South Hills Development

BULK SUPPLY SCOPE REPORT

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Rev 4

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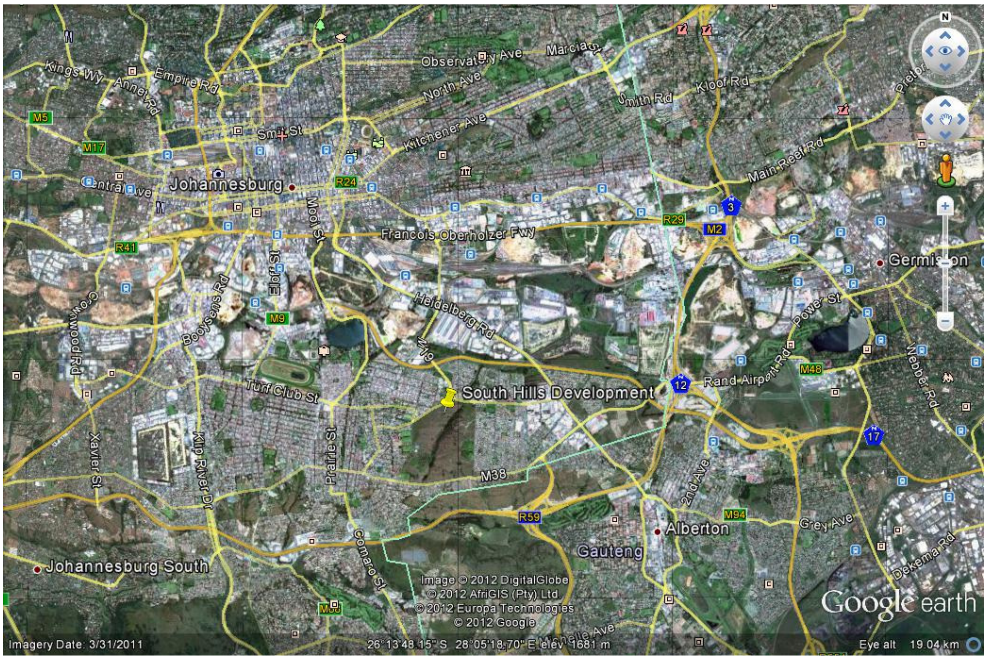
MODIFICATIONS TO MOFFAT SUBSTATION FOR THE BULK SUPPLY OF SOUTH HILLS DEVELOPMENT

Contents

1. BACKGROUND

South Hills development is situated south of Johannesburg and falls within the City Of Johannesburg's (City Power) supply area. The nearest major electrical substation is City Power's Moffat substation. The substation is located approximately 3.6 km from the proposed South Hills development site.



South Hills Development Location

Electrical Infrastructure Overview

2. REQUIREMENTS

A total capacity of 21 to 26 MVA is required for the (4200 – 5200 unit) South Hills development. This power will be delivered to the development from City Power's existing Moffat Substation by means of 3.6km, 4 x 300mm^2 Copper, 11kV XLPE cables. (Red route indicated on infra-structure overview map above)

Four (4) x 11kV bays will be used at Moffat substation to supply the new development.

3. CURRENT STATE

Moffat substation is an 88/11kV station fed from Prospect substation that is one of City Power's Eskom in-feed substations with a total capacity of XX MVA (City Power to confirm). Moffat is fed from prospect by means of 4 x 400mm^2 Al XLPE 88kV cables. Two of these cables are connected directly on 2 x 45 MVA 88/11kV transformers. Moffat substation currently has a spare capacity of of XX MVA (City Power to confirm). There are two (2) 88kV bays available for the installation of additional 88/11kV transformers. Spare 88kV cables from Prospect substation with its associated 88kV outdoor terminations at Moffat Substation are already installed. These cables will have to be tested to confirm availability.

There is no space available in the substation's 11kV switchgear room for additional switchgear.

Transformer nr 2's 88kV cables are faulty, and are currently being fed from an adjacent spare cable bay cable by means of an overhead link.

4. BULK EXPANSION SCOPE

Additional capacity can be created by installing a 45 MVA 88/11kV transformer in one of the two of the spare 88kV bays. The transformer will be fed from Prospect's 88kV GIS station by means of 88kV cables.

The existing substation building must be extended to accommodate the additional 11kV switchgear. Space is available to extend the existing substation to accommodate one additional 11kV switch room. It will also be possible to build a separate substation building with a switch room, control room and battery room.

The following is a high level scope of the equipment and services required to expand Moffat Substation and associated 88kV cable work:

1. Replace the faulty 88kV cable going to transformer 2.
2. Build and equip a new 88/11kV (45 kVA) transformer bay similar to the existing transformer bays. (Current loading and redundancy must still determine if two transformers should rather be installed)
3. Extend the existing substation building by constructing a second 11kV switchgear room, **OR** build new substation building next to existing one.

4. Install 11kV cables from the new transformer to the new 11kV switchgear room.
5. Install new 11kV switchgear in new switchgear room.
6. Modify and/or install additional earthing system.
7. Install new Transformer- and 11kV protection and control panels. This includes all secondary and auxiliary equipment required like metering, SCADA, AC/DC system, etc.
8. Integrate new equipment into existing supervisory system.
9. Upgrade existing battery bank and charger.
10. Install 4 x 11kV 300 mm^2 copper cables from new 11kV switchgear to the South Hills development.

Spare 88kV bays available at Moffat Substation

Space available on either side to extend the existing Substation

5. ANTICIPATED SCHEDULE

Capacity investigations are in progress. The results of these investigations will determine the final scope of work.

The table below shows a high level schedule for the upgrading of Moffat Substation:

	Month												
TASK	**1**	**4**	**7**	**10**	**13**	**16**	**19**	**22**	**25**	**28**	**31**	**34**	**36**
Feasibility Study													
City Power Approvals													
Tender Stage													
Contracts & Appointment													
Construction													
Commissioning													
Closeout													

Moffat Substation High level Task and Time Schedule

It is important to note that that the time estimated above are based on worse case scenarios, and may be shortened considerably.

6. COST

Below is a high level cost estimate for the substation expansion:

Item	Description	Qty	Cost/Unit (Supply & Install)	Total
1	88kV cables and terminations	450	R 13 500.00	R 6 075 000.00
2	88kV Transformer Bay	1	R 1 650 000.00	R 1 650 000.00
4	Civils	1	R 1 250 000.00	R 1 250 000.00
5	Earthmat Modifications	1	R 105 000.00	R 105 000.00
6	Transformer (88/11kV, 20MVA)	1	R 6 750 000.00	R 6 750 000.00
7	11kV Cables (630mm^2) S Core (Cu) x 2	360	R 1 450.00	R 522 000.00
8	11kV Incommer Panel	1	R 315 000.00	R 315 000.00
9	11kV Interconnector Panels	2	R 315 000.00	R 630 000.00
	11kV Bus Section	1	R 325 000.00	R 325 000.00
10	11kV Feeders	10	R 225 000.00	R 2 250 000.00
11	TRf P&C Panel	1	R 145 000.00	R 145 000.00
12	11kV switchgear P&C panels	5	R 95 000.00	R 475 000.00
13	11kV Cables (300 mm^2) S Core (Al) x 3)	7000	R 1 560.00	R 10 920 000.00
14	Dual Batteries & Charger with AC/DC Board		R 555 000.00	R -
15	SCADA interface	1	R 495 000.00	R 495 000.00
16	Miscellaneous	5%		R 1 595 350.00
17	P&Gs	15%		R 4 786 050.00
			Total (Excl)	**R 38 288 400.00**

Moffat Substation High level Upgrade cost

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