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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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

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REG. NO.: 2007/003039/07

PC du Plessis

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Per: PC DU PLESSIS

cc. The Manager: Civil Engineering Services
Mossel Bay Municipality
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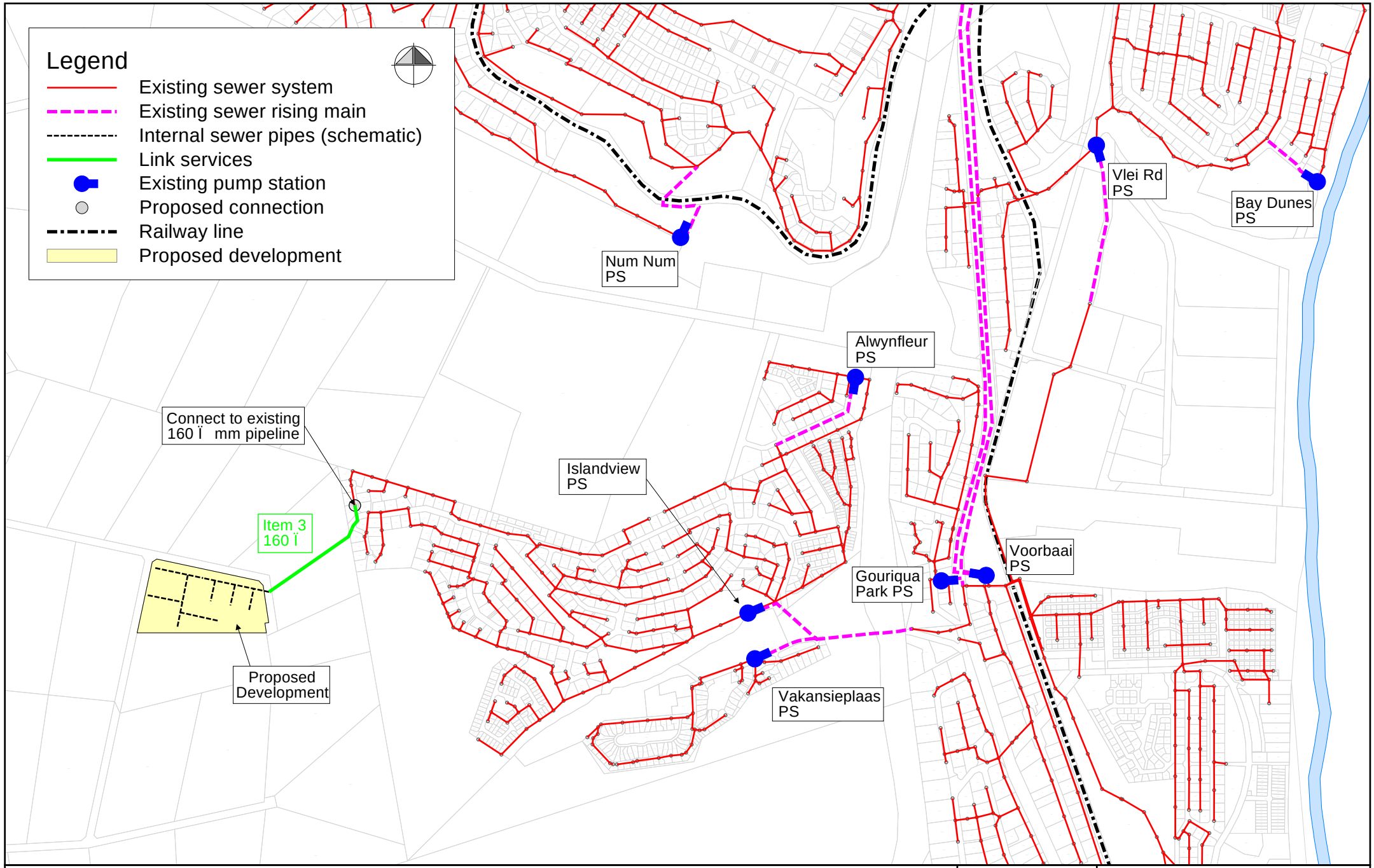
Attention: Mr Eric Louw



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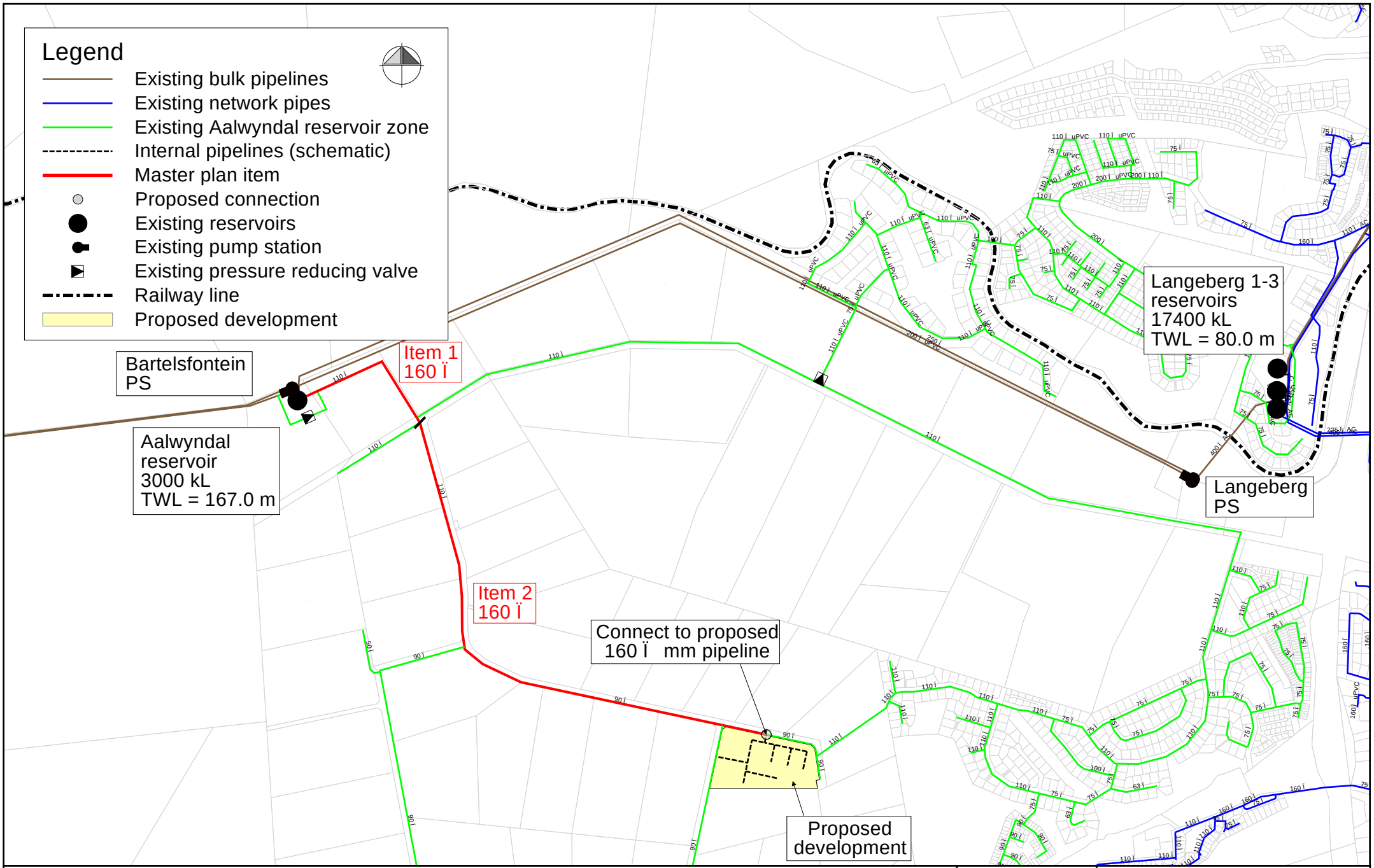
Proposed development:
Portion 209 of Farm 220 - Mossel Bay

0 175 350 700 m

Scale 1:12500

Figure 2 (Draft)

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



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Proposed development:
Portion 209 of Farm 220 - Mossel Bay

0 200 400 800 m

Scale 1:15000

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Figure 1 (Draft)

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