



Ernie Els Design
Nondela – Drakensberg Mountain Estate
Progress Report

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On-Course Solutions site establishes at Nondela for Hydro-seeding, Bunker Stabilization and a Cart Path Trial Section

Background

Having already seen our results at Serengeti, the Ernie Els Design Team in conjunction with WBHO placed their order and commissioned On-Course to apply Hydrotac™ for hydro-seeding of the bunker complexes and Bunkertac™ for the Bunker lining stabilization. In addition, On-Course was to train the on-site crews.

A full site assessment was conducted in February 2009, during which it was determined that the course and bunker design had suffered damage from excessive rains and erosion. The course of action decided on was to:

- 1) Insert erosion control measures where needed as an immediate interim measure. Silt fences were constructed and put in place to help prevent the erosion.
- 2) Hydro-seed the bunker complexes using KBG seeds and Hydrotac™. Facing budget constraints since the initial hydro-seeding mixture had washed away the new method was to seed then apply Hydrotac™ to hold the seed in place and promote quicker germination.
- 3) Fully prepare and stabilize two pot bunkers on hole 2 as a demonstration of the bunker lining method devised by On-Course Solutions using Bunkertac™ for the lining and sand flashing of bunkers.
- 4) Conduct a trial cart path section in order to introduce On-Course's nature's path™ coating as an alternative to traditional concrete paths for the course.

Site Establishment – March 30, 2009

Preparation for the application of Hydrotac™ to each bunker complex included the following:

- A pre-inspection of the area to be treated
- The installation of silt fences and placement of sand bags for erosion prevention
- Inspection of the sprinklers
- The placement of top soil
- Cleaning of the decorative rocks within the bunker complex
- Placement and raking of the seed

During the first three days of our establishment little was accomplished due to the recent storm and subsequent cleanup that followed. On Wednesday April 1st we began the spraying of the bunker complexes on holes 12 and 13 and the following was completed:



Hole 13 Complex of 3 Fairway Bunkers

The total approximate area treated was 370 m².

The final application rate was .11 liters per m² including repairs.

Additional topsoil is required to assist with germination over certain areas.

Later in the week there was 27mm of rain causing no damage to the applied area except where the sprinkler head had not been repaired and the spray did not cure, there was also a small patch of about 500mm² where the face collapsed due to insufficient compaction and placement of the topsoil.

Germination took place two days prior than expected.

Only areas without germination were due to an insufficient amount of topsoil placement.



April 2, 2009 after application



April 20, 2009 showing germination

Hole 13 Complex of 5 Fairway Bunkers

The total approximate area treated was 864 m².

The final application rate was .14 liters per m² including repairs.

Requires additional topsoil to assist with germination.

Later in the week there was 27mm of rain and causing no damage except where a small patch where the silt fence overflowed and created a small wash out.

Germination took place two days prior than expected.

Only areas without germination were due to an insufficient amount of topsoil placement.

There is an area behind the silt fence that is acting as a catch pit for irrigation and rainwater, which is running through the silt fence and coming out by the rock and running into the bunker causing erosion and possible contamination. A proper drainage solution needs to be installed in this area.



April 2, 2009 after application



April 20, 2009 showing germination



Hole 13 Hillside 1 Large Fairway Bunker

Prior to our initial site establishment and application the rain caused a large section of the bunker to collapse, the bunker was repaired and the topsoil replaced.

The total approximate area treated was 450 m².

The final application rate was .12 liters per m² including repairs.

Later in the week there was 27mm of rain causing no damage except for a patch of about 1 m² where the face collapsed due to insufficient compaction and placement of the topsoil.

Germination took place two days prior than expected.

Only areas without germination were due to an insufficient amount of topsoil placement.

The excavated material of clay and sand that was dumped and spread around at the top of the hill has been removed which will help eliminate a possible source of contamination.

There are a few areas of the bunker face with erosion problems where the face actually collapsed from previous rains that have not been repaired as of yet.



April 3, 2009 after application



April 20, 2009 showing germination

Hole 12 Hillside 1 Large Fairway Bunker

The total approximate area treated was 285 m².

The final application rate was .08 liters per m² including repairs.

Requires additional topsoil to assist with germination.

Later in the week there was 27mm of rain and causing no damage.

Germination took place two days prior than expected.

Only areas without germination were due to an insufficient amount of topsoil placement.

The excavated material of clay and sand that was dumped and spread around at the top of the hill has been removed which will help eliminate a possible source of contamination.



April 3, 2009 after application



April 20, 2009 showing germination



Hole 13 Complex of 3 Greenside Bunkers

The total approximate area treated was 170 m².

The final application rate was .17 liters per m² including damage repair.

Later in the week there was 27mm of rain causing no damage.

Germination took place two days prior than expected.

Only areas without germination were due to an insufficient amount of topsoil placement.



April 3, 2009 after application



April 20, 2009 showing germination



April 20, 2009 showing germination



April 20, 2009 showing germination



Hole 18 Tee Box Cart Path

On April 4th and 5th we completed a trial cart path section introducing nature's path™
The total trial area is 2.5meters x 12 meters and to date has had traffic, rain and no damage.



Hole 2 Complex of 3 Fairway Bunkers

The two pot bunkers with existing grass were prepared and treated with the first 3 coats of bunker lining.

1 hour after completion there was 27 mm rain and 50 – 60% of the work was lost as the rain came before the bunkers had a chance to dry.

The large holes left by the pegs from the sod installation created an unexpected drainage issue so they were filled in and sealed to prevent contamination.

The same holes caused water ingress through the wall of the bunker base and have now been plugged.

They have now been prepared again and treated with the first two coats of bunker lining treatment.

They were left to cure over the long weekend.

The total approximate area treated was 116 m².

The final application rate was .70 liters per m² including damage repair.



Hole 1 Green

Upon finishing the work on the two bunkers on hole 2, there was excess material that was requested by Wallington Turf to be applied as erosion control for the Hole 1 green which was consented to and completed.

The total approximate area treated was +/- 500 m²

The final application rate was .12 liters per m².



April 8, 2009 during application



April 20, 2009

The week of April 19th – 24th 2009 was for training of a crew for hydro seeding of the bunker surrounds and for inspection of the hydro seeding applied during our previous visit during May 30th – April 8th 2009. Due to bad weather on Tuesday, April 21, 2009 and Voting Day on Wednesday April 22, 2009 the training time was shortened but with good weather on Thursday and Friday the training session was a complete success.

Training of Hydro-seeding crew commences

On Monday April 20, 2009 a crew of four individuals including a supervisor, a tractor driver and two workers began training for the hydro seeding process. Training began with a complete explanation and description of the use of each piece of equipment. All equipment was assembled and re-assembled to ensure a complete understanding of the process. Once re-assembled all equipment was tested using water and each person was trained on the use of the spray nozzle and the different types of spray that should be used while applying to a bunker surround.

Once each person had a chance to practice spraying we selected a bunker complex on hole 5 to use for training using only water to better demonstrate an actual application. This allowed for training of the entire process from evaluation of how to approach the bunker complex, proper tractor placement and most efficient use of the spray hose.





Training on hole 5 bunker complex



Training on hole 10 green

For additional training we moved to a green on hole 10 which needed to be watered prior to compaction. This was a perfect area for training of the short, medium and long-range methods of spraying and how best to adjust the spray nozzle when moving between the different ranges.

At the end of the day the crew was trained how to clean each piece of equipment and the importance of the cleaning process in order to ensure proper functioning of each piece of equipment and to prevent any clogging or delays in the process.

Tuesday, April 21, 2009 the training continued with the use of water at the bunker complex on hole 5. Due to high winds and rainy conditions the training was stopped mid morning and after inspection of the bunkers being prepared on hole 2 it was agreed that on Thursday morning the process would continue.

On Thursday, April 23, 2009 the training continued with the proper way to mix the Hydrotac™ and water. The proper mix ratio is 1 part Hydrotac™ to 20 parts water or for a full container 50 litres of Hydrotac™ to 1,000 litres of water.

Once the mix was properly prepared we were ready to begin training using the actual product on the prepared bunkers on hole 2.

Each bunker was inspected for proper preparation and topsoil placement then pre-wet to moisten and loosen the tension of the soil.

Hole 2 Furthest Bunker from Green

The total approximate area treated was 71 m².

The final application rate was .14 liters per m².



Hole 2 Bunker Complex with 4 Bunkers

The total approximate area treated was 545 m².

The final application rate was .06 liters per m².



Hole 2 Bunker to Side of Green along Grass Line

The total approximate area treated was 90 m².

The final application rate was .11 liters per m².



Hole 2 Large Fairway Bunker Furthest From Green

A silt fence was installed all along the high side of the bunker.

The total approximate area treated was 420 m².

The final application rate was .05 liters per m².



Hole 2 Middle Fairway Bunker along Silt Fence

A silt fence was installed all along the high side of the bunker.

The total approximate area treated was 230 m².

The final application rate was .08 liters per m².

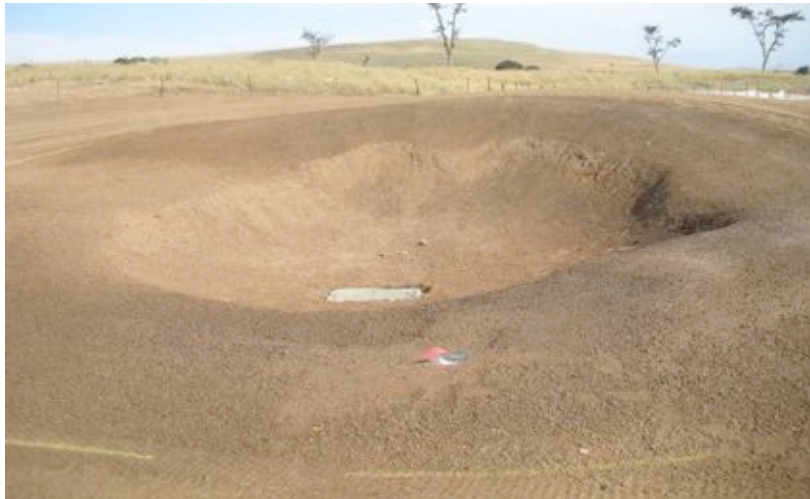


Hole 2 Small Pot Bunker Near Green

A silt fence was installed all along the high side of the bunker.

The total approximate area treated was 66 m².

The final application rate was .11 liters per m².



For proper training throughout the day each individual completed every task involved in the process in order to make sure everyone involved in the process understood each and every aspect required from the spraying down to the proper operation of the pump.

At the end of the day the crew was again shown the complete cleaning process. It was explained that at the end of day if there is still mix solution remaining that it may be left overnight but the rest of the cleaning process remains the same.



Friday, April 24, 2009 the Final Training Day

As part of the training process we wanted to be sure to include how to repair areas where proper germination did not occur. As the bunkers on hole 15 were being prepared and seeded we went back to hole 12 and 13 to repair areas where germination did not occur.

The areas in need of repair were areas where an insufficient amount of topsoil was placed and germination did not occur. Preparation of these areas included spiking of the clay area, mixing of topsoil and seed, raking of the topsoil and seed and then pre-wetting of the area to be treated.



Hole 12 Hillside 1 Large Fairway Bunker prepared for repair



Hole 13 Hillside 1 Large Fairway Bunker prepared for repair

Hole 15 Pot Bunker 1

A silt fence was installed all along the high side of the bunker.
The total approximate area treated was 70 m².
The final application rate was .07 liters per m².



Hole 15 Pot Bunker 2

The total approximate area treated was 50 m².
The final application rate was .08 liters per m².



Hole 15 Pot Bunker 3

A silt fence was installed all along the high side of the bunker.
The total approximate area treated was 50 m².
The final application rate was .08 liters per m².



After finishing the three bunkers on hole 15 a final review meeting was held with the crew to discuss the entire process once again and make sure that any and all questions had been asked and answered. The equipment was officially handed over and the crew was then left to finish the remaining repairs to the bunkers on holes 12 and 13 on their own.

