

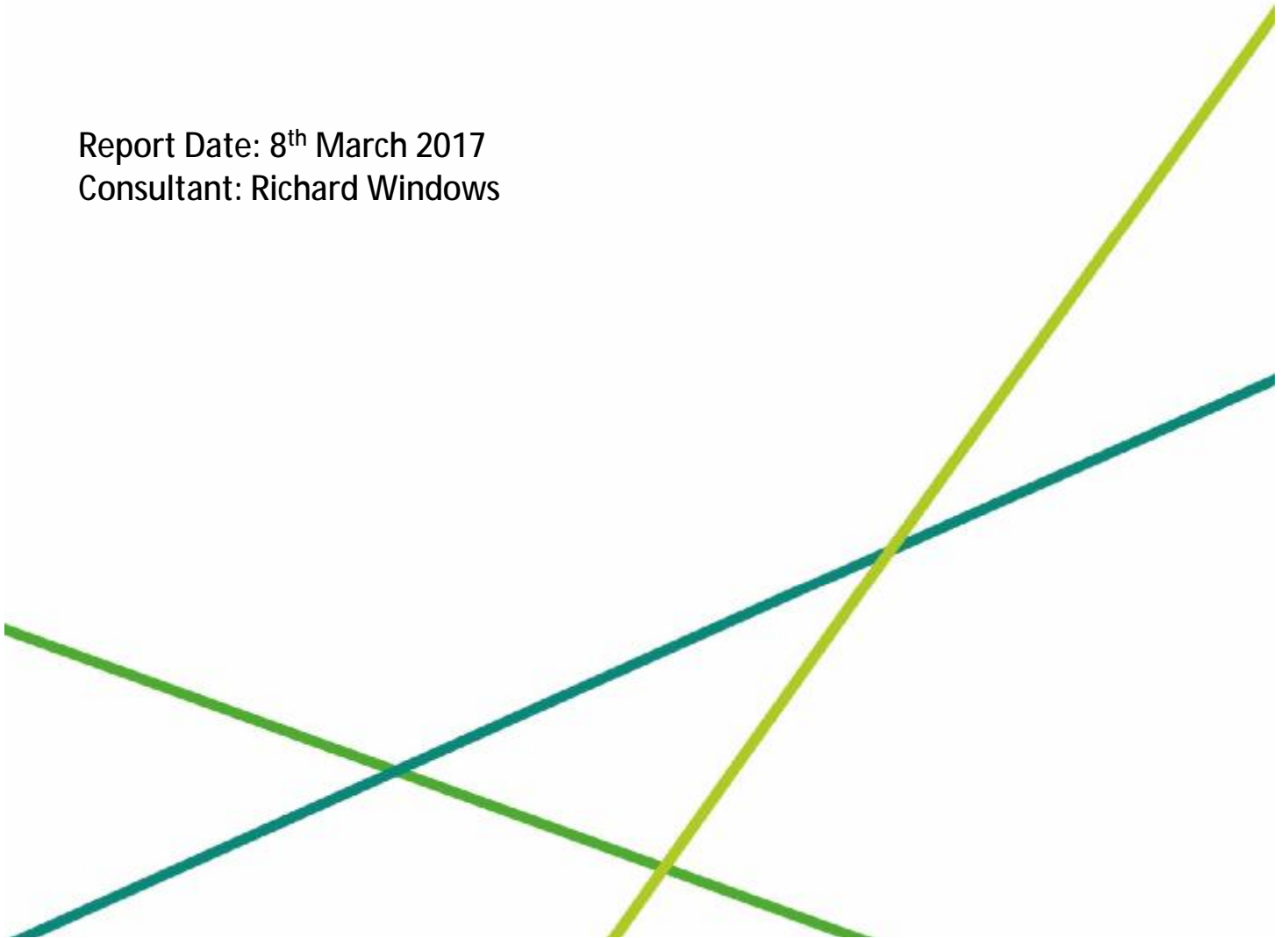


Making great sport happen

ORKNEY GOLF CLUB

Advisory Report on the Golf Course

Report Date: 8th March 2017
Consultant: Richard Windows



Orkney Golf Club

Date of Visit:	Tuesday 28 th February & Wednesday 1 st March 2017
Visit Objective:	To review the condition and maintenance of the golf course and provide recommendations for future management.
Present:	Bruce Moar - Captain Doris Hutchison – Lady Captain Chris Rae – Head Greenkeeper Fergus Macivor – Apprentice Greenkeeper Richard Windows – STRI Ltd
Weather:	Dry, cold and breezy with snow overnight

Headlines

- The course is a wonderful place to play golf, with great views and a good layout.
- Routine maintenance practices are based on sound principles and are excellently executed by a committed greenkeeping team.
- Despite limited resources, the Club have invested excellently in machinery and materials.
- The Club is an excellent example of Club & Greenstaff working together to deliver sustainable quality with minimal resources.
- The greens are in very good shape and routine operations should be sustained.
- More wet areas are developing across the site probably due to collapsed stone drains.
- Drainage and waterlogging is a major issue and does result in course closure and cancelled events.
- Take-all patch was a problem to greens last season especially; to wet surfaces, e.g. 6, 9, 10.
- Green approaches are generally wet and suffer from Take-all patch and coarser textured turf.
- Dense rough has been a major problem and has reduced the pace of play.
- Bunker renovation has been a focus and delivered excellent results.
- Machinery provision is good and the Club have invested very well in recent years.

Key Actions

- Sustain current maintenance practices to greens as this is delivering consistent quality.
- Install swales and mounds to greens to avoid surface water shed, e.g. 10.
- Implement deep aeration with the new Terra-Spike to accelerate surface drainage on greens.
- Moss control is necessary on 6G with lawnsand and scarification.
- Take-all patch control is necessary to greens and approaches.
- Deep aeration, manganese application and potentially fungicide is the strategy for Take-all control.
- Pipe drainage may be necessary on 17G if limited response is achieved from deep aeration.
- Deep aeration and sanding is required to approaches to improve drainage and firmness.
- Tee enlargement using turf nursery material can be achieved now there is turf on site.
- Localised deep aeration is necessary to wet sections of fairways.
- An AFT45 trencher would be useful for a multitude of drainage jobs around the course.
- Cut and collecting rough with raking is an important objective as density of rough was thick.
- Relax cosmetic mowing to tee banks and around the pond to 17.
- The sand used for top dressing should be submitted for laboratory analysis to confirm suitability.

Photo Observations and Comments



Figure 1: The maintenance of the course is based on sound principles and are excellently executed. Despite limited resources, the Club & Greenstaff work hard to deliver improvements year on year.



Figure 2: Turf quality to greens is very good with browntop bent dominant turf with fescue to drier surfaces, e.g. 4&18 and more meadow-grass to wetter ones.



Figure 3: Organic matter/thatch is well managed in the upper soil profile and the indigenous underlying soils are friable but were showing significant compaction.



Figure 4: Take-all patch was a significant blemish to the greens especially to the wetter surfaces, e.g. 6, 9 & 10. Control measures are required to reduce symptoms.



Figure 5: Populations of cushion moss were high to wetter greens but worse to 6G. Additional lawnsand and scarification is required to reduce levels.



Figure 6: The approaches to greens were collectively the weakest set of surfaces. Many were soft and wet (e.g. 9) and the texture of the turf was coarser with more ryegrass and Take-all scars were prominent. It is likely lime applications in the past would have caused the issues with turf and Take-all.

Photo Observations and Comments (continued)



Figure 7: 10G receives water from surrounding higher ground and would therefore benefit from swales and mounds to capture and divert surface water from the green.



Figure 8: 17G and surrounds is the wettest part of the course and is the first green to close in wet conditions. The new ditch may help as will deep aeration but if insufficient improvement is realised, pipe drainage will be needed.



Figure 9: The use of ropes is excellent to protect wet areas such as 7 surround. Deep aeration to alleviate compaction should help improve drainage and firmness to these areas.



Figure 10: A cut off drain at the foot of the slope to back left of 13G will capture surface water and improve firmness to the rear of the green.



Figure 11: Daisies are a significant problem to surrounds and fairways. Two applications of selective herbicide are required for control.



Figure 12: Local wet areas are present to fairways and should respond to deep aeration, but may require drainage installation if additional improvements are required.



Figure 7: Areas of rough have been introduced to give better definition, save maintenance time and fuel costs, and also; provide some additional strategy to the course.



Figure 8: To provide thinner and wispy textured rough where it has been introduced and therefore; increase pace and enjoyment of play, a programme of cutting, clipping collection and scarification is required.



Figure 9: The new ditch to right of 17 has been an excellent introduction and should help improve drainage as well as providing a good outlet for future drainage.



Figure 10: The 8th tee is a good example where strimming for cosmetic purposes to tee banks can be relaxed to provide a more natural look as well as saving maintenance time.



Figure 11: Investment into a closed loop wash down facility is excellent and does illustrate the Clubs commitment to investing in modern maintenance equipment.



Figure 12: The problems with soil compaction are evident to high trafficked areas of the course such as pathways whereby surface water is retained following rainfall events.

Recommendations

Greens

- The fertiliser programme was discussed in detail with the potential of changing to water soluble products but with such windy conditions and shortage of maintenance time, it was felt the current granular based programme is working sufficiently well and not providing excessive growth.
- Therefore, the programme of lawnsand in the early spring followed by the main spring feed of 14:6:6 (Thomas Elliot) and 5:0:28 in autumn should be sustained.
- The programme of 3-4 applications of iron for moss control and general colour provision is good and should be sustained.
- To reduce moss populations, the 6th green should receive an additional application of lawnsand during May and perhaps again in August. Following blackening of the moss, scarification with Thatch Away units and bent overseeding should be implemented to help restore grass cover and avoid the re-invasion of moss.
- Use the Thatch Away verticut units for light and occasional refinement treatments, but there is a requirement to obtain conversion kits to allow the units to fit the new Jacobsen triple mower.
- There is no need for blanket hollow coring to the greens for the next couple of years assuming sufficient routine aeration and top dressing is achieved. However, localised hollow coring to soft sections of greens would be beneficial, e.g. rear of 2, 6 and 17.
- Solid tine and top dress in late May and repeat again in late September. The new Terra-Spike will be a significant improvement in depth and efficiency.
- Aim to apply 50 tonnes local sand per annum combined with solid tine aeration.
- Submit a sample of the local sand for laboratory analysis to determine it's particle size and also lime content. Once we ascertain its quality, we can make a decision of whether it should continue to be used for top dressing purposes.
- Continue the excellent process of hand weeding daisies, but treat the mouse ear chickweed and pearlwort with selective herbicide delivered via an aerosol.
- The 17th green is the priority for drainage improvement. However, its performance should be monitored this year following the new ditch installation and in response to deep aeration. If this work fails to deliver the appropriate drainage improvements, installation of a network of pipe drains at 2.5-3.0 metre spacings will be required.
- The installation of swales and mounds to divert surface water away from the 10th green would be an excellent move to help improve this green and provide some separation from surrounding ground.
- Rather than looking to alter the contouring of the slopey greens such as 1, 3 & 4, which is fraught with difficulty, it would be easier to avoid these greens becoming too fast for certain events. Therefore, omit mowing or roll without the mowing blades engaged to avoid generating excessive speeds.

Green Collars, Surrounds and Approaches

- Due to the coarser texture of the turf, the higher populations of perennial ryegrass and the level of Take-all patch activity, it is highly likely an application of lime was made to these areas in relatively recent history.
- When applying iron to the greens, extend applications into the approaches to help acidify the sward base and discourage Take-all.
- In addition, apply manganese in May & June at 20 kg/ha (supplying 6.2 kg/ha manganese) – this can be obtained in straight form from Terra-Firma (www.terrafirmascotland.co.uk). If necessary, apply Heritage MAXX fungicide at the first signs of symptoms and repeat 4 weeks later.

- Regular deep aeration using the new Terra-Spike is an essential operation to alleviate compaction and enhance surface drainage. The aim should be to implement 3-4 operations each year using the larger 18 mm tines set to achieve as much heave as possible without damaging the turf.
- To aid with surface drainage and firmness, sand top dressing should be extended into these areas with the aim of applying 50 tonnes over the course of a season.

Tees

- The maintenance of the tees is working well and providing good quality and sustainable surfaces. In general, the programme of work should be sustained.
- An area for future development would be to enlarge the size of surfaces, and also improve surface levels. Now that there is a good source of turf on the newly developed Turf Nursery, this course development work is now a possibility.

Fairways

- A blanket application of 12:6:6 fertiliser was made to the fairways last year. However; due to the strength of grass cover, the blanket application can be reduced to more local treatments to weak sections of fairways only, e.g. 2, 5, 8, 11 & 12.
- Once the new Terra-Spike has been purchased, commence deep aeration to improve drainage and natural turf vigour, thereby allowing reduction in nitrogen inputs. Local treatments should be the starting point with the objective of treating wet sections several times a year rather than less frequent treatments to wider areas.
- Selective herbicide Relay-P (mecoprop and dicamba) is currently applied once a year but populations of daisy remain relatively high. Therefore; it is necessary to increase the frequency of application of twice per year, with the first being applied once growth or flowering commences (May) and again late August.
- Once the effect of deep aeration has been assessed, it will be evident whether additional drainage improvement will be required in the form of pipe drainage installation. Certainly, the work to improve the 9th fairway has been positive in this regard and it's likely this sort of work will require extension in the future.
- To facilitate the efficient installation of pipe drainage, the purchase and subsequent use of a dedicated trencher such as the AFT45 unit would be ideal. This is probably considered the next key machinery purchase.

Rough

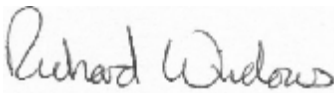
- Allowing the rough to develop and grow is a positive move in terms of reducing maintenance time, providing better definition etc, but its density did result in some frustration last year.
- So, rather than cutting the rough routinely, the plan should be to initiate a programme to develop a fringing rough. This is a 5 metre band of managed rough in between the semi and thick (ecology rough), whereby the grass is allowed to set seed but a programme of cutting, clipping collection and scarification is implemented to reduce its density and allow easier ball retrieval at the same time as maintaining good definition between in and out of play areas.
- Immediately, the selected areas should be cut as low as possible, ideally less than 50 mm, and all clippings collected to provide a clean finish. Afterwards, scarify with a set of chain harrows with the aim of removing further fibre and biomass. This may be done a couple of times over the next few weeks.
- Once this treatment has been completed, leave the selected areas to flower and produce seed head rough for the season. Avoid the temptation to mow these areas again through the season unless they become too penal.

- In late September/October, recommence the programme of cutting/collection and repeat scarification. Continue this work during the autumn and late winter/early spring until sward density has been appropriately controlled.
- In selected areas, accelerated grassland management can be achieved with the use of graminicide. A product such as Rescue or Laser (has off label approval) can be used to remove coarser species of grasses. A small trial area may be the best method to experiment with this strategy.
- The hairy humps to the 15th hole are thick and coarse textured and should receive the same sort of work, but trim and rake off clippings rather than use tractor mounted machinery.
- There are many areas where cosmetic mowing should be relaxed to save maintenance time and fuel costs. These would include tee bankings whereby they can be connected to surrounding rough grassland, e.g. 8th tee and areas such as that around the pond to the 17th carry. For the latter, annual cutting with the strimmer and then raking will help maintain good texture to this grass sward.

Machinery & Resources

- The Club have invested excellently in the machinery fleet and a good range of kit is now available.
- The main pending items are a Terra-Spike and flail mower/collector.
- A set of chain harrows would be a useful addition to assist with rough grassland management.
- The main purchase in the future would be an AFT45 trencher for pipe drainage installation.
- The sand quarried from the island should be tested for particle size and lime content.

Signed

A handwritten signature in black ink that reads 'Richard Windows'.

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Technical Note

PIPE DRAINAGE FOR GREENS

Plan the work well in advance and communicate plans to members to minimise disruption and complaints.

Start work as early as possible in the autumn when ground conditions are most suitable. If the ground is worked when conditions are wet it will have a significant impact on the quality of the finished work. There may also be significant damage caused to the haul routes during the works if the ground is too soft. Aim to complete the work prior to Christmas to allow plenty of time for the turf to re-establish along the drain lines before bringing the green back into use in the spring.

The drains may take in excess of 12 months before they start to pull to their full potential but an improvement should be noted straight away. However, further aeration treatments are likely to be required to maximise efficiency of the installed drainage, helping water migration to newly installed pipes. This should be part of a thatch reduction programme involving other elements such as extra top dressing and scarification/hollow tining.

The guidelines for pipe drainage introduction following excavation of drain trenches are as follows:

- Use 80mm diameter plastic pipe at 2-3 metre spacing depending on conditions.
- In cutting the drain trench, allow for 25mm either side of the pipe.
- There is always the risk of drain lines standing out in the summer which is one of the potential problems with pipe drainage introduction compared with redevelopment. Introduce a 60:40 rootzone at a uniform firmed depth of 300mm and a minimum of 250mm.
- To ensure bridging factors are met and to avoid rootzone migration into the gravel over time, it is important to test the suitability of proposed materials in the STRI Laboratory prior to proceeding.
- Whether a blinding layer is required depends on the choice of gravel size. An 8-10mm gauge aggregate could be blinded with 50mm firmed depth of a 1-4mm hard washed grit.
- The aggregate should be a washed, hard aggregate that is not limestone or sandstone.
- In order to dispense with the blinding layer the aggregate size can be reduced to a 3-6mm gravel. As a guide, the blinding layer or rootzone should be around one-sixth of the aggregate size. The depth of aggregate will depend on the drain depth, preferably 600mm but at least 450mm.
- Adequately firm each layer. Once the backfill has been completed, re-lay the stripped turf flush with surrounding ground, not proud in anticipation of settlement. If there is minor settlement then the unevenness can be selectively top dressed. Scalping of the turf should be avoided.
- Finally, give a light roll and top dress. Bringing the green back into play will depend on how quickly the turf knits in. Once the turf is fully integrated and a good surface has been restored, subsequent maintenance should involve tining and top dressing to maintain through flow of water past the initial base of the turf and organic layer into the growing medium and drain below.

Technical Note

TEE CONSTRUCTION

With the demands of modern golf and the likely future pressure on tee space, we recommend that the following total tee sizes are aimed for:

Par 4 and 5 holes	Par 3 holes
Mens 250m ²	Mens 330m ²
Ladies 100m ²	Ladies 100m ²

Also take into account the need for additional areas for winter teeing grounds and possible "extras", e.g. separate tees for juniors and seniors who may prefer a shorter course.

The design of teeing grounds has a profound effect on the shape of a golf hole. Careful consideration should be given to the positioning of new tees or the enlargement of existing tees to gain the best out of each hole. The advice of a qualified golf course architect should be sought where a major tee development programme is being considered. STRI can provide this service to clients.

When designing and building new tees or enlarging existing ones, ease

and rapidity of maintenance must be borne in mind, e.g. access for maintenance equipment, including triple mowers. Banks should have a shallow slope for safe mowing. Avoid steep banks that require time-consuming hand mowing. Allow room for moving tee markers from side to side as well as from front to back. Elevate according to the demands of the hole, always keeping to a minimum, and avoid poor sites where grass retention will prove difficult, e.g. under trees where tree

roots, overhanging branches, lack of sunlight and frost can be problematic.

Form the shape of the tee in the subsoil providing a smooth, evenly firmed surface with a slight fall from front to back of between 1 in 70 and 1 in 100 if its situation demands. One large teeing area is less trouble to maintain but constant use by golfers can create serious wear patterns into and away from it, so, in certain circumstances, two tees can reduce tracking considerably.

Where it is necessary to elevate, build up the formation surface using clean subsoil fill, ideally free from heavy clay and large stones. Build up in no more than 225mm layers, firming adequately at each stage to eliminate soft spots. If rubble is used as fill blind it with approved coarse sand to support the topsoil. Avoid fill materials that will decompose over the years, e.g. tree stumps, as these

will lead to sinkage and unevenness at the surface.

When determining the finished level, allow for the spreading of a minimum 200mm firmed depth of sandy topsoil or a friable sand/soil mix to the tee top and a minimum firmed 150mm of a similar material on banks. Form a smooth, evenly firmed turf bed by alternate raking and heeling. Spread a pre-turfing fertiliser and gently rake into the surface soil.

Turf the area with the best material available. This can be imported from a commercial grower or lifted from a turf nursery, practice ground or the side of a fairway. Ensure that the new turf consists of an appropriate blend of grasses, ideally the finer fescue and bent ones, though other species such as perennial ryegrass (only the dwarf amenity varieties) and smooth-stalked meadow-grass might be considered to small surfaces

where wear is going to be a real issue. The turf should be free from thatch, silt or clay at its base. Once laid, settle with a light roller using an implement weighing no more than 250kg, making two passes in transverse directions. Top dress with sandy compost at a rate of around 3kg/m² working it well into the joints. Further light top dressing will be required at intervals to perfect the final true surface. If there is sufficient time available then seeding is a feasible alternative to turfing.

Do not bring newly laid areas into play until the turf is well established and a true surface for close mowing has been developed through top dressing.

In executing the works, take recognition of and comply with all statutory Health and Safety Regulations.



Technical Note

WHY GOLF GREENS BENEFIT FROM DEEP AERATION

Aeration plays a vital role in improving the structure of a soil profile to create pathways for percolating water, root development and gaseous exchange, which are all important in maintaining a healthy sward. Native soils often have higher percentages of clays, silts and fine sands and are consequently more prone to compaction and tightening, so it is essential that this is relieved when and where possible to ensure that sward health and drainage rates are not compromised.

Deep aeration is a vital operation for targeting deep-seated compaction within the soil profile. Verti-draining has become the generic term for deep solid tining to depth and the aim of this operation is to create fissuring and cracking within the profile to improve soil structure and relieve compaction to depth. Applying heave during

verti-draining (when soils are relatively dry) will help create maximum fissuring and achieve the most out of the operation. However, it should be understood that carrying out verti-draining when ground conditions are unsuitable (i.e. too soft or saturated) can be counterproductive and lead to greater destabilisation of the soil profile.

Verti-draining is an extremely adaptable operation as it can be applied to a range of depths, tine spacings and tine diameters to suit the problem. The two most commonly used verti-drain units on the market at present are the Wiedenmann Terraspine www.wiedenmann.co.uk and the Charterhouse Verti-Drain www.redeximturproducts.com. There are also linear deep aeration machines available. These relieve

soil compaction at depth and are an alternative to consider to, or complement, use of the Verti-drain. These linear aeration machines cut grooves or slits into the ground and work by applying a lateral force to break up and shatter the soil rather than using a vertical force as employed by the Verti-drain. The optimum time to use them is when soils are relatively dry to obtain maximum fissuring at depth.

The most commonly used linear aerators currently on the market include Imants Shockwave, Earthquake, Twose Subsoiler, Imants Rotoknife and Redexim Vertiquake. For additional product information on these units visit www.campeyturfcare.com, www.redeximturproducts.com and www.twose.com.