



STELLENBOSCH MUNICIPALITY

Link and Bulk Investigation Study for Lindida Erven

URBAN DEVELOPMENT OF ERVEN 11554-11457 AND ERVEN 11452 – 11463, LINDIDA(IDAS VALEY), STELLENBOSCH PROVISION OF CIVIL ENGINEERING SERVICES

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Annexure A – Development Layout

1 INTRODUCTION

1.1 Background

Imodie Projects was appointed by Stellenbosch Municipality under RFQ 58/25 to undertake a link and bulk investigation study for the further development erven 11554-11457 and erven 11452 – 11463, Lindida (Idas Valley), Stellenbosch.

The location of the erven is shown in Figure 1.1 below.



Figure 1.1: Location of erven for further development

The proposed development is situated within an existing residential area, with uncertainty on the availability, level of service and/or condition of the existing services. The land is zoned for residential purposes and has already been subdivided, and form part of an approved General Plan.

This report was compiled to provide technical information regarding the external and internal civil engineering services required for the proposed development.

1.2 Goals and Objectives

The goal of this report is to assess the water and sanitation services, as well as the handling of stormwater for the implementation of the proposed housing project. The specific objectives are:

- a) To assess availability of water and sanitation service.
- b) To assess capacity and level of service of water and sanitation services
- c) To assess the handling of stormwater on the sites

1.3 Scope of the Study

The proposed development are located in two locations in Talana Street (Erven 11554 – 11570) and Davy Street (Erven 11452 -11463). The study will cover the following services:

- Water
- Sanitation
- Stormwater

The technical scope include:

- Assessing the availability of bulk water supply
- Assess availability of bulk sewerage handling
- Assess water pressure during peak demand period
- Assess sewerage flow during peak demand period.
- Assess stormwater flow and capacity in channel over erven in Talana Street erven.

2 WATER SUPPLY

2.1 Bulk Water Supply

This is an infill development with existing services directly adjacent where the erven will be connected to. The sufficiency of the storage capacity as well as the residual water pressure during the peak hour periods have been investigated.



Figure 2.1: Existing water supply in Talana Street



Figure 2.2: Existing water supply in Newman Street

The required storage capacity for these erven is 24hours of average daily demand and for the above demand, the required storage is 52,2kl or 0,0522Ml. The area is currently being provided with water from the reservoir A , which has a capacity of 20Ml. The additional storage can therefore be easily accommodated within the existing storage capacity.

2.3 Internal Water Layout

The internal layout of the water reticulation system will be designed to accommodate peak demands in terms of the “Guidelines for Human Settlement Planning and Design”.

2.4 Design Criteria and Materials

- Annual average daily demand l/day (AADD)
 - Residential and other - refer to Section 2.2 above
 - Instantaneous Peak - 4 (AADD)
 - Daily Peak - 2.4 (AADD)
 - Losses - 10%
- Fire protection
 - Fire Hydrants - Quick Coupler fittings or as requested by the fire department, maximum distance 180m apart
 - Development - 1500 l/min @ 7m residual head.
- Water network uPVC pipes Class 9 minimum, (SABS approved) minimum pipe diameter of 110mm
 - Maximum pressure - 90 meter
 - Minimum pressure - 24 meter
 - Maximum flow velocity - 2.0m/s
- Valves and fittings - Class 12 or a class higher than the required pipe class

2.5 Existing Water Infrastructure

The existing as-built water infrastructure is shown in Figure 2.3 This is the actual as built infrastructure. It is clear that the water connections to the individual houses are not installed. No water metres have also been installed.

2.6 Flow capacity and Residual Pressure

{Busy analysing}

3 SEWER RETICULATION

3.1 Bulk Sewer

The existing sewer network is shown in Figures 3.1 and 3.2. The erven are all provided with a house connection. The sewerage is eventually transported towards the Stellenbosch Sewerage Treatment plant, which has not long ago been upgraded and will be able to accommodate the additional effluent of the 29 houses.



Figure 3.1: Existing sewer network in Talana Road

3.2 Sewerage Run-Off

The sewer flow for the proposed residential units will be estimated at 80% of the average daily water demand. Provision is made for full-flush sanitation.

The table below reflects the estimated sewer flow determined as indicated above.

Table 3.1: Sewerage run-off

Land Use	Units	Annual Average Daily Flow (AADF)	Sewerage Outflow (kℓ/d)
Residential 1	29 units	720ℓ/day/unit	20,88kℓ/day
Total			20.8kℓ/day

The bulk sewerage treatment plant has a capacity of 35,000 kℓ/day. The additional outflow of the houses is an additional 20,88kℓ which is less than 0,06% of the capacity of the treatment plant. This is a negligible load and can be comfortably accommodated.

3.3 Existing Sewer Layout

The internal sewerage system with house connections is in place. No additional designs are required and the capacity of the sewerage systems have been investigated and is discussed in section 3.4 below. The existing as-built sewer network in the areas is shown in Figure 3.3 and 3.4.

3.4 Flow capacity Analysis

{Busy analysing}

4 ROADS

4.1 Layout and Access

The erven are located adjacent to existing roads. Talana road is a two lane undivided surface road which can be classified as an Class 4 Access road. Newman street is for the section in front of the proposed erven not surfaced and no formal road exist. A formal road need to be constructed as indicated in Figure 4.1 below.



Figure 4.1: Existing gravel road to be surfaced

4.2 Internal Roads

Access to the individual areas within the development will be obtained from an internal road system. The road system will be constructed by the developer.

The internal road layout will be submitted to the Local Municipality for approval. The roads will be constructed in varying widths depending on the category of road. All geometry will be designed according to applicable standards. The traffic impact study deals with this in detail.

4.3 Design Criteria

The proposed pavement design will be based on anticipated traffic volumes and ground conditions. The anticipated design life of the proposed pavement will be 15 to 20 years on provision that repairs to the surface will be made where necessary to maintain the impermeability and integrity during the design life of the road.

Table 4.1 and 4.1 indicate the proposed pavement design for the Distributor and Access Roads respectively.

Table 4.1: Pavement Design for Access Roads

Surface	25mm Asphalt
Base	150mm G2 type base
Sub-base	150 G6
Road-bed	150mm thick layers compacted to 93% of modified AASHTO density. Minimum CBR = 7 at 93% of modified AASHTO density – G9

4.4 Road Construction Standards

Roads are to be constructed to the standards specified in SANS 1200. Road materials conforming to the requirements of TRH 14 will be specified.

5 STORM WATER MANAGEMENT

5.1 Bulk Storm Water

The storm water runoff captured in the internal storm water network as well as the surface flow from the adjacent area development will flow towards the stormwater channel at the back of the erven in Talana Street. The drainage area has been determined to be 48ha. so serves as public open space.

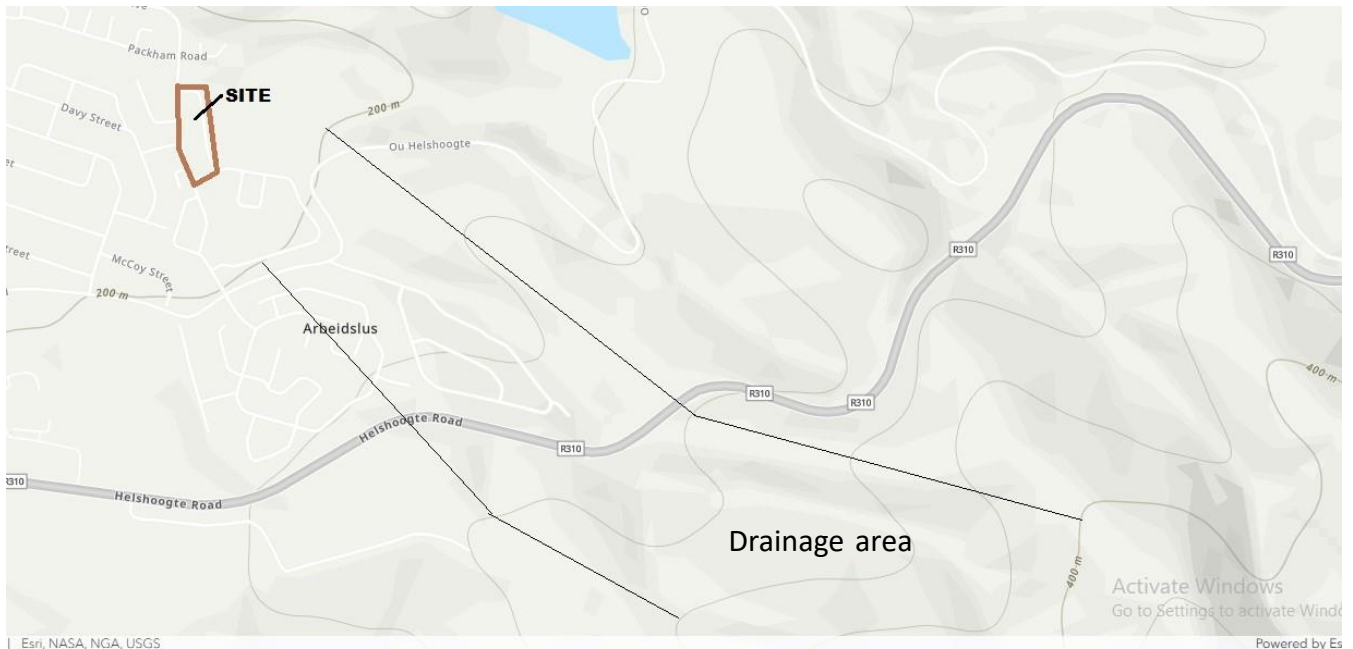


Figure 5.1: Drainage catchment area (48ha)

No drainage structure are in the vicinity of Newman Road.

5.2 Internal Layout

The natural drainage pattern of the terrain is towards the north. The area drains via street flow. The storm water design will be done in accordance with the “Guidelines for Human Settlement Planning and Design” compiled under the patronage of the Department of Housing by the CSIR, DWAF and design specifications of the Local Authority.

Run-off and peak flow rates will be calculated according to selected return periods and outflow points. The 1:50-year recurrence interval will be used for the major system design and the 1:5-year recurrence interval will be used for storm water design of the subsurface system. A formal drainage system of pipes or canals will be provided to convey storm water and to discharge this water into the retention pond.

Erosion protection will either be in the form of open drains and shallow side drains, or they could consist of standard municipal type kerbs or mountable kerbs. Energy dissipaters will be

provided at the lower end of each watercourse and at sites where the drainage is diverted away from roads.

The drainage system will be designed to minimize the impact of the development on the storm water characteristics of the property and adjacent properties by utilizing:

- Surface drainage where possible.
- Sub-surface (underground) pipe systems to convey storm water from higher laying areas.
- Erosion protection, stabilisation of erodible materials, and sediment control.
- Retention where applicable.

5.3 Design Criteria and Materials

The storm water design will be done in accordance with the “Guidelines for Human Settlement Planning and Design” compiled under the patronage of the Department of Housing by the CSIR. The rational design method will be applied to smaller drainage areas to calculate storm flows. The location of the proposed retention pond is shown in Figure 5.1

5.4 Flood Line

The erven along Talana road is a concern for flooding due to the water running through the stormwater channel at the back of the erven. As previously stated, the area draining toward this channel is 48 ha.

The capacity of the channel will be analysed and the safety of the development of houses will be evaluated.

6 CONCLUSION

{ Will be made on final analysis}



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Date

ANNEXURE A: DEVELOPMENT LAYOUT
