

Meydan Development, Dubai

PROJECT OVERVIEW

The world-renowned Dubai World Cup horse racing event at the Meydan Racecourse in Dubai is the richest event of its kind in the world today. With the increased popularity of horse racing, the Dubai Racing Club decided to redevelop the Nad Al Sheba Racecourse and incorporate the facility into the new Meydan Development.

The Dubai Roads and Transport Authority (RTA) appointed Aurecon in joint venture with Al Burj Engineering Consultants for the design, tender documentation and construction supervision of the new road network, including bridges, for the Meydan Development. One of the key challenges of the project was the requirement to complete the work on time for the 2010 Dubai World Cup event. Construction on the first phase of the road network, with a cost of AED 1,088 billion (R2,2 billion) commenced in August 2007 and was completed on schedule at the end of March 2010.

The first phase of the project consisted of the construction of the new Meydan racecourse facility, grandstand and hotel, approximately 4,5 km of an 8-lane dual carriageway, two access bridges and the signature VIP Bridge. Also forming part of the first phase was the construction of a 50 m wide navigable canal and bridge to carry the main road over the canal, which will eventually connect the Dubai Creek to the main grandstand. In addition, the stable facilities and the existing golf course would be expanded and a mixed use development be added in the future.

1 The Meydan VIP Bridge, which drew its inspiration from a horse's flowing mane, stands out against the city centre of Dubai in the background

The VIP Bridge is a special feature of the development, providing vehicle access to the main racecourse stadium from Meydan Road. The main span of the VIP Bridge is 80 m long. It is also adorned with innovative, artistic steel and aluminium composite cladding in the shape of waves. The architectural inspiration for the VIP Bridge was a horse's flowing mane, with horses being an integral part of the Meydan Development.

The Meydan Development can essentially be divided into two main

components – the Meydan Racecourse and its amenities, and a mixed-use residential and commercial development. The project site is located in the vicinity of the current Nad Al Sheba horse and camel racecourses, as well as the westernmost portion of the Ras Al Khor industrial area.

SCOPE OF WORKS

In addition to the reconstruction of Muscat Road and the provision of access roads to the Nad Al Sheba Racecourse,



MEYDAN DEVELOPMENT, DUBAI, UAE

International Projects category

KEY PLAYERS

Client Dubai Roads and Transport Authority

Professional Team Aurecon in joint venture with Al Burj Engineering Consultants

Main contractor Afcons Infrastructure Limited

Architect Theo A Khing Design Consultants

the scope of works included the construction of four bridges (including the VIP Bridge), 4.6 km of road works between Al Ain/Muscat Road and the existing mosque on Muscat Road, the diversion of existing service lines, the raising of two 400 kV overhead power lines, the construction of a section of the marine channel, and landscaping.

THE BRIDGES THAT FORM PART OF THE PROJECT

VIP Bridge – Bridge MDN 2

Completed in March 2010, this bridge is the VIP access to the grandstand, providing vehicle access from Meydan Road. The VIP Bridge is adorned with innovative, artistic steel cladding in the shape of waves which represent a horse's flowing

mane. The steel cladding takes the form of a complex three-dimensional shape that was challenging to model, design and manufacture. The lighting on the VIP Bridge forms a special feature.

Bridge MDN 1A – Interconnecting bridge

Bridge MDN 1A was completed in February 2010 and carries two lanes of a directional ramp from the exit of the grandstand across Meydan Road. Bridge MDN 1A consists of a post-tensioned concrete box girder. This construction method allowed the bridge to be constructed to follow the combination of horizontal and vertical curvature of the road.

Bridge MDN 3D – Interconnecting bridge

Bridge MDN 3D was also completed in February 2010 and carries two lanes of a directional ramp as entry to the grandstand across Meydan Road. Bridge MDN 3D consists of a post-tensioned concrete box girder.

Main Bridge over canal

The Main Bridge carries six lanes of Meydan Road over the canal and was completed in March 2010. This bridge is a total of 450 m long, with a central span of 60 m across the 50 m wide canal. The central 60 m span consists of four variable post-tensioned box girders. The approach fills consist of terraced embankments which will be landscaped at a later stage.

CONSTRUCTION

Construction planning

The programme for the design and construction of the roads was dictated by the requirement to have the Meydan development operational for the Dubai World Cup event in March 2010. The first phases of the road network therefore had to be completed by November 2009 and the remainder by February 2010.

Bridge construction

The impressive VIP Bridge forms the main visual focus of the development, while two interconnecting bridges and ramps are intended for guests accessing the racecourse stadium, with Main Bridge



- ② Construction of the Main Bridge over the canal
- ③ VIP Bridge detail
- ④ The project included the construction of an 8-lane dual carriageway
- ⑤ Two icons competing for attention – the Meydan VIP Bridge and the Burj Khalifa Tower, the tallest building in the world

carrying Meydan Road over the canal. All the bridges were constructed as post-tensioned concrete box girders.

After the concept for the VIP Bridge had been finalised, different structural engineering systems were considered. The two likely options were a steel box girder or a post-tensioned concrete box girder. It was decided to construct the VIP Bridge as a post-tensioned concrete box girder, for the following reasons:

- The construction of concrete box girders is well known in the local construction industry, whereas steel bridges are less common.
- The steel elements would have to be manufactured offshore, whereas concrete was readily available.
- With the tight schedule to complete the bridge by March 2010, there were too many risks in delivering a steel bridge.
- The inherent durability of concrete in the aggressive local climate also favoured this option as opposed to the higher maintenance of a steel bridge.
- There was only a small cost differential between the steel and concrete options..

- The aesthetic appearance of off-shutter concrete and the limitless forms and shapes that concrete can be moulded into, were some of the added benefits of using concrete as the primary structural material.

Construction of road network

The roads providing access to Meydan were constructed as the first phase of the future road network in the area. The roadways were constructed as sand embankments and subgrade, aggregate subbases and roadbases, and an asphalt wearing course. Special decorative street lighting posts were manufactured for the project.

UNIQUE AND UNUSUAL FEATURES

The complexity of the project lay in the planning and tendering of various components of the works in order to meet the extremely tight deadlines. Tender documents had to be compiled in such a way that phasing of the works could be accommodated. Tendering of the main contract could therefore not be delayed until designs for all the components of the

works had been completed. In particular, the concept for the VIP Bridge was not finalised at the time when the main works were tendered. As a consequence, the VIP Bridge was designed and tendered as a separate package. Particular conditions in terms of availability of the site for works for different contractors were therefore included in the tender documents. The cladding of the VIP Bridge was also tendered as a separate package within the VIP Bridge contract. Again, particular conditions had to be included to set deadlines for works to be completed by various contractors and subcontractors.

CONCLUSION

The successful cooperation between the client, consulting engineering joint venture, consultants and architect ensured that the construction of the road network and the bridges were completed in time for the 2010 World Cup event at the Meydan Racecourse. The project was a contribution to the ultimate success of the event and now forms an integral part of the Meydan landscape. □

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Source:

http://www.saice.org.za/downloads/monthly_publications/2010/2010-Civil-Engineering-dec/#/0