

MCMILLAN-SHIELS ASSOCIATES

ASTBURY GOLF CLUB

Agronomist's Report

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ASTBURY GOLF CLUB
COURSE VISIT

1.0 INTRODUCTION

1.1 We have been working steadily for some time to improve the greens by reducing organic matter and by improving the environment of the greens, reducing tree shade for example. The aim at Astbury, as with all courses, is to provide firm, well grassed greens that are smooth, run true, are consistent and are playable for most of the year.

In my first report on the Course I made a number of comments regarding the original construction of the greens, the quality of materials used and, just as importantly, the specification for construction, e.g. depth of materials.

The construction method has not changed and therefore nor has my original opinion regarding the options for the future, as shown in the following extract from my first report: -

“From my observations during my course walk I feel that there are several options for the future: -

- The Club may decide not to do anything other than continue with the existing pattern of maintenance. It is probable that the same problems will occur again.
- The Club may decide that they want to have greens that are guaranteed to drain well and to remain firm. If an instantaneous result is essential then the greens would have to be reconstructed. Ideally to a modern specification, with guaranteed performance levels.
- If the drainage carpet and drains are in good condition then a partial rebuild is possible.....
- Accepting that full or partial reconstruction is unlikely because of the cost and disruption the next approach to be considered is re-establishing a programme of intensive aeration..... I suggest that it is possible to make improvements through maintenance.”

One option that I did not include in 2005 was installing drainage. It is still my opinion that drainage is not a viable option because of the variation in the construction of the greens, from 13-28cm depth of rootzone. I would still opt for vertical aeration using the Ecodrill, Vertidrain etc because they can cope with different depths of rootzone. If the gravel carpet is still functioning well we should be able to connect the surface to this layer and improve drainage.

On this occasion I undertook additional tests on several greens and the Club also sent away samples to a specialist laboratory to check organic levels in the profile of several greens. The results are included below.

2.0 GREENS: - General Assessment.

- Visually the greens have very good grass density though there are scars and some areas of thinning, for example the front edge of the 12th where there is also an indication or triplex damage around the front edge.

- There is good colour and grass composition has steadily improved since I first saw the greens in 2005. We have a considerably larger population of bentgrass and this aspect of management should continue as it will give golfers much better greens.
- Unfortunately meadow grass and bentgrass start to grow at slightly different temperatures and this can lead to surface unevenness during spring until temperatures rise consistently into double figures. On several greens the meadow grass was noticeably paler in colour, it is still dormant or semi dormant but the bentgrass is growing.
- Bentgrass tends to lie flat and is easily missed by the mowers. This results in long shoots which can affect surface smoothness and pace.
- There was no active disease and very few signs of disease attack during winter. Scars that do exist should be growing out quickly.
- There were signs of fresh roots developing.
- Organic levels were measured in the laboratory for accuracy. Visually the greens have 3-4cm of dense thatch and then a lighter layer below this but we then reach a depth of about 80mm when a dense layer of thatch has survived from some years ago. Each year it is pushed deeper into the profile as a result of topdressing and is very difficult to reach and deal with.

3.0 TESTS UNDERTAKEN.

a) SURFACE FIRMNESS.

With good control over levels of organic matter in the greens we should be able to produce firm putting surfaces for most of the year. They will of course be softer in wet weather but with good aeration and topdressing they should remain within the target range for most of the year.

Firmness is measured using a device called a Clegg Impact Hammer. On greens the range of measurements is typically between 70 and 110, lower figures representing softer surfaces. At levels below 76 the greens will be too soft, a ball will stop dead and pitchmarks will be a major issue. Above 130 it becomes more challenging to stop a ball. High organic levels result in lower Clegg values, softer greens and slower speed. For parkland greens a range of 80-100 is expected.

During the testing process 9 measurements are taken on each green and then averaged.

GREEN	CLEGG VALUE	GREEN	CLEGG RESULT
	Astbury	Type	Target
2nd	85	Parkland	80-100
12th	83	Heath	90-110
16th	75	Links	100-130
18th	80		

The 2nd and 12th greens proved to be the firmest. On the 12th this was not unexpected. It is the green with the better level of rootzone. 12 and 12 rate as acceptable for parkland greens.

The 18th was at the bottom of the acceptable range and the 16th was poor.

To show the significance of these results to the golfer the following chart should help a little.

CLEGG VALUE	DESCRIPTION OF FIRMNESS	
Over 130	Hard and unreceptive. Ball impacts and continually bounces forward. No control from well-struck shots as hardness increases. Frustrating to all levels of golfer	
100-130	Very firm. Ball impacts, bounces on, checks and then rolls out. Well-struck shots need to be positioned correctly. A true test of ball striking and accurate play.	Links
80-100	Firm. Ball impacts, bounces forward, checks and then quickly stops. Good control of well-struck shots but less control from loose ball striking (especially at the firmer end).	Parkland
70-80	Receptive. Ball impacts then stops on first bounce or spins backwards. No footprinting. No real premium for ball striking. Such surfaces are flattering to average play.	
60-70	Soft. Balls stop dead and leave a large pitch mark. Footprinting becomes evident to make putting surface uneven. Not a good surface.	
Below 60	Very soft. Unstable and unplayable	

Astbury's greens fit in around the 80 mark and the 16th of course would be regarded as "flattering" to average play because the golfer doesn't need to hit the ball well to get a very generous and receptive response from the green.

b) ORGANIC MATTER.

As a natural follow on from testing surface firmness we checked organic matter. Levels in the greens were tested at a specialist laboratory with the following results.

ORGANIC MATTER CONTENT LOSS ON IGNITION %				
DEPTH	12th	16th	18th	TARGET %
0-20mm	6.9	5.4	7.8	5-7
20-40mm	4.8	5.9	5.7	<4
40-60mm	5.2	5.0	5.2	<4
60-80mm	9.2	5.9	8.0	<3
80-100mm	5.2			<3

Organic Matter has a major impact on how greens perform, how a ball reacts with the surface and what the potential is for speed during the year. Since 2005 the Club has targeted trees which cast shade and restrict air movement as well as tackling the organic matter directly. Improving the environment to improve growing conditions is important because it will improve the results from all other aspects of routine greens maintenance.

The ideal level of organic Matter in UK greens varies with depth in the profile. The preferred or target depths are included in the above chart.

From the chart we clearly have a little too much organic matter in the surface of the 18th but the 12th and 16th have come down into the target range. Below the surface levels continue to be higher than we would wish and this is particularly so at a depth of 60-80mm

From the profile of organic matter it is my opinion that thatch management in recent years has made a major impact on organic levels but deeper layers continue to resist and must be targeted if we are to improve the performance of the greens.

The chart only represents three greens. I examined several others and we do still have too much thatch in the surface, some of it is wetter and yellow due to poor air supply in the surface but we are getting the greens moving in the right direction. I am happy that the work of the last few years has produced results. It should continue, the poorer greens needing additional treatment. Scott will be very much aware of the better and poorer surfaces and thatch levels and will adjust his programme accordingly.

I believe that the surface should continue to be targeted but that deeper work is also needed to connect the surface with the drainage carpet and improve surface drainage.

c) SOIL MOISTURE.

The quickest test was for soil moisture because this affects firmness and green speed. The moisture level is shown in brackets in the chart below.

d) SPEED

The greens were also checked using the Stimpmeter and compared to international standards.

GREEN	SPEED
18 (14% Moisture)	6'2" unmown
16 (10.2% Moisture)	Not tested
12 (9.0% Moisture)	7'3" mown
2 (9.2% Moisture)	7'9" mown

For club golf the following speeds apply:	
Fast	8'6"
Medium fast	7' 6"
Medium	6' 6"
Medium slow	5'6"
Slow	4'6"

The 18th green was tested before mowing. The 2nd and 12th had been mown, height of cut was at 4mm. The mown greens were running at medium fast pace but there had been rainfall during the night and the thatch layer was retaining this. With wind and sunshine the surfaces would speed up as they dry.

Dry thatch would also firm the greens a little but they will always tend to be soft and because of thatch are always vulnerable to vary a lot according to weather conditions. For greater consistency and uniformity we must continue to target thatch and moisture levels in the greens.

4.0 RECOMMENDATIONS

GENERAL MAINTENANCE NOTES

Having started into growth the greens will need routine work along the lines that Scott has followed for some time. With a heavy underlying soil and meadow grass/bentgrass surfaces there will always be a need to maintain frequent aeration. This includes shallow and deep work to improve drainage throughout the profile.

With organic matter to deal with we cannot allow it to seal during wet weather as this limits air movement and we lose plant roots as a result. Frequent surface aeration is necessary combined with less frequent but deeper aeration. Removing surplus organic matter is described below, we need to target specific depths but more importantly the work should be undertaken at a time when we can ensure recovery and the best results and this means when there is grass growth. October is too late, it might be warm but light levels are poor and will affect results and recovery.

In early parts of the year wetter surfaces will be slow to warm, water needing more energy input than air. This means that spring growth will usually be later on wet greens and this means that spring work has to be carefully timed to ensure the best recovery rates.

Early season growth.

Slow growth is usually down to poor weather conditions but on many courses is also affected by factors such as shade or wet thatch and even compacted soils which all reduce the rate of soil warming.

The whole programme is aimed to improve the rate of drying and warming but we need to make greater progress.

In the early part of the year there is usually a mild spell of a few days when greenkeepers may be able to apply a light liquid feed that encourages a little movement in terms of growth, it doesn't always of course.

Take advantage of any mild spell that is due to last 3- days even if in February.

Later on as the weather is expected to change, verticut, reduce the cutting height by 0.25-0.5mm and then roll. This is often sufficient to improve surfaces for golfers. If conditions allow apply a light but early topdressing and this will help to fill scars from any disease.

Use a quick acting feed such a potassium nitrate or calcium nitrate etc, they often work better. If the greens are wet on top try one of the liquid aeration products which do improve the air supply to grass roots and can encourage growth when otherwise the cold, wet thatch prevents it.

Summarised as follows: -

Thatch Removal.

- Scarification is only occasionally needed on these greens because surface organic is coming down into the target range. I would expect one pass with 2mm blades per year unless conditions change. This pass can also help to open up some of the Ecodrill holes and help drainage.
- From experience with this machine I know it will be effective if used during suitable weather conditions, avoiding cold, dry and very hot periods when grass recovery is affected. I have also seen this machine used to scarify, overseed with bentgrass and then topdress at the same time. It is labour intensive but gives excellent results and has an immediate effect on firmness and drainage.
- From the above chart it is also clear that we have thatch at greater depths to consider if overall drainage rate is to be improved.
- We can hollow tine aerate and reach 8-10cm to reduce the thatch layer. We can also solid tine aerate and topdress to mix dressing with the thatch and improve its rate of decomposition.
- The surface organic layer must be kept open and micro hollow tines produce holes that last longer, try to fit in one or two passes with these during the growing season. They shouldn't annoy golfers. One of the passes can be immediately before the scarification work so achieving two operations and only one recovery period, but ensure the weather is suitable and avoid working late in the year when results will be poor.
- Sarel Rolling will help surface drainage and aeration, target not less than weekly passes. This is a reasonably low cost piece of equipment that will be used at least weekly forever. It does not disrupt play but does help the greens.
- At some stage during the season, just before winter we need to continue deep aeration, Wiedenmann or Vertidrain to help the greens going into winter by improving deep drainage.

- The lower wetter areas would also benefit from additional hollow tine aeration and the addition of more topdressing to help to firm them up.

Mowing.

- Height of cut to remain at no less than 4mm if the members are happy with pace. This certainly protects the grass but height can occasionally come down if necessary and if there is no sign of stress.
- Compensate for the extra height of cut by regular rolling.
- Pedestrian mowing is less stressful; it includes a degree of rolling and of course improves presentation. It's a good idea to include it when possible but of course it has labour and cost implications as well as machine requirement.

Feeding.

- Target feeding level remains at approximately 70-80kg/nitrogen per hectare for the year. This level is right for the finer grasses we are trying to encourage and will not encourage more thatch to form.
- Potassium levels need to be above the nitrogen, typically 50%-100% more to ensure the green has some protection during summer and winter. The potassium silicate will also help in this respect.
- Include seaweed in the programme to maintain healthy soil biology.
- There are several products on the market to improve soil biology and virtually any of these would help to decay the thatch a little faster. You might also like to look at specific Thatch Eater products such as those sold by Symbio. They all cost of course and if the budget is tight, as with most clubs at present, we can work with mechanical removal as the main operation.

Brushing.

- Include it routinely, there shouldn't be any stress from brushing but the grass can struggle a little in dry or hot weather.

Verticutting.

- Because of the improving bentgrass levels verticutting should be light and only when needed to lift the bentgrass shoots into the mower. Initially it is useful to help to improve surface levels and then again before topdressing but working down to -2mm only.
- If we can topdress frequently and can reduce nitrogen levels we should be able to maintain good pace without lushness but in wet weather these greens will revert to being lush and will need increased verticutting.

Overseeding.

- Overseeding should continue. The best time for a single seeding is generally late August when there is moisture, light and warmth but mid season seeding can be successful if the cut is kept up. As indicated above, the best results I have seen from overseeding is where the seed is placed into scarifier grooves in late August-early September
- If the Primo programme starts this year it should continue through the season on a fortnightly basis as this fits well with the overseeding and feeding needs of the greens and it will not affect seed growth. However Primo does not have to be used all season and can be used in preparation for special events, eg overseeding or for competitions as a way of slowing growth for specific periods of time. Use 300ml/ha about 4 days before the event to help pace.
- For the best results even small bent seed should be placed below the organic layer either after deep aeration or even light scarification.

Topdressing.

- Frequent but light topdressings to maintain levels where necessary.
- As the surfaces are marked at present I would expect 2-3 dressings by the end of this month, or one heavier dressing if that is easier because of machine resources.
- Then aim to topdress each month after aeration to get the material down into the thatch itself.

Aeration.

- Frequent Sarel Rolling to keep surfaces open would be beneficial, not less than weekly, if it is possible to get such an attachment it would be very worthwhile and would be well used.
- Monthly pencil tining as a minimum.
- Deep Vertidrain aeration at least in October and thereabouts to improve winter drainage, followed by a pass with narrower tines in spring.
- Because of the deeper organic layers can we include 2-3 passes with hollow tines at some stage during the season, followed by sand topdressing. Then the organic matter levels can be checked again next year to assess improvements.

Irrigation.

- Irrigate minimally to keep the turf alive and support the automatic system with Hand-watering and wetting agents as necessary.
- We must aim to retain firm and dry surfaces throughout the season otherwise we shall see the greens slowing down.
- With appropriate aeration and wetting agent programmes carried out beforehand, it should be possible to support a complete turf cover, even in times of drought

Rolling.

- Use the rollers every week provided the surfaces aren't too wet. Three passes per week is acceptable on these greens and they should be able to cope with extra passes occasionally.

Primo.

- When the putting surfaces recover from winter, and reach a level that everyone is happy with, begin the Primo programme. This means good surfaces with a soil temperature of close to 10°C.
- Spray at half rate, 200ml, every two weeks (or 400ml every 4 weeks if you prefer) with a liquid feed.
- Don't start spraying until any scars are healed.
- Primo can also be used as single sprays, ie before a tournament or overseeding where a short term reduction in growth is needed. Rate of use is given above.

Disease.

- Just a suggestion to try Scotts new product based on fludioxynil, it penetrates thatch and has good results against Fusarium spores. This should be looked at as a preventative to reduce scarring next winter. Thatch removal will also help of course.

TEES.

We did not spend much time on other areas but we did look at the 5th tee. We discussed extending this tee and my comments are simply that: -

- Enlargement is desirable. Another 150-200m² would be sufficient.
- Do not simply extend the existing tee. If you do there will always be two levels and a noticeable join. Strip the existing tee and rebuild the base as one larger unit, then add 150-200mm 70/30 rootzone over the whole tee and seed or turf. The results will be better value for money.
- Enlarging the tee to the left will mean removing trees on the left, that will benefit the other tee but a few selected specimens should be left for presentation.
- Forward from the tee, there will be some clearance on the left for the shot line from the enlarged tee but on the right we have a silver birch that intrudes into the shot line and obscures some of the hole. I would remove it together with two pines behind to improve the view of the hole, especially the bunker and ground to the right.
- Otherwise tee work is routine but difficult without irrigation.

SUMMARY

- The greens are being taken in the right direction. Progress has been made good and is only limited by the quality of the original construction.
- Thatch removal by scarification and hollow coring is recommended, timing to be when there is growth for recovery. Late remedial work rarely gives good results.
- Lower thatch levels will help with early growth by producing drier surfaces that are easy to warm up.
- Bentgrass levels are improving and this will produce smoother, earlier greens.
- Work undertaken to date has been in the right direction but we do need to accelerate it to ensure removal of all surplus thatch and members will then benefit. Aeration etc is all summarised above. The Club should have access to a Sarel roller and hollow tine machine such as a Procore.
- Regarding my current opinion about the way forward for the greens, it hasn't changed since 2005. Reconstruction will overcome the problems and is the preferred route to take but costs are likely to be prohibitive.
- Maintenance can and has made improvements and what I saw in 2011 is considerably better than what I first saw in 2005, so well done to the staff.
- Improvements as a result of maintenance operations are limited; they will not be of the same order as from new, properly constructed greens.
- I don't include a drainage system of pipes because your greens are so variable in terms of their construction. I would prefer to work with vertical channels for drainage, assuming that the drainage carpet works. If there is ever reason to excavate any green then do check the quality of the drainage carpet, if for any reason it has failed then you may have to consider a

drainage system of some sort as the last alternative. There are systems of sand injection, crating very narrow drainage channels to only 300-400mm depth that may be considered before pipes but that is a decision for a time when greens are being excavated and a better view of what is underneath can be obtained.

Let me know if anything else is needed or if you need clarification of any points.

George R Shiels