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# PORTION 159 FARM DIEPKLOOF 319-IQ DEVELOPMENT AT DIEPKLOOF, SOWETO FOR CITY OF JOHANNESBURG

# **ELECTRICAL BULK SERVICES REPORT**

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#### 1. INTRODUCTION

Rivoningo Consulting Engineers (Pty) Ltd has been appointed by Turning Point Project Management to prepare an electrical bulk services report for Portion 159 Farm Diepkloof 319-IQ Development for City of Johannesburg.

Electrical supply authority for the area is City Power.

The project name will be referred to as Portion 159 Farm Diepkloof 319-IQ Development.

#### 2. KEY ASSUMPTION

This electrical bulk services report is based on the assumption of site investigation findings as conducted by Rivoningo Consulting Engineers.

#### 3. SCOPE OF REPORT

The purpose of this report is to investigate and determine the estimated electrical capacity required for the proposed development.

The scope of this report entails identification of the existing electrical services in the surrounding areas of the site and engage with the electricity supply authority to investigate if there is available capacity on their network to support the proposed development.

This will include the following:

- General description of the site
- Nearest Electrical supply
- Electrical load estimate for the proposed development

# 4. SITE INSPECTION

#### 4.1 SITE DESCRIPTION

The proposed site is situated at corner Chris Hani and Collinder Road in Soweto, South of Johannesburg.

The site is currently vacant with landscaping consisting of rocks, grass and trees which is adjacent to Soweto Empowerment Zone Center along Chris Hani Road and opposite Diepkloof Medico Legal Laboratory along Collinder Road.

The site consists of vacant land of 30.4 hectares and it is owned by City of Johannesburg.



Figure 1: Site Locality Map



Figure 2: Site Photo



#### 4.2 SERVITUDES

Based on the information available from the town planner, there are 3 servitudes crossing the site. The services are gas, water and sewer which will require to be protected.

#### 4.3 PROPOSED DEVELOPMENT

The proposed development will consist of a shops, restaurants, hotel, conference centre, offices, car sale lots, motor showrooms, medical facilities, children care centre, social halls, residential units, religious purposes, sport and recreation clubs.

# 5. EXISTING BULK ELECTRICAL SERVICES



Figure 3: 11/6.6kV-415V 315kVA mini-sub and metering kiosk located in the Soweto Empowerment Centre



Figure 4: 6.6kV Substation building located at the boundary of SowetoEmpowerment Centre





Figure 5: 6.6kV Substation building located within the Diepkloof Medico Legal Laboratory premises

The two 6.6kV substation buildings indicated on figure 4 and 5 are located along Chris Hani Road (Soweto Empowerment Centre) and Collinder Road (Diepkloof Medico Legal Laboratory). Both substations are fed from the main Orlando Substation.



Figure 6: Position of nearest substation buildings

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# 6. ELECTRICAL LOAD ESTIMATE

The load estimates for different subdivisions were calculated using area sizes and they are as follows:

- 3kVA per residential unit.
- 65W/m<sup>2</sup> for car sales lots and motor showrooms.
- 65W/m<sup>2</sup> for children care centre and social halls.
- 65W/m<sup>2</sup> for religious buildings and sport and recreation clubs.
- 80W/m<sup>2</sup> for restaurants and hotels.
- 80W/m<sup>2</sup> for conference centre and offices.
- 80W/m<sup>2</sup> for restaurants and hotels.
- 80W/m<sup>2</sup> for medical facilities.
- 80W/m<sup>2</sup> for shops with air-condition system.
- 120W/m<sup>2</sup> for shops with air-conditioning system and cold rooms.



The electrical load estimate calculation breakdown for the development is as follows:

# Portion 159 Farm Diepkloof 319-IQ Development - Electrical Load Estimate

Proposed Subdivisions	AREA (m²)	Calculated Load(kVA)	Calculated Load(Amps)	
<u>ERF 1</u>				
Shops, Restaurants, offices, car sales lot, motor showrooms, showrooms,dwelling units, residential buildings, warehouses	24748	1732	2501	3-ph
<u>ERF 2</u>				
Shops, Restaurants, offices, car sales lot, motor showrooms, showrooms,dwelling units, residential buildings, warehouses	41600	2912	4203	3-ph
<u>ERF 3</u>				
Offices, medical consulting rooms, clinic, place of instruction, dwelling units, residential buildings	52744	4220	6091	3-ph
ERF 4				
Dwelling units, residential buildings	306	918	1325	3-ph
<u>ERF 5</u>				
Dwelling units, residential buildings	306	918	1325	3-ph
ERF 6				
Dwelling units, residential buildings	192	576	831	3-ph
ERF 7				
Dwelling units, residential buildings	443	1329	1918	3-ph
ERF 8				
Public Open Space	1389	7	10	3-ph
<u>ERF 9</u>				
Dwelling units, residential buildings	496	1488	2148	3-ph
ERF 10				
Dwelling units, residential buildings	519	1557	2247	3-ph
<u>ERF 11</u>				
Residential buildings, hotel, conference centre, restaurant	16487	1319	1904	3-ph
Place of instruction, child care centre, religious purposes, institutions, social halls, sport and recreation clubs	14733	958	1382	3-ph
ERF 13				
Place of instruction, child care centre	2094	136	196	3-ph
<u>ERF 14</u>				
Shops, Restaurants, business purposes, car sales lot, motor showrooms, showrooms	1916	153	221	3-ph
Street Lighting				
Street Lighting	57593	115	166	3-ph
PTN 159 Farm Diepkloof 319IQ - Total Estimated	18	MVA		
80% Diversity Factor	- 0.8			
	-			
PTN 159 Farm Diepkloof 319IQ - Total Diversifie	d Estimated Load	15	MVA	

PTN 159 Farm Diepkloof 319IQ - Total Diversified Estimated Load



#### 7. INVESTIGATION FINDINGS

The areas in close proximity to the site are fed from Orlando Substation, this includes the Soweto Empowerment Zone Center, Diepkloof Medico Legal Laboratory and Chris Hani Baragwanath Academic Hospital.

We have engaged with Zanele Sibanyoni from City Power regarding the availability of capacity on their network to accommodate power supply required for the proposed development and they have confirmed that Orlando Substation firm capacity is 30MVA and is currently fully utilised, this means there is no spare capacity available at the Substation.

According to information gathered during our investigation, City of Johannesburg was planning to upgrade the Orlando substation in 2013, but the project did not proceed due to lack of funding, therefore no new power connections for any new proposed developments have been considered to be added on their existing supply network.

City Power has confirmed that Nancefield Substation has available capacity but it is situated 10kM from the site (See figure 7). The long distance between the substation and development site will result in a high voltage drop on the supply cable, which will exceed the tolerance acceptable by City Power, therefore, Nancefield substation is too far to supply power for the site.



Figure 7: MV Supply Cable Route from Nancefield Substation to PTN 159 Diepkloof 319-IQ Site



# 8. CONCLUSION

The Orlando Substation requires to be upgraded to supply additional power for any new developments around the area. The supply constrain on City Power existing network will not be able cater for any additional load, as this might overload the substation and damage the equipment as a result.

Based on the load calculations above, we hereby confirm that the estimated load capacity of **15 MVA** is required for the Proposed Portion 159 Farm Diepkloof 319-IQ Development.

THOMAS MAKAMO For and on behalf of RIVONINGO CONSULTING ENGINEERS (PTY) LTD