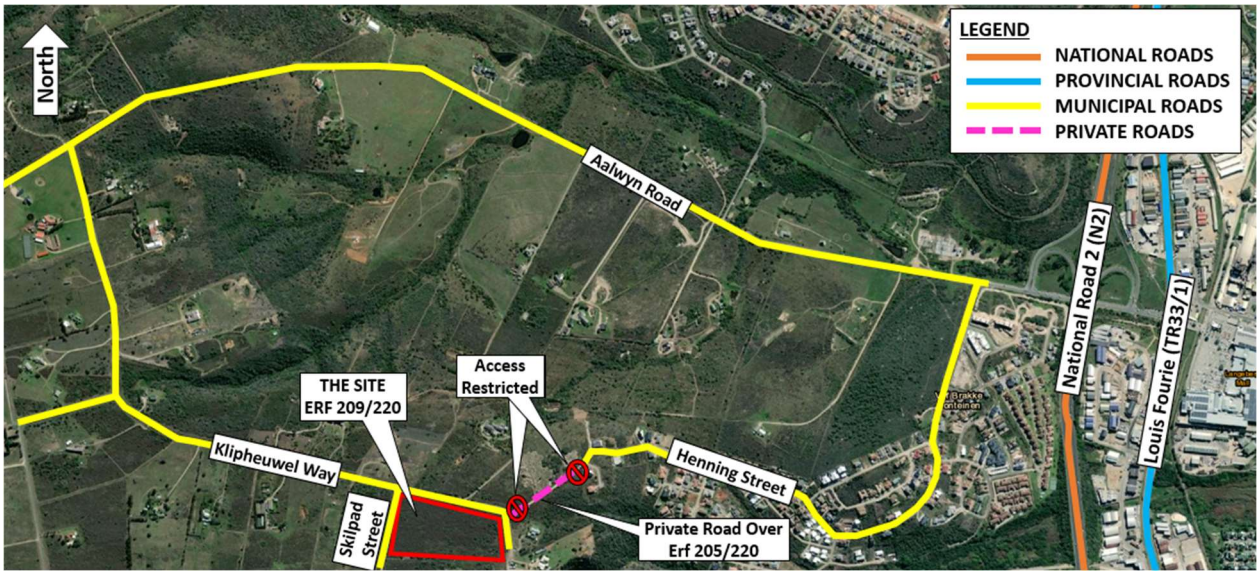


Figure 1-2 Erf Land Use Display

The proposal is to convert a portion of the land/erf into different land use developments. The proposed development includes residential and business units.

The Site Development Plan has been attached as **Annexure A,** but for ease of reference an extract has been included as Figure 1-3 below.

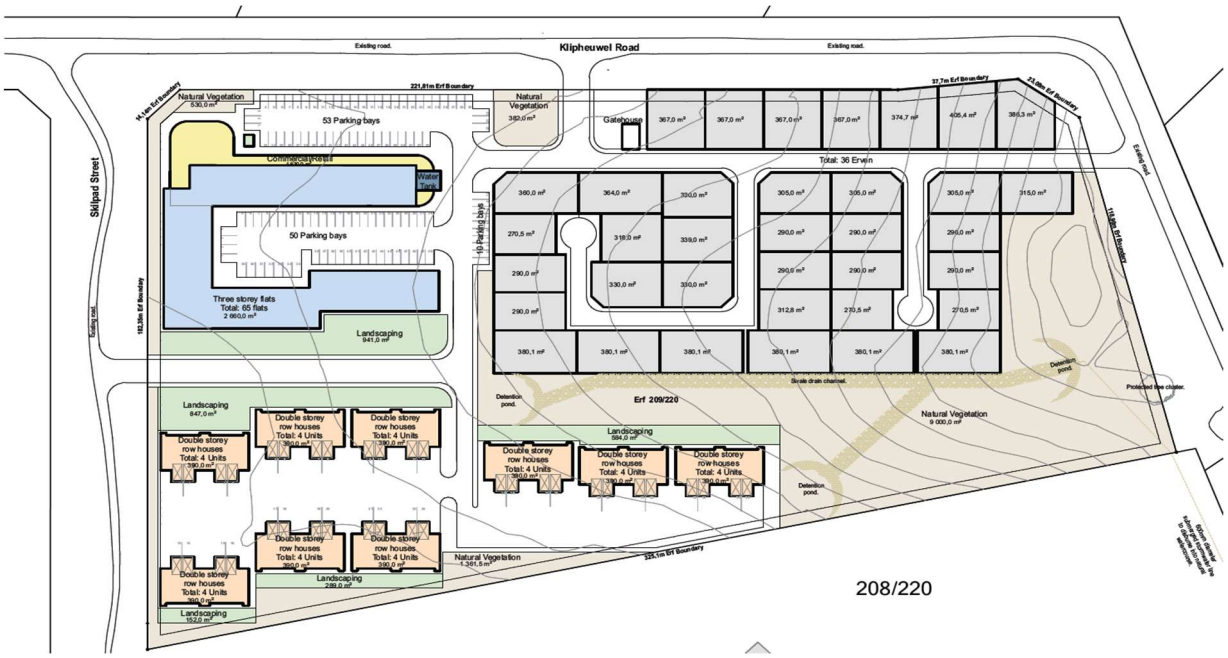


Figure 1-3 Site Development Plan

1.2 OBJECTIVE OF THIS REPORT

The purpose of this report is to determine the demand on municipal water and sewer services and to investigate the availability and capacity of these services.

1.3 SITE DESCRIPTION

The site is located at the junction of Klipheuwel Road and Skilpad Street. The approximate site centre has WGS 84 coordinates of 34°09.70'40"S and 22°04'46.7"E. The site consists of a single Erf of approximately 5 Hectares in area with a frontal dimension of 282m and a width of 187m. There are currently no structures on the site.

1.4 TOPOGRAPHICAL SURVEY

The topography across the site is the steepest at approximately 8.6% from the Southwestern portion of the site. A Topographical Plan of the site has been attached to this report as **ANNEXURE B** and shows the approximate contours across the development. The site has an average altitude of roughly 48m above msl (mean sea level) with its highest and lowest points situated at approximately 59m and 37m above msl respectively.

2 EXISTING BULK SERVICES

Information regarding Existing Bulk Services were obtained from the following sources:

1. GLS Consulting Engineering Master Plan for Water and Sewer.
2. Mossel Bay Municipality system was referenced for the position of Existing Bulk Services. (Refer to Annexure C&D for extracts).
3. GLS Capacity Analysis of the Bulk Water and Sewer Services (dated 06 March 2024, Attached as **ANNEXURE F** to this report)

3 POTABLE WATER

3.1 STATUS QUO

Water for the development will be sourced from the Mossel Bay Municipality Water Network.

The Water Services Infrastructure consists of various raw water sources including the Wolwedans Dam, Klipheuwel Dam, Hartenbos Kuil Dam and Ernst Robertson Dam as well as boreholes. Raw water pipelines convey the untreated water from the source to several Water Treatment Plants situated throughout the municipal area.

The 3.0 Mℓ Aalwyndal Reservoir is presently supplied from the 17.4Mℓ Langeberg Resevoir. The Langeberg Pumpstation provides the water supply via the "Die Voorbaai Bulkwater" Pipeline.

The Aalwyndal Reservoir supplies the Aalwyndal smallholding area along a gravity feed Water Reticulation Network which consists of 160mm up to 63mm diameter pipes. The floor of the Aalwyndal Reservoir is at a level of 162.6m. The full water level is at 169.3m. The highest proposed Erf for the development is situated at a level of approximately 59m above sea level. The minimum required residual head for dwelling houses are 24m, which implies that the existing elevated storage tank is adequate for the proposed development.

3.2 WATER DEMAND CALCULATIONS

The water demand was calculated in the GLS Capacity Analysis report (refer to **ANNEXURE F**) and has been summarized below. (**Note: Paragraphs 3.2.1 and 3.2.2 were copied directly from the GLS report**)

3.2.1 WATER DEMAND

Provision was made in the original water analysis for the master plan for development on portion 209 of farm 220 with a theoretical annual average daily demand (AADD) of 0,71 kL/d. For this re-analysis, the AADD and fire flows for the proposed development was calculated as follows:

- 37 Single Residential erven (High density) @ 0,60 kL/d/unit [(1)] = 22,2 kL/d
- 65 Apartment/Flats (Very high density) @ 0,25 kL/d/unit [(1)] = 16,3 kL/d
- 36 Group/cluster housing units (High density) @ 0,40 kL/d/unit [(1)] = 14,4 kL/d
- 1 630 m^2 commercial/retail area @ 0,65 kL/d/100 m^2 [(1)] = 10,6 kL/d

TOTAL = 63,5 kL/d

[(1)] As per Table J.2 from Section J - Water Supply of "The Neighbourhood Planning and Design Guide" (so called "Red book").

- Fire flow criteria (Moderate risk) = 25 L/s @ 10 m

3.2.2 PRESENT SITUATION

BULK INFRASTRUCTURE

The existing bulk water system that supplies water to the Aalwyndal reservoirs has sufficient capacity to accommodate the proposed development on portion 209 of farm

220 (the Langeberg reservoirs supplies the existing Aalwyndal reservoir water distribution zone).

RETICULATION NETWORK

The existing water reticulation network between the Aalwyndal reservoir and the proposed development has insufficient capacity to provide the required minimum water pressure of 24 m water head to the development during peak demand conditions.

A combination of 110 mm Ø and 90 mm Ø supply pipeline between the Aalwyndal reservoir and the proposed development experiences high flow velocities during peak demand conditions. It is proposed that the pipelines must be upgraded to provide adequate water head during peak demand conditions and sufficient flow rate for fire-flow to the proposed development.

RESERVOIR CAPACITY

The criteria for the total reservoir volume used in the Mossel Bay Water Master Plan is 48 hours of the AADD (of the reservoir supply zone).
The existing Aalwyndal reservoir has sufficient capacity to accommodate the domestic demand and fire-flow requirements of the proposed development.

3.3 HYDRAULIC CONSIDERATIONS

As stipulated in the NPDG, the following hydraulic considerations should be adhered to as far as possible:

- The pressure should be kept as low as possible to minimize real losses.
- The number of low and high points on pipes should be kept to a minimum to reduce the number of scour and air valves respectively.
- The velocities in the pipeline should be kept between 0.6 m/s and 1.2 m/s.
- Velocities through special fittings should not exceed 6 m/s or as per manufacturer's specifications.
- Pipelines should be designed to be protected against water hammer/surge pressures.
- Using 110 mm as the minimum pipe size for ring mains in urban areas should be considered where the provision of fire flow is required

3.4 WATER FOR FIRE FIGHTING

The provision of water for Firefighting should comply with the requirements as specified in the NPDG as well as the SANS 10400 (National Building Codes).

According to the NPDG guidelines, housing and flats are classified as Moderate Risk 2 for which fire hydrants should provide a Minimum Design Fire Flow of **1500 ℓ/min** per hydrant, minimum pressure at the fire node of 10 m and a minimum residual head of 5 m. This fire flow must be sustained for a period of at least 2 hours, by all hydrants with a maximum spacing between hydrants of 120 m. The Site Development Plan will therefore require 4 hydrants.

The resultant reservoir capacity required to satisfy the Firefighting needs are calculated as follows:

- 4 x Hydrant @ 1500 ℓ/min/hydrant x 60 minutes = **360 kℓ/h**
- 2 Hour Storage = **720 kℓ**

NPDG specifies the following with regards to Firefighting:

- Hydrants should not be provided off mains smaller than 75 mm diameter.
- Hydrants should be located in vehicular thoroughfares, opposite stand boundary pegs, and at a maximum spacing of 200 m (or as required by the local Fire Department).
- 75 mm diameter sluice-valve hydrants should be used for the high-risk and moderate-risk categories. For the low-risk category, the hydrant may be the screw-down type.
- The location of hydrants should be indicated by using permanent marker posts on the verge opposite the fitting or painted symbols on road or kerb surfaces.
- Symbols on markers should be durable.
- The hydrants' flow rate should be serviced and checked for conformity requirements at intervals not exceeding one year.
- Where possible, fire hydrants should be positioned to also serve as a scour valve

3.5 FUTURE MASTER PLANNING

Information provided by GLS Consulting pertaining to the development of 175/220, indicate a proposed future upgrade of the gravity water line along Aalwyndal Road. The upgrade entails increasing the existing 100mm diameter water line to a 250mm water line. The relevant information has also been attached as **ANNEXURE C**.

3.6 WATER STORAGE

The purpose of storing water is to meet balancing requirements and cater for emergencies (e.g. Firefighting) or planned shutdowns. The balancing volume is required to cater for peak outflows while a constant (or variable) inlet flow is being received. Where water is obtained from a Bulk Water Supply authority, the storage capacity provided should comply with the requirements of the authority. For domestic water use, a storage capacity of 48 hours of Annual Average Daily Demand is suggested, although there may be situations where 24 hours will suffice.

Since the Annual Average Daily (24 hours) Demand has been estimated as 63,5 kℓ/d (Refer to GLS report), it follows that a reservoir spare capacity of at least 127 kℓ is required to satisfy the domestic water use requirement.

Combining the domestic requirement (127 kℓ) and the Firefighting requirement (720 kℓ), it follows that a total reservoir spare capacity for the proposed development of approximately 847kℓ will be required. Since the total capacity of the Aalwyndal Reservoir is in excess of 3.0 Mℓ, the Aalwyndal Reservoir has sufficient storage capacity to meet the water demand needs of the proposed development.

3.7 PROPOSED FIRE RETICULATION

It is proposed to create a 75mm diameter ring main class 12 uPVC pipe with a 32mm diameter water connection to each Erf within the development.

In order to ensure proper coverage of the site, four proposed fire hydrants will not be placed directly on a 75mm ring feed but at a slight offset. This is not seen as a problem as the hydrants can be used to scour the line should it be required.

4 WATER DESIGN PARAMETERS

The following specifications as reflected in the Mosselbay Municipality's Civil Engineering Standards & Requirements for Service shall be applicable:

4.1 VALVES

- All valves shall be in accordance with SABS 1 200 I SABS 664/1974 and approved by the relevant department head.
- Valves to be approved and to exceed the specification of AVK resilient seal type.
- Valves shall be clockwise opening or anti-clockwise closing.
- Direction of opening to be clearly marked on valve body or spindle cap.
- All valves shall be heavy duty, class 16.
- All valves shall have non rising spindles.
- All valves shall be fitted with cast iron caps, secured with retaining bolts.
- All valves Belltobies shall be polymer concrete as per AV Moulding, concrete, recycled plastic or cast iron depending on area and relevant condition.
- Only valves supplied with a minimum thickness of 225 micron Copon EP 2300 epoxy paint applied to all internal surfaces after it has been thoroughly cleaned by grit blasting to SA 1/2 finishes in compliance with the requirements of SIS 05 09 00 or valves with similar approved coatings, will be acceptable.

4.2 FIRE HYDRANTS

- All fire hydrant types shall be in accordance with SANS 1200, comply with the local Fire Department Standard Regulations and approved by the relevant department head.
- All fire hydrants shall be 63 mm diameter (Internal).
- Outlets shall be London Round Thread with cast iron caps and securing chain.
- Hydrants shall be left hand closing.
- Hydrant covers shall be polymer concrete as per AV Moulding, concrete recycled plastic or cast iron depending on area and relevant conditions.
- Hydrant covers shall be painted with a minimum of two coats oil paint, "Yellow".

4.3 WATER SAVING

The development is in a water scarce area and the following general household water saving practices are proposed

- Dual Flush Toilets
- Low flow shower heads which make use of either aerators or pulse systems to reduce the flow without compromising the quality of the shower. The choice of shower heads are up to the homeowner but must have a flow of less than 7 liters per minute.
- Low flow faucets. The faucets in bathrooms should have a peak flow of less than 10 liters per minute.
- Rainwater Tanks - All houses should be fitted with rainwater collection tanks for landscaping and washing of vehicles.

- Consideration should be given to provide solar pumps at each rainwater tank in order to more effectively supply the units. The overflow from tanks should be directed into the stormwater system. All water sources situated externally on buildings should be fed from these rainwater tanks.
- Geyser and Pipe Insulation. Homeowners must be required to install geyser and pipe insulation. This must be included in their building guidelines.

5 SEWERAGE

5.1 STATUS QUO

Sewerage in the Aalwyndal smallholding area is presently handled by a combination of suction and septic tanks with soak-aways (french drains). The closest waterborne sewerage reticulation is in the Northern residential suburb in Henning Street.

The proposed development area will approximately be 3.9 ha when fully developed and will generate a design peak flow as detailed in the sections below. Based on the GLS report, the proposed development should be accommodated within the existing Island View pumping station (PS) drainage area. The proposed connection point for the development is the manhole on the existing 160 mm Ø gravity sewer in Henning Road, North- East of the proposed development. The development is inside the sewer priority area.

The sewer calculation were included in the GLS report and has been included below. (**Note: Paragraphs 3.2.1 and 3.2.2 were copied directly from the GLS report**)

5.2 SEWER FLOW

In the original sewer master plan, the theoretical peak day dry weather flow (PDDWF) for portion 209 of farm 220 was calculated as 0,5 kL/d.

For this re-analysis of the master plan, the PDDWF for the proposed was calculated as 44,5 kL/d.

5.3 PRESENT SITUATION

5.3.1 GRAVITY SEWERS

The existing Islandview PS drainage area in Vyf Brakke Fontein has sufficient capacity to accommodate the proposed development within the existing sewer system.

The following link service is however required to connect the internal sewer reticulation network of the new development to the proposed connection point of the existing sewer system:

Take note that the route of the proposed pipeline is schematically shown in the GLS report, but must be finalised after a detail pipeline route investigation.

Provision should be made for a pipeline servitude (in favour of Mossel Bay Municipality) to accommodate this outfall sewer from the proposed development to the proposed connection point of the existing sewer system.

5.3.2 PUMPING STATIONS & RISING MAINS

ISLANDVIEW PUMP STATION:

The sewage for the proposed development gravitates to the Islandview PS located east of the proposed development. There is sufficient capacity in the Islandview PS and rising main to accommodate the proposed additional units of the development.

VOORBAAI PUMP STATION:

Sewage from the Islandview PS gravitates towards the Voorbaai PS, which pumps sewage to the Regional Hartenbos Wastewater Treatment Plant (WWTP) via 2 x 500 mm Ø rising mains. According to the Regional WWTP and Process Audit (October 2023) the capacity of the Hartenbos WWTP is 17,8 ML/d and the Voorbaai PS capacity is 336 L/s. The maximum raw sewage inflow for Regional WWTP from 2022 to 2023 was approximately 15,0 ML/d

6 SEWER DESIGN PARAMETERS

The following design criteria must be adhered to:

- The internal Sewerage Reticulation will be designed to drain at least 80% of each residential Erf.
- The average residential discharge is 800 ℓ/unit/day with a peak factor of 3,5.
- An allowance for an additional infiltration flow of 15%.
- A minimum self-cleansing velocity of 0,7m/s
- A minimum pipe diameter of 160mm and 110mm for house connections
- Precast concrete ring manholes spaced at a maximum distance of 90m with polymer covers.

7 ROADS

The proposed access to the development is via Klipheuwel Road and Skilpad Street to the north and west of the site. A comprehensive Traffic Impact Assessment (TIA) was prepared by Urban Engineering as part of the application.

The access will need to be constructed to a standard which allows for safe entry and exit to the site for refuse removal trucks and Firefighting trucks to the site.

The planned densification of the Aalwyndal area will lead to a direct increase in traffic volumes. In order to effectively handle the increased traffic volumes, geometric upgrades to the various roads have been proposed to ensure mobility along the main corridors remain unhindered. Currently, the only access to the development area is from the Klipheuwel Road, which intersect with Aalwyn Way from the N2 intersection with Louis Fourie Road.

The long-term strategy for the area indicates a new link road connecting Aalwyndal with the West via new link roads that will form part of a current Regional Road Planning Initiative for the greater Mossel Bay area. This proposed future road network is indicated on the Aalwyndal Precinct Plan which is shown as **ANNEXURE E**.

8 STORMWATER

A detailed Stormwater Management Plan was prepared by Element Consulting Engineers.

9 SOLID WASTE MANAGEMENT

The existing Municipal Landfill site will be used for the solid waste disposal. Removal of waste and management thereof will be handled by Mossel Bay Municipality as per Services Agreement between the George Municipality and the Developer.

10 FLOOD LINES

This proposed development is not directly affected by flood lines.

11 DEVELOPMENT CONDITIONS AND LAND REHABILITATION

The general terrain and the underlying geology of this site appears to be suitable for housing development.

12 CAPITAL CONTRIBUTIONS

Capital Contributions are the tariffs payable in respect of the water, electricity, sewerage, roads and solid waste removal infrastructure of the Municipality, relating to the capital and replacement costs and associated interest charges in respect thereof. The development costs for these capital contributions are to be determined by the Directors: Electrotechnical Services, Civil Engineering Services and Community Services in accordance with standard formulas & applicable road model.

Due to the complexity in calculation and time lapse between date of calculation and actual payment, it is recommended that the Capital Contribution amounts be determined after consultation with the relevant Municipal Departments and not be specified in the Engineering Services Report.

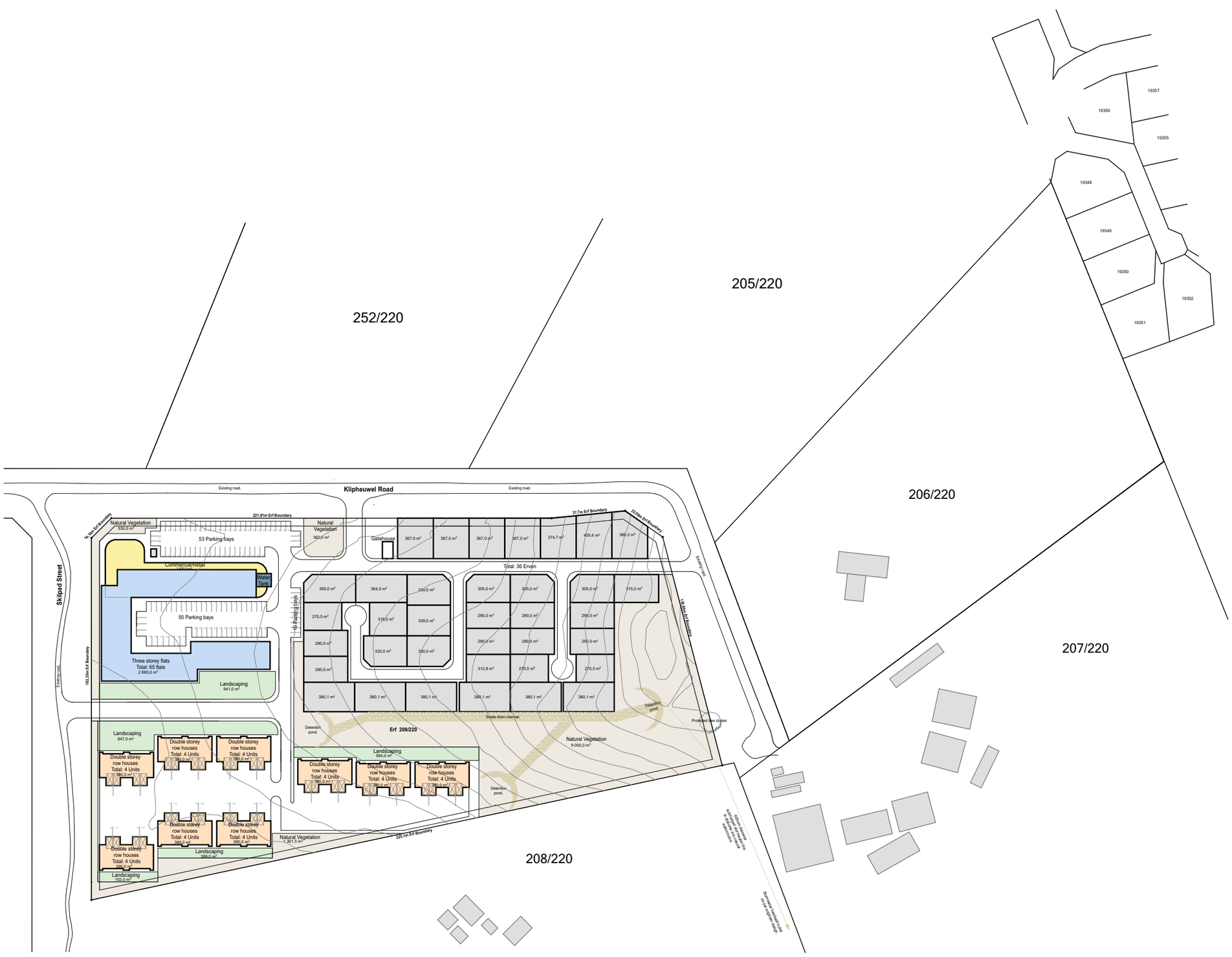
13 SUMMARY

The findings of this report are summarised below:

1. The proposed rezoning is in line with the Mossel Bay Municipality's Local Spatial Development Framework.
2. Water for the site will be obtained from the existing 90mm uPVC Pipe that runs along the Southern site boundary along Klipheuwel Road. There is however, insufficient capacity in the existing water system to provide the required minimum water pressure of 24 m water head to the development during peak demand conditions. Two solutions are proposed:
    a. Long Term Solution: Upgrade the existing 110mmØ and 90mmØ water pipes to 160mmØ water pipes.
    b. Interim Solution: Install an on-site elevated reservoir with sufficient capacity for domestic and fire water. The reservoir will have to be able to provide 24m of residial head and have a min capacity of **720kl** (2 hours of firefighting water)
3. Sewer discharge will be through the existing Municipal Sewerage Network.
4. A detailed Stormwater Management Pan (SWMP) was prepared by Element Consulting Engineers.
5. The Capital Contributions are to be determined by the various Municipal Directorates involved.
6. A detailed Traffic Impact Assessment (TIA) was prepared by Urban Engineering.

ANNEXURE A

SITE DEVELOPMENT PLAN



Outeniquasig, Aalwyndal, Mossel Bay
Erf 220/209, 4,83 hectares

Legend	Area/Quantity
Commercial/Retail	1 630m²
Flats	65
Row houses	36
Erven	36
Natural vegetation	11 273,5m²
Landscaping	2 813m²
Detention pond	110m²
Swale drain	850m²
Water storage	50m²

DEVELOPMENT DATA

Erf / Portion	209/220	Site Area	4,83 Hectare
Township	Aalwyndal	Title Deed No	-
Town Planning Scheme & Year	Mossel Bay Zoning Scheme By-Law 2021	Amendment Scheme No	-

ZONING
Business Zone I (BZ1),
General Residential I (GRZI),
General Residential II (GRZII).

Transport Zone I,
Transport Zone II,
Open Space II.

Annexure
A - Engineering service report.
B - Traffic impact study.
C - Stormwater Management.
D - Planning statement.

	PERMISSIBLE	ACTUAL
F.S.R. (sqm)		
Business Zone I (BZ1),	3	TBC
COVERAGE (sqm)		
Business Zone I (BZ1),	100%	TBC
General Residential I (GRZI).	60%	TBC
General Residential II (GRZII).	60%	TBC
HEIGHT		
Business Zone I (BZ1),	12m	3 STOREYS
General Residential I (GRZI).	8m	2 STOREYS
General Residential II (GRZII).	8m	2 STOREYS
DENSITY		
General Residential I (GRZI).	35 Units/hectare.	TBC
General Residential II (GRZII).	60 Units/hectare.	TBC

BUILDING LINES	REQUIRED	ENCROACH TO
Business Zone I (BZ1),		
Street boundary	0m	N/A
Side & Rear	0m	N/A
General Residential I (GRZI).,		
Public street boundary	4m	N/A
Internal street boundary	2m	N/A
Side & Rear along perimiter	3m	1m
Side & Rear	1m	N/A
General Residential II (GRZII),		
Public street boundary	4m	N/A
Street boundary	2m	N/A
Side & Rear	0m	N/A

TOTAL G.L.A. (GENERAL LETTABLE AREA)	AREA
GROUND FLOOR COMMERCIAL	- sqm
CIRCULATION & ABLUSIONS	- sqm
G.L.A. (GROUND FLOOR)	- sqm
GROSS G.L.A.	- sqm

TOTAL G.B.A (GENERAL BUILDING AREA)	AREA
TOTAL GROUND FLOOR	- sqm
TOTAL FIRST FLOOR	- sqm
GROSS G.B.A.	- sqm

PARKING	QUANTITY
REQUIRED FOR SHOP ± 1300 @ 4/100sqm	52
REQUIRED FOR DWELLING HOUSE (GRZII) 9 @ 2/DWELLING	18
REQUIRED FOR FLATS 65 @ 1,25/FLAT	81
TOTAL REQUIRED	151
TOTAL PROVIDED	131

SITE PLAN scale 1:2 000

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Date: Wednesday, 26 June 2024
Scale: --
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RevisionNo:

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HAMILTON WESSELS ARCHITECTS

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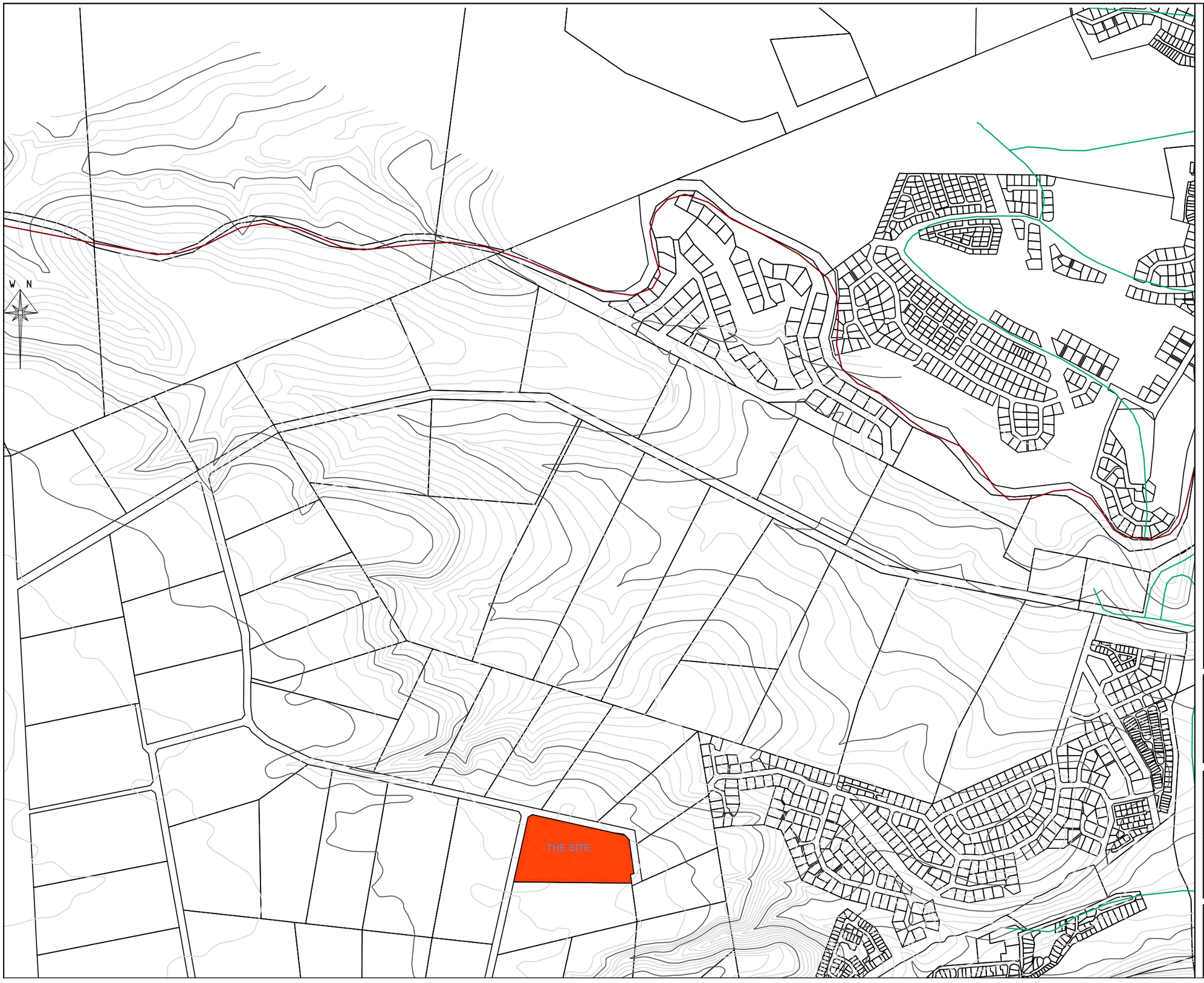
ANNEXURE B

TOPOGRAPHIC PLAN



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Project
MOSSEL BAY AALWYNDAL

Drawing Title
TOPOGRAPHIC PLAN

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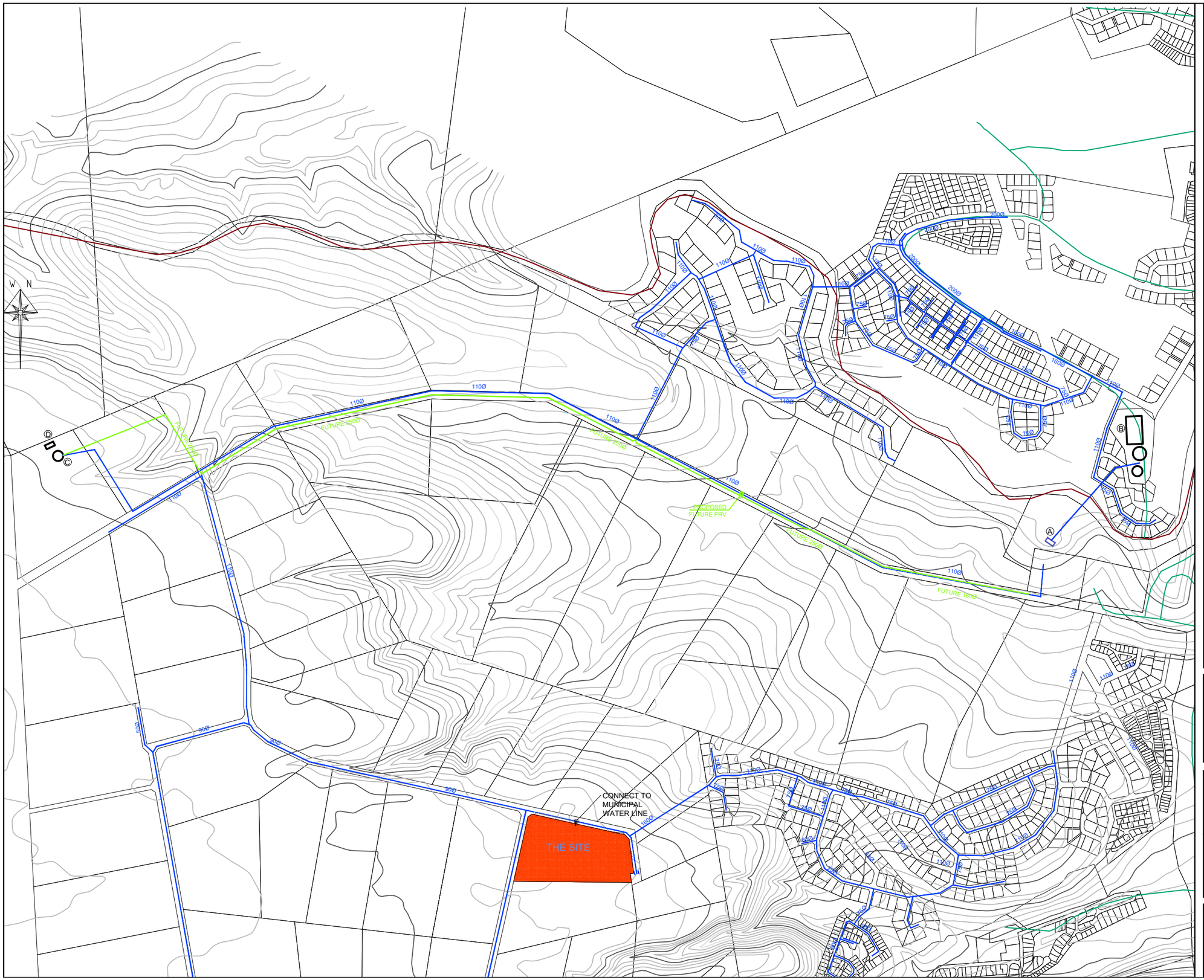
ANNEXURE C

EXISTING AND FUTURE WATER INFRASTRUCTURE



LEGEND:
WATER MAINS:

- EXISTING WATER PIPES
- GLS MASTER PLAN PIPES

RESERVOIRS AND PUMP STATIONS:

Ⓐ Langeberg Pump Station
35 l/s @ 126m
FL = 27.30

Ⓑ Langeberg Reservoirs
17.4 Ml
FWL = 80.40
FL = 75.63

Ⓒ Aalwyndal Reservoir
3.0 Ml
FWL = 169.25
FL = 162.585

Ⓓ Aalwyndal Pump Station
35 l/s @ 126m

SEWER:

- Sewer 110Ø and 160Ø

URBAN ENGINEERING
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

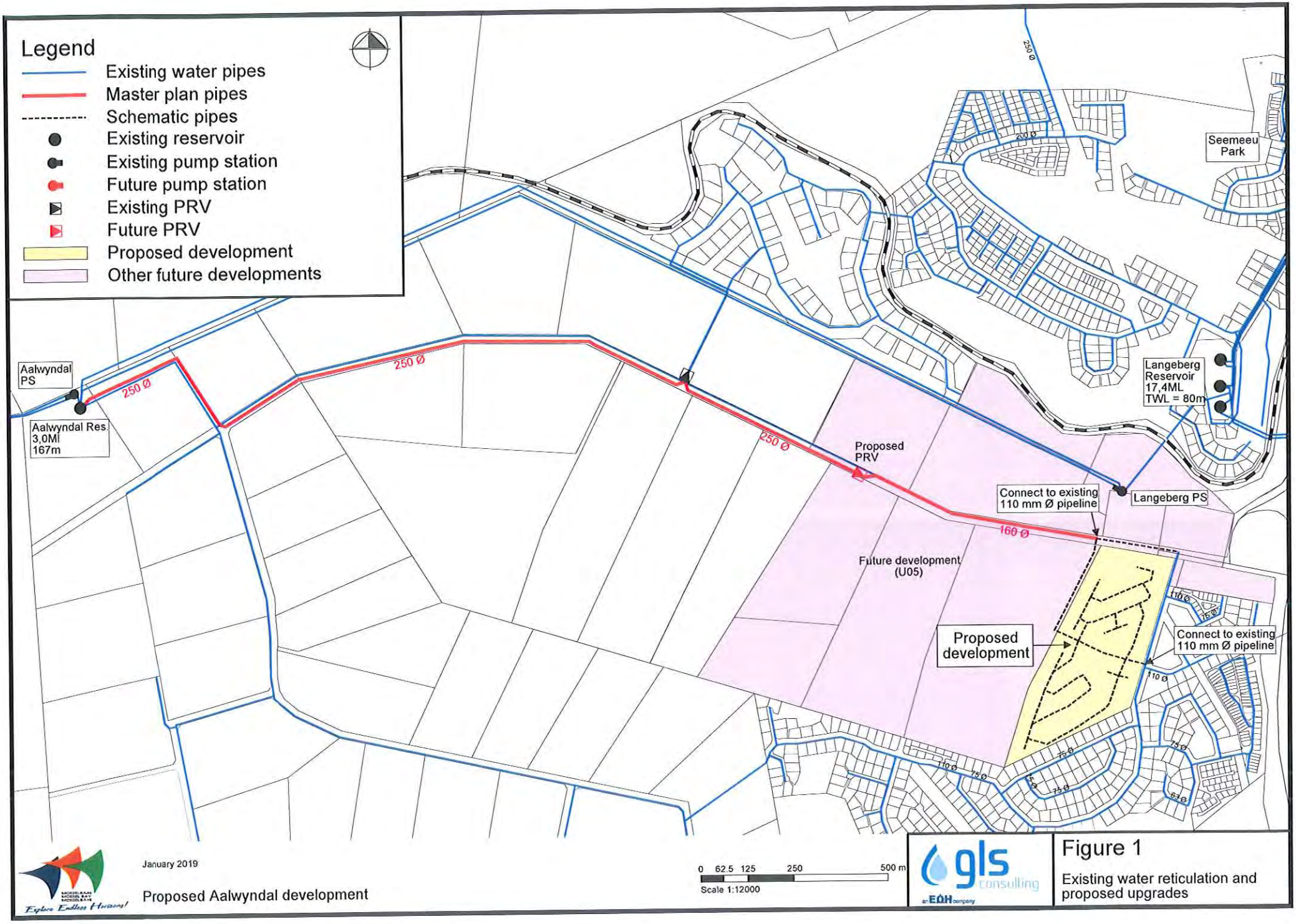
Project

PROPOSED DEVELOPMENT OF PTN 209, AALWYNDAL

Drawing Title

EXISTING AND PROPOSED NEW WATER RETICULATION

Scale (Paper Size) 1 : 5000	Date JUL 2022
Designed EW	Drawing Number 22-085-01
Drawn EW	Revision -
Checked FvA	


Legend
Existing water pipes
Master plan pipes
Schematic pipes
Existing reservoir
Existing pump station
Future pump station
Existing PRV
Future PRV
Proposed development
Other future developments
Aalwyndal PS
Aalwyndal Res. 3,0Ml 167m
250 Ø
250 Ø
250 Ø
250 Ø
200 Ø
Seemeeu Park
Langeberg Reservoir 17,4ML TWL = 80m
Proposed PRV
Connect to existing 110 mm Ø pipeline
Langeberg PS
160 Ø
Future development (U05)
Proposed development
Connect to existing 110 mm Ø pipeline
110 Ø
75 Ø
63 Ø
0 62.5 125 250 500 m
Scale 1:12000
January 2019
Proposed Aalwyndal development
gls consulting
an EQH company
Figure 1
Existing water reticulation and proposed upgrades

Insert Title

0 0,225 0,45 0,9 km

1:9 028

Date: 2022-06-02

Disclaimer:
The Mossel Bay Municipality accepts no responsibility for and will not be liable for any errors or ommisions contained herein.

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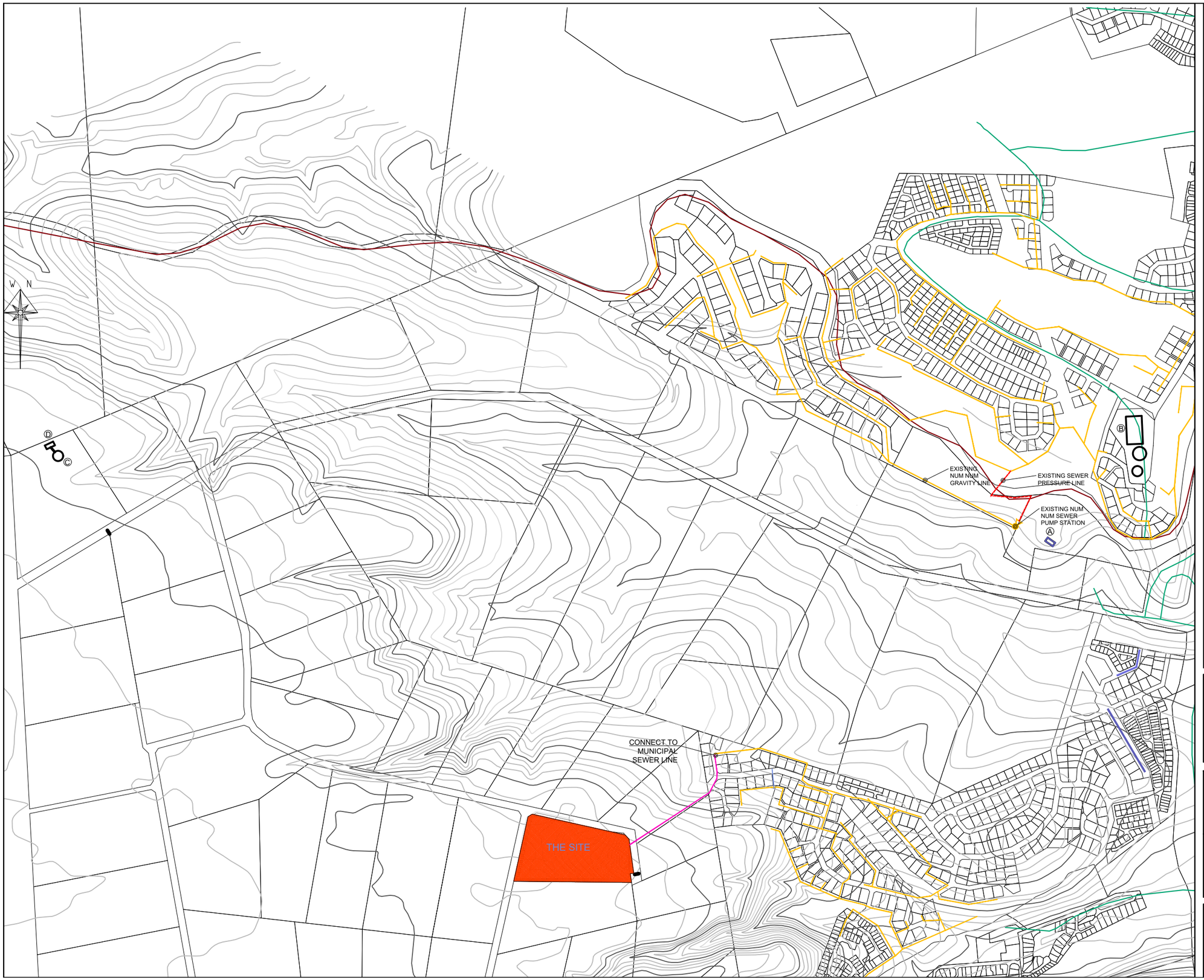
ANNEXURE D

EXISTING AND FUTURE SEWER INFRASTRUCTURE



LEGEND:

WATER MAINS:

- EXISTING SEWER PIPES
- EXISTING SEWER PRESSURE LINE
- PROPOSED DEVELOPMENT SEWER RETICULATION

RESERVOIRS AND PUMP STATIONS:

- Langeberg Pump Station
  35 l/s @ 126m
  FL = 27.30
- Langeberg Reservoirs
  17.4 Ml
  FWL = 80.40
  FL = 75.63
- Aalwyndal Reservoir
  3.0 Ml
  FWL = 169.25
  FL = 162.585
- Aalwyndal Pump Station
  35 l/s @ 126m

SEWER:

- Sewer 110Ø and 160Ø

URBAN ENGINEERING
CONSULTING CIVIL AND STRUCTURAL ENGINEERS

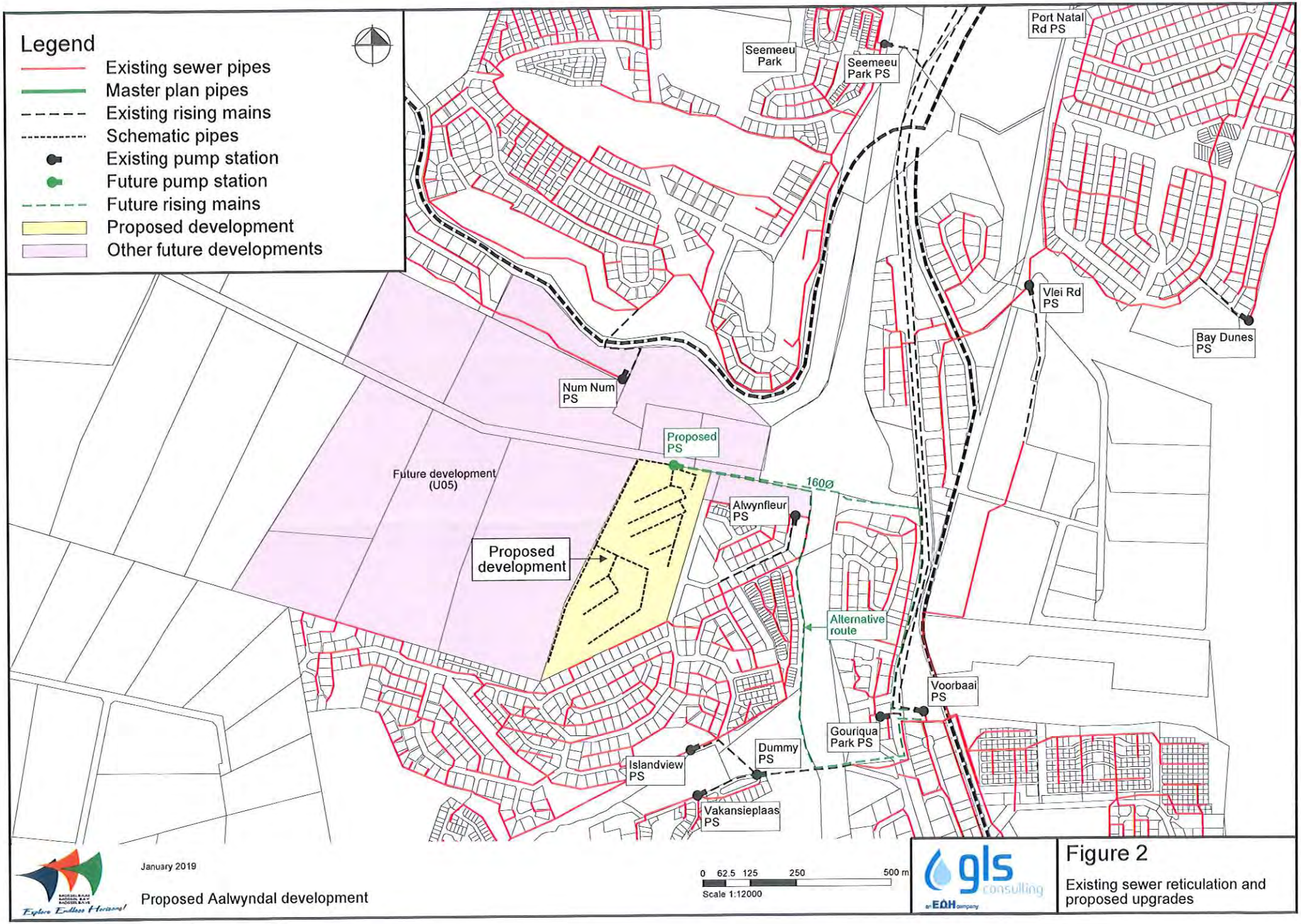
Project

PROPOSED DEVELOPMENT OF PTN 209, AALWYNDAL

Drawing Title

EXISTING AND PROPOSED NEW SEWER RETICULATION

Scale (Paper Size)	Date
1 : 5000	JUL 2022
Designed: EW	Drawing Number: 22-085-02
Drawn: EW	
Checked: FvA	Revision: -


Legend
Existing sewer pipes
Master plan pipes
Existing rising mains
Schematic pipes
Existing pump station
Future pump station
Future rising mains
Proposed development
Other future developments
Seemeeu Park
Seemeeu Park PS
Port Natal Rd PS
Vlei Rd PS
Bay Dunes PS
Num Num PS
Proposed PS
160Ø
Future development (U05)
Proposed development
Alwynfleur PS
Alternative route
Voorbaai PS
Gouriqua Park PS
Dummy PS
Islandview PS
Vakansieplaas PS
January 2019
Proposed Aalwyndal development
0 62.5 125 250 500 m
Scale 1:12000
gls consulting
Figure 2
Existing sewer reticulation and proposed upgrades

Insert Title

0 0,1 0,2 0,4 km

1:4 514

Date: 2022-06-02

Disclaimer:
The Mossel Bay Municipality accepts no responsibility for and will not be liable for any errors or ommisions contained herein.

N

ANNEXURE E

ROADS MASTER PLAN

MOSSELBAAI
MOSSEL BAY
MOSSELBAYI
Explore Endless Horizons!

AREA / TOWN:

AALWYNDAL PRECINCT PLAN

TITLE:

LOCAL SPATIAL DEVELOPMENT PLAN

ITO SECTION 9(1) OF THE MUNICIPAL BY-LAW ON LANDUSE PLANNING

EXISTING JUNCTION TO BE CLOSED AND RELOCATED

THE SITE

SINGLE STOREY AIRPORT RELATED USES: STORAGE, ETC.

FLY-INN

WETLAND

FLY-INN

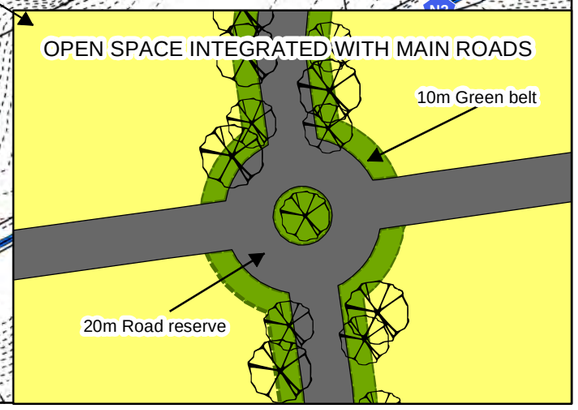
AIRFIELD

HANGERS

NUM NUM

N2

OPEN SPACE INTEGRATED WITH MAIN ROADS



LEGEND:

- APP. 55 LRdn NOISE CONTOUR
- EXISTING RESIDENTIAL COVERAGE
- RESIDENTIAL
- COMMERCIAL
- OPEN SPACE
- MIXED USE NODE
- RESIDENTIAL & AIRPORT RELATED COMMERCIAL USES
- MAIN DISTRIBUTOR ROADS
- NEW MAIN ROUTES (Alignment approximate)
- NEW MAIN ROUTES (Alignment to be further investigated during detail planning)

0 125 250 500 750 1 000 m

NOTES:

EXTENT OF OPEN SPACE IS CONCEPTUAL AND MUST BE GROUND TRUTHED.

A3 SCALE: 1:15 000

DATE: JAN 2018

PLAN NO: **MB/A/7.2**

ANNEXURE F

GLS CAPACITY ANALYSIS OF THE BULK WATER AND SEWER SERVICES

Infrastructure planning

Draft report

6 March 2024

Urban Engineering
18 Varing Avenue
George
6529

Attention: Mr. Frans van Aardt

Dear Sir

DEVELOPMENT ON PORTION 209 OF FARM 220, MOSSEL BAY: CAPACITY ANALYSIS OF THE BULK WATER & SEWER SERVICES

Your request regarding comments on the available municipal water supply and sewer discharge for the proposed development (development of 138 residential units and 1 630 m^2 commercial/retail area on Farm 220/209), refers.

This document should inter alia be read in conjunction with the "Mossel Bay Municipality Water and Sewer Master Plan" dated April 2017.

GLS is currently in the process to update the April 2017 water and sewer master plans for Mossel Bay Municipality and the result of this bulk water and sewer capacity investigation report for development on portion 209 of farm 220 will be included in the updated master plans.

The proposed development on portion 209 of farm 220 was not taken into consideration for the April 2017 master planning of the water and sewer networks.

1 WATER DISTRIBUTION SYSTEM

1.1 Distribution zone

The proposed development is located south of Klipheuwel Way in Vyf Brakke Fontein, Mossel Bay. It is proposed that the development will be supplied from the existing 3 000 kL Aalwyndal reservoir (TWL = 167,0 m above mean sea level(a.s.l.)).

Water pressure to the Aalwyndal reservoir zone is increased via an existing PRV on the reservoir site, supplied with higher water pressure from the higher lying Bartelsfontein reservoir. The Aalwyndal reservoir is supplied from the Langeberg pump station which is supplied from the Langeberg reservoirs. From the Aalwyndal reservoir water is pumped to the higher lying Bartelsfontein reservoir (the PRV on the Aalwyndal reservoir site is supplied with water and pressure from the bulk pipeline between the Bartelsfontein PS an Bartelsfontein reservoir).

The development is situated in the water priority area.

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Stellenpark, Block D North
Cnr R44 and School Road
Stellenbosch, 7600

Walker Creek Office Park
90 Florence Ribeiro Ave
Brooklyn, Pretoria, 0181

PO Box 814
Stellenbosch, 7599
South Africa

Directors: Marius de la Rey, Garreth Young

1.2 Water demand

Provision was made in the original water analysis for the master plan for development on portion 209 of farm 220 with a theoretical annual average daily demand (AADD) of 0,71 kL/d.

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

• 37 Single Residential erven (High density) @ 0,60 kL/d/unit [(1)]	=	22,2 kL/d
• 65 Apartment/Flats (Very high density) @ 0,25 kL/d/unit [(1)]	=	16,3 kL/d
• 36 Group/cluster housing units (High density) @ 0,40 kL/d/unit [(1)]	=	14,4 kL/d
• 1 630 m^2 commercial/retail area @ 0,65 kL/d/100 m^2 [(1)]	=	10,6 kL/d
Total	=	63,5 kL/d

[(1)] As per Table J.2 from Section J - Water Supply of "The Neighbourhood Planning and Design Guide" (so called "Red book").

• Fire flow criteria (Moderate risk)	=	25 L/s @ 10 m

1.3 Present situation

1.3.1 Bulk infrastructure

The existing bulk water system that supplies water to the Aalwyndal reservoirs has sufficient capacity to accommodate the proposed development on portion 209 of farm 220 (the Langeberg reservoirs supplies the existing Aalwyndal reservoir water distribution zone).

1.3.2 Reticulation network

The existing water reticulation network between the Aalwyndal reservoir and the proposed development has insufficient capacity to provide the required minimum water pressure of 24 m water head to the development during peak demand conditions.

A combination of 110 mm Ø and 90 mm Ø supply pipeline between the Aalwyndal reservoir and the proposed development experiences high flow velocities during peak demand conditions. It is proposed that the pipelines must be upgraded to provide adequate water head during peak demand conditions and sufficient flow rate for fire-flow to the proposed development.

The following network upgrades for the water reticulation system are required for the proposed development:

Network upgrade:

• Item 1: 1 715 m x 160 mm Ø upgrade of existing supply pipe	=	R 3 222 000 *
• Item 2: 490 m x 160 mm Ø upgrade of existing supply pipe	=	R 590 000 *
Total	=	R 3 812 000 *

(* Including P & G, Contingencies and Fees, but excluding VAT - Year 2023/24 Rand Value. This is a rough estimate, which does not include major unforeseen costs).

Take note that the routes of the proposed pipeline are schematically shown on Figure 1 attached but must be finalised after detail pipeline route investigations have been performed.

1.3.3 Reservoir capacity

The criteria for the total reservoir volume used in the Mossel Bay Water Master Plan is 48 hours of the AADD (of the reservoir supply zone).

The existing Aalwyndal reservoir has sufficient capacity to accommodate the domestic demand and fire-flow requirements of the proposed development.

1.4 Minimum requirements

The minimum requirements for the upgrade of the existing water reticulation system are as follows:

- Item 1 - to provide adequate water head during peak demand conditions (Maximum fire flow @ 10 m = 6,7 L/s)
- Item 1 & 2 - to provide adequate water head during peak demand conditions and sufficient flow rate for fire-flow to the proposed development.

2 SEWER NETWORK

2.1 Drainage area

The development on portion 209 of farm 220 should be accommodated within the existing Island View pumping station (PS) drainage area. The proposed connection point for the development is to the manhole on the existing 160 mm Ø gravity sewer in Henning Road, North-East of the proposed development, as shown in Figure 2 attached.

The development is inside the sewer priority area.

2.2 Sewer flow

In the original sewer master plan, the theoretical peak day dry weather flow (PDDWF) for portion 209 of farm 220 was calculated as 0,5 kL/d.

For this re-analysis of the master plan, the PDDWF for the proposed was calculated as 44,5 kL/d.

2.3 Present situation

2.3.1 Gravity sewers

The existing Islandview PS drainage area in Vyf Brakke Fontein has sufficient capacity to accommodate the proposed development within the existing sewer system.

The following link service is however required to connect the internal sewer reticulation network of the new development to the proposed connection point of the existing sewer system:

Link services:

- Item 3: 400 m x 160 mm Ø new sewer pipeline = R 720 000 *

(* Including P & G, Contingencies and Fees, but excluding VAT - Year 2023/24 Rand Value. This is a rough estimate, which does not include major unforeseen costs).

Take note that the route of the proposed pipeline is schematically shown on Figure 2 attached but must be finalised after a detail pipeline route investigation.

Provision should be made for a pipeline servitude (in favour of Mossel Bay Municipality) to accommodate this outfall sewer from the proposed development to the proposed connection point of the existing sewer system.

2.3.2 Pumping stations & rising mains

Islandview pump station:

The sewage for the proposed development gravitates to the Islandview PS located east of the proposed development. There is sufficient capacity in the Islandview PS and rising main to accommodate the proposed additional units of the development.

Voorbaai pump station:

Sewage from the Islandview PS gravitates towards the Voorbaai PS, which pumps sewage to the Regional Hartenbos Wastewater Treatment Plant (WWTP) via 2 x 500 mm Ø rising mains. According to the Regional WWTP and Process Audit (October 2023) the capacity of the Hartenbos WWTP is 17,8 ML/d and the Voorbaai PS capacity is 336 L/s. The maximum raw sewage inflow for Regional WWTP from 2022 to 2023 was approximately 15,0 ML/d.

3 CONCLUSION

The developer of portion 209 of Farm 220 in Mossel Bay may be liable for the payment of a Development Contribution (as calculated by Mossel Bay Municipality) for bulk water and sewer infrastructure as per Council Policy.

There is insufficient capacity in the existing water system to provide the required minimum water pressure of 24 m water head to the development during peak demand conditions. Upgrading of the existing water reticulation system is proposed to be implemented to reinforce pipelines between the Aalwyndal reservoir and the proposed development, currently experiencing high flow velocities during peak demand conditions.

The minimum requirements to accommodate the proposed development in the existing water system are master plan items 1 and 2 (upgrade existing pipelines to 160 mm Ø pipeline).

There is sufficient capacity in the existing sewer reticulation system to accommodate the proposed development. Link services item 3 is however required to connect the proposed development to the existing sewer network.

We trust that you find this of value.

Yours sincerely

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

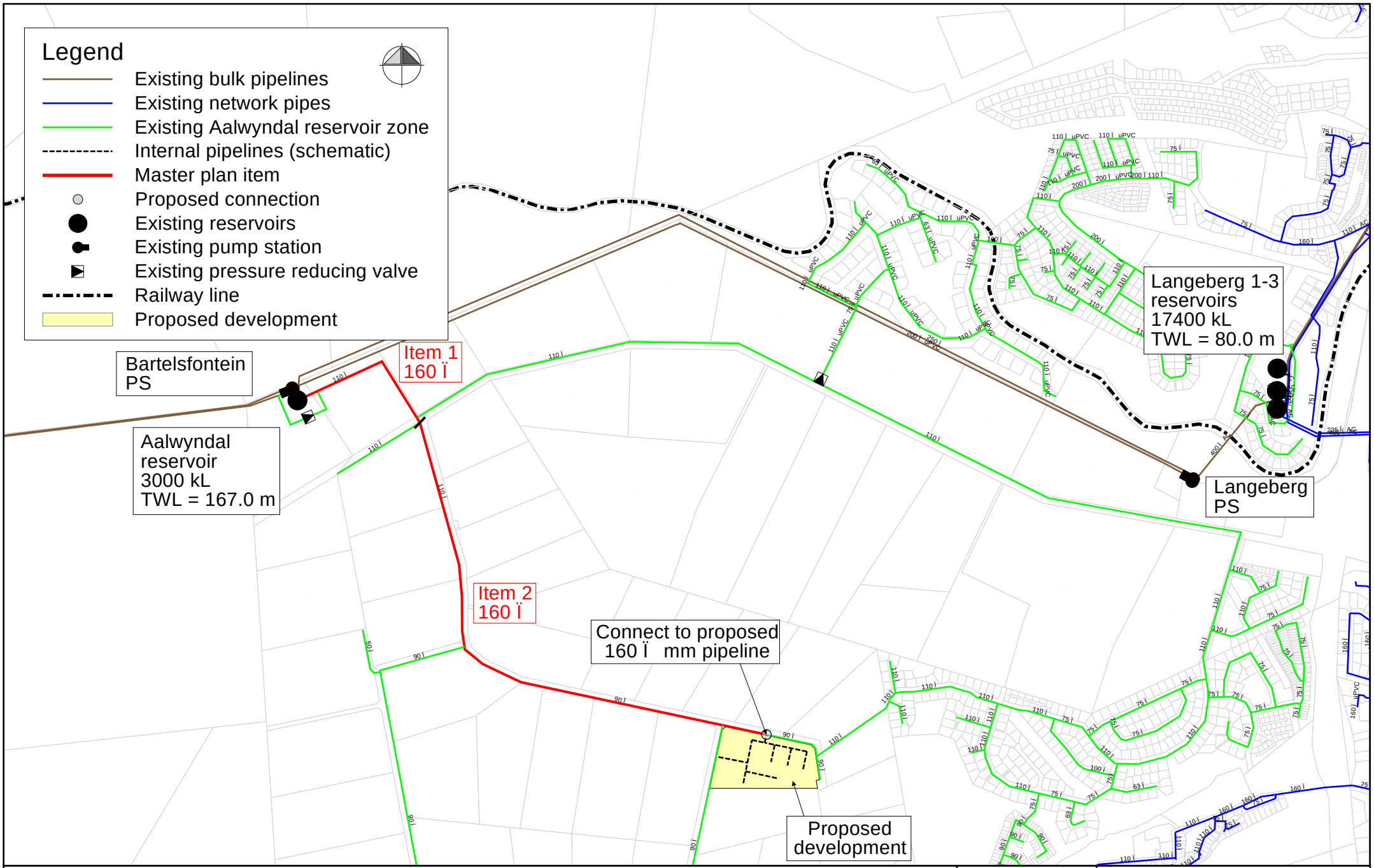
PC du Plessis

_____

Per: PC DU PLESSIS

cc. The Manager: Civil Engineering Services
Mossel Bay Municipality
Private Bag X29
MOSSEL BAY
6500

Attention: Mr Eric Louw



March 2024

Proposed development:
Portion 209 of Farm 220 - Mossel Bay

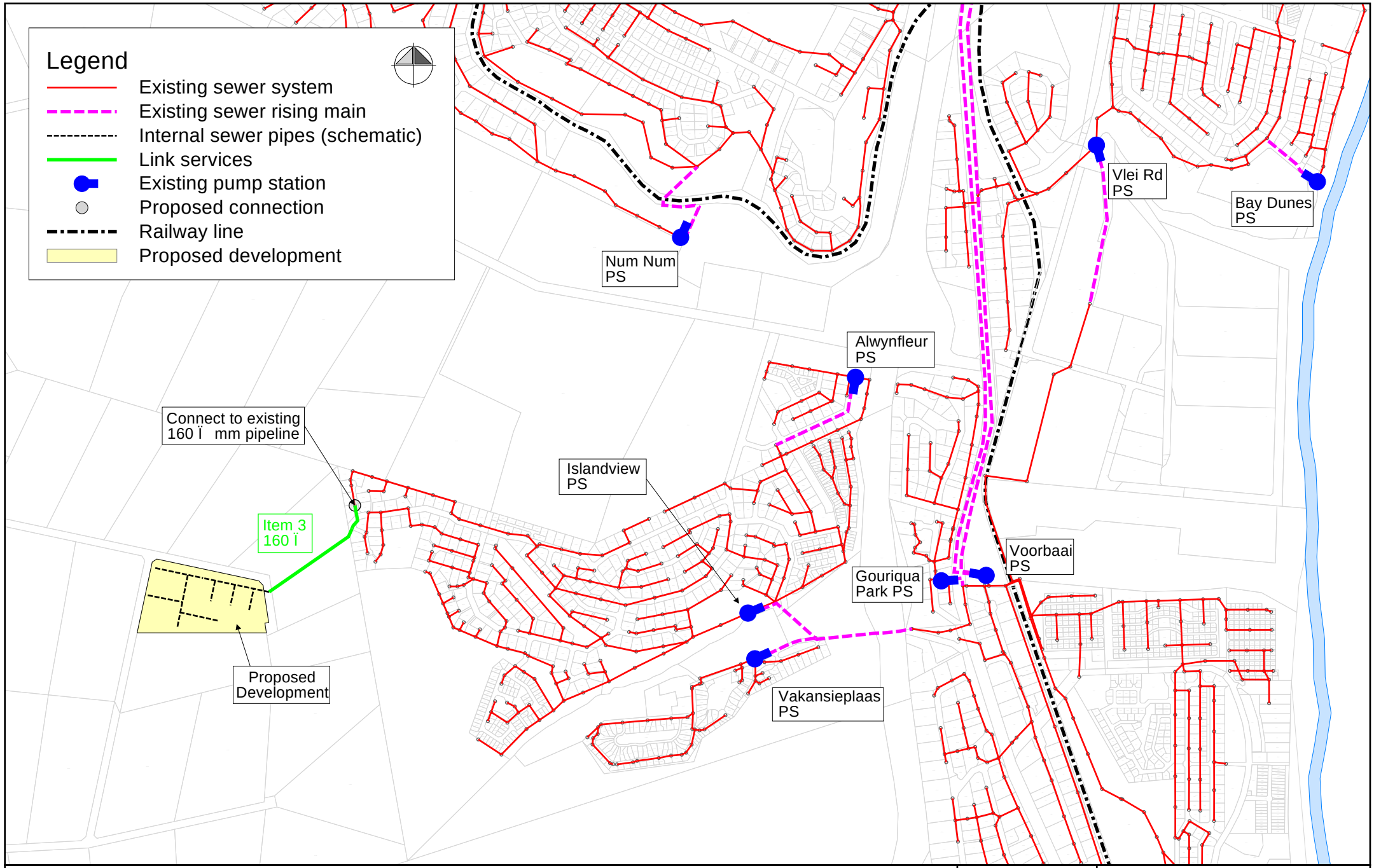
0 200 400 800 m

Scale 1:15000

GLS Infrastructure planning

Figure 1 (Draft)

Proposed Development
Mossel Bay - Farm 220/209
Existing Water Reticulation



March 2024

Proposed development:
Portion 209 of Farm 220 - Mossel Bay

0 175 350 700 m

Scale 1:12500

Figure 2 (Draft)

Proposed Development
Mossel Bay - Farm 220/209
Existing Sewer System