



By November 2009, the cool season rye grass had died off. The *Cynodon* is now being encouraged to form a thick cover, the perfect base for over-seeding again in autumn.

#### Project Team

**Client:** City of Durban

**Project Engineering and Management:** Illiso Consulting Engineers

**Main Contractor:** Group 5, Pundev, WBHO

**Turf Consultant, Pitch Specifications and Design:** Sportsturf Solutions

**Turf Installation:** Turftekk

*Durban's new Moses Mabhida Stadium, owned by the South African Football Association, is located in the Kings Park Sporting Precinct. To make way for it and develop the new complex, Kings Park Stadium was demolished in 2006.*

The stadium is scheduled to host five group matches, one second round match, one quarter final and a semi-final, and has been designed as a multi-functional asset for Durban, accommodating rugby, cricket, athletics, recreational and cultural events.

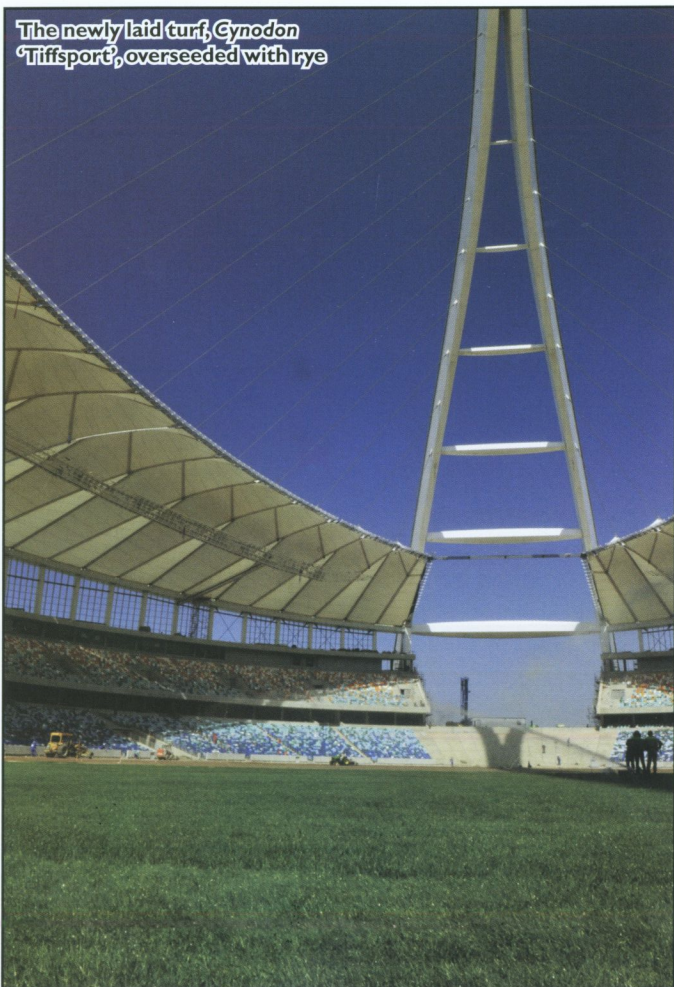
#### Ground preparation and pitch

Turftek's team, under project manager Len Ludick, comprised Johan Louw, Charl de Witt, Lucky Modise, Sifiso Mazibuko and Terry Paterson. Louw says that due to time constraints, the turfgrass, in super sod form, was not grown in the stadium but rather off-site by means of sprigging at a grass farm in Ballito owned by Evergreen Turf. The grass is a warm season *Cynodon* variety called Tiffsport. However, because the pitch is designed to accommodate various sports played during different seasons, two types of grasses – warm and cool season – will be used. The Tiffsport was laid first and later, a mix of cool season grasses will be added in the form of Perennial Rye and Kentucky Blue.

Louw says that the base was compacted by the main contractor and Turftekk undertook base levelling with a laser guided leveller and vibration roller to achieve tolerances and compaction ratio. They then installed a 315mm stormwater pipe for drainage and this was connected according to the engineering specification to a sub-surface pump. Water is pumped to the main storage tank for irrigation. It is collected from the sub-surface drainage and flows via PVC piping to an infield sump. When the drainage was installed, the entire field was covered with a relatively thick, non-woven bidim A5 geotextile as a filter separator to the prepared base and the stone aggregate layer. After this, 300mm wide Megaflo panel drains were laid flat onto the bidim layer at 7.5m intervals. Megaflo is a high strength, high drainage capacity slotted flat pipe system, which is connected to the 300mm peripheral pipe. It covers both the soccer field and the surrounding athletics track.

Thereafter, the pitch was covered with a 6,7mm crushed, sharp edge stone which was laser levelled in order to begin importing the sports field sand which had been premixed off-site with pine bark compost. Further laser levelling to a 10mm tolerance then took place.

The newly laid turf, *Cynodon* 'Tiffsport', overseeded with rye







300mm wide Megaflo laid on bidim A5 beneath 6.7mm stone  
(photo courtesy of Kaytech)



Planting of super sods



Above and below: Harvesting at Evergreen Turf's growing farm in Ballito



Rolls being loaded for transport  
Below: Rolls of 'super sod' awaiting laying



By mid-August 2009 most of the initial growing medium had been laid and the delicate task of shaping the 'turtle back' was underway



Twelve Perrot sprinklers were installed to irrigate the turf – ten around the perimeter and two in the pitch



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## Turf Management

The pitch is categorised as a 'premier playing field' comprising an upper layer of high-draining, non-compacting sand growing medium over a gravel layer with subsoil drain. The sand layer beneath the grass includes a StaLok® fibre which strengthens the root zone and makes it more flexible, thereby increasing the turf's load-bearing capacity. This means a wider range of sports can be played on the pitch. The StaLok stabiliser is a fibre netting that is mixed into the sand, creating an artificial root structure. The grass roots grow onto this fibre which is UV-resistant and does not break down. It was developed in Arizona, USA and has been in existence for just over two years. It provides a good playing surface, creates stability in the sand and prevents compaction.

Louw says the sand imported had to comply with StaLok specifications which requires a much tighter quality control than those of USGA specifications. Turftek opted for a local sand and random samples were taken from Port Shepstone up to Stanger. Approximately 50 sample analyses were done to ensure that the correct sand was obtained.

The final level of the pitch was shaped in a turtle back form, with a one percent fall from the centre of the field to the sides. It meets the requirements of FIFA, IRB, SAFA and SARFU.

## Turfgrass grow-in and installation

Evergreen Turf began to build the off-site pitch in the middle of December 2008 on its growing farm in Ballito and completed it two weeks later. The pitch was grown off-site in order to reduce the growing-in period so that construction could take place at the stadium without damaging the pitch. To build the pitch, silica sand as per FIFA specifications was imported to the field and StaLok stabiliser was then mixed into the sand. Thereafter, *Cynodon TiffSport* spriggs were planted. Sprigging was used as it provides better stability than sodding.

StaLok is the only stabiliser which is agronomically friendly, as all standard maintenance practices such as top dressing and hollow tining can be done without interfering with the stability. *Cynodon TiffSport* has been rated as number one in the world in the NTEP trials (National Turf Evaluation Programme) undertaken in the USA for 12 consecutive years. It is bred from indigenous South African mother material and has excellent wear tolerance, colour and spring green-up. It is also non-invasive and has done very well in South African trials undertaken at five separate locations around the country.

During the growth period, the TiffSport was closely monitored by Evergreen's staff to ensure that there would be no infestation of weeds, other grass varieties or disease. Foliar feeding was undertaken regularly as silica sand contains no nutrient value or organic material and these are vital to assist with grass growth in a short period of time. The total growth period lasted eight months.

Evergreen needed to ensure that the root system was 50mm or deeper before harvesting of the super sod could take place. The sod created an immovable tile that could be laid and ready for playing on within 36 hours. This had not previously been done in South Africa but members of Evergreen's staff had spent sufficient time in America and Europe to investigate and learn more about the procedure.

Prior to harvesting, the pitch was drenched with water in order to compact the sand, thereby ensuring a stable sod roll with no sand loss during harvesting and travel. The sod harvester cut the super sods to 40mm depth x 1,1m width and 17m length. The rolls weighed approximately one ton each and it was vital to keep a 40mm consistency to ensure that the pitch remained even.

The sods were installed with WMI sod installers and Evergreen's specialised team ensured that they were positioned to meet the linear lining. Super sods were installed on the centre playing pitch and *Cynodon* washed sods on the athletics track. Washed sods were used to ensure that there would be no contamination due to the different soils used. The installation was completed in just over two weeks. Evergreen Turf is the first in South Africa to install super sods as a growing medium using USGA sand and StaLok stabiliser.

## Irrigation

The irrigation system for the stadium is the Perrot sod cup sprinkler, capable of casting up to 36.5m at 35m spacing. It requires only 12 sprinklers in total. The main field was designed using the 12 sprinklers and the outer perimeter was done using the Signature 6005 stainless steel unit controlled by four



separate Signature 50mm solenoid valves. The Perrot units are all valve in head, requiring no additional solenoid valves for the main units. Only the two infield units required solenoid valves as there were to be no main lines under pressure within the field at any time, other than when operating.

Of the 12 units used for the main field, 10 are on the perimeter and only two are in the main field; these are found 17.5m from the centre going both north and south of the centre line. The original design specification from Controlled Irrigation KZN was followed and the entire system is fed from a 110mm class 12 upvc ring main. This in turn is fed by the feeder line which is 160mm class 12 upvc line out of the pump station and 60m into the field, where the two lines tie up. There was also a request for the drainage system to be tied up to the infield sump and for the water to be recycled back to the main tank. Turftek installed a 110mm class 9upvc line with electrics back to the main pump room where it tied back into the return line for the tank. The system was designed with the normal operation procedures of sports fields and this means that the northern section can be operated independently during winter as the shade increases and less water is required.

The main lines and track irrigation lines were installed on the eastern perimeter first as this was the only available area to begin working in. The ring main was installed into the base 500mm as there would still be an additional 400mm stone and growing medium to be placed on top of the base, making the system approximately 900mm in the ground. The main units were installed before the two different mediums were brought to site as Turftek could not disturb the drainage layer once it was installed. To ensure that the units were installed correctly, they made use of the laser level on site to level the sprinklers at the correct heights of the final pitch level. As the work proceeded, there were strict installation protocols set down by the client and every length of pipe installed was inspected before the trenches were closed. The piping had to be backfilled first using 150mm Umgeni river sand, compacted and then inspected. The final closing took place as normal, and heavy compacting was needed to ensure that the trenches would not collapse. During installation of the main field, the pump station construction was also underway.

The main sprinkler is the Perrot LVZ-RVR-22 valve in head with sod cup. This allows the entire sprinkler to be buried in the ground and the sod cup, which is 150mm deep, is also planted. This unit then pops up during operation, with the sod in place. The surrounds' sprinklers are Signature 6005 stainless steel pop-ups, operated from four Signature 50mm solenoid valves. The main pump station was designed using two Grundfos CR64 pumps with fabricated copon-coated pipe work. The main control unit is the Delta variable speed system with pump start facility to operate the various high and low flow situations found on site.

The water supply for the field comes from the main tank situated at the double southern arch at the base of the stadium. The tank has a holding capacity of 800 000 litres and is fed from the main municipal supply. The top-up of the tank comes from the surrounding stormwater and irrigation recycling sump situated in the main field. Since the pitch is currently still in the grow-in phase, it is irrigated as and when required. However, once the turf is established, irrigation will take place at night as the main cycle and during the day as a mist cycle to allow for cooling. The cycles will be determined by the groundsman as the field begins to mature.

### Maintenance

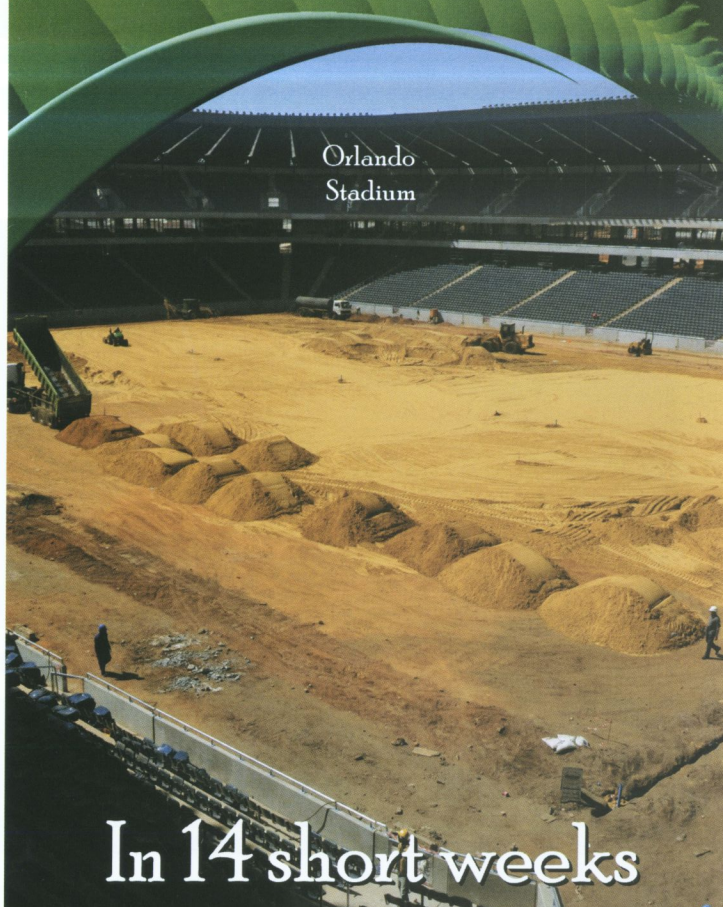
Turftek will be responsible for the growing in and maintenance of the turf up to and including the duration of the World Cup. Thereafter, a further maintenance contract will be negotiated. The *Cynodon* will be grown in until the first game and will be overseeded from April to June 2010 with the above-mentioned cool season grasses. Louw says that verticutting and vertidrainage on a regular basis is extremely important for *Cynodon*, as is foliar feeding on this sandy medium.

The fertilisation programme was worked out by Johan Jansen van Vuuren of Sportsturf Solutions.

Louw concludes that the turf installation at the stadium was well planned and that its two hectare grass area will be more challenging to maintain than the standard one hectare size stadium. **isa**

**Information supplied by Johan Louw and Terry Paterson of Turftek and Fanus Cloete of Evergreen Turf. Photos by Connall Oosterbroek of Roots SA and courtesy of Evergreen Turf.**

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