



Making great sport happen



MONTROSE GOLF LINKS

Revised Advisory Report on the Golf Course incorporating the STRI Programme

Report Date: 24th July 2020

Consultant: Gary Smith



Montrose Golf Links

Date of Visit:	25 th June 2020
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 Darren McLaughlan – Head Greenkeeper, Mr Gary Smith – STRI Ltd
Weather:	Partly cloudy. 18°C. Rainfall @14mm 7 days & @40mm 24 days pre-visit.

Headlines

The continued challenges faced by the maintenance team at Montrose Golf Links, during this period of global pandemic and lockdown are apparent in the maintenance restrictions imposed upon the Club. The maintenance team have not had the luxury of planning and working within their normal early season programme, which has been massively interrupted.

Only congratulatory comment can be made to the maintenance team at Montrose Golf Links. The course conditions produced during these most challenging (low maintenance input) times, in most areas contradict the limitations of the current restrictions and will no doubt underpin more improvements in the seasons ahead as time and patient turf management allows.

- Montrose Golf Links course is performing well albeit with a few notable pressure points. Remedial works are in place to further improve the already high aesthetic standards and plant health benchmarks expected at this renowned golfing environment.
- The off-season improvement works carried out on damaged sections of fairways and surrounds have proven a success in the health of the golf course grasses and the highest of presentation standards.
- Organic Matter levels throughout the green profiles are well managed and are all within, or on the cusp of targets set. Interruption of the spring maintenance will have decreased the possibility of further dilution and microbial degradation of Organic matter normally witnessed in this period.
- Basidiomycete Fungi (Superficial Fairy Ring) has expressed on several fine turf surfaces and was under controlled management at the time of STIR. No additional remedial action was necessary.
- Average moisture levels are in target and display the results expected in a regularly aerated and top-dressed root zone profile.
- Smoothness was in target and an exceptional result in defiance of the recent limited maintenance inputs.
- Trueness was in target in all but the 14th green, this anomaly was without doubt influenced by some *Poa annua* seed head florescence in the grass plant sward.
- Irrigation strategies to control the quality and regularity of irrigation cycles are under investigation. The resultant irrigation plan will minimise the build-up of bicarbonates in the rootzone.

Key Actions

- Continue with the top-dressing regime this season to achieve the necessary final reductions in Organic Matter volume. Introduce increased amounts onto the surrounds and approaches, if possible?
- Continue with the sward refinement strategy and increase intensity as manpower restrictions allow.
- Continue with the current Surfactant applications and look to expand to all sections of the golf course.
- Promote the use of Mycorrhizal Fungi on greens to increase the absorptive area acting as extensions to the root system.
- Consideration of the Hydroject or Air2 G2 aeration systems is encouraged to open and increase the pore space in the mid-lower horizons of the greens rootzone.
- The purchase of an over seeding machine is imperative to continue the sward quality improvements and reach the botanical aspirations as well as aesthetic expectations of Montrose Golf Links.

Objective Measurements

Measurement	Average	Target Range
Soil Moisture (%)	17.4% (range10-20%)	15-30%
Hardness (Gravities)	98 Gravities (range91-105g)	85-110 g
Smoothness (mm/m)	22.5mm/m	<25 mm/m
Trueness (mm/m)	8.6mm/m	<10 mm/m
Green Speed	7ft 8in	8.5-10 ft
Organic Matter 0-20 mm (%)	5.7%	4-6%
Organic Matter 20-40 mm (%)	5.5%	<4%
Soil pH	6.4	5.5-6.5
Phosphate (P ₂ O ₅)	12 mg/l	>10 (mg/l)
Potassium (K ₂ O)	63 mg/l	>30 mg/l

Key: In Target Marginal Variance Out of Target

Photo Observations and Comments



Figure 1: Montrose Golf Links is presented to the highest standards current manpower levels allow.



Figure 2: The attention to detail and excellent links presentation is evident in all areas of the golf course.



Figure 3: The greens swards and surrounds are in rude health and continue to improve in both sward density and botanical composition.



Figure 4: Hugely successful top-dressing applications and Organic matter dilution are visible in the rootzone profile. Encouraging excellent root growth and an open structured rootzone material.



Figure 5: Continued maintenance works and irrigation influences are under controlled management to mitigate any potential negative impact in particle distribution or bicarbonate forming horizons.



Figure 6: Basidiomycete Fungi are expressing on the greens but under control with the current Surfactant (wetting agent) applications.

Photo Observations and Comments (continued)



Figure 7 & 8: Recently repaired sections of the golf course have shown an excellent recovery and are a credit to the maintenance team at the links.

Recommendations

Greens

- Top dressing inputs should be targeted at a minimum 120 tonnes per hectare on the Greens in a little and often approach throughout the calendar year. This approach will help stabilise and will further assist in dilution of the organic matter whilst improving the percolation rates of applied irrigation and falling rainwater.
- Renovation works carried out this off-season period should include; solid tine the greens with an 8-10mm diameter tine at 35mm spacings to a depth of 80mm. Apply a sand top-dressing to ensure that the holes are filled to the surface level through drag matting or a sweep-n- fill style brush if available.
- Follow this operation with a pass of a scarifying unit to remove organic material in the immediate 5-15mm surface of the green profiles (subject to weather conditions) and replace with sand. This is an ideal opportunity to incorporate an inter-seeding with a Browntop bent/Fescue seed mix. Repeat this operation in the spring as both operations in tandem with inter-seeding will accelerate the recovery process.
- Aeration is carried out regularly and it is evident, sorrel rolling on all greens should be implemented at twice monthly intervals throughout the year to maintain the quality witnessed on the greens surface area, likewise the deeper solid tine aeration, verti-drain type operation using an 12mm solid tine at least once annually should assist in deeper and more efficient percolation through the rootzone.
- The use of the Hydroject system should be adopted if these very dry weather patterns persist, likewise the Air2G2 would provide excellent aeration results year-round in view that the tine depth is varied on each application. A minimum 4-6 Air2G2 usages per annum would be advisable.
- Continued use of a Turf Iron on a disciplined as-necessary approach, already adopted at Montrose Golf Links will help increase the overall pace of the greens at pressured times of the year. Overuse will no doubt put seedlings under undue pressure, so a controlled regime must be practiced throughout the year.
- The current wetting agent (Pro wet evolve), nutritional and bio-stimulant inputs are ideal and should be continued with the addition of monthly seaweed applications. Continue these applications in the off-season months to facilitate healthy and robust grass plant swards on all fine-turf areas of the golf course.
- Considered use of Primo Maxx (trinexapac-ethyl) or a similar Plant Growth Regulator Attraxor (Prohexadione) on greens throughout the growing season will positively influence sward texture and surface consistency.
- The use of Molasses and the addition of Symbio Bio tabs will improve and encourage stimulus in root zone microbial activity which will ultimately help to increase the release of organic nutritional elements and assist in the microbial breakdown of thatch and improve percolation rates.

- The use of Fulvic acid (5-10l per hectare) in the off-season will prove valuable to the greens overall. More especially at springtime where greens are showing signs of performing better earlier in the playing season. Fulvic acid enhances cell division and elongation. Root growth is magnified with obvious benefits (so long as moisture and soil structure are appropriately managed) it also increases the plants oxygen uptake capacity with an associated increase in chlorophyll production and the permeability of plant membranes which improves the uptake of all nutrients.
- The greens should be inoculated with Mycorrhizal fungi. Mycorrhizal Associations/Mycorrhizal fungi form a mutualistic symbiosis with fine grass plants causing the fungal hyphae to extend the root systems and allow the roots to contact a greater volume of the rootzone and increase the solubilization of nutrients such as phosphorus and increase the intrinsic water use efficiency.

Green Collars, Surrounds and Approaches

- All fine turf, in play areas, immediately adjacent to the green should continue to receive the exact maintenance regime as the green surface area.

Irrigation Cycles

- To avoid high levels of sodium and bicarbonates building up in the rootzone which will lead to reduced infiltration rates, decreased gas exchange and poor turf quality, remedial flushing/flooding of the rootzones with the irrigation system will be required. Requested longer gaps between current irrigation cycles but heavier volume applications of water will allow deeper penetration and percolation of the irrigation water and thus negate the potential for salts to form a barrier at the current maximum and regular horizon depth reached when rootzones are irrigated.

Machinery

- The use of the disc seeder throughout the off season has proven invaluable to the maintenance teams' aspirations in sward improvement and demonstrated even further the need for a single use overseeding machine on site at all times throughout the year. I cannot emphasise enough the value of such a piece of equipment to the overall aspirational improvements and continued regular maintenance these improvements will require and advise that Montrose Golf Links consider adding through purchase, a Vredo super compact disc seeder or its near equivalent to the maintenance teams fleet of equipment.

Signed

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

Gary Smith, MBPR, FQA

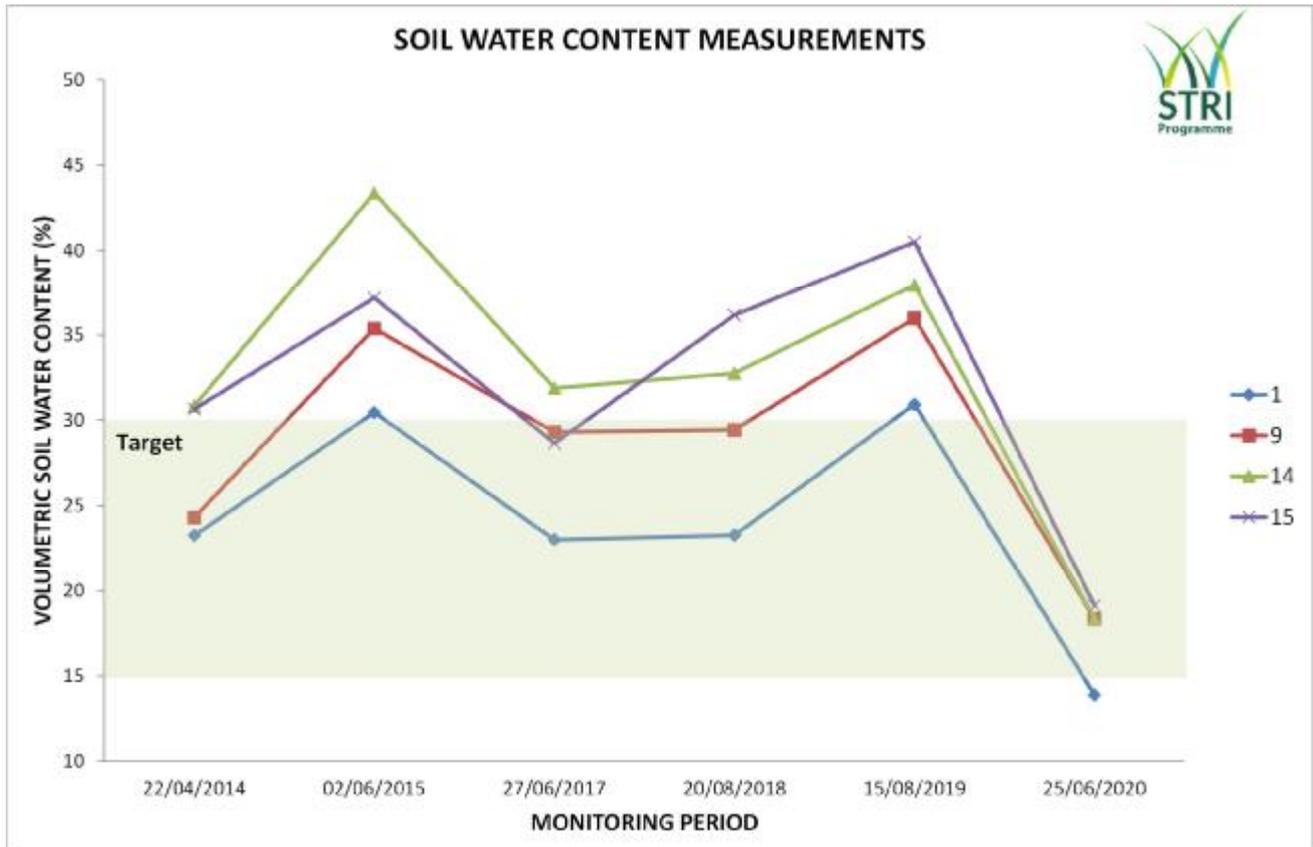
Agronomic Consultant

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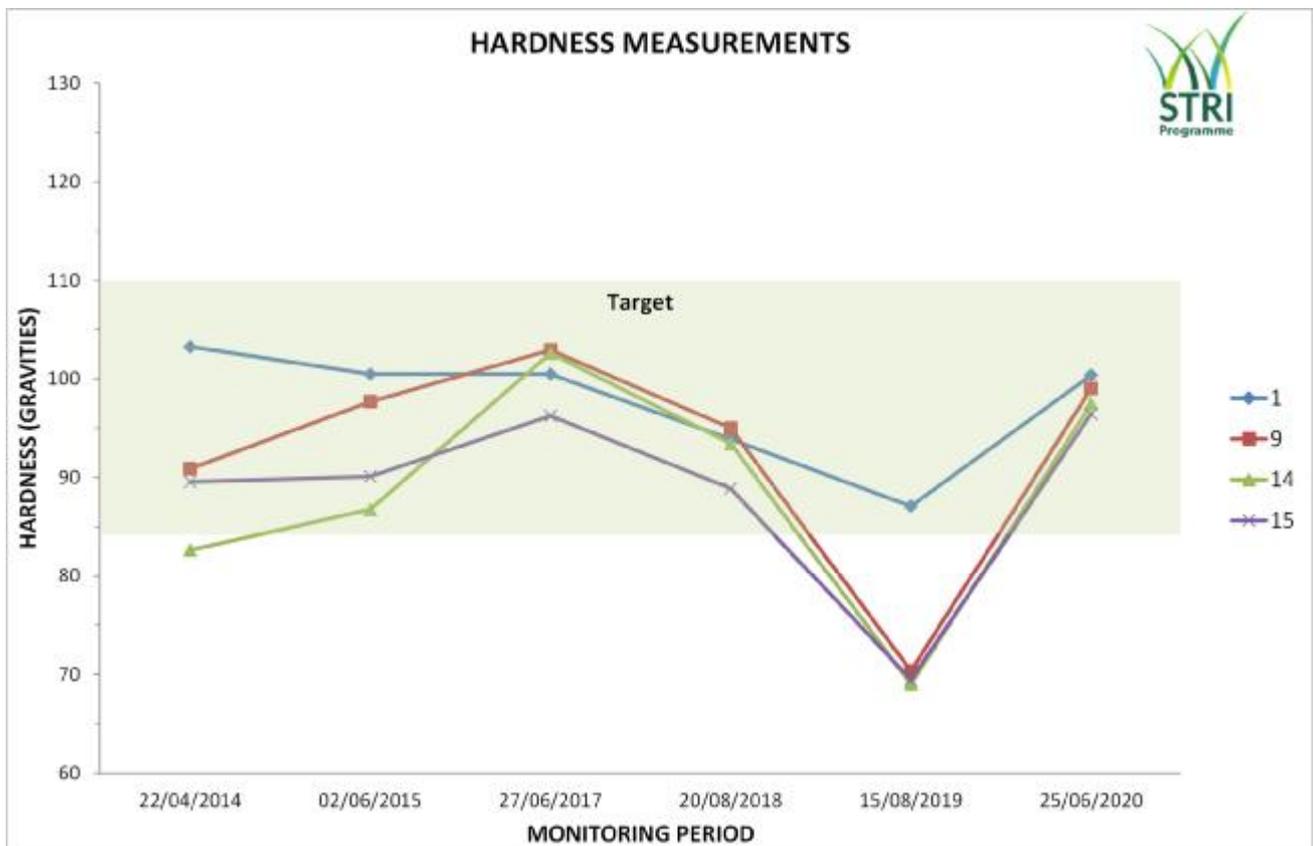
t. +44 (0)1274 565131

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Objective Data

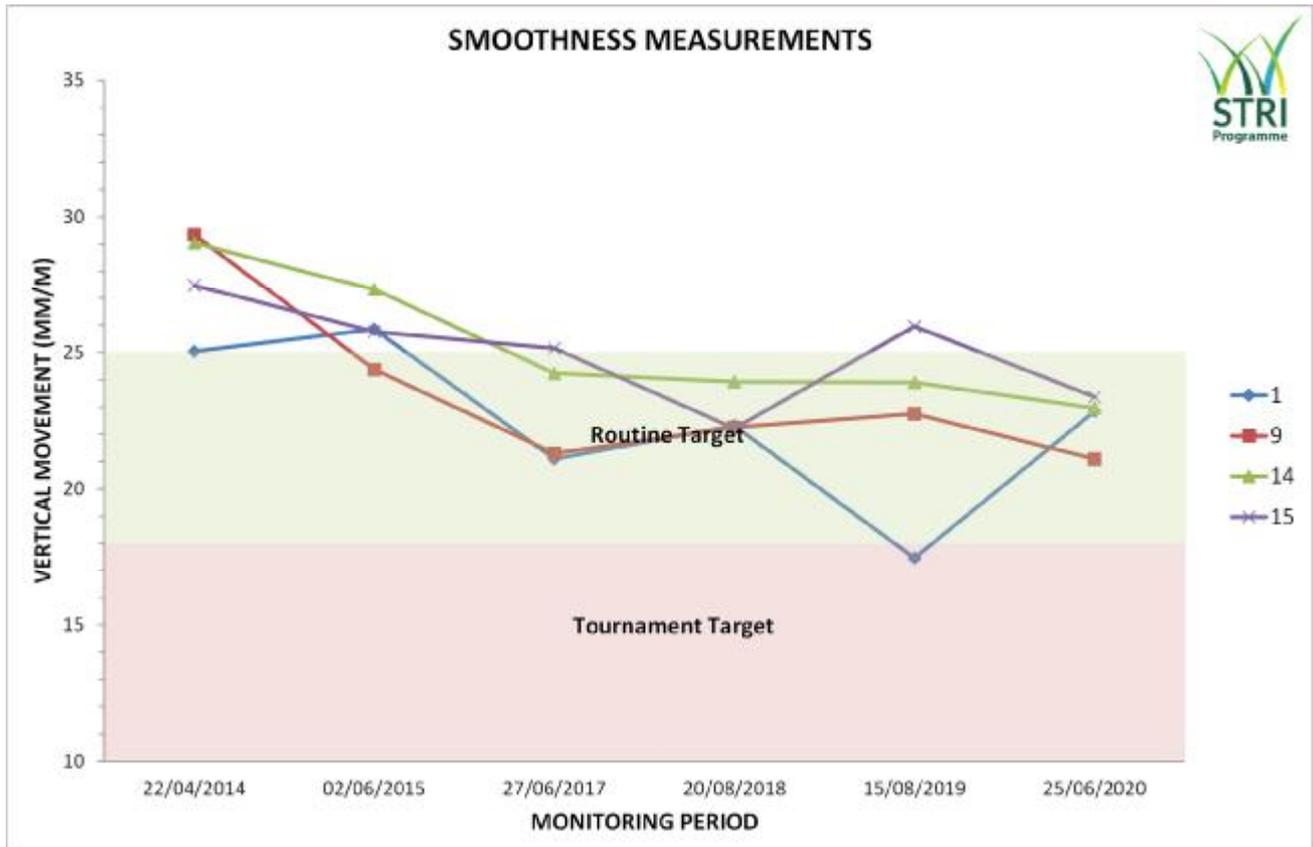


Objective Data Graph 1: Moisture content was within or just below target and showed an excellent consistency throughout the golf course.

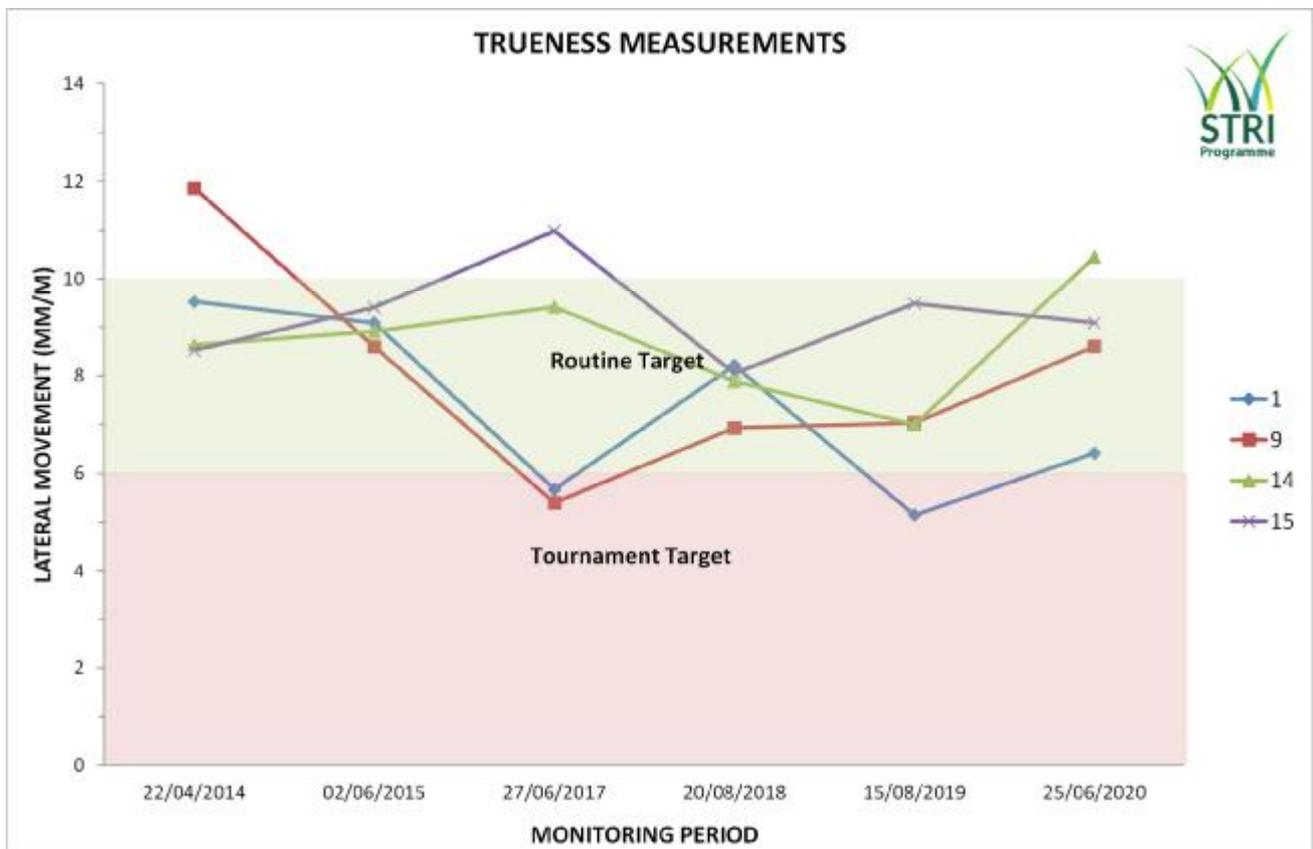


Objective Data Graph 2: Firmness was also within target and again show an impressive level of consistency from green to green.

Objective Data (continued)



Objective Data Graph 3: The results achieved on both Smoothness and Trueness are excellent even more so when recent limitations on maintenance are factored in. Outstanding achievement!



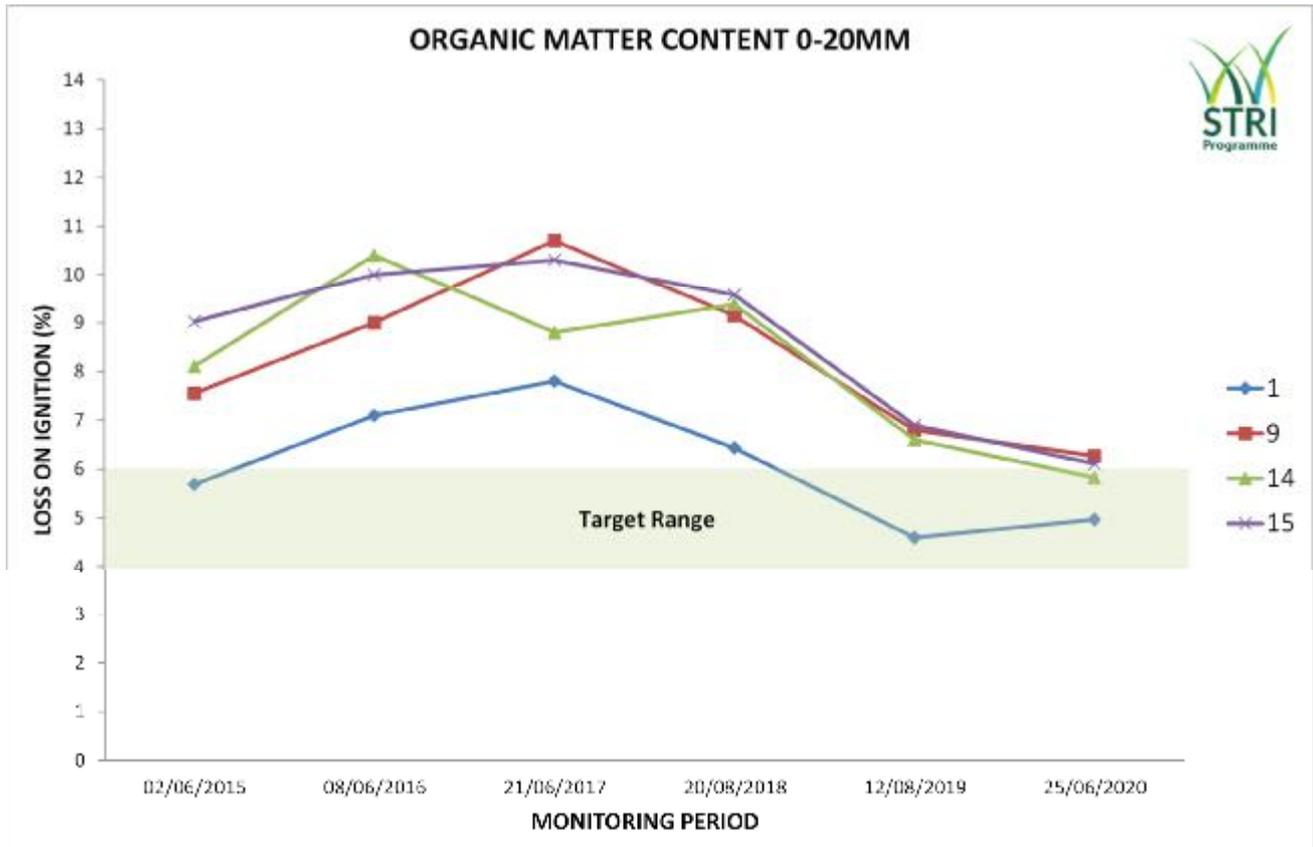
Objective Data Graph 4: The influence of Poa Annua seeding is the main contributory factor in the variability in this very good set of results.

Objective Data (continued)

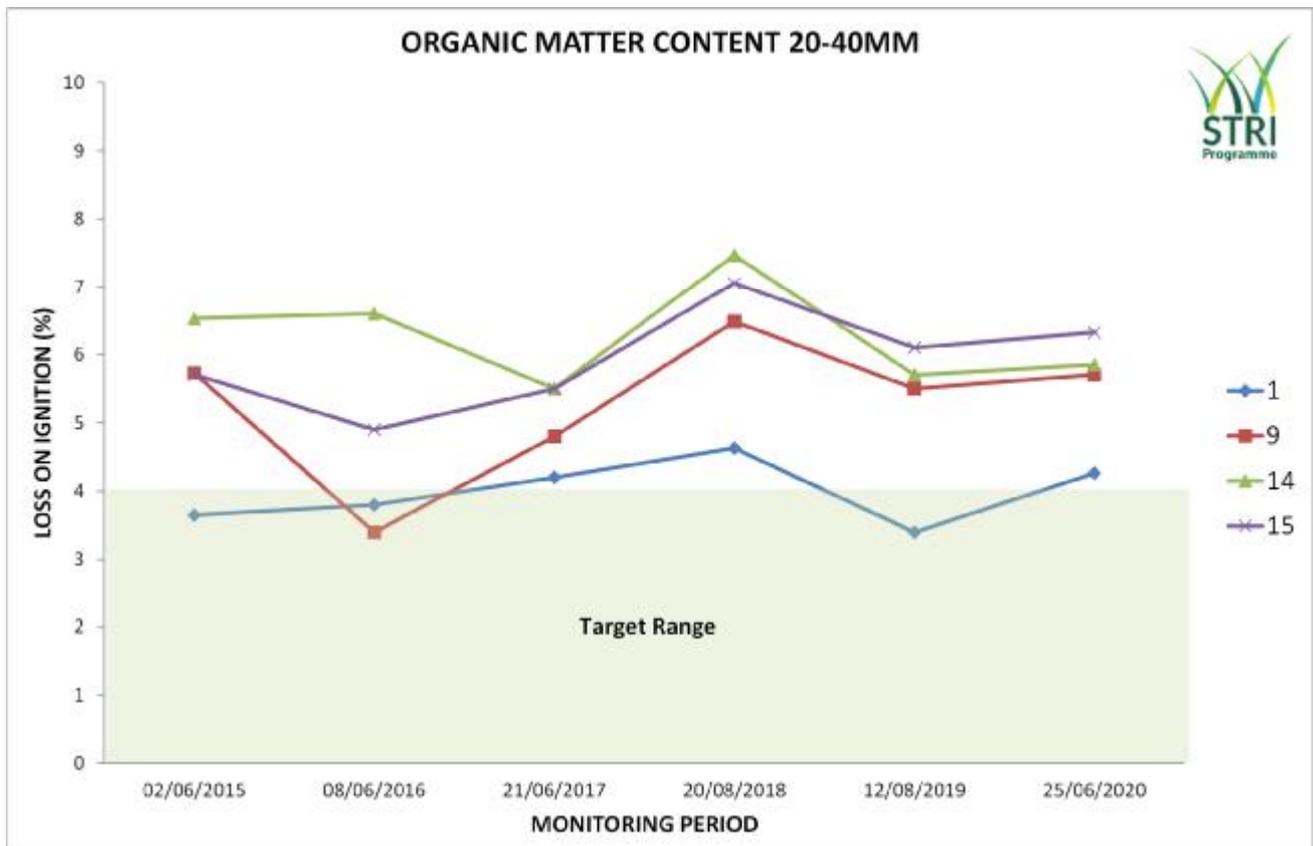


Objective Data Graph 5: Green speed would be expected to be lower due to recent maintenance regimes and extremes of weather, however the surfaces are being expertly managed to suit current levels of play. A very wise strategy.

Soils Laboratory Data

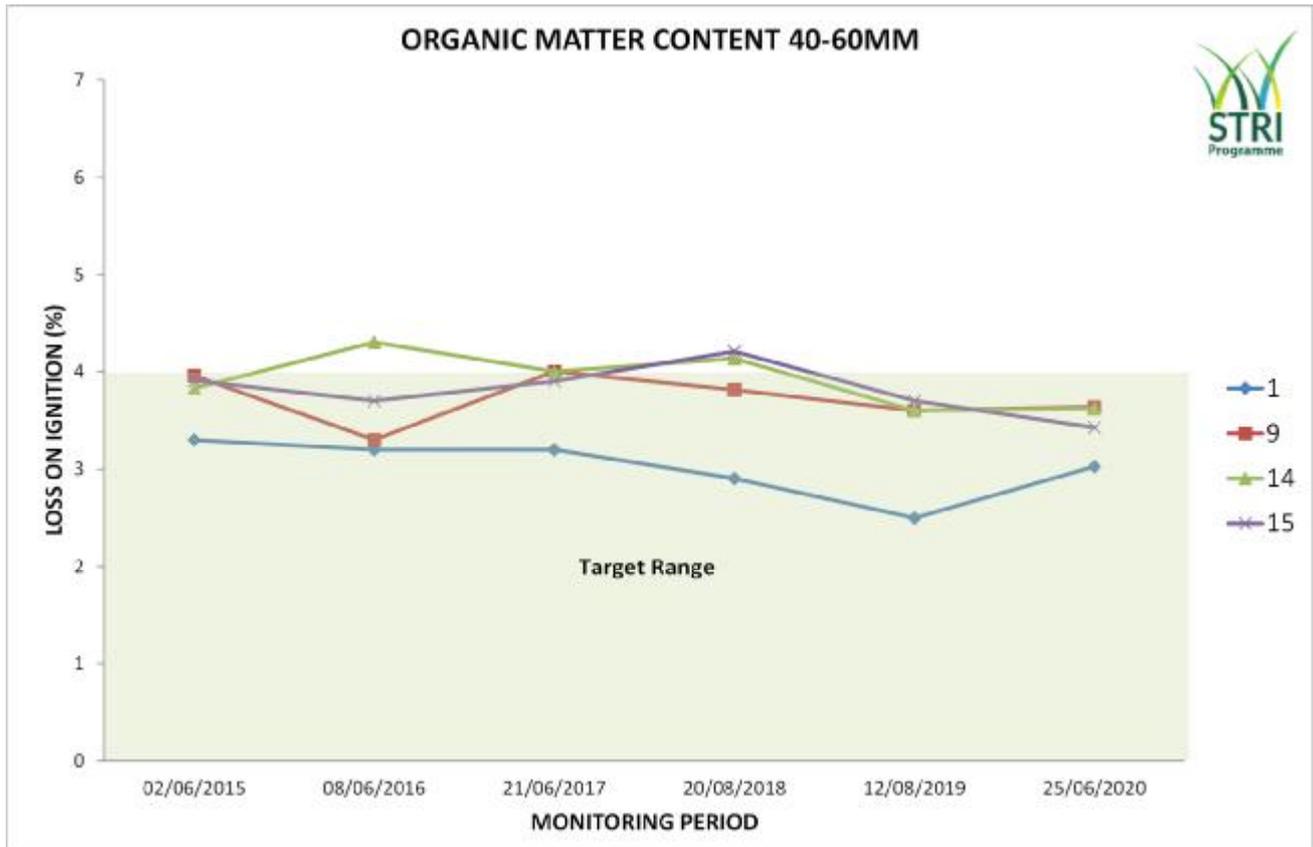


Soils Laboratory Graph 1: Organic Matter levels are in or just above target levels and some remedial work is still required.

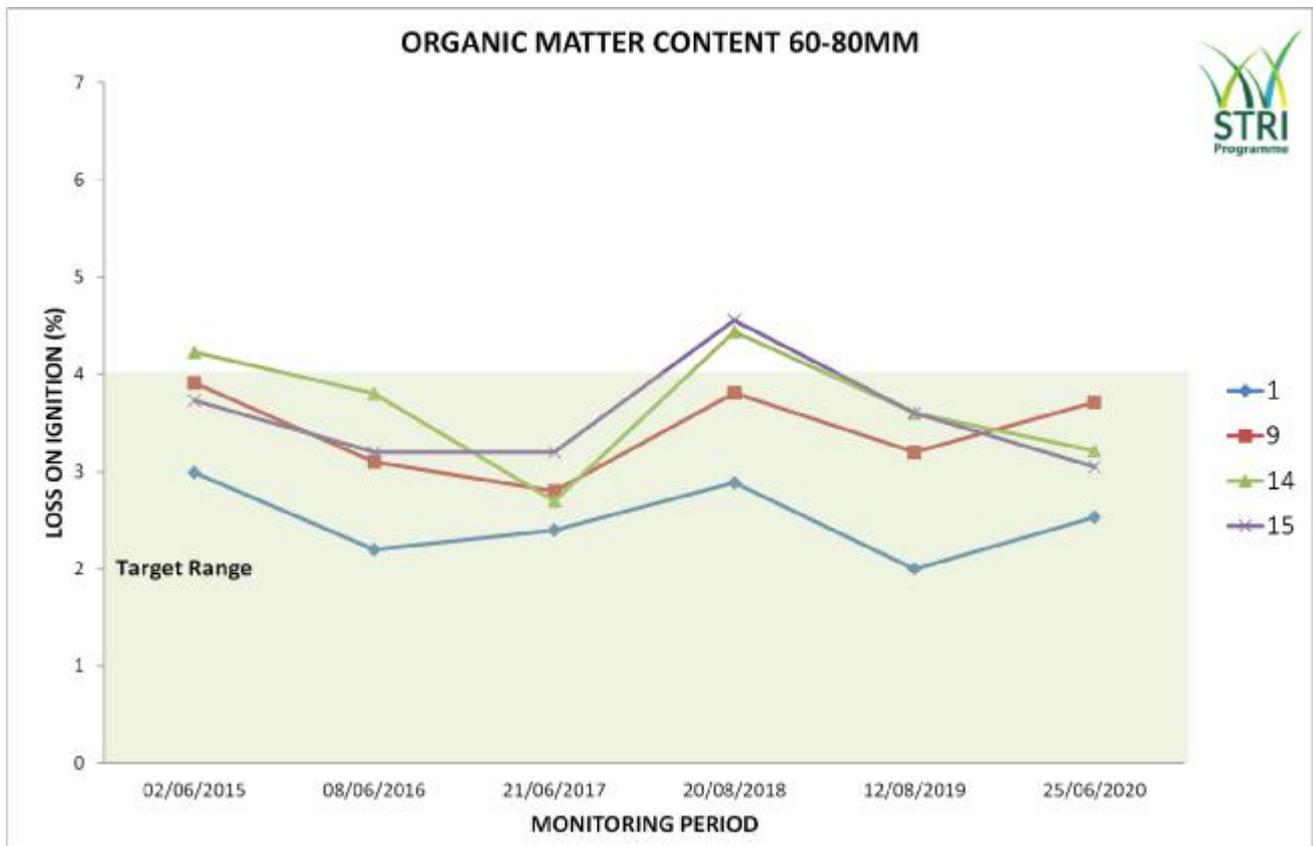


Soils Laboratory Graph 2: This horizon will require continued remedial aeration, microbial stimulus, and top-dressing solutions, in place at the Links.

Soils Laboratory Data (continued)

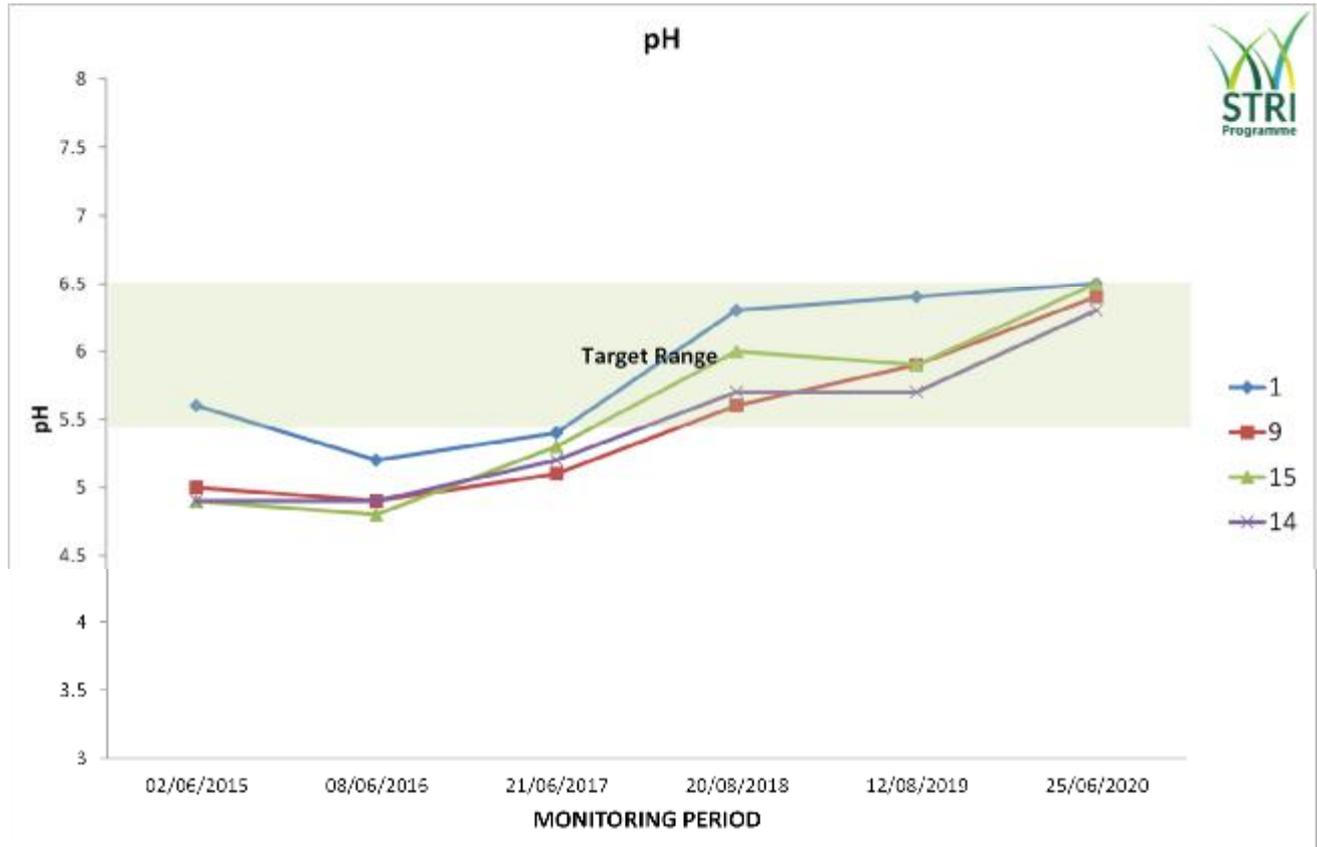


Soils Laboratory Graph 3: Both 40-60mm and 60-80mm horizons are in target.



Soils Laboratory Graph 4:

Soils Laboratory Data (continued)



Laboratory Graph 5: pH is at the optimum level and requires no additional remedial action going forward.

ORGANIC MATTER CONTENT

CLIENT: MONTROSE LINKS LTD
ADDRESS: TRAILL DRIVE,
MONTROSE,
ANGUS, DD10 8SW

DATE RECEIVED: 01/07/20
DATE REPORTED: 09/07/20
RESULTS TO: GS

TEST RESULTS AUTHORISED BY:

Michael Baines, Laboratory Manager

CONDITION OF SAMPLE UPON ARRIVAL: MOIST

SAMPLE NO	DESCRIPTION	LOSS ON IGNITION (%) [*]
A18453/1	1 0-20 mm	4.97
	20-40 mm	4.26
	40-60 mm	3.03
	60-80 mm	2.53
A18453/2	9 0-20 mm	6.27
	20-40 mm	5.70
	40-60 mm	3.64
	60-80 mm	3.71
A18453/3	14 0-20 mm	5.83
	20-40 mm	5.85
	40-60 mm	3.62
	60-80 mm	3.21
A18453/4	15 0-20 mm	6.11
	20-40 mm	6.32
	40-60 mm	3.43
	60-80 mm	3.05

* ASTM F1647-11 Standard Test Methods for Organic Matter Content of Athletic Field Rootzone Mixes (Method A)



Testing Certificate 2159 - 01

THE RESULTS PERTAIN ONLY TO THE SAMPLE(S) SUBMITTED AND TESTED

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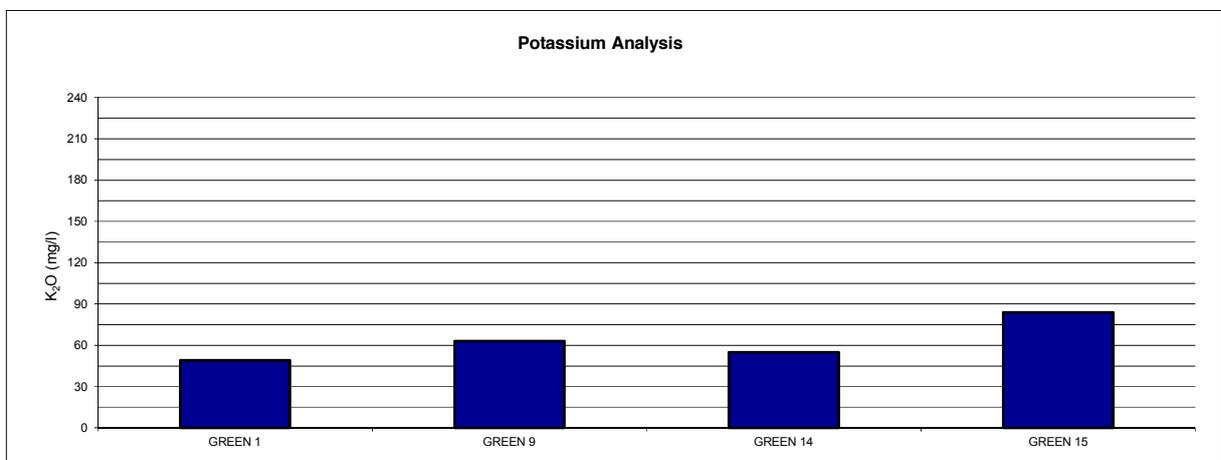
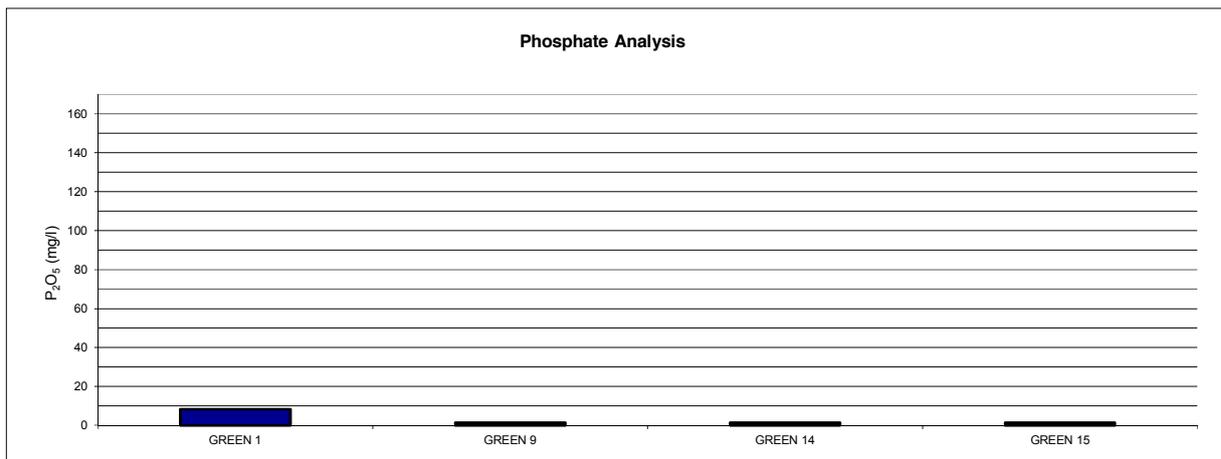
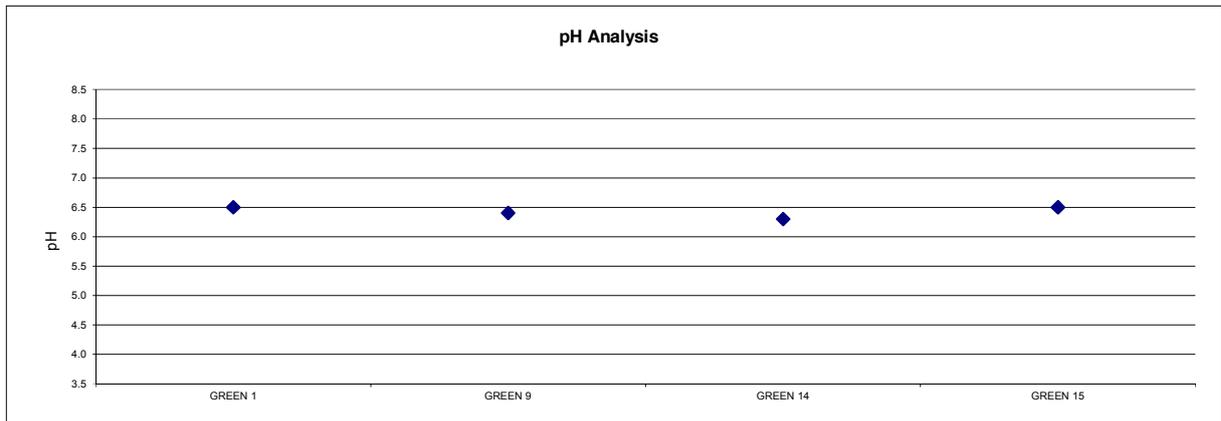
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SOIL CHEMICAL ANALYSIS

MONTROSE LINKS LTD

Date: 01/07/20



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