

Our ref: C1692/20

05 August 2008



**WSP Consulting
Engineers SA (Pty) Ltd**

3rd Floor
35 Wale Street
Cape Town 8001
Republic of South Africa
PO Box 2613
Cape Town 8000
Tel: +27(0)21 481 8700
Fax: +27(0)21 481 8799
E-mail: wspcpt@wspgroup.co.za
<http://www.wspgroup.com>
Registered Number: 1984/02074/07

A member of the WSP Group plc
Offices worldwide

Michael Schmidt
Electrical Department - City of Cape Town
Ndabeni Complex
Test & Metering Building
Melck Street
Ndabeni
7405

Dear Sirs

CRYSTAL TOWERS, CENTURY CITY - ENERGY SAVINGS REPORT

As required by the council we submit our report indicating where we will be implementing energy saving measures and equipment within development.

Electrical Loads

The following basic principles of design are being applied to minimize the energy consumption of the development and reduce the overall maximum demand:

- We have allowed for electronic ballasts for all fluorescent and compact fluorescent luminaires. The use of low voltage down lighters has been minimised and electronic transformers will be used throughout, to minimize energy consumption of lighting in these areas
- We have allowed for good quality Osram 35W IRC 12V dichrolic halogen lamps for the low voltage luminaires. These have good lamp-life and have approximately the same light output as a normal 50W low voltage lamp but at the reduced wattage.
- LED lighting will be installed on the façade of the Hotel building to minimize energy consumption of lighting up the facade
- Low energy and LED lighting will be used for external lighting to highlight pedestrian areas as well as lighting up the general ground floor parking area to minimize energy consumption of lighting in these areas
- Office light fittings and design – light fittings with the highest lux output and not over designed i.e. most efficient light fittings to be used, with energy efficient designs.
- Substantial metering is planned for large energy users linked to the BMS, including HVAC and water heating, and all tenancies, to be able to monitor energy usage split. This will assist with fine tuning energy efficiency of the building once in operation.
- Power Factor Correction equipment will be installed, thus reducing maximum demand and pressure on the City council's grid.
- Daylight harvesting is being considered for the offices and parts of the Hotel building, through an automated lighting control system. This system will help reduce energy consumption of the light fittings through the day when the offices are occupied.

Mechanical Loads

- The air-conditioning system and heating system is a fully integrated system, whereby heat generated by the air conditioning plant is recovered and used to heat the domestic water.

Directors: A.J. Mather (C.E.O.)*, G.J. Page (C.O.O.)**, R.W. Baard, M.C. du Plooy**, D.B. Fleming^{B*}, S.G. Gagliardini**, P.D. Hodgkinson*, A.R. Keen^{B*}, D.R. Kennaugh*, N.J. King*, G.L. Mazzuchetti*, G.M. Nichollas*, B.G. O'Brien*, A.J. Page^{B**}, N.S. Pilling^{B**}, G.T. Westgate**
Principal Associates (Regional): H.R. Bischoff, J.N. de Villiers, R. B. Düsterwald, K. Ferreira*, D.C. Morkel**
Associates (Regional): A.C. Crafford, J.A. Eagar, D. Friis, S. Koch, P.A. Minnaar, G.J. Pantone, E.J. Pedlar*, N.W. Smith,
^{([†] British) (*Pr Eng) (**Pr Tech Eng)}

- All chilled water piping is insulated to a high specification, in order to reduce thermal loss and thus reducing energy consumption.
- The chiller plant is controlled by a sophisticated plant manager system, which ensures that the entire plant is operating at optimal energy consumption at various load conditions.
- The entire HVAC system for the building(s) is managed and controlled by a sophisticated Building Management System (BMS), which ensures optimal energy consumption for all HVAC plant and equipment at any load condition.

Wet Services

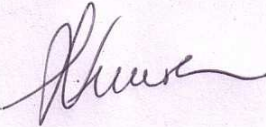
- All hot water piping will be insulated, thus lowering radiation losses.
- Hot water cylinders will be lagged to lower radiation losses, where individual cylinders are being implemented – typically for office block only.
- Hot water reclaim will be made via a plate heat exchanger connected to the chiller de-super heater, ensuring the minimal heating of water, as mentioned above under mechanical loads.
- Booster pumps are fitted with variable speed drives and demand controlled, ensuring that they run more efficient than standard pumps.
- Energy savings are also being achieved by not using individual hot water cylinders in the apartments. The hot water will be supplied from the boilers which will also be serving the hotel.

Building Envelope

- The windows to the Hotel guest rooms are double glazed, which reduces thermal gain (summer) and loss (winter) to / from the rooms. This reduces energy (operating) costs for the HVAC system serving the hotel rooms and the plant overall.

In summary, we have implemented significant energy saving measures in our design throughout the development and we have applied for a load of 3500 kVA ADMD. This is the demand we anticipate the development actually running at with the energy saving measures in place.

Yours faithfully



Lukas van Vuuren (Pr Techni Eng)
WSP Consulting Engineers SA (Pty) Ltd

cc Rabie Property Group : Steve Cloete / Jon Sparks
 Vivid Architects : Ian Bennie