

# **DEVELOPMENT OF A PORTION OF ERF NO 548- IQ PORTION 54 QUAGGASFONTEIN ALIAS LAPDOORNS**

**PRELIMINARY CIVIL ENGINEERING DESIGN REPORT**

**FOR**

**THE PROPOSED REGIONAL HOSPITAL SITE**

**NOVEMBER 2022: REVISION 0**

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**REPORT DETAILS:****Lyners Reference No: C22153****Client: SETSQUARE DEVELOPMENTS (PTY) LTD****Report prepared by: Wihan Swart / Fred Laker****Client representative: J Coetzee****Keywords: Regional Hospital Preliminary Design  
Report****Revision record and date:**

<b>Date</b>	<b>Revision</b>	<b>Status</b>	<b>Format</b>	<b>Issued to:</b>
November 2022	0	Active	PDF	J Coetzee

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## 1 INTRODUCTION AND SCOPE OF WORK

Neil Lyners & Associates (RF) PTY Ltd (Hereafter referred to as Lyners) were appointed as part of Professional Resource Team (PRT) as Consulting Civil Engineers for the proposed development of erf 548-IQ Portion 54, Quaggasfontein Alias Lapdoorns. It is the intention to develop a mixed use (commercial, retail, and residential), low income and bonded housing development.

The purpose of this report is to provide background information in terms of engineering services required, as well as the intended design methodology thereof and possible restrictions and options in terms of providing engineering services, to unlock this specific portion of this development.

This report is based on the latest town planning layout (attached as Annexure A), the urban design, site inspections, liaison with the local authority, previous studies, and available existing services information. All opinions and assumptions within this report are preliminary and can only be confirmed after completion of the final design.

## 2 LOCATION AND BACKGROUND

A locality plan is included in Figure 1 below. Erf 548-IQ Portion 54 Quaggasfontein Alias Lapdoorns, of approximately 225ha is situated east of Sebokeng Unit 10 and north of Waterdal Road (previously known as Houtkop Road). The hospital site is located on the southern side of Phase 5. It is bordered by Waterdal Road on the southern side and the wetland on the western side.



**Figure 1 : Site Locality**

Overhead electrical lines in a registered servitude are located on the eastern side of the site.

A preliminary geotechnical investigation was conducted by Jones and Wagener (attached as Annexure B).

## 3 PRELIMINARY DESIGN CRITERIA

The proposed hospital site will be the location for a regional hospital which will have 800 beds.

All design criteria will be based on the “Guidelines for Human Settlement Planning and Design” referred to as the “Red Book”, the National Building Regulation (SANS 10400), the Code of Practice: Water Supply and Drainage for Buildings (Part 1 & 2) (SANS 10252) and will comply with the standards of the Civil Engineering Department of Emfuleni Local Municipality (ELM) where applicable.

## 4 ACCESS ROADS

The primary access road to the hospital site will be from Waterdal Road. The existing intersection on the eastern side of the existing Total Service Station will have to be upgraded to a signalized intersection with dedicated turning lanes. The access to the hospital which will be located behind the Total Service Station and will link with this upgraded intersection.

A secondary access road, which will be utilized for deliveries will cross the wetland from the existing Phase 2 development.

## 5 WATER SUPPLY

### 5.1 EXISTING WATER SUPPLY

There is a 1000mm diameter Randwater bulk water supply pipeline, located adjacent to Waterdal Road that has been utilised for supplying the current Phase 2 of the Development. The connecting 355mm diameter link watermain was sized in an appropriate manner to make ample allowance for the balance of the development. To service the Phase 5 and the hospital site, the 355mm dia watermain from Phase 2 will be extended across the wetland (within the planned road servitude crossing the wetland) to the eastern portion (Phase 5) of the development to supply water and to complete a ring feed connecting in a similar manner with the more northern Phase 4 across the wetland.

An additional connection directly to the Randwater bulk water supply pipeline will have to be constructed for the exclusive use of the hospital.

### 5.2 WATER DEMAND

Wadiso Hydraulic Modelling of the future proposed networks combined with information from pressure logging on the current water meter chamber indicates that there is sufficient pressure for the greater development including Phase 5. Thus, the hospital site has sufficient water supply.

The expected daily water demand for the hospital site in accordance with Table 1 of SANS 10252 Part 1 is as follows:

- Average Annual Daily Demand : 550 l/bed/day
- Proposed number of beds : 800
- Total Annual Daily Demand : 440 kℓ/day

### 5.3 LINK SERVICES

There are currently no services available within the immediate vicinity of the hospital site. Link Services will accordingly be required to be constructed from Phases 3 and 4 to service the Phase 5 area as well as the hospital site.

The proposed water supply and foul sewer services for Phase 5 are indicated in Annexure D.

### 5.4 INTERNAL RETICULATION

The internal reticulation systems should be designed once the hospital layout has been finalised and must comply with the requirements of Emfuleni Local Municipality's Engineering Department.

The requirements of on-site water storage facilities for emergency and fire-fighting facilities must be investigated and incorporated into the final design.

## 6 SEWERAGE

### 6.1 EXPECTED SEWAGE FLOW

The expected Sewerage flows for the hospital are preliminarily calculated in accordance with Table 9 of SANS 10252 Part 2 is as follows:

• Expected sewage flow	:	500 l/bed/day
	:	40 l/employee
• Proposed number of beds	:	800
• Expected flow from beds	:	400 kℓ/day
• Assume number of employees	:	800
• Expected flow from employees	:	32 kℓ/day
• Total expected sewage flow	:	432 kℓ/day

## 6.2 EXISTING SERVICES

The Quaggasfontein Bulk Foul Sewer Main is located on the western side of the hospital site and will serve this development.

## 6.3 INTERNAL RETICULATION

The internal reticulation system should be designed once the hospital layout has been finalised and must comply with the requirements of Emfuleni Local Municipality.

## 7 STORMWATER

### 7.1 EXISTING SERVICES AND DRAINAGE

The portion of the Quaggasfontein ERF being used for Phase 5 of the development has a natural gradient from northeast to southwest with an average gradient of +/- 4% with Waterdal Road intercepting the southern portion and the existing wetland on the western boundary and an Eskom Servitude on the eastern boundary.

There is no bulk municipal stormwater infrastructure in the hospital site area. The stormwater from the hospital site can therefore not connect to any existing underground network in the area. The surface area of the site will have to be reworked to facilitate effective drainage towards the environmentally sensitive area. This will require a WULA Application to allow for construction and release of runoff into the environmentally sensitive area.

The proposed stormwater services for Phase 5 are indicated in Annexure C.

### 7.2 EXISTING RIVER AND AVAILABILITY OF FLOODLINES

The Unchanneled Valley Bottom of the environmentally sensitive area is located on the western side of the hospital site and is flowing in a north to south direction.

Graeme McGill Consulting were appointed to undertake a floodline investigation and to produce the 1 in 50- and 1 in 100-year floodlines.

The Floodline Report and Drawings are attached as Annexure E.

### 7.3 CATCHMENT AREAS

Catchment areas and runoff calculations were conducted by CEDS Engineering, and a Stormwater Management Plan was produced and discussed/approved by Emfuleni Local Municipality.

The Stormwater Management Plan is included as Annexure F.

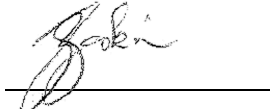
### 7.4 STORMWATER DESIGN PRINCIPLES

The internal stormwater network for the hospital site should be designed once the layout has been finalized and must comply with the requirements of Emfuleni Local Municipality.

## 8 CONCLUSION

The available civil engineering services in the vicinity of the proposed hospital site necessitates the construction of the proposed link services from Phase 3 and 4 across the wetland from west to east and as part of the Phase 5 development. These services will adequately service Phase 5 and the hospital site and will be designed in accordance with local municipal requirements and standards, considering environmentally progressive design and construction methods.

Yours faithfully



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**Zain Gaskin**  
for LYNERS



# **ANNEXURE A : TOWN PLANNING LAYOUT**



# **ANNEXURE B : GEOTECHNICAL REPORT**

# **ANNEXURE C : PHASE 5 : ROADS AND STORMWATER LAYOUT**

# **ANNEXURE D : PHASE 5 : WATER AND SEWER LAYOUT**

# **ANNEXURE E : GREAME MCGILL FLOODLINE REPORT**

# **ANNEXURE F : CEDS: STORMWATER MANAGEMENT PLAN**