SANDYHILLS GOLF CLUB

Advisory Report on the Golf Course incorporating the STRI Programme

Report date: 6th October 2014
Consultant: Ian Craig

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Date of Visit:	1st September 2014
Visit Objective:	To carry out an inspection of the golf course and take further information from the 3 indicator greens.
Present:	Mr Scott Forrester – Greenkeeper
	Mr Ian Craig – Turfgrass Agronomist, STRI Ltd
Weather:	15°C and overcast.

Contents

Executive Summary

- The visit takes place at the tail end of a good summer of sustained warm temperatures with intermittent rainfall, resulting in ideal growing conditions.
- Despite positive early season reductions in organic matter levels, the latest figures see an increase of around 3% in the upper soil profile across the three indicator greens.
- The greens were scarified and top dressed in the spring with the Graden sand injection scarifier and top dressed again following a midseason hollow coring in July.

  Recovery from both of these processes has been good,

  Despite these cultivation operations, routine top dressing inputs remain too low and is the primary reason for an increase in organic matter content.
- Evidence of black layer was noted in certain heavy traffic areas of greens, in particular the 2nd green which is low lying and sheltered.
- Performance characteristics of the greens were largely unchanged from 2013 however there was a distinct variation in green speed with the 1st green being significantly quicker than greens 2 and 10.
- We discussed the partial reconstruction of the 12th green and our subsequent concerns with the differing playing qualities and maintenance required by the different construction types within the same green.
- The forward tee on the 3rd is suffering badly from the overhanging tree canopy and underlying roots. This tee has extremely poor grass cover and we discussed options including removal of the tree or replacement of the tee itself.
- The sand levels within bunkers is variable and some fairly extensive work is required to improve these.

Key Observations

Greens

The greens have recovered well from the hollow coring in July, however an increase in top dressing inputs is required as the recovering core holes are having an adverse impact on ball roll qualities.

Evidence of summer hollow coring

Recovery from coring

There has been no further top dressing of the greens since the hollow coring and, as a result, levels are uneven; particularly around the holes and this is causing some disruption to ball roll.

Black Layer

Black layer occurs in compacted or waterlogged soils where aerobic bacteria are unable to respire and the soil becomes dominated by anaerobic bacteria which respire hydrogen sulphate. This hydrogen sulphate gas has a distinct 'rotten egg' smell which is often noted when changing holes on the green.

Black layer 2nd green

The above photograph demonstrates a core taken from the front left of the 2nd green, a low lying area subject to heavy foot traffic. The distinctive rotten egg smell was present and pockets of black layer (metal sulphate deposits) was noted.

The black layer can be combatted by regular aeration, particularly deep aeration where necessary and soil amendments (containing activated charcoal) to reduce the toxic effects of the exudates from black layer.

12th Green

The back half of the 12th green was reconstructed in February and the new section of green is currently being maintained at a height of 6mm with the original part at 4mm. This is resulting in significant inconsistency of ball roll across the surface.

Evidence of microdochium patch was noted on the new section of the green and surround.

Microdochium patch on the new section of the green

On analysis of the underlying rootzone, we were slightly concerned to see the layering of different sands within the soil profile of the new section of the green. To provide a healthy and free draining rootzone in the long-term, it is important to have a consistent and homogenous rootzone material. Where layering occurs, water movement through the profile varies and rooting can be compromised meaning higher inputs of fertiliser and irrigation (in dry weather) is required. During wet conditions, the layering effects consistent movement of water through the soil and therefore results in black layer development and a further compromise in sward health. It is therefore important to understand the vulnerabilities of this new area of the surface due to the underlying construction. Ongoing aeration and top dressing will lessen the issue with time but the ideal solution would be to reduce the layering via reconstruction.

Cores from the original green (left) and new construction (right)

The above photo shows 2 differing sand layering patterns taken from the new section of the 12th green

Tees

The newly constructed tee on the 3rd hole is performing well, however some hollow coring and top dressing is required to remove and dilute the thatch layer from the imported turf.

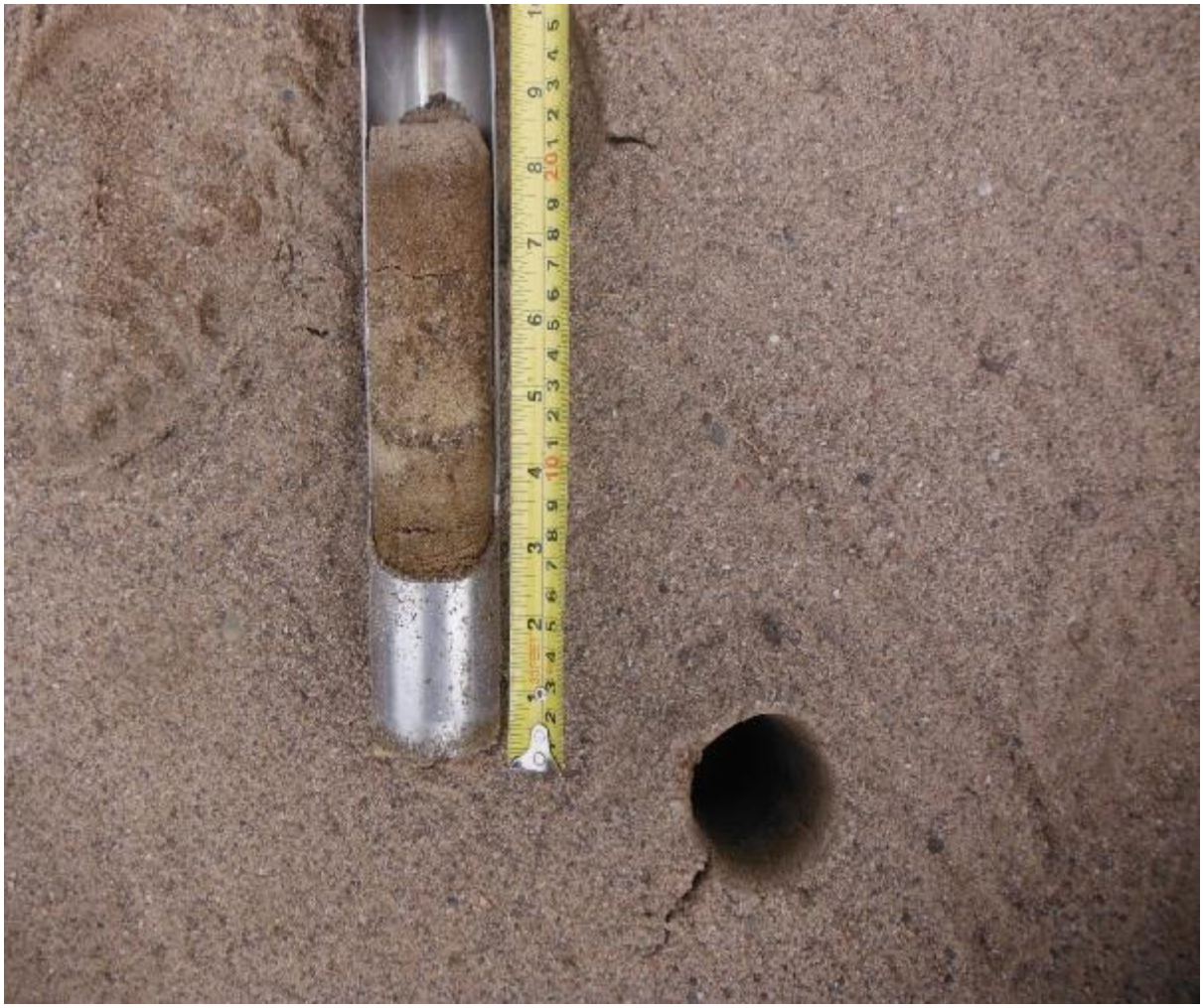
The forward tee on this hole is in very poor condition due to root ingress and dripping from the overhanging tree canopy. Immediate action is therefore required to improve the turf cover and presentation of this surface.

3rd forward tee requires immediate action to improve grass cover

Bunkers

The sand levels in the bunkers is variable and some extensive work is required to correct these. In some bunkers there was a difference of 6-7 inches in sand depths within the same bunker and this will result in variable playing qualities.

Re-edging the bunkers year on year will lead to uneven bases particularly on the faces of greenside bunkers and this was evident in the bunkers we looked at during the visit.



Variable sand depth in bunkers

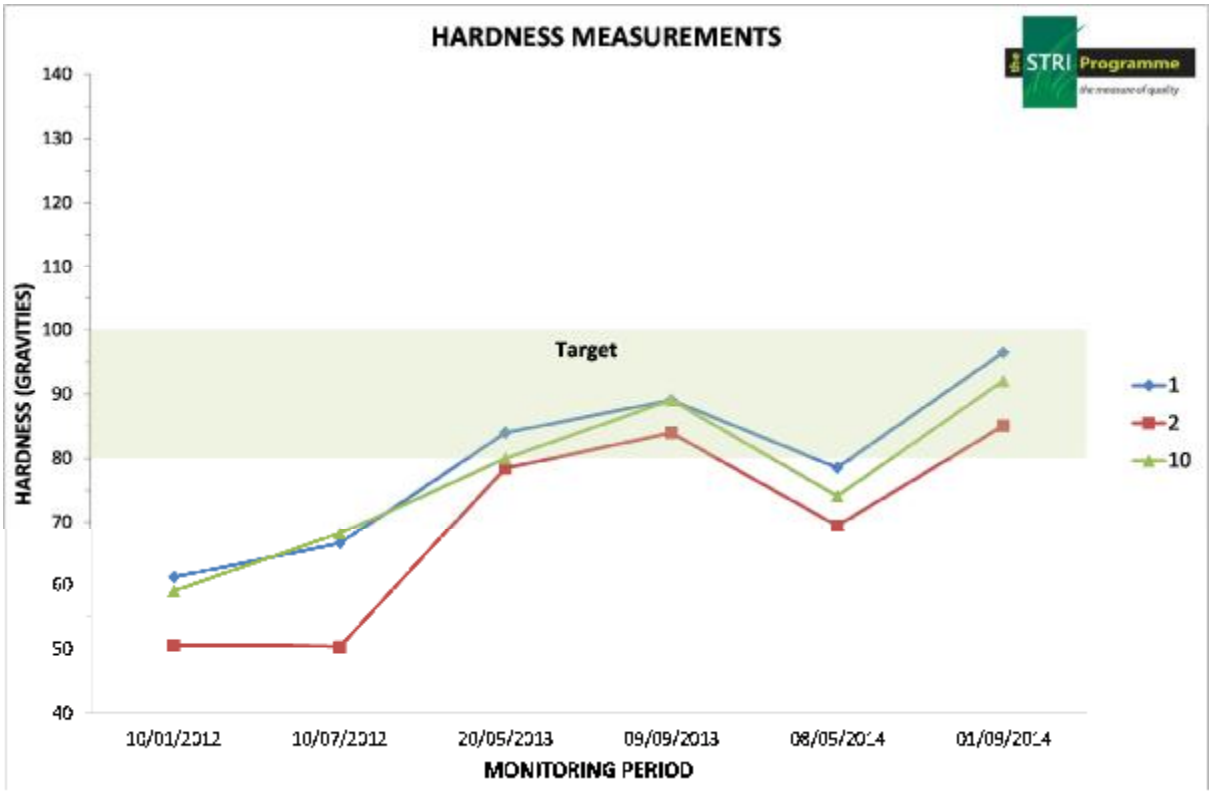
The above photos were both taken from the same bunker within a few metres of each other and show 9 inches of sand in one area and little over 1 inch in the other. The surface levels within this bunker appeared to be good, indicating that the base requires reshaping.

Performance data

The greens were tested for firmness, speed, trueness and smoothness of ball roll. The measurements were taken following a cut at 4mm and a roll with the TruTurf greens roller on the morning of the visit.

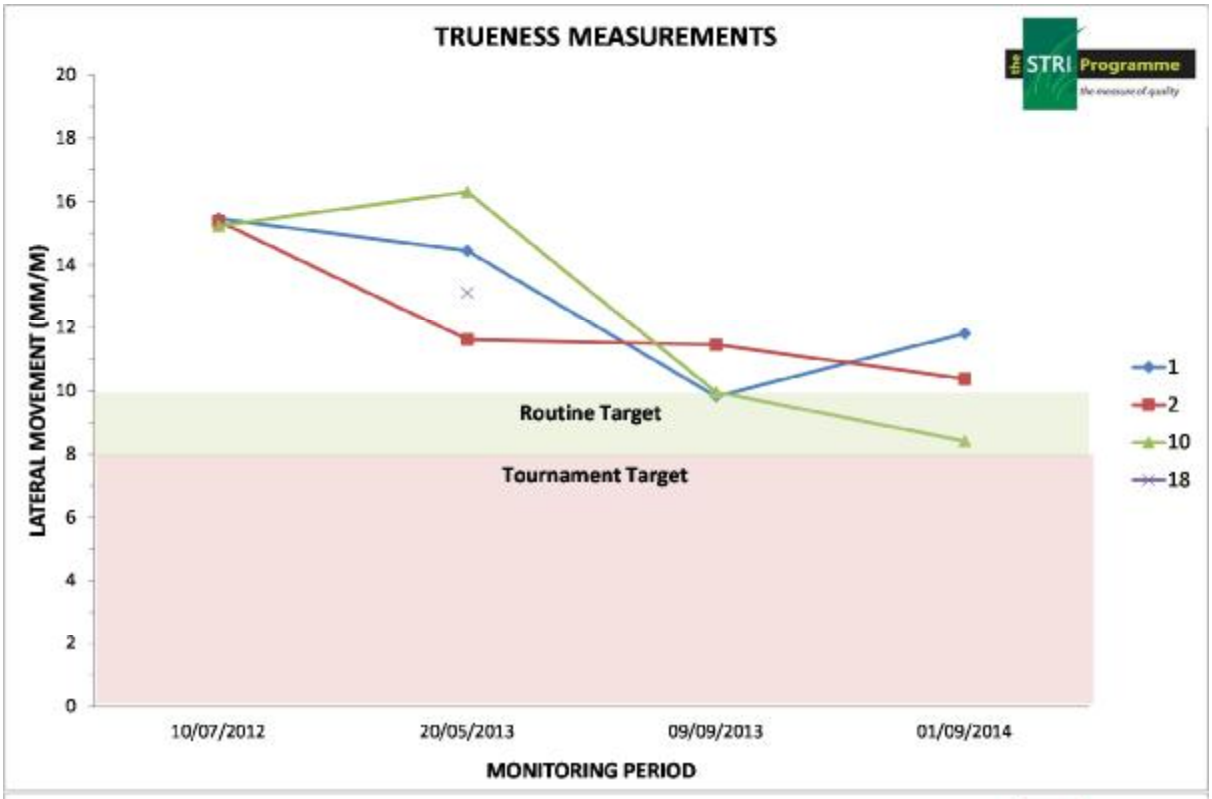
Performance Measurement Results							
Green No.	Speed (distance)	Smoothness (mm/m)	Trueness (mm/m)	Firmness Mean (gravities)	Firmness SEM (±)	Moisture Content (%)	Moisture Content SEM (±)
1	9 ft 11 in	26.0	11.8	97	2		
2	7 ft 10 in	25.5	10.4	85	1		
10	7 ft 9 in	23.9	8.4	92	2		

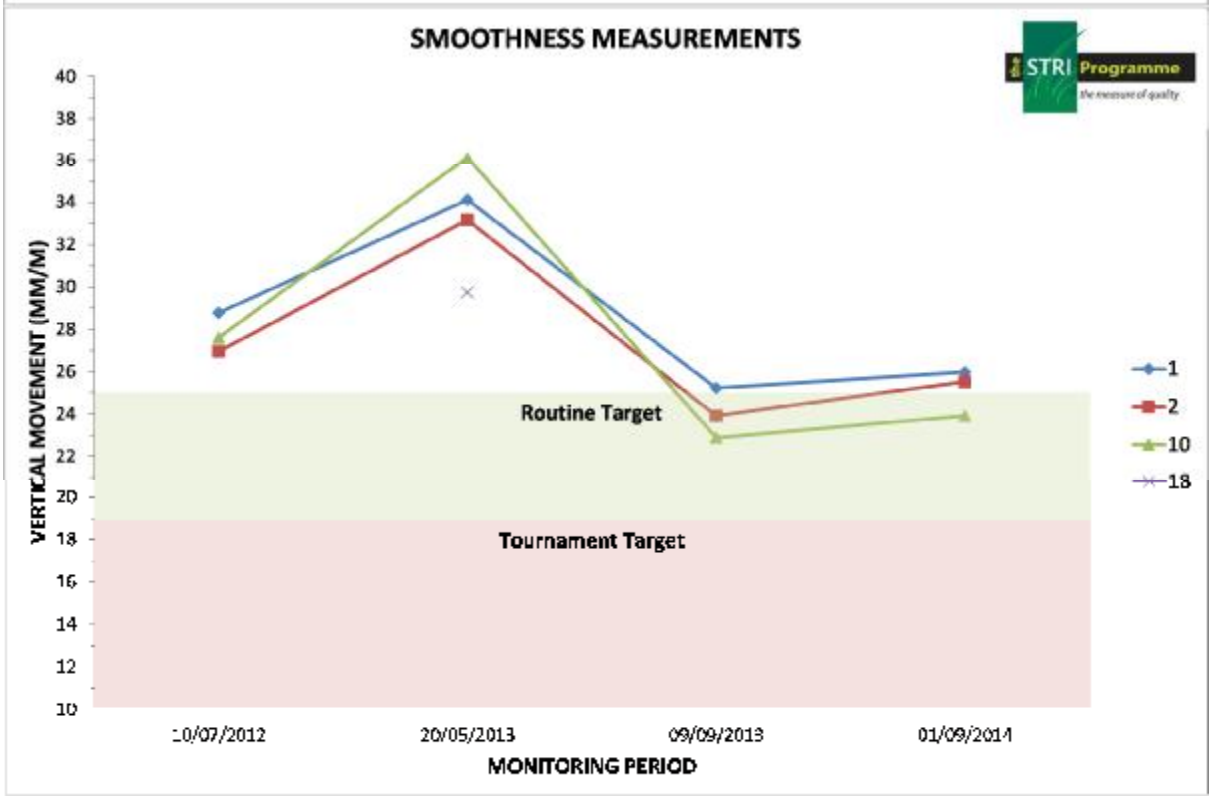
Surface Firmness/Hardness

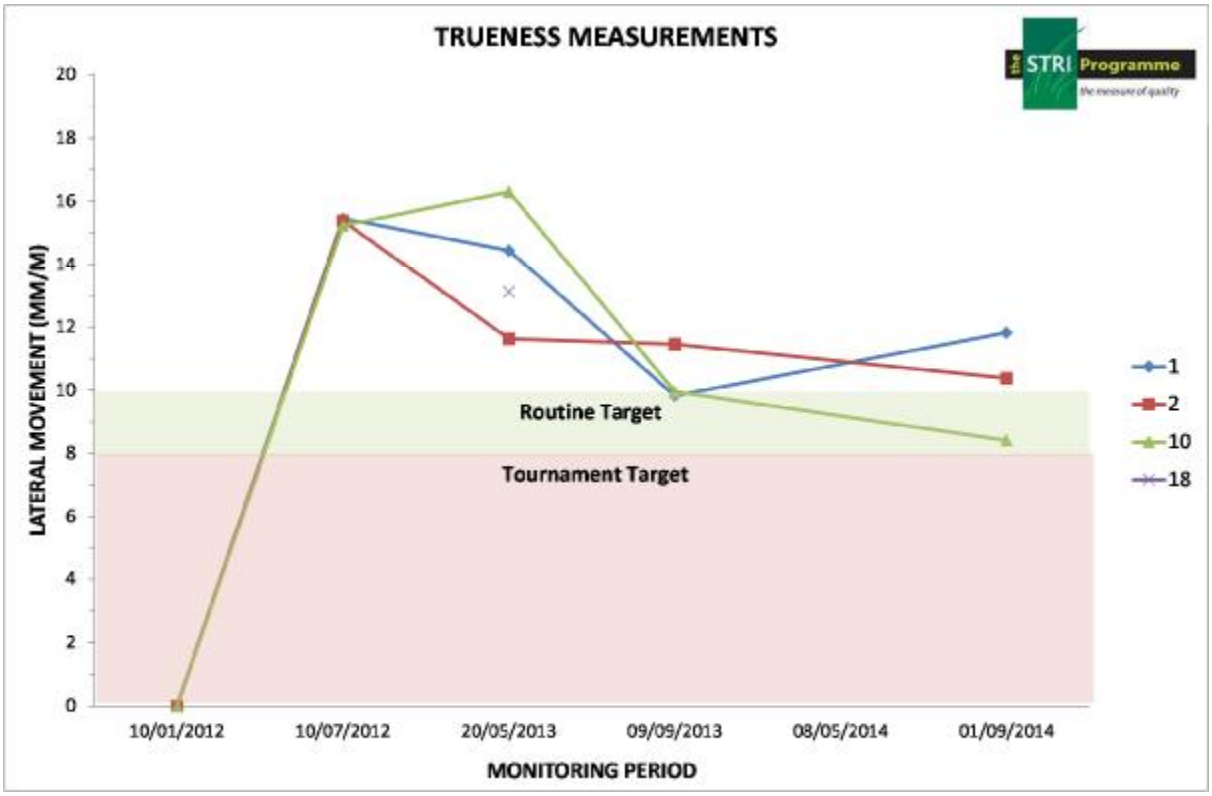


- The firmness was within routine target across the three indicator greens, albeit towards the lower end of the target and some variation from green to green was noted.
- With an average firmness of 85 gravities the 2nd green was just inside routine target range. This low lying and sheltered green was noticeably moisture retentive within the upper 40mm of the profile and was seen to have a visible black layer further down the profile.
- The hardest green was the 1st with an average of 96 gravities and the 10th at 91 gravities was also comfortably within the target for routine play.
- The 1st and 10th greens were also visibly drier than the 2nd and no evidence of black layer was noted on these greens.

Smoothness & Trueness

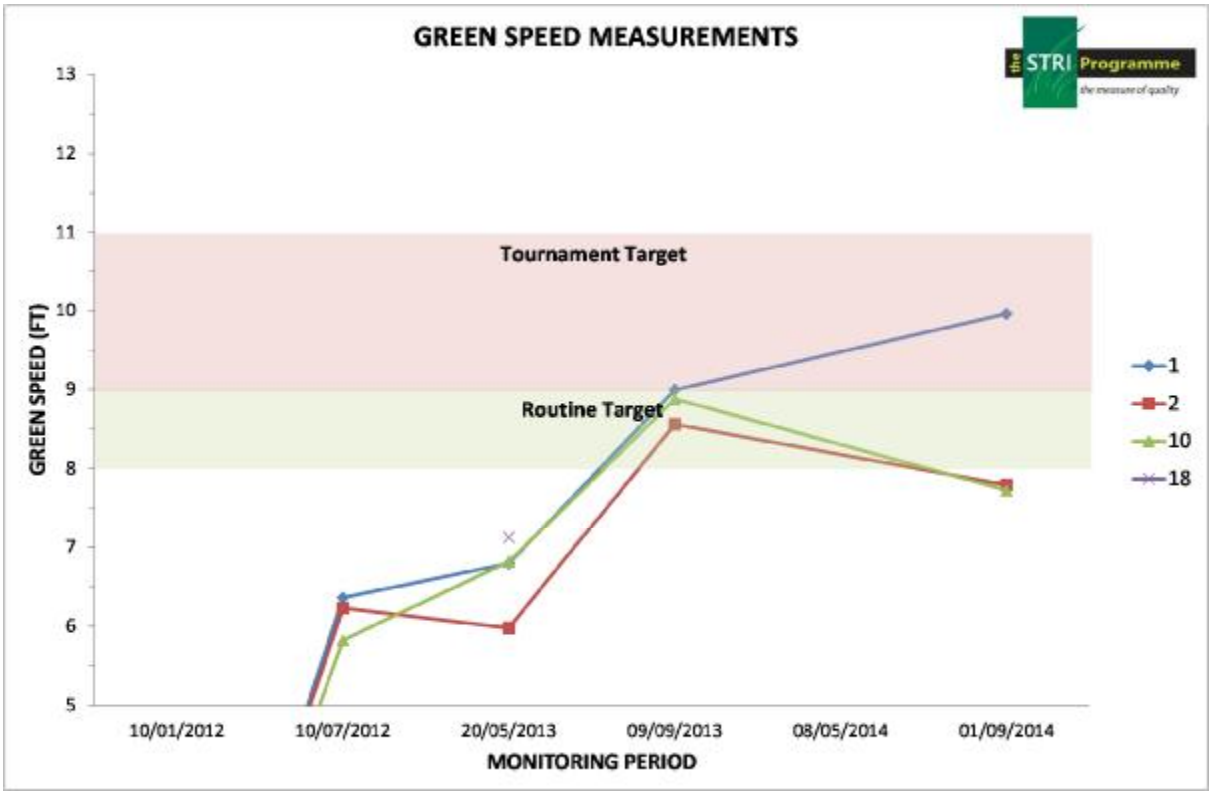






- The target range for routine smoothness is 19-25mm/m and with average readings of 25.5 mm/m and 26mm/m the 1st and 2nd greens fell just outside of this target. The 10th green, which is generally considered to be the best green had an average smoothness of 24mm/m and was just inside the target range.
- Similarly the trueness readings for greens 1 and 2 were outside the ideal target range of 8-10mm/m and green 10 was on target with an average trueness of 8.4mm/m.
- Recovery from the July hollow coring has been good, however the lack of routine top dressing following this process has resulted in readings for smoothness and trueness being higher than we would ideally like to see at this time of year.
- Heavy top dressing following hollow coring is essential in order to back fill the hole with a suitable sand, however it is necessary to follow up with repeat top dressings at a lighter rate in order to maintain a smooth and true surface as the sand will quickly settle and levels will become uneven.

Green Speed

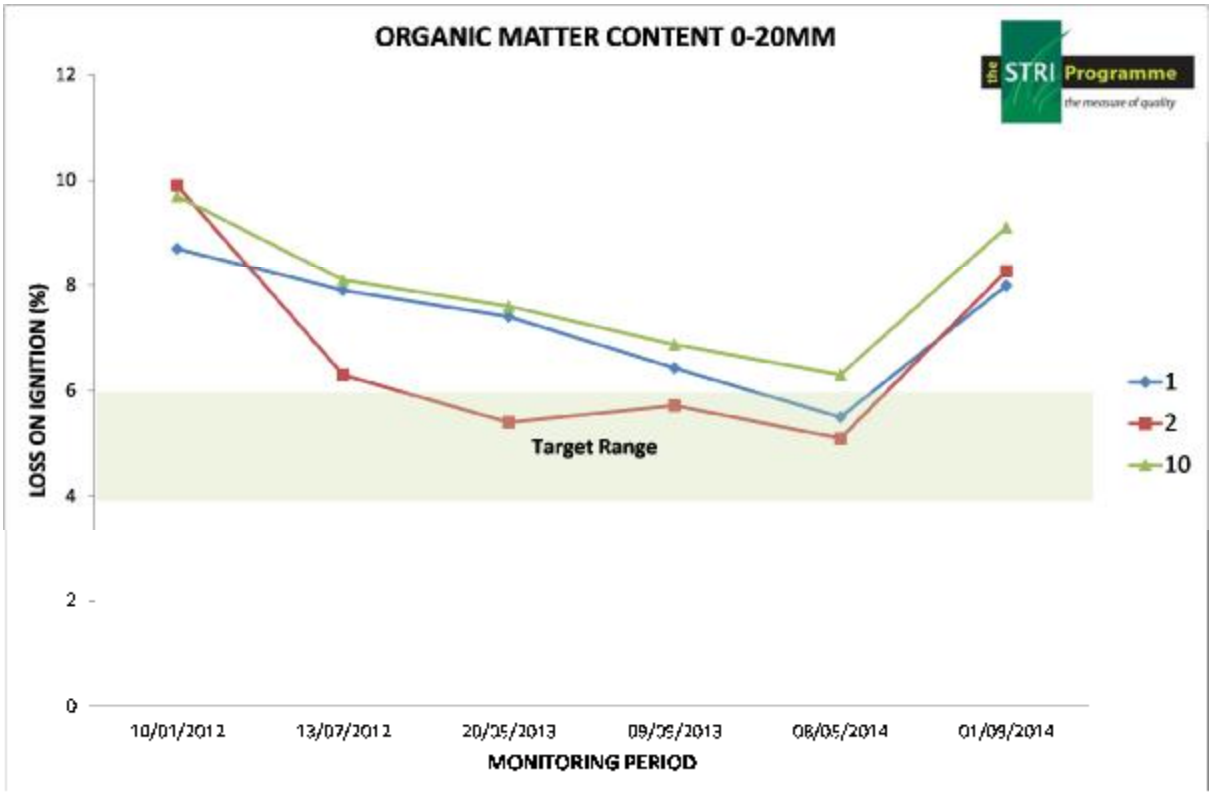


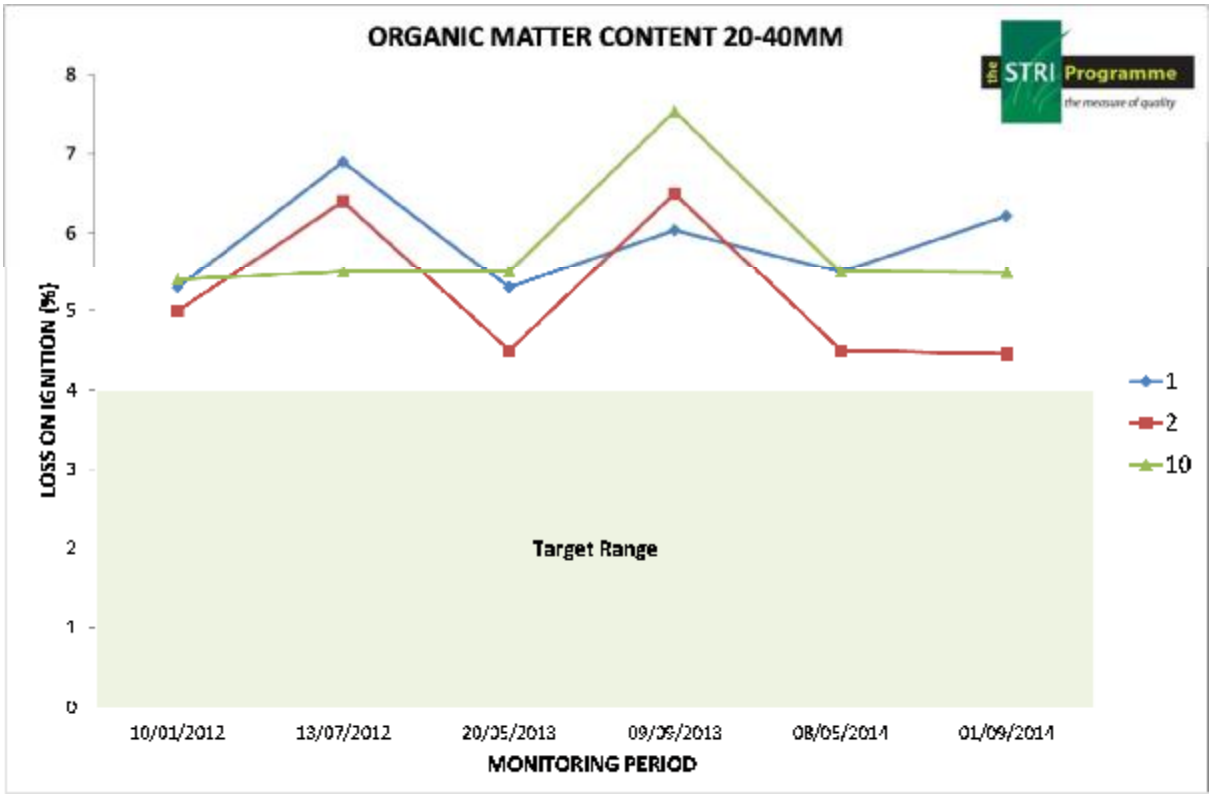
- Green speed on greens 2 and 10 was very consistent and just outside routine target at 7ft 8in and 7ft 7in respectively.
- At 9ft 9in the 1st green was significantly quicker and well within the tournament target range.
- A pronounced difference in green speed is likely to be problematic for players and should be regularly monitored with the use of a Stimpmeter in order to keep green speeds as consistent as possible from green to green.

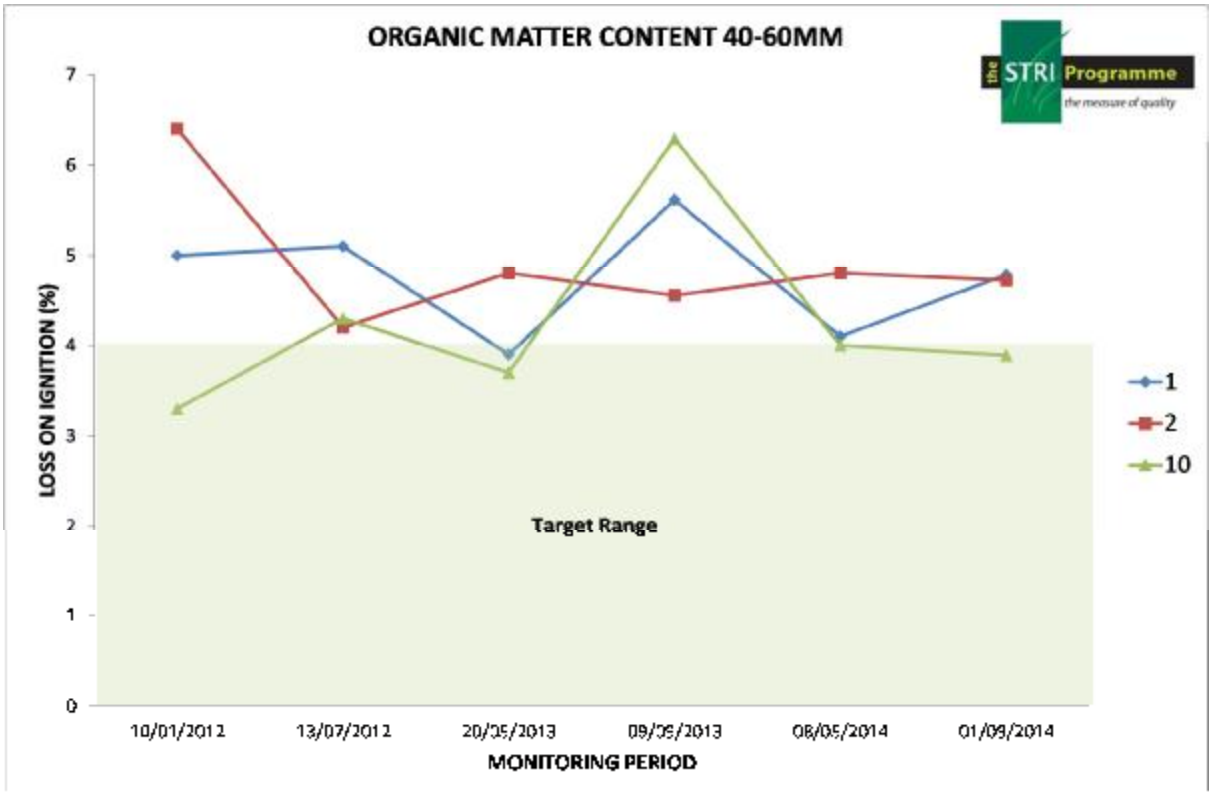
Organic Matter Content

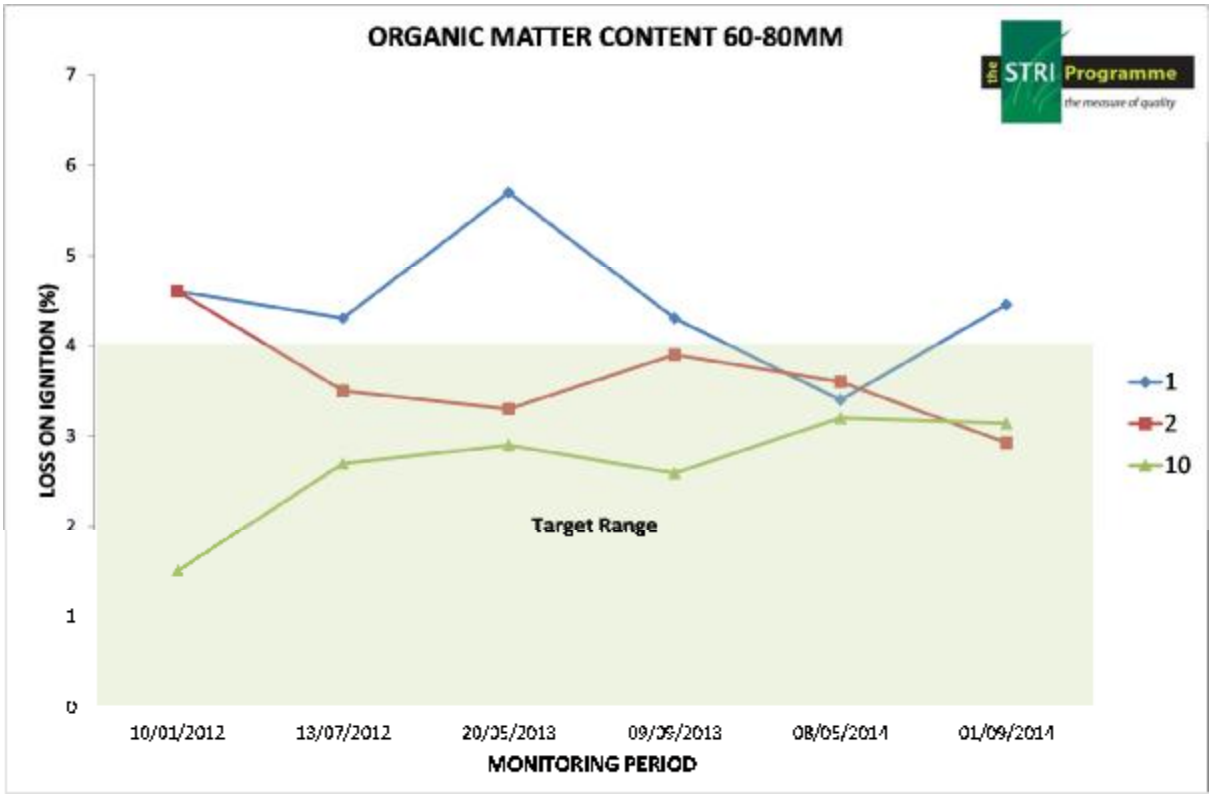
Samples were submitted to the laboratory for organic matter analysis at 20mm increments through the top 80mm of the soil profile. The results are shown in the table and graphs below along with interpretation where necessary.

Organic Matter Content			
Loss on Ignition (%)			
	Green 1	Green 2	Green 10
0-20 mm	8.0	8.3	9.1
20-40 mm	6.2	4.5	5.5
40-60 mm	4.8	4.7	3.9
60-80 mm	4.5	2.9	3.1


ORGANIC MATTER CONTENT 0-20MM
the STRI Programme
the measure of quality
LOSS ON IGNITION (%)
12
10
8
6
4
2
0
Target Range
1
2
10
10/01/2012
13/07/2012
20/05/2013
09/09/2013
08/05/2014
01/09/2014
MONITORING PERIOD


ORGANIC MATTER CONTENT 20-40MM
the STRI Programme
the measure of quality
LOSS ON IGNITION (%)
8
7
6
5
4
3
2
1
0
Target Range
1
2
10
10/01/2012
13/07/2012
20/05/2013
09/09/2013
08/05/2014
01/09/2014
MONITORING PERIOD





- Despite a very pro-active approach to organic matter control involving spring and autumn treatments with the Graden sand injection scarifier and a midseason hollow coring, we have seen a notable increase in organic matter from the spring samples, particularly within the upper 20mm of the soil profile.

- It is likely that the increase is due to a lack of sand top dressing through the season and perhaps excessive growth from high nutrient inputs and the very low soil pH.
- Recommendations would be to continue with the planned Graden treatment again in the autumn and we will take further samples for analysis again in the spring.
- It is extremely important that regular top dressing inputs are implemented as this, in conjunction with verti-cutting, will help to minimise a further build-up of organic material as well as diluting that which is already present in the upper profile.

Soil Chemical Analysis

Samples were submitted to the laboratory for routine chemical analysis of soil pH, plant available phosphate (P_2O_5) and potassium (K_2O) levels. The results of the testing are outlined in the table below.

Soil Chemical Analysis			
	pH	P_20_5 (mg/l)	K_2O (mg/l)
1	4.2	35	134
2	4.6	12	176
10	4.6	24	106

- No particular anomalies were noted with phosphorous and potassium levels indicating that the current fertiliser programme is suitable.
- The pH is showing a general trend towards acidity, with green 1 being particularly low. This should be carefully monitored over the next year paying attention to early season nutrient pick-up and organic matter breakdown. If fertiliser response is poor and organic matter reduction continues to be slow (despite an increase in top dressing and sustained cultivation) it may be necessary in the future to increase pH with some granular calcium carbonate applications. However, we do not make this recommendation casually and further monitoring is required over the next few months.

Key Recommendations

Greens

- More regular verticutting and top dressing would be required in order to produce more consistently smooth and true surfaces.
- More surface aeration is required and solid tining or slitting would be recommended to create more air fill porosity within the soil and alleviate the black layer noted, particularly in high traffic areas of the greens.
- A soil amendment containing activated charcoal such as Rigby Taylor Blockade may be useful to help ‘sweeten’ the soil and reduce black layer symptoms.
- Careful monitoring of fertiliser pick up and organic matter breakdown is required over the next 6-8 months to determine whether increasing soil pH is required.

- Tighter control and monitoring of nutrient inputs would be desirable to ensure accurate and not excessive nitrogen inputs are made. This will help provide a better balance with organic matter reduction in response to the maintenance programme implemented.

12th Green

- We should look to even up the cutting heights of the old and new sections of the 12th green. Raising the height of the cut for winter play in the upcoming months would be an ideal opportunity for this with a view to reducing the height of the old green for the start of the 2015 season.
- Hollow coring and some heavier top dressing of the new section will help to consolidate levels and improve the firmness of this surface bringing it in line with the rest of the greens.
- The microdochium patch should be treated with a suitable contact fungicide such as Instrata.
- Regular deep aeration and top dressing is required to the rear section of this green to help provide consistent water movement through the profile. If this surface deteriorates due to the layering, consideration of rootzone amendment may be required.

3rd Tee

- The newly turfed back tee on the 3rd requires hollow coring and top dressing in order to remove and dilute as much of the thatch layer from the turf as possible. This will help to achieve a more uniform soil profile.
- We discussed possible options for the forward tee on this hole in order to achieve adequate grass cover. The most effective way to improve turf quality would be to remove the overhanging tree as roots are leading to lack of available soil moisture for the turf and dripping and shade from the overhanging canopy is making re-establishment of grass cover very difficult.
- Another option would be to move the tee to the right, however this would bring the trees on the right hand side of the fairway very much into play and possibly require removal of some of these.

Bunkers

- The bunkers are in need of attention and it would be worthwhile to prioritise starting with the greenside bunkers.
- The bases have become very uneven following years of play and regular edging and these bases need to be re-levelled in order to have appropriate depths of sand and not lose the shape and characteristics of the bunkers.

Signed:

Ian W Craig BSc (Hons)

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The STRI Programme provides golf courses with measurements and data that help to monitor and assess golf course performance. The R&A has recently developed CourseTracker (www.coursetracker.org), a free, online business management tool for golf courses, to record, review and analyse golf club performance across many areas of your business, including the golf course. STRI believes The R&A CourseTracker combined with the STRI Programme provides the tools you need to objectively monitor and assess your golf course performance.