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Sustainable Golf Course Management Project



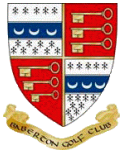
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Baberton Golf Club

Providing year round firm, smooth putting surfaces.

Baberton is an 18-hole parkland golf course, renowned for its undulating terrain, spectacular views of the Edinburgh skyline, surrounding hills and mountain ranges. Baberton is also recorded in golf club history through a famous founder member, Thomas Horsburgh, the inventor of the first steel-shafted golf clubs, which he patented in the U.K. in 1894.

The Par 69 course, which is 6,115 yards in length, has evolved through many changes since its original 9-holes were laid out by Willie Park Jnr. in 1893. The course was re-designed by James Braid in 1926, laying out an extended, appropriately challenging, yet enjoyable course for players of all standards including the ladies whose short course at the time was incorporated into Braid's new layout.



The Challenges

Like many inland golf courses over recent decades, Baberton, had been subjected to periods of over-watering and over-feeding associated with little, if any, aeration, scarification or top dressing activity. In the attempt to produce an aesthetically pleasing, green, manicured and very presentable looking golf course, undesirable consequences started to develop. Acceptable playing surfaces were only available for golfers for short periods during the mid-summer to early Autumn months and playing conditions deteriorated significantly during periods of heavy rainfall, particularly as the course entered the late Autumn/early Winter months. Temporary greens, or perhaps more permanent Winter greens, were in play from November to March each Winter and were also required on increasing occasions during the playing season. The course also struggled to encourage early growth in the Spring. In 1999 grass coverage was lost on the majority of greens, impacting on the golfing experience for all players.

Five of the worst conditioned greens had been re-constructed between 1994 and 1999 by both in-house staff and external contractors, using a form of sand-based construction and re-laying the existing turf back onto the greens. These greens did not perform as expected and the reconstruction programme was deemed an unsuccessful solution at that time.

Independent STRI agronomy reports from 1997 to 1999 had highlighted the following key issues which were having a significant impact on the standard of course presentation:

- Existing course maintenance procedures and programmes were deemed inadequate to provide consistent putting surfaces
- It was evident that a significant thatch problem had established on the vast majority of the greens.
- Deficiencies were evident in staff's technical, operational planning and management skills
- Upgrading of machinery was necessary to allow optimum efficiency.



During this period the putting surfaces were dominated by annual meadow grass, with significant levels of thatch reducing the natural percolation through the upper soil profiles. Greens became very susceptible to flooding, puddling and frequent incidences of disease. This profile consequently resulted in soft, slow and bumpy greens for golfers to play on. With very high proportions of annual meadow-grass within the sward, the downward spiral of excessive thatch and resultant poor surface drainage simply continued. When combined with the very low soil pH there was a real risk of the green surfaces being 'lost' completely if nothing was done to correct this position.

In 2000/2001 Ronnie Lumsden (sub-contracted as a consultant agronomist for the STRI at the time) recommended a programme of intense aeration and top dressing to alleviate the problems being created by the high levels of thatch and resultant poor drainage. While the programme provided a short-term success during the first season of implementation, it did require additional time, effort and focus from the greenkeeping staff, impacting on the time available to maintain the other areas of the golf course. Concern was raised by the staff that this increased workload could not be sustained within their existing resources. The greens staff numbers were increased to 6 full-time and 1 part-time to deal with this increased workload. A significant investment was also made by the club, upgrading the grass cutting equipment in 2000.

Despite a further increase in staff in 2002, staff were unable to comply fully with instructions to implement recommended programmes either due to adverse weather conditions or having alleged inadequate resources and as a consequence there was little improvement in the overall condition of the greens. Adverse feedback from members and visitors at this time reflected the poor course condition.

Solutions

Green reconstruction – decisions and implementation

In 2002, the problem culminated in the lack of reasonable putting surfaces being presented at the club, until July of that year. Whilst recognising that this was a significantly wetter year, the devastating effects on the course of another prolonged period of wet weather prompted the Council to engage consultant agronomist, Ronnie Lumsden, to advise on a sustainable, long-term solution that would allow the golf club to:

- meet the significant challenges posed by climatic change
- position the golf club to succeed over the next 100 years,
- enhance the golfing experience for all members and visiting golfers alike, both short and long-term

Given the severity of the problems within the soil structures across what is primarily a clay-based golf course, it was agreed that the most appropriate solution was to enhance the overall course drainage and reconstruct the greens to the USGA recommended method of construction, on a sand-base.

Scope of reconstruction project

Whilst undertaking a significant project to reconstruct all 18 greens to a USGA recommended method of construction, the Council agreed to also include a full design review of each hole and green, incorporating potential changes to fairway bunkers, green bunkering and tee reconstructions. This was a pragmatic decision as it meant that the hole would only be disrupted once for all works to be carried out and the costs would be covered by a modest increase in the financing budget for the overall project.

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A fundamental decision was also made regarding the type of turf to be utilised on the new greens. Initially the use of washed turf was considered but this was rejected as being labour-intensive to maintain initially and examples of its use on other golf courses had had resulted in various levels of success. In conjunction with the appointed golf course architect for the project and the contractor it was decided that the new turf would be grown off-site on the same rootzone specification as being used for the reconstruction programme. This ensured that the greens could be brought back into play quicker than by seeding, without impacting the quality of the surfaces. In an attempt to minimise the disruption to play and competition fixtures, reconstruction work was planned for the period between September and December. This allowed deep rooting to establish by early Spring the following year, with members accepting a requirement to play to temporary greens during the reconstruction period. The re-constructed greens were planned to come back into play around mid-May on a temporary basis, primarily for weekend and competition play. They would then come in to play on a full time basis in mid-June, with the proviso that they could be rested again if required – this was particularly important as some of the pilot greens were Baberton's smallest, subject to greatest wear in the walk-on / walk-off areas and were located in challenging shaded locations on the course.

The Council was fortunate at the time to be able to draw on the services of Colin Gray, a civil engineer with top level management experience of tendering, contract specification and supervision and who had been responsible for a major drainage contract for the Monarch PGA Centenary course at Gleneagles. He agreed to manage the project on behalf of the club.

The membership, however, still had serious reservations given the club's recent experience in attempting to reconstruct greens and given this history, the Council proposed to pilot three greens in the first year. The success of the pilot would be determined by an independent committee of 10 selected members, evaluating the results and recommending whether or not to proceed with the rest of the programme. The holes chosen were the Par-3 8th hole where the green sat right alongside neighbouring properties and in its current position was potentially a major health & safety issue; and the 3rd and 4th holes, which had previously been reconstructed but were generally accepted to be the weakest greens on the course.

The Council at this time were also in the process of completing an agreement with a developer to sell the current clubhouse and car park site, and while the development included the redesign and redevelopment of part of the golf course and incorporated a re-location and build of a new clubhouse, it was decided to present the proposal for reconstructing the greens independently to the membership. A Special General Meeting (SGM) in June 2003 to consider the Council's development proposal.

The motion for the Special General Meeting included the following statement :-

"The project (to reconstruct greens to a USGA recommended method of construction) has been planned taking advice from professionals in the fields of architecture, agronomy, construction and turf growing. Should the project proceed we will employ only people with successful track records in this type of work. Correct specification and tight supervision will be crucial. Council believes the project is feasible both financially and technically. The actual cost will not be known until tendering was completed but the cost is expected to be well within the proposed borrowing limit. Close financial control would be applied and all borrowings would be accurately and openly recorded."

Members were informed that plans would be put in place to present an 18 hole course lay-out while the reconstruction operations were undertaken. Specific areas would be cordoned off for safety purposes and designated routes for the use of construction traffic only would be introduced.

The members accepted the proposal which included a £50 levy per member to be made in 2004 to help finance the first phase of the project, planned for the end of that year. The membership also gave the Council the authority to borrow up to £400k on a 15 year term loan, to finance the remainder of the project. Repayment of the loan and interest was planned to be covered from the joining fee income from new members to the club.

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Phase 1

Was completed within the planned timescales and in mid-May of 2005, based on the quality of the new surfaces, the review committee agreed that the reconstruction programme had been a success and the club should proceed on the reconstruction of the rest of the greens using the same design and build specification. The rest of the work was planned to be completed in two phases over the following two years. It was decided that Phase 2, involving the reconstruction of five greens, would be carried out at the end of 2005.



Impact of New Greens on Course Maintenance Work

The demands of growing in the new greens to retain and develop the quality swards required dedicated, focused and specific work to be undertaken by the greenstaff. A balanced set of agronomic processes that allowed the greens to retain and improve their existing swards was established and growing in the new greens then became more routine in nature. The programme was, however, still very demanding given there were still a number of old, clay-based greens to maintain and addressing the existing thatch issues remained a key priority across the remainder of the golf course to attempt to maintain consistency across all the greens.

In the summer of 2005 the head greenkeeper suffered a prolonged period of ill health. During his absence, with the assistance of consultant agronomist Ronnie Lumsden, revised working practices were introduced to cover maintenance of both the new greens and the existing clay based greens. This included frequent aeration with a weekly combination of slitting and solid tining of the old greens to keep the surfaces open. Light scarifications were significantly increased to help remove the underlying thatch combined with an increased frequency of top dressing applications to further dilute the thatch within the upper soil profiles. It was also complemented by deeper aeration, as often as possible.

Ronnie also implemented a time management system for evaluating the time expected to complete the various maintenance tasks and producing daily and weekly work programmes which were achievable by the remaining greenstaff.

Playing conditions across the golf course improved dramatically during the summer of 2005, especially the surface quality of the old greens and for the first time in many years there was positive feedback from members on the course condition and presentation.



Course Management re-structuring – Phase 1

When the head greenkeeper left in November 2005, the Council approved the Club Manager's proposal for Baberton to take the unprecedented step of employing consultant agronomist and golf course architect Ronnie Lumsden in the temporary role of Course Manager. This role importantly incorporated responsibility for the training and development of the greenkeeping staff on current greenkeeping practices, and in particular on the maintenance of USGA specification greens. The role was conducted on a part-time basis, 2 to 3 days per week. Ronnie's agronomy and greenkeeping background and experience helped the club achieve certain objectives, by assuming responsibility for providing:

- Advisory agronomy services for all areas of the golf course
- Course maintenance plans and programmes, particularly for the post green reconstruction phases
- Monitoring of key maintenance activities, again particularly for the different types of green surfaces across the course post reconstruction
- Monitoring of processes over a period to establish 'best practice' and empowering staff to encourage a culture of team working, professionalism and an attention to detail
- Ad hoc on-course training
- Formal training sessions/opportunities for all members of the greenkeeping staff

Course Focus Group

To improve communication with members on course maintenance and allow members input into standards of course presentation, a focus group was formed, comprising eight members from various sections of the membership. Their role was to approve a Course Policy Document outlining expected standards of course presentation. This group then were tasked with evaluating and providing feedback to the Club Manager and course management team on whether or not these defined standards were being achieved. Regular meetings were held initially between this group and the course management team to discuss acceptable and attainable standards and to obtain detailed information on any area of concerns and complaints on the quality of course presentation from the membership.

Phases 2 and 3 of the Development

Phase 2 covering the reconstruction of 5 greens was completed successfully by the end of year 2005. The plan was then to complete the remaining greens in 2006 including the revised course design around the new clubhouse location. Plans for the clubhouse development, however, stalled and as a consequence the three greens planned to surround the new clubhouse development, were postponed.

Continuing course maintenance

Having 3 greens in Phase 1 (2004), 5 greens in Phase 2 (2005) and 7 greens in Phase 3 (2006) now all at different stages in their development, led to demands for a very different approach to the overall course maintenance programme. The 'little and often' approach to feeding, aerating and top dressing simplified the maintenance programme, making planning and applications easier for staff to manage. This also meant that no more than two weeks went by without some feed, seed, or surface aeration and dressing being undertaken. This helped complement other potentially more disruptive work, such as hollow coring, encouraging quicker recovery times for the putting surfaces, enhancing the golfing experience for members and visitors alike.

As part of the evaluation process on new grass cutting equipment in 2006, the greens staff carried out an extensive review of the various equipment available from all major suppliers. The decision on which machines to purchase was then based on the quality of course presentation each could provide and also the contribution each machine could make to improved staff efficiency. These decisions were supported by the base data collated as part of the time management system and resource allocation review previously conducted.

Course Management re-structuring – Phase 2

The role of temporary Course Manager lasted for a 2 year period in total, during which the greenkeeping team structure was revised, working practices amended and individual responsibilities allocated. Course audits became part of the working routine and a new professional approach, outlook and attention to detail was engendered across the greenkeeping team.



During this period there was inevitably some additional staff turnover. Employing new greenkeeping staff gave the club the opportunity to attract greenkeepers with additional, different experience to the Baberton team. New staff recruited had previous experience at courses such as Dalmahoy and Gleneagles. The new structure and on-going development of the staff, with the renewed focus on attention to detail across the golf course, had a very positive impact on the quality of the playing surfaces being presented to members and visitors alike.

At the end of this 2 year period, the temporary Course Manager was confident that the staff had now developed to a level that would allow them to successfully take on full responsibility for managing the course. A new Course Manager and Assistant Course Manager were therefore appointed from within the existing team.



Outcomes

Environmental Benefits

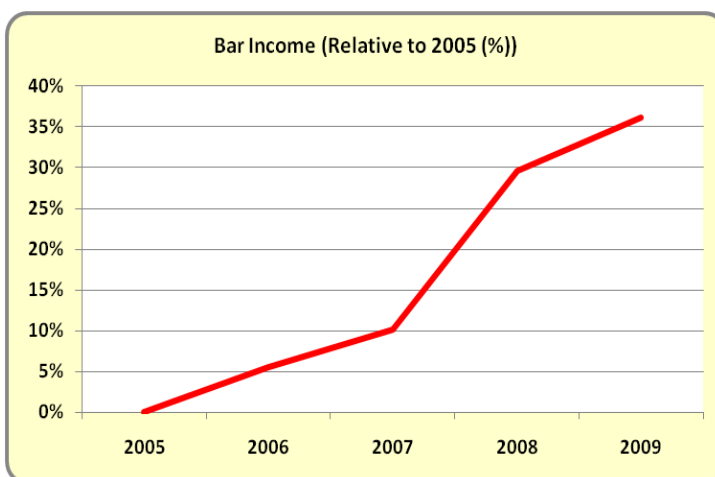
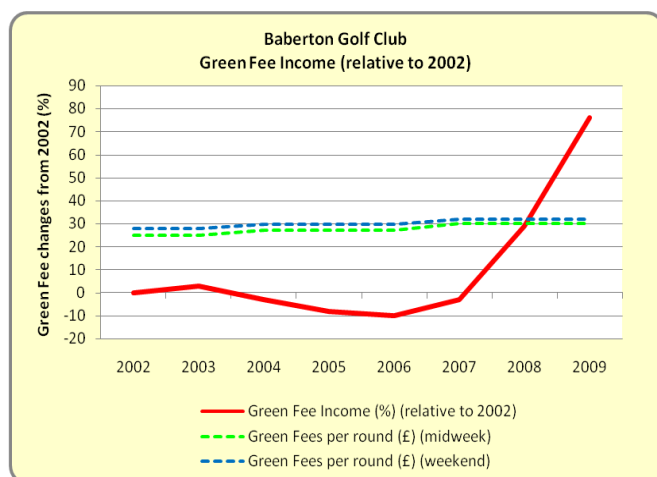
- Of the initial greens reconstructed on Holes 3, 4 and 8, the green on Hole 8 was faring far better than the other two. This required additional, specific attention to the 3rd and 4th holes as these greens struggled to retain a good sward until well into the summer months. Most notably the proportion of bent grass which was strong element of the original turf laid was now visibly weaker. Fundamentally, the nutrient content of the new growing medium/rootzone was too low in many elements, including calcium and phosphate. The previous management's regime reluctance to apply phosphates to discourage annual meadow-grass clearly hindered the development of a bent dominated sward.
- The nutrient regime was therefore altered to ensure that required levels of calcium and phosphate were established. These elements were re-applied into the soil profile and with a light and regular fertiliser programme combined with regular bentgrass overseeding, superior bent dominated swards were achieved.
- One of the keys to success was the introduction of a planned course management programme. Aeration, feeding, dressings and overseeding all became 'little and often' processes - helping improve the quality and health of the green swards across the course. For the newly constructed greens, the work to prepare the putting surfaces, which had earlier included some regular light verti-cutting was now be limited to light brushing on a more regular basis. Mowing was balanced between hand-cutting and ride-on mowing. Thatch management would be in the form of micro-coring three times per annum during May to September. If conditions at the time dictated, solid tining replaced hollow coring, where appropriate.
- As the newly constructed greens developed they became far less prone to disease than the four older clay based greens, maintaining a healthier bent dominated sward.

Managing the ingress of annual meadow-grass

- Annual meadow-grass management is a significant challenge on new green reconstructions dominated by the finer grasses. Initially any new annual meadow-grass plants establishing themselves were removed by hand. This method was, however, very labour intensive and therefore not sustainable longer-term. Annual meadow-grass ingress is now therefore restricted by the 'little and often' processes principally keeping the surfaces well aerated, freer draining hence reducing surface water, regularly top dressed and regularly overseeded with bent grasses. Regular brushing, especially around Spring/Early Summer, also helped control the annual meadow-grass seed head development on Baberton's newly constructed greens. Ensuring a free draining upper soil profile creates an environment, encouraging for the establishment of the finer grasses. Combining this regular aeration work with regular overseeding provides ideal competition for annual meadow-grass which is not 'at home' under these conditions struggling to survive in drier top soil profile conditions. The results at Baberton of this management philosophy have been very successful and any ingress of annual meadow-grass has been restricted to small areas and has been successfully managed.

Economic Benefits:

- Reduced staff numbers to a current team of five has enabled the club to make substantial ongoing annual savings in salary costs.
- Increased costs of materials for regular maintenance e.g. top dressing materials, has been offset by the significant savings on pesticides due to the reduced disease incidences (£5,000 spent in 2004 – average £600 since 2007)
- Baberton's increasing reputation for good course conditions has seen visitor green fee revenues increase significantly (+96%) since 2006 and unlike the experience of many other golf clubs bar income has also increased year-on-year since the green reconstruction programme was completed.



- The course now only closes for snow and frost cover, or for short periods after heavy rainfall until the slopes on the rolling terrain dry out, mitigating against any health & safety risks of players slipping

Success criteria

- Clubs commitment to employ an external consultant to help determine the best way forward for the club's course management policy.
- The employment of an external consultant to train and update the staff's technical knowledge of best practice for maintaining both traditional soil based and newly constructed sand based greens. In addition the external consultant also delivered improvements in operational course management planning and enhanced existing staff's management skills.

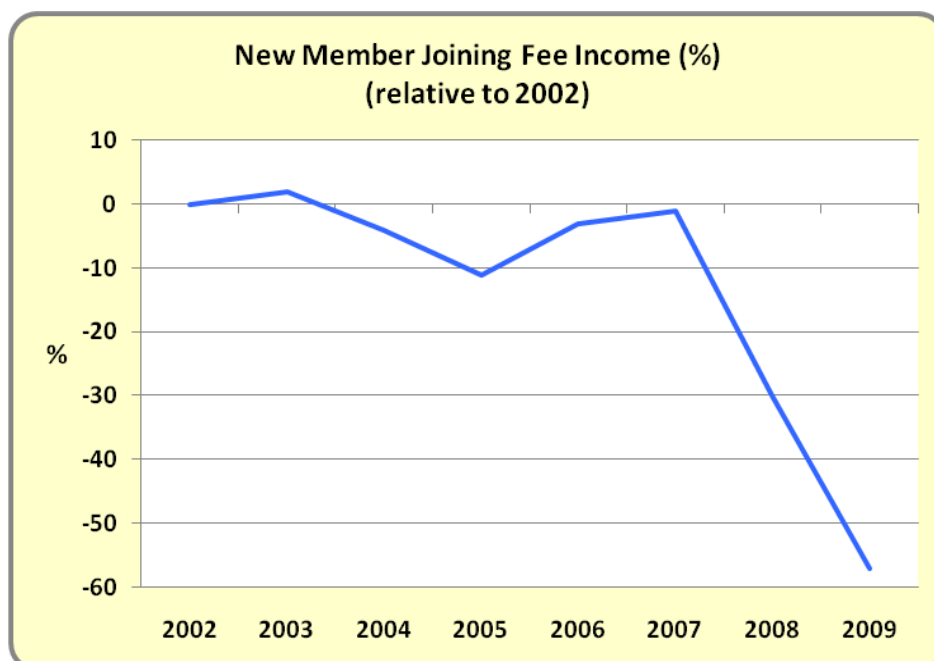
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- Club's initiation of a rolling machinery lease purchase programme, ensuring that the greenkeeping staff always have the right tools available for them achieve the high standards of course presentation expected by members and visitors alike.
- Club's commitment to adjusting the competition fixture lists to accommodate and support the greenstaff's 'little and often' micro-coring/top dressing applications. These and other course maintenance operations can now be planned and completed without any disruption to club competitions, and minimal disruption to midweek play on the course.
- Sound financial management of club's affairs to sustain a major development in the current economic climate.

What Next?

- The Club Manager retired at end of March 2010, his successor will now inherit the on-going responsibility of managing the greenkeeping operations and continuing the strategy of continuous course presentation improvement.
- Looking forward, there are plans to address a number of projects, some of which remain dependent upon when funds can be made available:
 - Upgrading the greenkeepers bothy
 - Developing on-line communications with members
 - Club's new website will include a section for the Course manager to update daily with information on the course
 - Building a new clubhouse, incorporating the reconstruction of the three remaining clay based greens and the practice putting green
- As with other clubs who have had to borrow to complete development projects over the past few years, given the impact of the current economic climate and significantly reducing levels of new member joining fees, it is imperative that the club continues to manage finances efficiently, ensuring budgets and cash flow plans are achieved.



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- The new clubhouse development will once again bring in a requirement to manage the newly constructed greens at different stages of development to the other greens on the course. The experience of dealing with this through the different phases of greens reconstruction should stand the greenkeeping staff in good stead to cope with the different maintenance regime that will be required. Unfortunately the clubhouse development was delayed due to the current economic climate and the club is acting prudently to ensure that any further project work does not require the club to commit to any additional borrowing. The location for the new clubhouse once initiated will trigger the re-modeling and reconstruction of the three remaining clay based greens, which will surround the new clubhouse position.
- Baberton still has four old clay based greens, including the practice putting green. These greens require a separate maintenance programme involving more intense aeration and verti-cutting work in an effort to maintain them as near as possible to the standard of the newly constructed, sand based greens. The greenstaff work hard to ensure as much consistency as possible between the different types of greens although the older clay based greens inevitably suffer during the wetter and colder winter months reverting to softer and bumpier surfaces.

If you would like to discuss the content of this case study, the work undertaken by Baberton GC or make any enquiries on specific elements of the programme of works, please contact

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