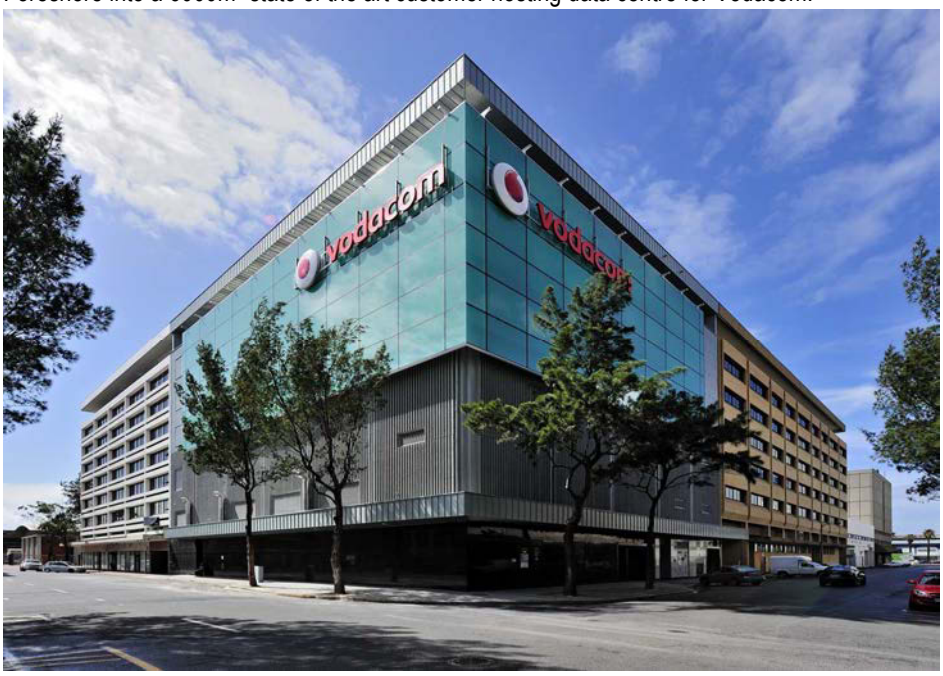
VODACOM FORESHORE DATA CENTRE
CAPE TOWN CBD

The project comprised the conversion and extension of an existing building on Cape Town's Foreshore into a 6000m² state of the art customer hosting data centre for Vodacom.

The brown field site before construction.



VODACOM FORESHORE
Data Centre, Cape Town

Client
Vodacom Business
Project Managers
Coffey Projects
Architects
KMH Architects &
MHV Architects
Quantity Surveyors
PACE Quantity Surveyors &
Turner & Townsend
Consulting Engineers:
Structural
Pure Consulting &
S&T Consulting Engineers
Mechanical
Spoormaker & Partners
Electrical
Claasen Auret Incorporated
Fire
Chimera Fire Protection Consultants
Main Contractor
Aveng Grinaker-LTA
Text
Project team collaboration
Photography
WielandGleich - ARCHIGRAPHY.com

The design criteria for the facility strived to achieve continuity in the operation of data equipment. Construction and services installation, finishes, plant machinery and equipment had to be of the highest standard to comply with the latest best practice, technology and innovation - all focussed on being energy efficient.
At the outset of the project, it had to be assumed that the entire data centre would be fully populated and that the specified ultimate energy capacity would be attained over time. In order to obviate abortive costs, all system and utility designs had to be modular.

ARCHITECTS REPORT
The major components in this project are the Electrical, Mechanical and Fire Protection installations. Architecturally, the primary objectives were:

- to plan the facility to comply with Local Authority and all other statutory requirements and the National Building Regulations;
- co-ordinate the mechanical, electrical, fire and structural designs with the architecture;
- document, detail and provide all necessary architectural information that would allow implementation of the primary services;
- and provide suitable accommodation for end users, all equipment and plant.

The Data Centre provides a secure enclosure for the data equipment and is inhabited by only a few fulltime staff members to showcase the facility to potential Vodacom Business Customers. The introverted design brief had no

requirement for a transparent facade and limited public interface at street level in strong contrast with conventional urban environments.

To communicate social interaction with the city and the public, opaque glass and glossy granite was selected as facade cladding. These materials reflect the clouds in the sky and the surrounding buildings which provide viewers with identification of a 'public' building. At night the glazed curtain wall is lit up by 1,792 concealed RGB LED's to animate the Foreshore's skyline. The animation is programmable and controlled by specialist software.

Technically the roof and facades had to have high R-values to minimise the heat load on the HVAC system. The external envelope had to eliminate the risk of damage caused by moisture and dust coming into contact with the IT equipment. This was achieved by layering light coloured reflective materials, air cavities, masonry, insulation and networks of emergency drainage systems in the external envelope.

The energy efficient design of Mechanical, Electrical and Fire equipment is augmented by opportunities for green architectural intervention:

- a refuse room for waste sorting;
- 70% recycled content bricks;
- as far as possible paints and adhesives with low or no VOC were specified;
- FCS approved timber was used;
- most light fittings are activated by motion;
- and toilets have dual flush systems to save water.

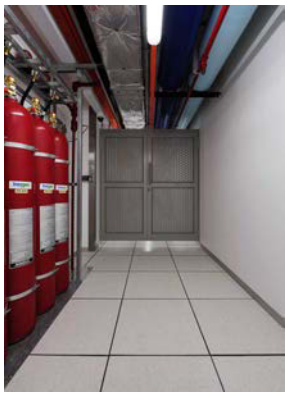
PROGRAMME CHALLENGES
The site was handed over to the principal contractor in May 2010 and the Project was completed in May 2011, on programme. This 12 month construction period presented many challenges some of which were overcome by using a structural steel design to ensure the building could be completed as quickly as possible. Fast track services design allowed pre-ordering of plant and an extensive prequalification tender process for the major subcontracts ensured that the appointed contractors were capable of carrying out a programme and project of this complexity.

An Integrated Services Testing (IST) process was carried out prior to the handover of the building to Vodacom. This process involved the simulation of various tests (including using over 200 domestic heaters to simulate data rack loads) to ensure that the building services were functioning as per the design in every foreseeable scenario.

SERVICES INFRASTRUCTURE
Actual gas discharge testing was done to confirm that design concentration and holding times were met. This was done to prove compliance with the Rational Fire design. The very high airflow velocities associated with the fire protection system had unique challenges to overcome. HVAC units could not be shunted as the heat loads are very high. The system installed comprises high sensitivity detection in combination with analogue addressable detection. Full flooding gas suppression has been installed in all critical areas, such as data centres, energy centres as well as in the incoming supply sub stations.

The MV electrical installation comprised primary medium voltage switchgear and dry-type transformers each having very low maintenance requirements. High quality redundant backup power supply systems were implemented. Main LV reticulation was achieved throughout the building by way of locally produced SABS approved busbar systems.

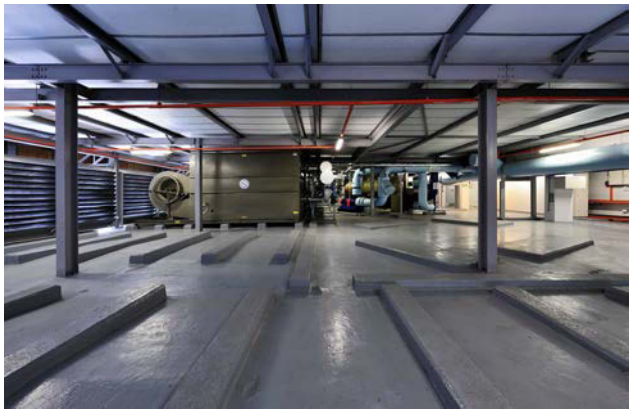
The backup power has been achieved by emergency generators, capable of delivering 110% power to the HVAC plants, IT equipment and other essential services. The emergency generators are controlled by a network of programmable logic controllers, designed and configured to suit the customized requirements of the site.
redundancy configurations.




The HVAC design incorporates a ‘hybrid’ of tiered redundancy configurations. Limited plant space was available to achieve a normal tiered design on the HVAC system. The restricted plant room spaces were inherited from the existing building's footprint and strict zoning regulations which had to comply with the Council's specifications.

A water-cooled chilled water plant was installed as the primary chilled water generator for the chilled water computer room air conditioning (CRAC) units to obtain maximum coefficient of performance in chilled water generation. The water-cooled chiller plant is backed up by an air-cooled plant since make-up water for the cooling towers could not be stored, due to the space and weight limitation of the existing building structure.

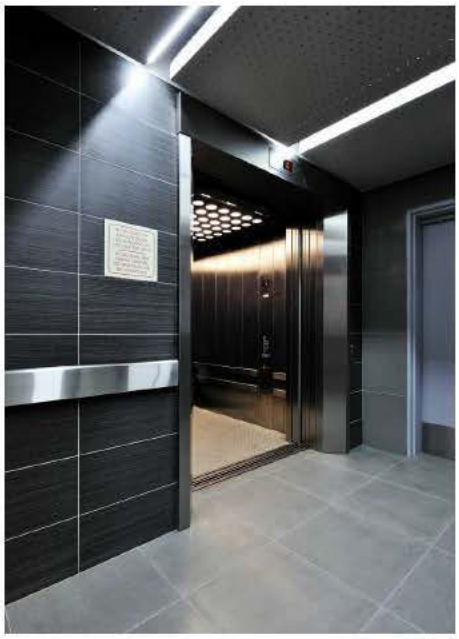
The CRAC units are also configured in a redundancy configuration for each control zone complete with electronically controlled fans for demand control capability. The CRAC units are connected to the chilled water piping ring which reticulates throughout the building and are served by 2 sets of secondary chilled water pumps with variable speed drives. A conditioned fresh plant provides the required ventilation as well as the necessary pressurisation to minimise dust and heat infiltration into the data floors.

CUSTOMER HOST REPORT

The latest fibre optic technologies are installed, which supports 1Gb/s and 10Gb/s applications and in future 40Gb/s and 100Gb/s systems. This is a key facility for Vodacom as it is connected to a number of local and national fibre cable routes, the newly launched West African Cable System (WACS) and other cable routes.

The data centre is built with redundancy in infrastructure and all components are under constant monitoring by a Building Management System. The facility has a high level of security presence. Since the launch in September 2011, there has been large interest by various customers. A diverse choice of connectivity options giving... *power to you!*



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