



Making great sport happen



MONTROSE GOLF LINKS

Revised Advisory Report on the Golf Course including the STRI Programme

Report Date: 19th September 2019
Consultant: Gary Smith



Montrose Golf Links

Date of Visit:	Thursday 15 th August 2019
Visit Objective:	To review the condition of the golf course, take objective performance measurements from the indicator greens and confirm ongoing maintenance requirements.
Present:	Mr Jason Boyd – Operations Manager, Mr Gary Smith – STRI Ltd Mr Darren McLaughlan – Head Greenkeeper Mr Les Rae – Deputy Head Greenkeeper
Weather:	Sunny intervals, Heavy Showers 14°C. 43mm rainfall 4 days pre-visit.

Headlines

- The golf courses are performing very well with positive feedback from members and visitors and both have shown incredible resilience and recovery from the heat and drought stress of 2018.
- Organic matter reduction in the greens has been a great success with an average 2.5% average reduction at 0-20mm horizons in the tested greens, in what have been very challenging weather conditions. Further reduction and increased dilution are necessary.
- Soil moisture content and surface firmness were out of target at the time of testing, wholly predictable and expected with the very recent rainfall.
- Smoothness and trueness are in target, showing very good results with all greens achieving an acceptable pace in poor conditions pre-visit.
- Superficial fairy ring had expressed but was under controlled management.
- Spring conditions this year were typically are remaining unfavourable for stimulating recovery so early in the season (often cold and dry). The application of surfactants and a robust nutritional input has made a huge contribution to the overall excellent condition of the greens.
- Localised but significant areas of fairways and some approaches are still in recovery. Time and patient management will be needed to fully restore those surfaces going forward whilst the reparations and natural recovery process unfolds.
- Rough grassland management is ongoing and proving very valuable in its successes throughout both courses.
- Traffic management is an increasing issue and deleterious wear is visible due to a lack of travel path options for both players and the maintenance team.
- Gorse management requires a review, as does the consideration of introducing more natural sand-scrape areas on the links.

Key Actions

- Organic matter reduction is still a priority, the target of 120 t/ha of sand top-dressing to further dilute the organic matter in a little and often approach is encouraged going forward into 2020.
- Greens sward refinement is advanced, keep the intensity to an optimum on all fine turf areas.
- Inter-seeding to further improve the sward composition of the greens and fairways is required.
- Consider applying Surfactants (wetting agents) to all fairways to help control moisture content.
- Consider the application of Acelapryn for Leatherjacket control in the Autumn.
- An on-site single purpose Vredo compact style seeding machine is a much-needed tool at Montrose Golf Links.
- A managed approach to Gorse removal/thinning and increasing areas of sand scrape will benefit the Golf Club and assessments are being undertaken.



Objective Measurements

Measurement	Average	Target Range
Soil Moisture (%)	36% (range 29-45)	15-30%
Hardness (Gravities)	74 Gravities (range 65-91)	85-110 g
Smoothness (mm/m)	22.5 mm/m	<25 mm/m
Trueness (mm/m)	7.1 mm/m	<10 mm/m
Green Speed	8 ft 8 in	8.5-10 ft
Organic Matter 0-20 mm (%)	6.2%	4-6%
Organic Matter 20-40 mm (%)	5.1%	<4%
Soil pH	6.0	5.0-6.0
Phosphate (P ₂ O ₅)	17 mg/l	>10 (mg/l)
Potassium (K ₂ O)	59.5 mg/l	>30 mg/l

Key: In Target Marginal Variance Out of Target

Photo Observations and Comments



Figure 1: The courses are presented to the highest achievable level, with an attention to detail evident throughout.



Figure 2: The greens surfaces and surrounds are showing an excellent and continued improvement in sward consistency.



Figure 3: The greens display surface of great refinement but some disfiguring *Poa annua* is still visible.



Figure 4: Organic Matter dilution and removal is evident throughout the profile, with further work still required.



Figure 5: Most natural pathways are in very good condition, but some are showing pressures of heavy traffic.



Figure 6: Most Tees are in a good state, although several are showing signs of very heavy wear from both play and maintenance machinery.

Photo Observations and Comments (continued)



Figure 7: Challenging conditions in 2019 have not allowed the Fairways to return the expected condition at Montrose Golf Links.



Figure 8: Increased Inter-seeding will be required on sections of Fairway and approach to return Montrose to its pre 2018 weather condition.



Figure 9: Rough grassland management where practiced is proving very valuable to the club, both aesthetically and ecologically and should be increased to more sections of the courses.



Figure 10: Gorse management is under a review and needs some immediate attention in some areas of the course.

Recommendations

Greens

- The accumulation of organic matter in the top 40mm of the soil profiles has seen a very positive reduction but remains just above or on the cusp of average target. A sand top-dressing input target for 2019/2020 of 120 tonnes/ha can be achieved over the next 12 months to see a further decrease in organic matter levels. Continue to make applications in a little and often approach @3-5 tonnes per hectare, more especially over the off-season months. There has been no recorded increase of Pathogenic activity (disease expression) with this style of application.
- Autumnal renovations should combine physical removal of the organic matter via scarifying the surfaces combined with top-dressing to further dilute the accumulation of Organic Material and an inter-seeding operation to accelerate recovery.
- Follow up the scarifying with a Hollow-tine to the greens with an 8-10mm diameter tine down to 40mm depth at 35mm spacing to further physically remove material from the soil profile and apply top-dressing to fill the aeration holes.
- Inter-seeding using a vredo style machine with a suitable Browntop bent will provide an acceleration in surface recovery and as agreed at the time of visit should be repeated as necessary throughout the coming season with the addition of Fescue on a 2:1 ratio, this strategy will give Montrose both the quality and hardness of fine-turf surfaces required on the Links.
- Aeration is carried out regularly. I would suggest an increase of sorrel rolling to be practiced on all greens, at least monthly, likewise the deeper Air2G2 should be considered for use up to four times per annum and the length of tines varied to accommodate mid (100mm-150mm) and deep (225mm-300mm) aeration. on the visits.
- Nutritional inputs currently at 40kg N per annum should continue through the winter after discussion with myself to ensure that turf vigour remains, and a strong sward is maintained coming into the spring.
- The use of Fulvic acid was discussed and is encouraged at (5-10l/ha) in the off-season, October through until March. This addition will prove valuable to the greens condition going forward. Fulvic acid enhances cell division and elongation. Root growth is magnified with obvious benefits, it also increases the plants oxygen uptake capacity with an associated increase in chlorophyll production an increase in the permeability of plant membranes improving the uptake of all nutrients.
- Bi-monthly applications of wetting agent through the off-season and continued in early spring and through the playing season monthly will decrease the risk of the rootzones becoming hydrophobic and thus also have an influence on Fairy Ring (Basidiomycete) control.
- Apply Acelepryn insecticide at 0.6l/ha in the Autumn to control any signs of an increasing leatherjacket population. We had a recent update training session with Syngenta. The main points for review was that timing and art of application are paramount for greater success.
 - Apply when there is the very first sign of leatherjacket activity on the wing (regionally or on site).
 - Mow prior to application
 - Apply at 0.6 L/h in 600 L/water using Syngenta XC 08 nozzles or suitable equivalent air injection soil nozzles.
 - Apply with a wetting agent.
 - Irrigate immediately using 3-6mm water (applying irrigation in the evening or night is too late).



Green Collars, Surrounds and Approaches

- All surrounds and approach sections should receive the same maintenance as the green surface area, aeration with a larger 12mm diameter tine the exception in the autumn. This strategy will improve the overall playability of the Golf Courses and ensure a much greater consistent golfing experience year-round.
- Sward separation is apparent on a number of these sections and considerable planning, such as traffic management to reduce the invasion of unwanted coarser grasses and these localised pressures and stresses is needed.
- Traffic management is of paramount importance and using whatever means you can to alleviate traffic pressure will only aid the sward composition and appearance of these challenging sections. Controlling machinery pressure when turning, golf carts and foot traffic should be directed in different directions and to different areas. Architectural changes may be the answer to improve a pernicious problem.

Fairways

- Solid tine or verti-drain all areas that have lost grass cover due to the hydrophobic conditions of the soil to aid moisture penetration.
- Apply a penetrant wetting agent to vulnerable areas to reduce the hydrophobicity of the soil and accelerate recovery.
- It is advisable to carry-out a full inter-seeding of the affected fairways with a fescue seed mixture of the course managers choice.

Pathways & Traffic Wear

- This is part of the overall traffic management. Montrose Links is a golf course with little totally flat expanse to channel traffic and it is not easy to swiftly change things to suit. A strategy of renewing pathways, opening greater access in walk in/off areas would benefit the course. By introducing these wider approaches, with the addition of crossing points via managed rough and wildlife corridor. It will without doubt improve the golfing experience at Montrose Golf Links.

Signed

A handwritten signature in black ink, appearing to read 'Gary Smith', written in a cursive style.

Gary Smith, MBPR, FQA

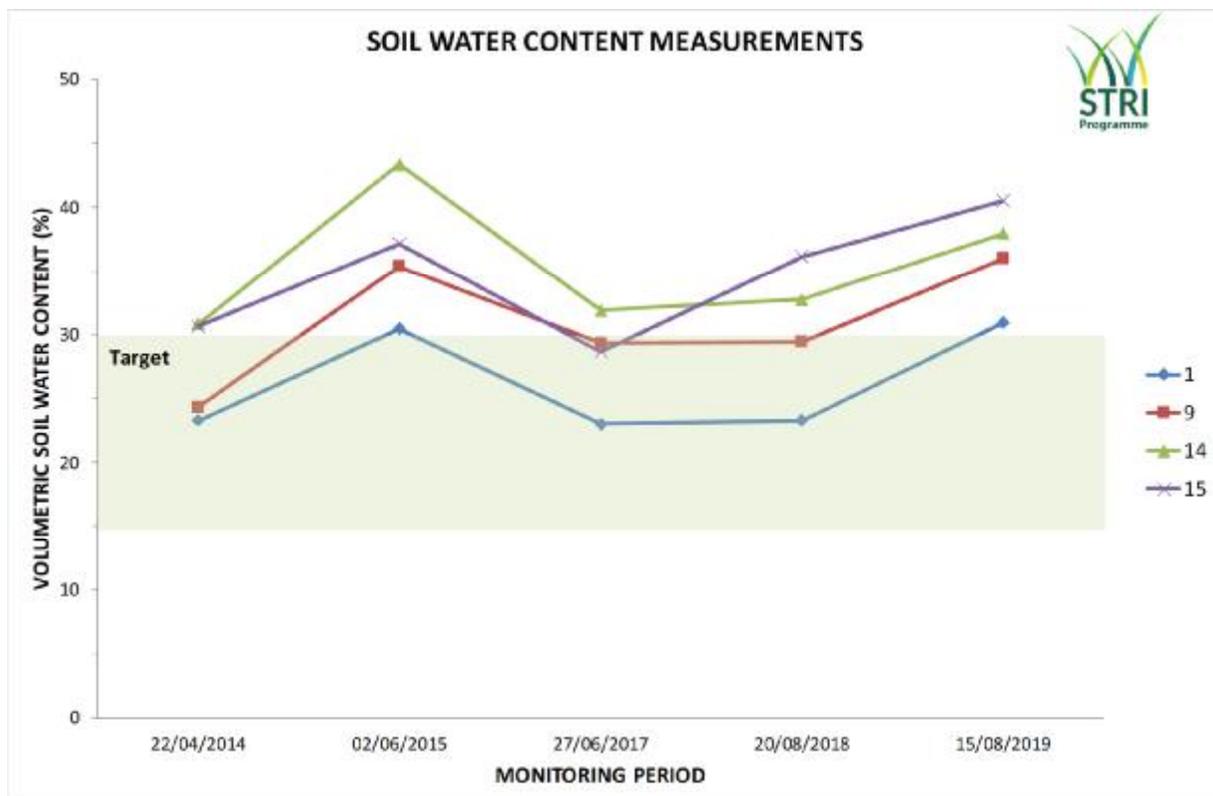
Agronomic Consultant

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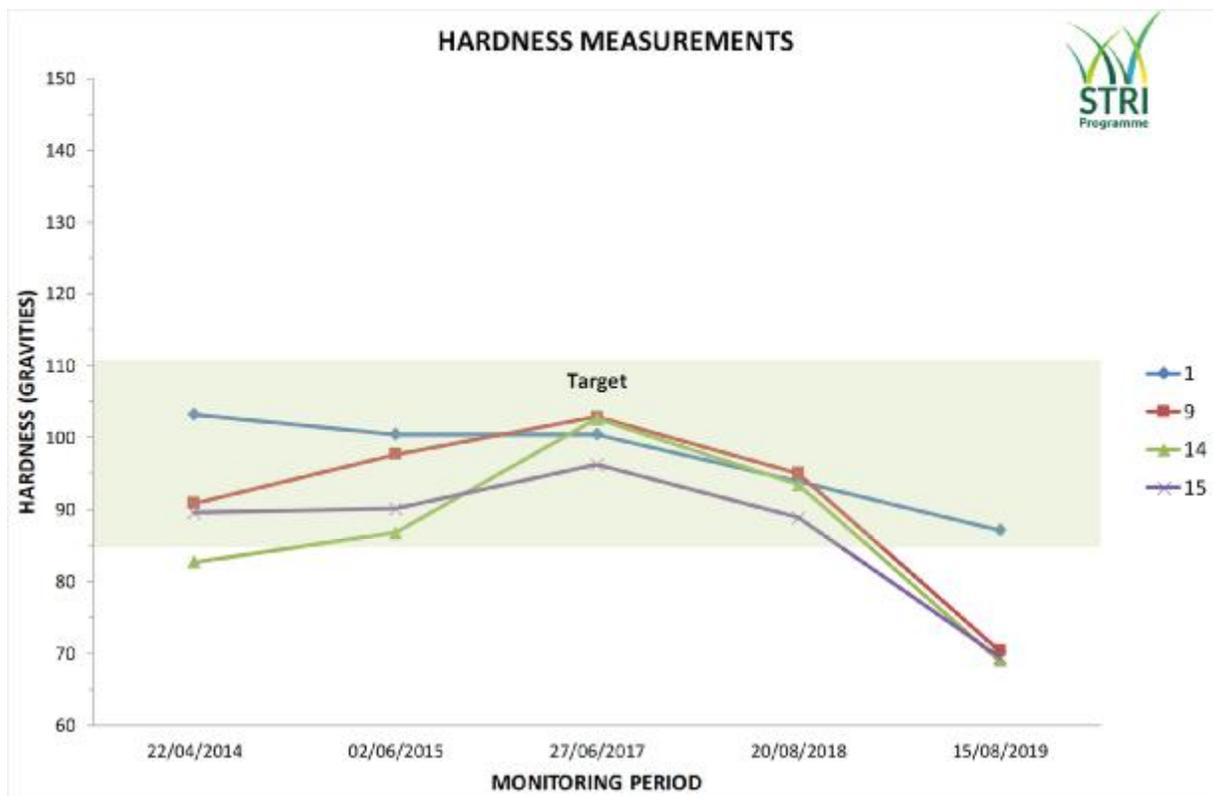
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Objective Data

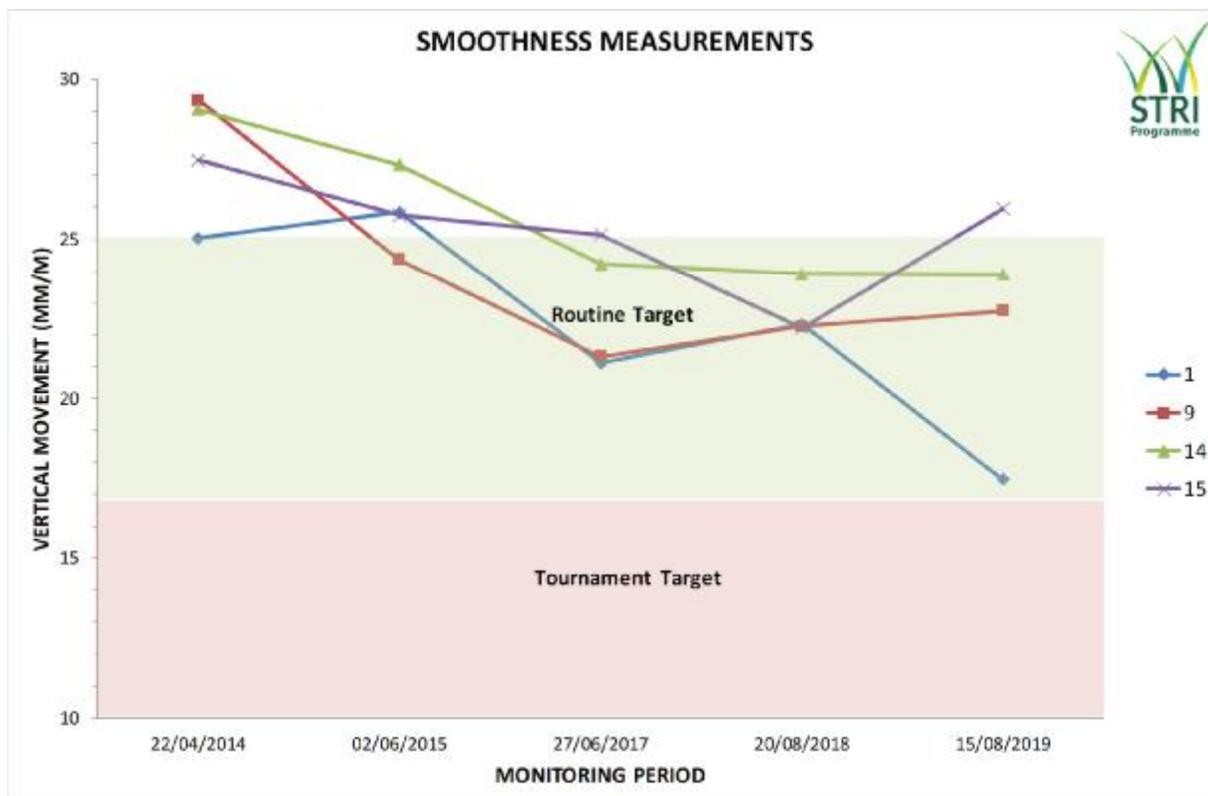


Objective Data Graph 1: The moisture contents in the greens were all out of target apart. This highlights the volume of rainfall in the previous days and this season in total.

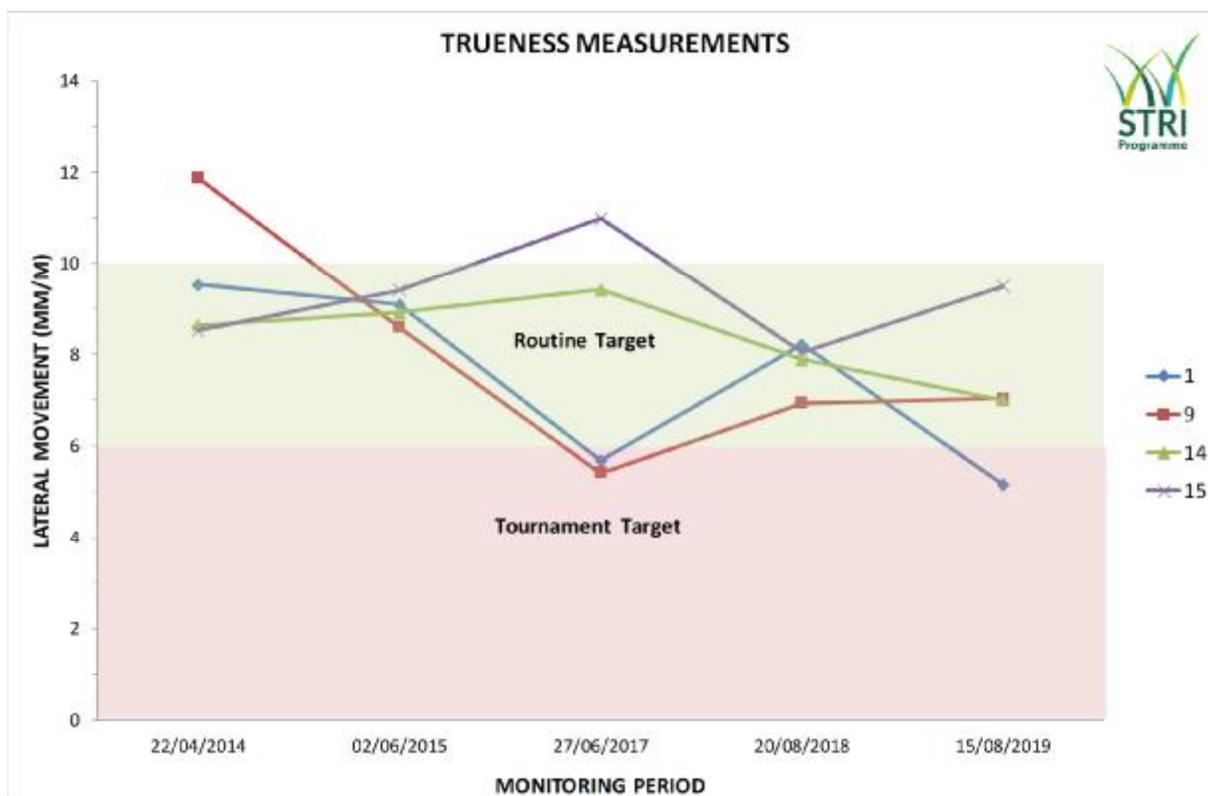


Objective Data Graph 2: The firmness measurements were all out of target at an average of 74 Gravities, highlighting the softening of the surface following rainfall and the need for some further Organic Matter removal/dilution.

Objective Data (continued)



Objective Data Graph 3: The Smoothness performance was good, with all the tested greens recording smoothness measurements in or just on the cusp of target for routine play at an average 22.5mm/m, with the difference between top and bottom reflecting a direct correlation between the Organic Matter and moisture contents and how it influences all results.



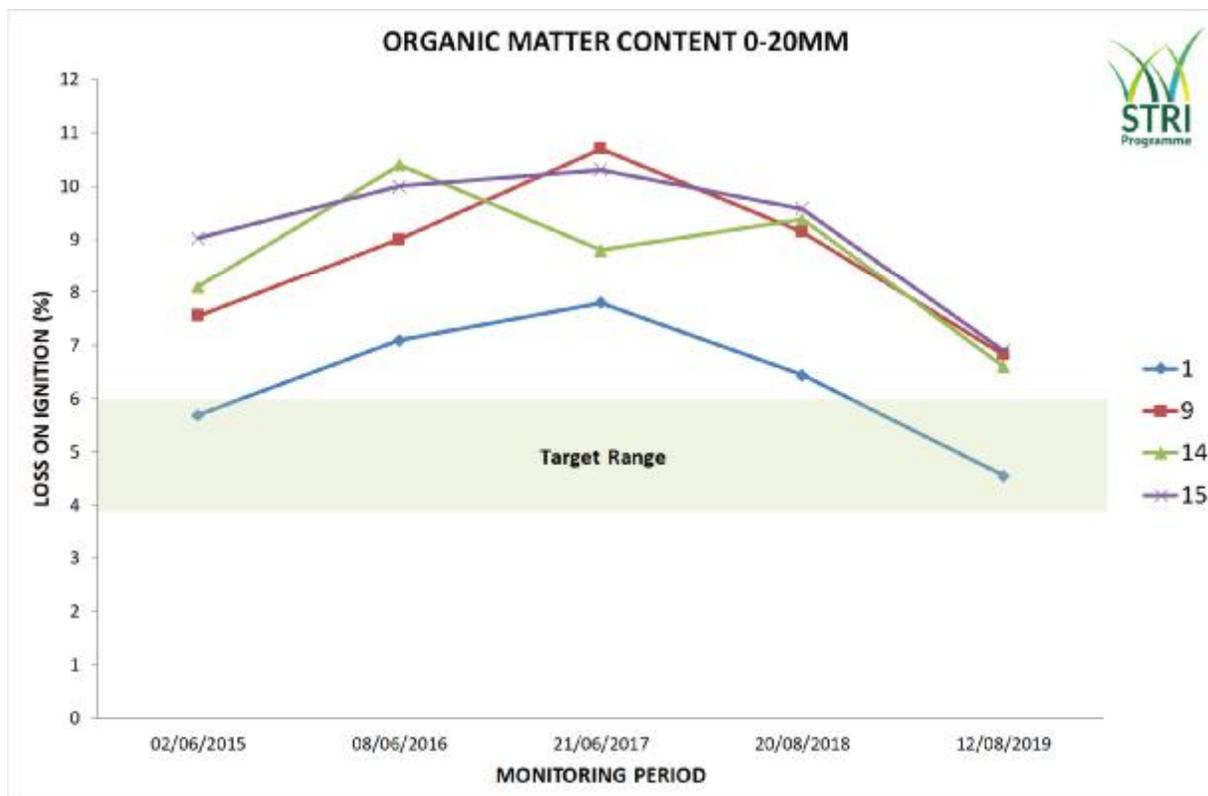
Objective Data Graph 4: The trueness measurements at an average of 7.1mm/m were in target.

Objective Data (continued)

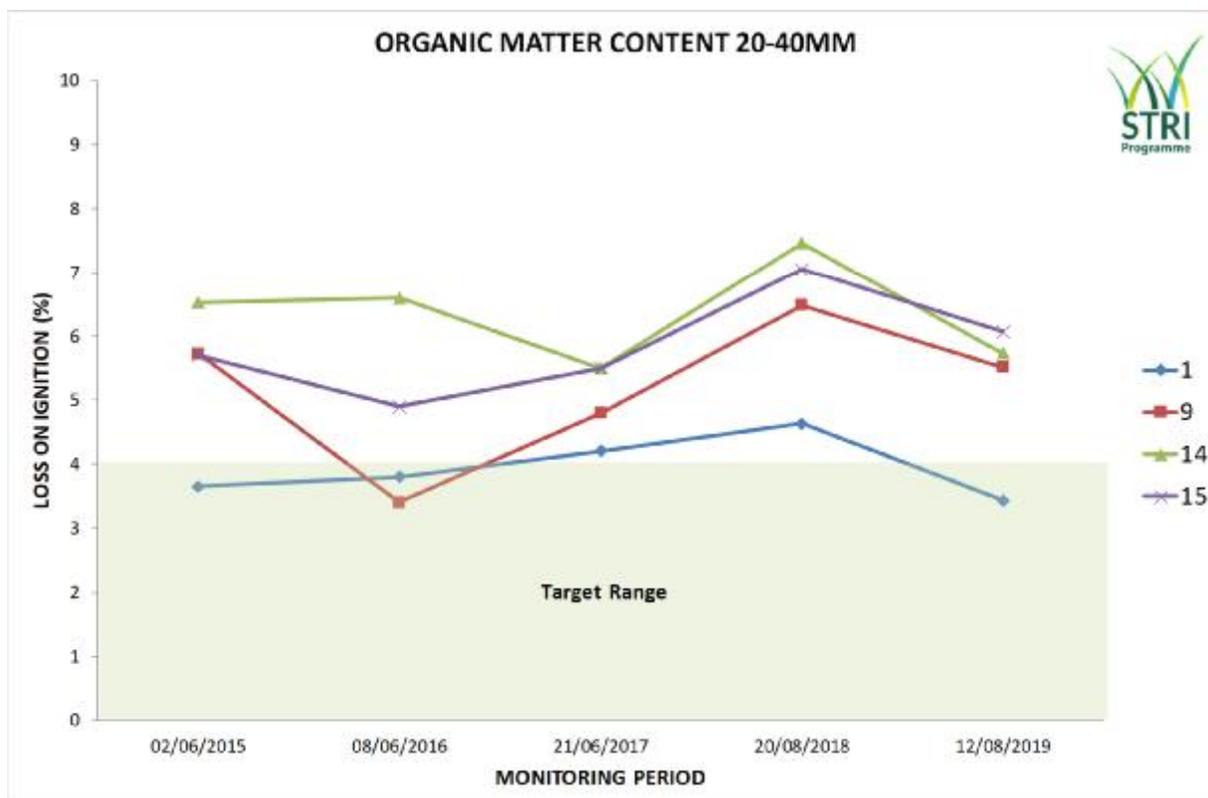


Objective Data Graph 5: The green speeds were in target, (except 15th) for routine play. Organic Matter and higher moisture had an impact on this result at time of testing.

Soils Laboratory Data

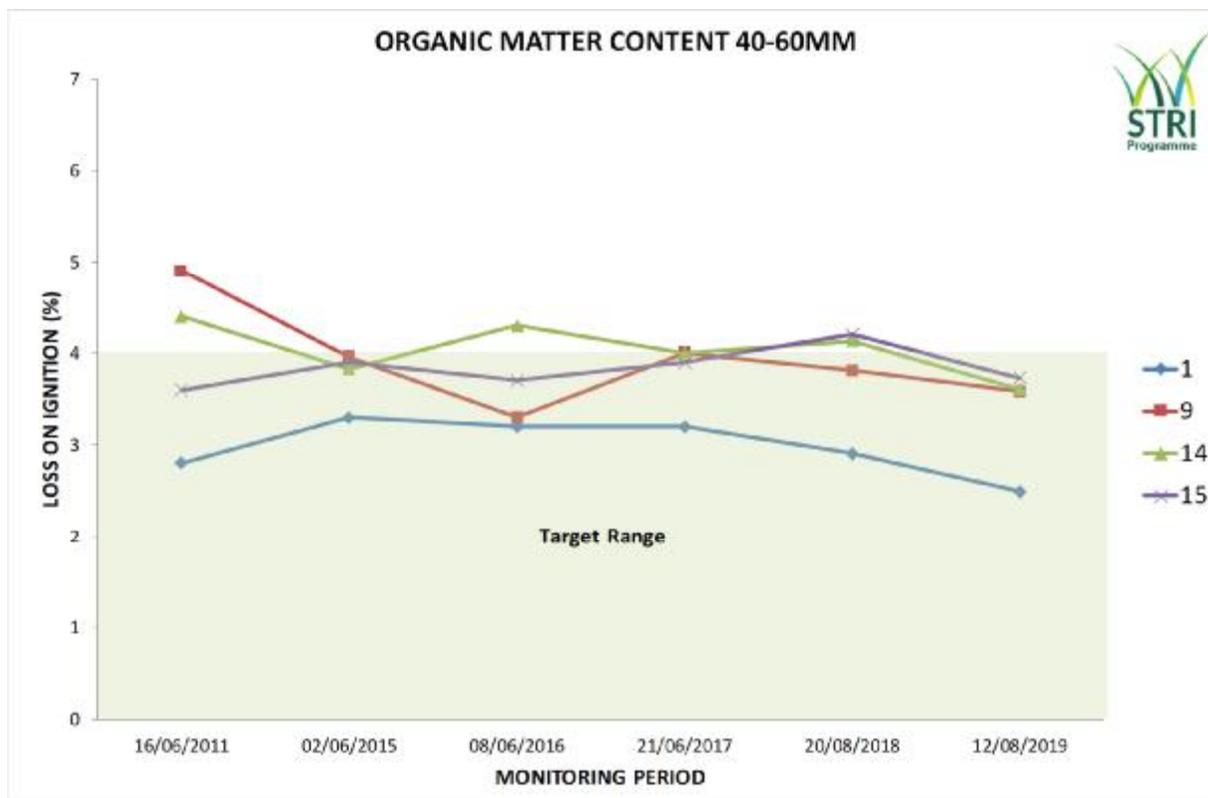


Soils Laboratory Graph 1: At an average of 6.2%, the organic matter accumulation at 0-20mm remains on the cusp of target. A further reduction has been achieved through increasing the top-dressing applications.

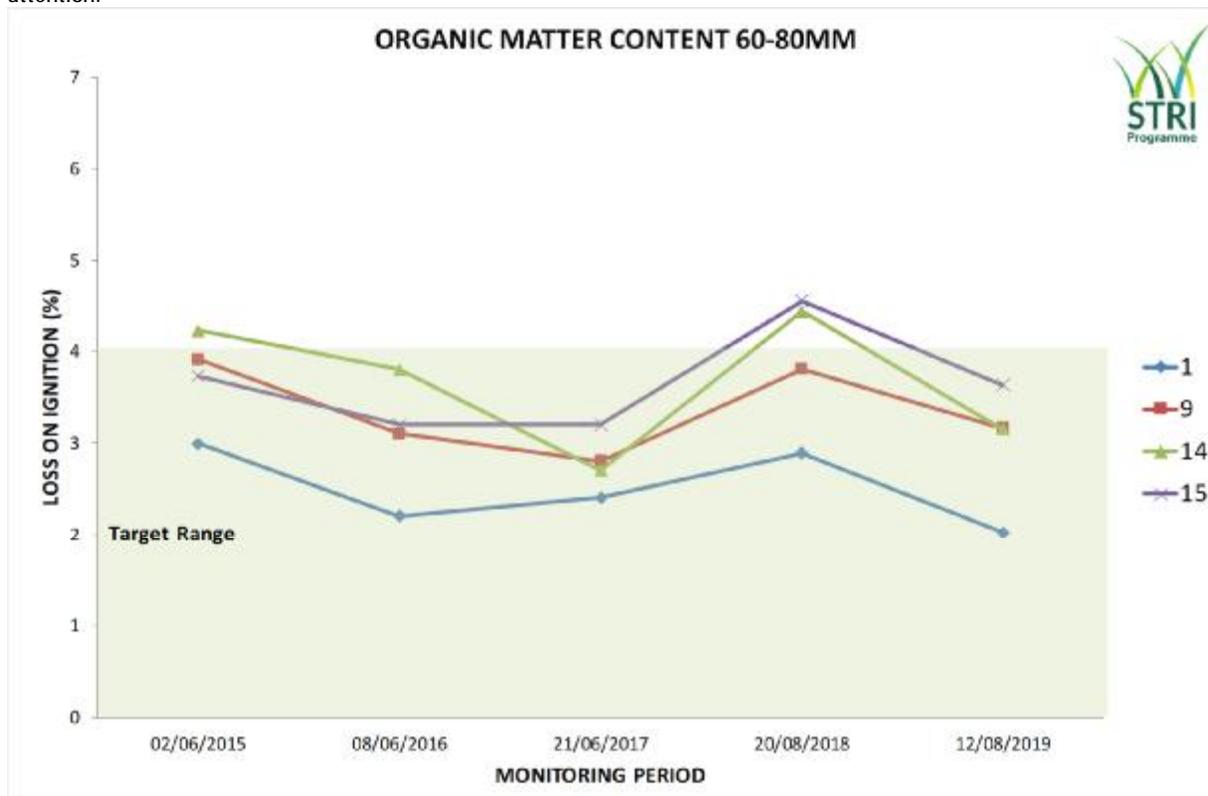


Soils Laboratory Graph 2: The organic matter content at 20-40mm remains higher than the ideal at 5.1% supporting the recommendation carry out further remedial works.

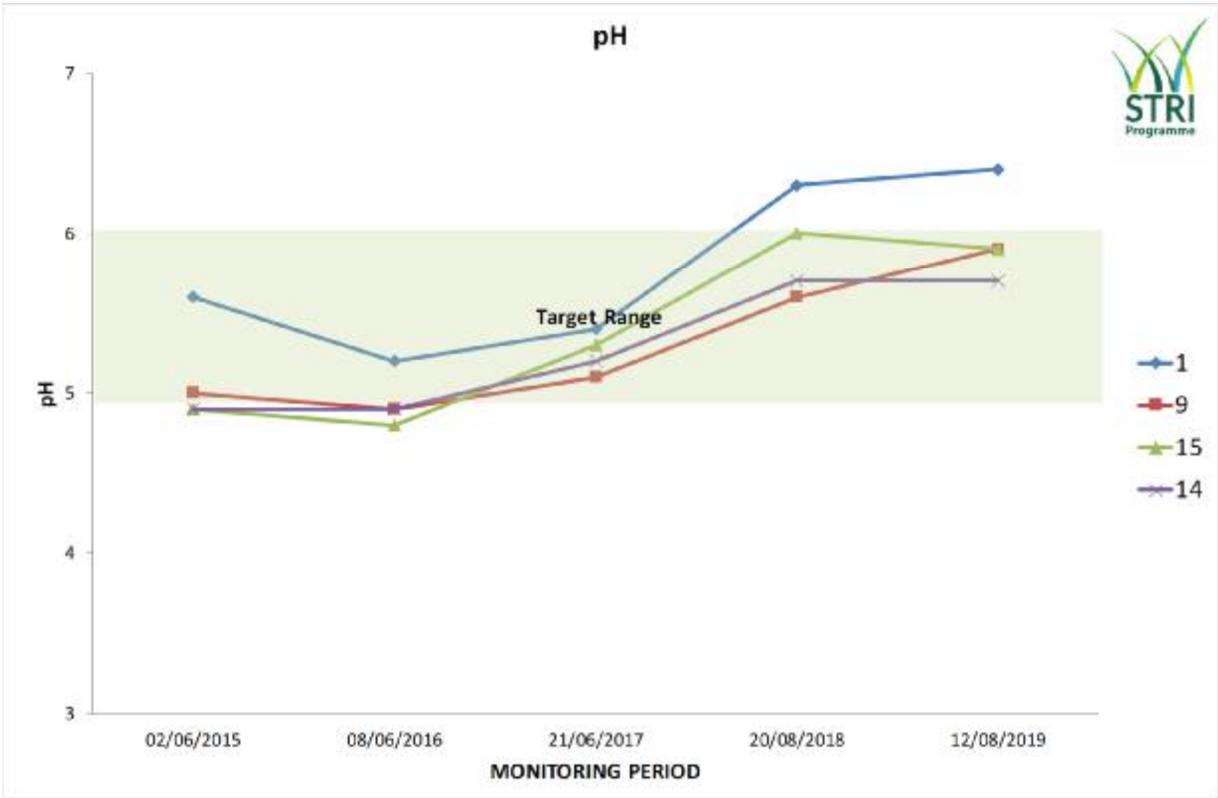
Soils Laboratory Data (continued)



Soils Laboratory Graph 3: The organic matter content below 40-80mm is in target and does not require any specific remedial attention.



Soils Laboratory Graph 4:



Laboratory Graph 5: pH is in target as is Potassium and Phosphate levels and requires no remedial action.