

KUBU PROPERTY INVESTMENTS

Bakubung Ledig Integrated Mixed-use Development

CONTRACT 2734-30-00

ELECTRICAL OUTLINE SCHEME REPORT

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KUBU PROPERTY INVESTMENTS

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KUBU PROPERTY DEVELOPERS

Bakubung Ledig Development

ELECTRICAL OUTLINE SCHEME REPORT: AS PER THE REPORT

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1 INTRODUCTION

Bigen Africa Services has been requested to provide an Electrical Outline Scheme Report for the proposed Bakubung Ledig Integrated Mixed-use Development.

1.1 Purpose of the Report

The purpose of this report is to provide information regarding the following.

- Existing electrical infrastructure
- Bulk supply and link services to the development,
- Internal electrical design; and
- Cost estimates for the development.

1.2 Background

The proposed land-uses of the proposed Bakubung Ledig development is summarised in Table 1.2 below:

Table 1.2: Land-use

Bakubung Ledig		Zoning	Various Residential Units
Number of Units / Floor Area (m ²)	Number of Stands		
5 000	5 000		

2 SITE DESCRIPTION

2.1 Locality

The proposed Bakubung Ledig development is located on the farm Ledig 909-JQ in Moses Kotane Municipality's area, in the North West.



Figure 1 – Location

2.2 Existing Electrical Infrastructure & Services

The electrical supply authority for the area is Eskom. The existing electrical infrastructure in the vicinity of the Proposed Development consists primarily of rural overhead lines that have limited capacity and that will not be able to supply new developments.



3 ELECTRICAL SUPPLY

3.1 Bulk Electrical Infrastructure

The bulk supply for the Proposed Development will come from Eskom. A formal application was lodged and an Investigation Fee of R62 643.00 (VAT Incl.) to Eskom. Eskom completed their internal investigations to determine whether the required capacity could be made available from the nearest existing Eskom Substation.

The Bakubung-Ledig Development will require 20MVA supply at end state, and can be supplied as indicated below:

3.1.1 Temporal Supply - 3.7MVA

The full load cannot be accommodated from any of the nearby substations without upgrades. This supply will be connected in phases starting from 2017 up to 2023.

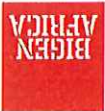
The 22kV overhead line that passes by the southern boundary of the Proposed Development has enough spare capacity to provide a temporary supply to the Proposed Development, but there are severe constraints at the Sun City Substation which only has 1 X 5MVA transformer.

The Sun City Substation will have to be upgraded before additional loads can be added to the existing 22kV overhead line.

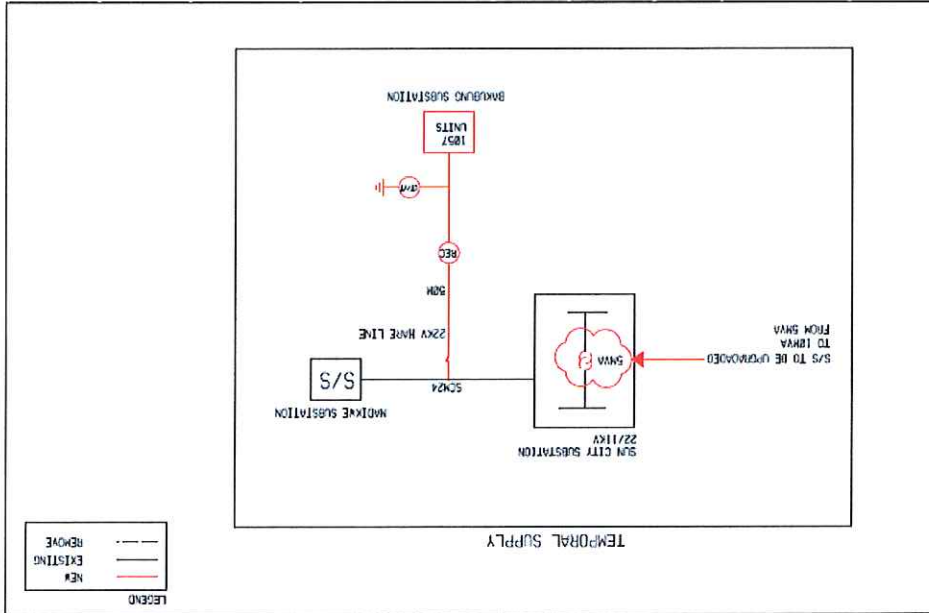
The 3.7MVA that can be made available after the substation has been upgraded, can only cater for the first 1057 units.

Eskom has indicated that the Scope of Works required at the Sun City Substation is as follows:

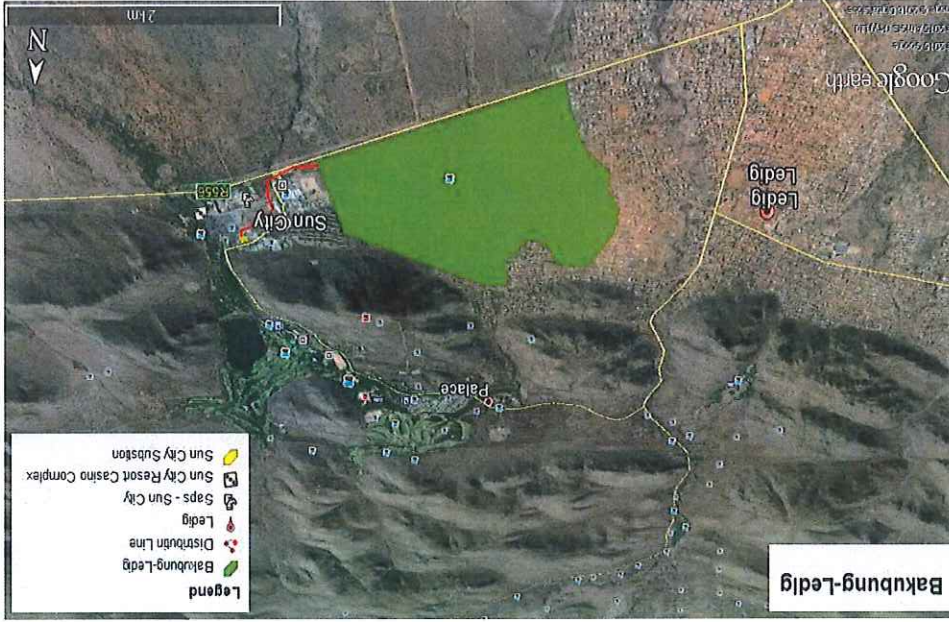
- Extend the substation towards the North
- Exchange the existing 5MVA transformer with a new 10MVA, 11/22kV transformer
- Build 550m of 22kV Hare overhead from Pole No. SCM24 of the existing 22kV line to the boundary of the Proposed Development



- Install Metering Units (ground CT/VT) on the boundary of the Proposed Development
- Install an auto-recloser on the boundary of the Proposed Development to create a bulk point



The nearby substation is indicated below; it is approximately 2km from the development.



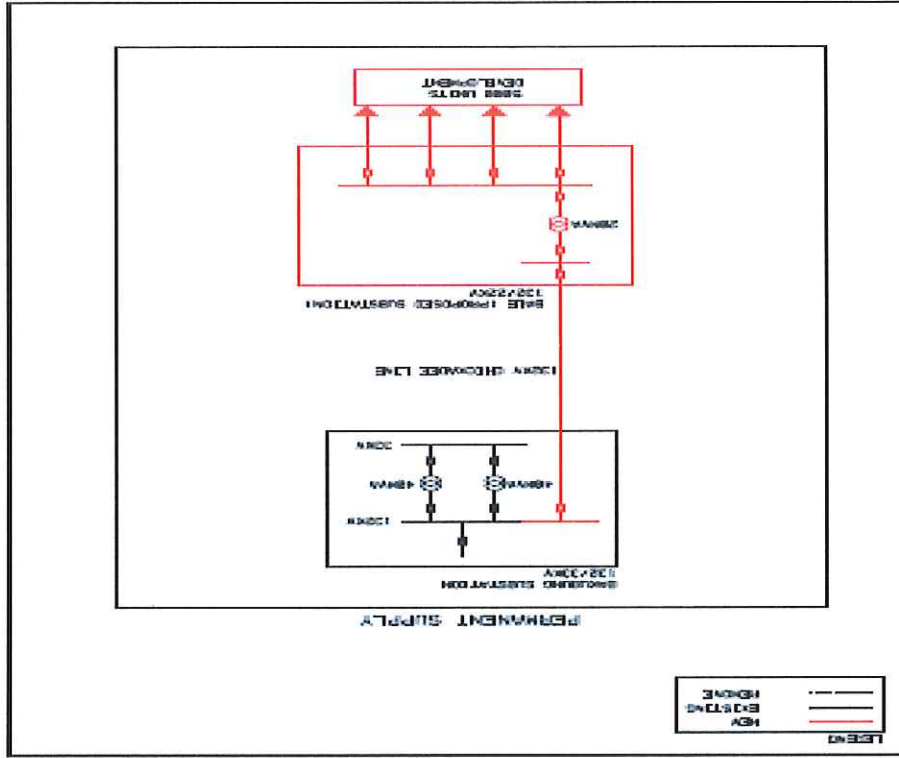
3.1.2 Permanent Supply - 20MVA

To supply the end state capacity of 20MVA to the Proposed Development, Eskom has indicated that a new substation will have to be constructed on the Proposed development.

The Scope of Works required to construct the substation, is as follows:

- Build a new 20MVA, 132/22kV Substation that will be called 'Bale Substation'. The substation will consist of:

- 1 X 132kV Feeder Bay
- 2 X 22kV Feeder Bays
- A fully equipped control room with protection and metering equipment
- Build 3.5km 132kV Chickadee line from the existing Bakubung Substation to the New Bale Substation



Substation to the New Bale Substation

All the internal designs will be completed according to Eskom specifications as the internal network will be handed over to Eskom on completion.

4 ELECTRICAL DESIGN

Bakubung Ledig		Zoning	
Number of Units / Floor area (m ²)	After Diversity Unit Load Assumption (kVA / Unit)	Load (kVA)	Various Residential Units
5 000	3.5	17 500	
Total		17 500	

Table 3.2: Estimated Maximum Demand

The total estimated maximum demand for the proposed development is shown in Table 3.2 below:

3.2 Bulk Requirements





4.1 Medium Voltage Reticulation

We propose that the medium voltage network will be a 22kV underground network feeding a configuration of 500kVA miniature substations, of rating 22kV / 415V and Ring Main Units (RMU's) for larger stands, to be installed at optimum positions within the development. The miniature substations and RMU's will be energized via installing new 185mm², 3-core, 22kV, XLPE, copper cable ring-feeds.

4.2 Low Voltage Reticulation

To supply the residential stands, we propose that the low voltage network will consist of 120mm² and 150mm² low voltage, 4-core, copper cables supplied from the different miniature substations at a supply voltage of 415/230V with a regulation of +10% / -10%. The low voltage cables will energise planted, 3CR12, secure metering kiosks.

4.3 Service Connection

Each residential stand will be connected through a 10mm², 3-core, copper service cable, with communication core, from the metering kiosks pre-wired with 60A, single phase circuit breakers and space for split pre-paid meters. All underground road crossings will be through sleeves.

4.4 Street and Area Lighting

The street lighting network will be separate from the low voltage network. The street lighting network will be fed from feeders terminated in metering kiosks installed near the miniature substations to allow the network to be metered, as the Moses Kotane Municipality will be responsible for the payment of the electricity used by the streetlights.

The proposed streetlights will be according to Moses Kotane Municipality standards, we estimate that these standards are luminaires fitted with 70W HPS lamps, installed at a 7 meter mounting height on galvanized steel poles, with a 0.5 to 1.0 meter outreach-arm, supplied by 10mm², 4-core, copper cables.



5 ESTIMATED CONSTRUCTION COST

The estimate construction cost of the development, is as follows:

Table 5.1: Total Cost

Temporal Supply (1057 Units)

Item No.	Description	Amount (R)
CONSTRUCTION COSTS		
	Electrical Engineering Services	
A	External Services – Bulk supply	
A1	Eskom Feasibility Quote	6 839 138.00
Total A		
B	Internal Services	
B	Underground Reticulation	33 824 000.00
Total B		
C	Professional Fess	
C1	External Services	2 638 841.15
C1	Internal Services	6 972 811.20
Total C		
Total (A + B + C) (VAT Excluded)		
		50 274 790.35
VAT (14%)		
		7 038 470.65
Total (VAT Including)		
		57 313 261.00



Permanent Supply (5000 Units)

Item No.	Description	Amount (R)
CONSTRUCTION COSTS		
	Electrical Engineering Services	
A	External Services – Bulk supply	
A1	Eskom Feasibility Quote	66 792 329.55
Total A		66 792 329.55
B	Internal Services	
B	Underground Reticulation	160 000 000.00
Total B		160 000 000.00
C	Professional Fess	
C1	External Services	16 903 471.63
C1	Internal Services	31 640 640.00
Total C		
Total (A + B + C) (VAT Excluded)		275 336 441.20
VAT (14%)		38 547 101.77
Total (VAT Including)		313 883 543.00

Notes

- Infrastructure cost up to individual stand boundary
- Costs base on averages from similar development
- All insurance costs are excluded (estimated at 10% of contract value)
- Full ECOSA rates used for budget