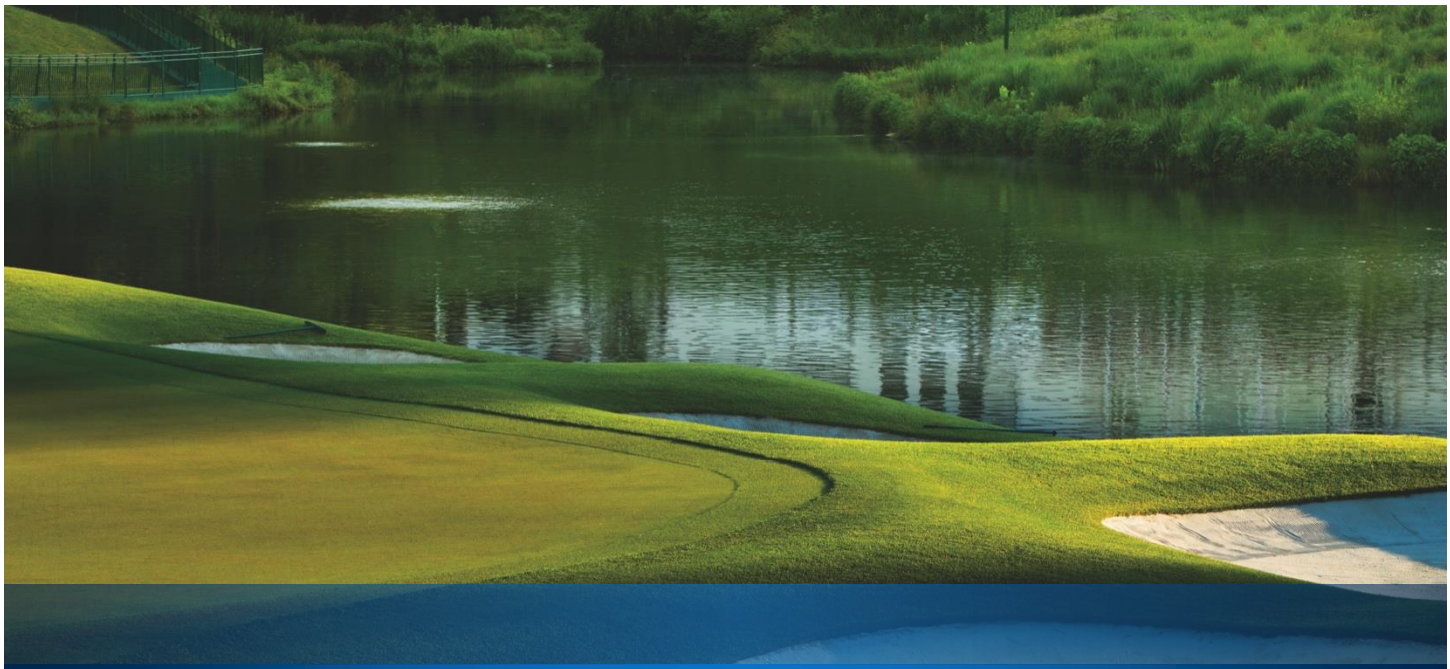

COURSE CONSULTING SERVICE

Onsite Visit Report

Cranberry Valley Golf Course
Harwich, Massachusetts

Visit Date: July 12, 2018

Present:
Mr. Shawn Fernandez, Golf Course Superintendent
Mr. Roman Greer, Director of Golf
Mr. Clem Smith, Chairman, Harwich Golf Committee
Mr. John Crook, Golf Committee
Mr. Peter Wall, Chairman, Capital Outlay
Mr. John Wheeler, Golf Committee
Mr. Dick Fagan, PGA Head Professional
Mr. Rob Donovan, Assistant Superintendent
Mr. Spencer Jablonicke, USGA Intern
Mr. Jim Skorulski, USGA Green Section

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The USGA Green Section develops and disseminates sustainable management practices that produce better playing conditions for better golf.

Background

This report is provided for the Course Consulting Service visit at Cranberry Valley Golf Course on July 12, 2018. It is always a pleasure for me to return to the facility to conduct this visit. I was especially pleased to see that the information gained from the GPS logger study was being utilized to modify forward tees and to reexamine the placement of sand bunkers. The information may also be helpful to prioritize maintenance and irrigation going forward.

Executive Summary

We used our time together to tour the golf course and examine the work that has been completed since my last visit. We examined the rootzones in several greens and evaluated the impacts of trees on a number of playing areas. The following topics will be covered in this report:

Rootzone Management

Observations

1. **Several greens were probed as we toured the golf course.** I found root development to be strong and consistent in the greens we examined. The depth and vigor of rooting are good considering this point in the summer season and the heavy traffic the greens receive.
2. **There is a significant thatch layer (organic matter accumulation) in the upper inch of the rootzone.**
   - The organic matter can leave the green surfaces softer than desired.
   - The mat retains moisture longer than desired.
   - Once the organic material dries it can become water repellent. This can make it difficult to rewet water repellent soils in the rootzone.
3. **The rootzone in the 12th green contained more moisture than is desired.**

Recommendations

1. **The hollow tine aeration continues to be the best means to manage the organic mat near the greens surface.**
   - Continue to complete the practice in October preferably with 5/8-inch hollow tines. Complete the aeration in as early October as possible to allow the greens time to heal before winter. The core aeration is repeated in spring. Complete that practice with 5/8-inch hollow tines on a 2-inch x 2-inch spacing and make every effort to fill the coring holes with sand.
   - Solid tine aeration might also be used if hollow tine aeration is not practical for the operation. If solid tine aeration is used, then I recommend using 5/8-inch tines and applying the sand prior to the cultivation. The sand should be topdressed heavily on the surface with the objective of filling the holes. Facilities that topdress prior to the solid tine cultivation report that it is easier to incorporate the sand into the rootzone.
   - The solid tine aeration will not physically remove thatch but will help incorporate sand into that layer. It would be used to recover the surfaces more quickly. However, it will be beneficial to use hollow tines in spring and fall until the thatch mat is reduced.
2. **We discussed dethatching (Graden sand injection machine) as another tool to reduce the organic material near the surface.** This machine uses 2-millimeter blades to cut channels in the greens and remove the organic material. The machine also drops sand into the groove that is created. This will have an immediate effect on the firmness of the surfaces.
   - The practice would be completed in early – mid-October to provide time for the surfaces to recover before winter.
   - The dethatching program is probably not necessary if the greens can be core cultivated with hollow tines in the spring and fall season. It would be an option if solid tine aeration is used for one of the events.
   - The dethatching operation would be done by an outside contractor.
3. **Continue to use the Verti-Drain to fracture the soils below the amended rootzone.** That practice should be done later in fall.

4. **I support the program to vent the greens with small diameter solid tines throughout the summer season.** The small holes created by this practice allow gas exchange through the rootzone. That will help to sustain the root system longer into the summer season.
5. **Use verticutting units to cultivate the greens through early summer.** The verticutting will slow the accumulation of thatch and help incorporate sand into the dense turf canopy.

Trees

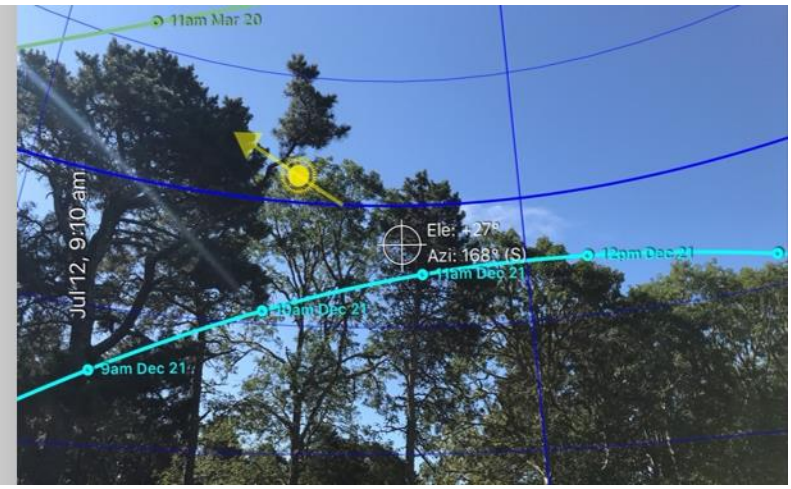
Observations

1. **Tree work throughout the golf course is progressing.** The work completed on the 7th hole is a good example of the improvements that can be made with the tree removal program.
2. **There is a large amount of selective tree removal work required across the golf course.**
    - Trees that impact the playing surfaces on putting greens and tees should be the highest priority for removal.
    - Trees that are impacting air circulation and turf quality on fairway and rough areas, and trees that are impacting play corridors would be the next the highest priority.

Recommendations

1. **There are still many areas of the golf course where tree stands need to be cut back and thinned.**
    - One such area is the right side of 5 fairway to No. 6 green to improve air circulation in that area. Hopefully that work can be initiated this fall.
2. **Thin trees growing behind No. 7 green.** It was also recommended to remove the shrubbery that has been planted along the back of the green.
    - Shrubs growing in other areas on the golf course should also be removed. Indiscriminate plantings do not belong on the golf course.
3. **Remove trees growing along the left side of No. 7 tee (two oak trees) to increase the sun penetration to this tee.**
    - The work that has already been done has improved the site but any trees that can be removed from the south side of the tee will be beneficial.
4. **I also recommend removing most of the smaller oak and pine trees growing on the right side of the 6th tee.**
    - This will leave two – three larger oak trees that will separate the tee from No. 11 green. The removal work will improve the appearance of the area and more importantly reduce root competition with the turf and provide wider movement of traffic.
5. **Selective tree work along the right side of No. 11 green will increase morning sun exposure to the turf.** The Sun Seeker app shows the suns path and the impacts the trees are having in blocking sun to the green.

The Sun Seeker app shows the need to remove trees that are blocking fall and winter sun on No. 11 green. Additional trees may need to be thinned to increase morning sun exposure there in the summer season.



6. **Remove some of the smaller oak trees that are growing inside the cart path behind No. 11 green.**
   - The trees serve no purpose and only impact turf quality adjacent to the green. The trees will also impact the cart path as they mature.
   - Removing unnecessary trees like this will help reduce maintenance costs.
7. **Air circulation on No. 12 green is impacted by a dense tree stand.**
   - The lack of air circulation is keeping the soil profile in this green wet.
   - Remove trees from the back and back left side of the green towards No. 13 tee to increase wind circulation and dry the green site.

Green Expansion/Restoration

Observations

1. **We discussed modifying mowing lines around several greens to create larger apron areas.**
   - Creating larger aprons will provide greater shot opportunities that should make the holes more enjoyable for the golfer.
   - Creating apron areas is also the first step in converting some of the perimeter areas back into putting green turf to provide additional hole locations and provide wider distribution of traffic on the greens.
   - The apron adjustments were discussed for the 11th and 12th greens.

Recommendations

1. **Lower heights of cut in areas where the aprons will be expanded.** The height adjustments should be initiated in September or when temperatures become more moderate. Core aerate the areas aggressively at the same time the greens are aerated. They should be treated in the same fashion as the putting greens.

- Eventually some of the apron areas can then be converted into putting green turf (once the thatch is reduced and underlying soils have been modified with sand). We can discuss the green restoration program in more detail once those areas are better prepared for it.

Tees

Observations

1. **I was very glad to see some of the new forward tees that have been installed and to hear that you are working with your golf course architect to locate additional tees.** The new forward tees will make the golf course much more enjoyable for a wider range of golfers and should also have a positive impact on pace of play.
2. **Many of the original tees are very large in size and are not fully utilized.** The limited use over some areas of the tees increases thatch in those areas and results in higher maintenance costs.
3. **The turf quality on the tee boxes was good with no agronomic concerns.**

Recommendations

1. **Continue to move forward with installing the forward tees based on the information provided by the GPS tracker visit.** I fully support the work that has been done and will go forward with the golf course architect who will also modify some fairway contours to better suit the location of the new tees.
2. **It might be possible to readjust some tee shapes and tee orientation with fairways through mowing changes.** The mowing changes can be initiated in the late summer or early fall seasons.
3. **Tees that are not being fully utilized might be reduced in size.**
4. **We discussed the renovation plan for the back tee on the 11th hole.** The forward tee on that hole is right in the primary site line from the back tee. Any steps that can be taken to relocate that tee or to lower its elevation, so it is no longer in the site line, would be beneficial.
5. **We also discussed the current location of the forward tee on be 13th hole.** Room is available to relocate that tee to the right towards the cart path. That would provide a good angle to the putting green. Discuss the tees location with your architect.

Fairways

Observations

1. **The fairways were performing well this summer outside of areas where the irrigation was not operating.**
2. **The perennial ryegrass is a practical choice for the fairway surfaces.**
   - Its ability to establish quickly and to persist under high traffic make it a good species for a busy operation.
   - The only concern with the ryegrass is its susceptibility to grey leaf spot disease which will be a concern during periods of hot and humid weather.
3. **Root development in the fairways was strong.** There was minimal thatch observed.

4. **The core aeration, slice seeding, and solid tine practices are all contributing factors to the improved fairway conditions.**

Recommendations

1. **The cultivation and overseeding practices in place are sound and no changes are recommended.**
2. **It is important to monitor the irrigation system more closely to make sure all the sprinkler heads are operating off the central controller and are rotating.**

   - Check the operation of all sprinkler heads weekly during the summer season.

Water Management

Observations

1. **A significant investment was made to upgrade the irrigation wells and control system.**
2. **Power outages over the winter and early spring season apparently impacted the controllers, which has impacted irrigation practices into the playing season.**
3. **We discussed options to reduce water use on the golf course.**

   - The primary water reduction will come from reducing irrigated acres (low or non-play areas). The following table provides a theoretical water use budget for your golf course. The table is based on historical ET and monthly rainfall totals for your region.

Water Budget Calculations for Golf Courses using Average Rainfall

This spreadsheet uses **average annual rainfall** in the proposed water budget calculation.

Month	ET_o Daily [w] (inches)	ET_o Monthly (inches)	Average Rainfall (inches)	Effective Rainfall [x] (inches)	ET Adjustment Factor [y]	Irrigated Area [z] (acres)	Water Budget Proposed [a] (gallons)		Actual Water Use (gallons)	Actual Rainfall (inches)
Jan	0.00	0.00	3.66	1.83	0.8	100.00	0			Jan
Feb	0.00	0.00	3.31	1.66	0.8	100.00	0			Feb
Mar	0.08	2.48	4.49	2.25	0.8	100.00	0			Mar
Apr	0.12	3.60	3.86	1.93	0.8	100.00	2,579,630			Apr
May	0.14	4.34	3.19	1.60	0.8	100.00	5,096,806			May
Jun	0.14	4.20	3.39	1.70	0.8	100.00	4,521,141			Jun
Jul	0.16	4.96	2.80	1.40	0.8	100.00	6,973,147			Jul
Aug	0.14	4.34	3.19	1.60	0.8	100.00	5,096,806			Aug
Sep	0.12	3.60	3.50	1.75	0.8	100.00	3,068,402			Sep
Oct	0.09	2.79	3.75	1.88	0.8	100.00	969,398			Oct
Nov	0.06	1.80	4.06	2.03	0.8	100.00	0			Nov
Dec	0.04	1.24	4.17	2.09	0.8	100.00	0			Dec
TOTAL	1.09	33.35	43.37	21.69			28,305,330	Total gallons	0	TOTAL 0
							86.87	Total acre feet	0.00	

   - The water budget table is calculated on average historical monthly evapotranspiration rates and rainfall rates based on irrigating 100 acres of turf and replacing all the water lost through evapotranspiration. The tables and other water conservation tools can be accessed through the USGA Water Resource Center and the video Developing A Water Budget explains the budget process further.

Recommendations

1. **The primary water reductions will probably occur by reducing and in some cases eliminating irrigation from non-play or low play/low traffic areas.**

   - The data logger information helps to identify those areas where water reductions might be possible.

- Moving to part-circle irrigation heads on tee boxes offers an opportunity to eliminate irrigation from tee surround areas where there is no traffic. Some of those areas might also be allowed to naturalize at that point.
- There were also some areas surrounding greens that receive little or no play that might be suitable for reductions in irrigation. The irrigation system would be programmed to significantly reduce the water applications. It might be possible to accomplish this through a deficit irrigation program where water applications are based on replacing 60 – 70% of water lost through ET.

2. **Any opportunity to further reduce water applications in the fairways would also be beneficial.** Visit the Water Resource Center to observe case studies and other water conservation techniques.

Ponds

Observations

1. **Water quality in the ponds has improved with the addition of the bubbling systems.**
   - The bubbling system helps to circulate water and maintain more oxygen in the water column.
   - The added oxygen supports bacteria that can make nutrients unavailable to algae and aquatic plants.
   - The added oxygen also improves water quality to better support fish and produce a more balanced system.

Recommendations

1. **The pond systems are much improved, and I have no additional recommendations.** Well done!

Equipment Wash Area

Observations

1. **Equipment is being washed away from the maintenance facility.** The leachate water from the wash area is filtered from dense turf and vegetative canopy. This is probably sufficient at this point in time.
2. **A larger wash area will be developed for the golf carts.** This area would also be viable to wash maintenance equipment.
   - There are self-contained washing units that can be installed. Units from Carbtrol and other manufacturers are commonly seen at facilities across the Northeast for this purpose.
   - We also discussed a manufactured wetland to filter water from wash off facilities.

A manufactured wetland area developed at Baker Hill Golf Club is used to filter rinsate water from the operation. A larger designed wetland system would be required to manage the higher water volumes generated from the golf cart operation.

Recommendations

1. **Work with UMass to determine if the wetland system is a practical option to filter rinsate water from the cart barn operation.**

    - I have contacted Michelle DaCosta who should be in touch with you to set up a cooperative effort in that regard.

Summary

It was exciting to see the installation of the new cart barn and all of the work that will improve the entrance to the golf facility. That work will significantly improve traffic flow and make the facility more inviting. It is also exciting to see that resources continue to be made available to improve the golf course and keep it competitive with other facilities in the area. There are a number of longer range needs including improvements to the cart path system, the constant repair of sinkholes, a bunker renovation program, the addition of new tees and possibly upgrading the practice facility.

Finally, I want to encourage that the tree work be completed, especially targeting some of the dense pine stands that line a number of holes. Thinning those tree stands and, in some cases, replacing the trees with fine fescue turf will improve air circulation through the property, will help to highlight some of the surface contours and will change the character of the course.

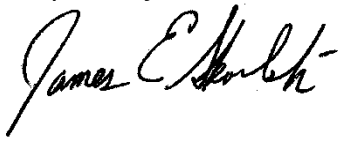
Additional Considerations

Do not hesitate to contact the office if there are any questions regarding this report or should any questions arise as the season progresses. The Green Section appreciates your support of the Course Consulting Service and we hope to be able to continue to work with you going forward. Finally, we encourage you to visit the USGA website for additional information on a number of golf course management topics.

USGA Green Section Record

If you would like to receive the USGA's electronic publication, the *Green Section Record,* click here. It is free, informative and sent directly to you via email every two weeks.

Respectfully submitted,



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USGA Green Section, Northeast Region

Distribution:
Mr. Shawn Fernandez, Golf Course Superintendent

About the USGA Course Consulting Service

As a not-for-profit agency that is free from commercial connections, the USGA Course Consulting Service is dedicated to providing impartial, expert guidance on decisions that can affect the playing quality, operational efficiency and sustainability of your course.

First started in 1953, the USGA Course Consulting Service permits individual facilities to reap the benefits of on-site visits by highly skilled USGA agronomists located in Green Section offices throughout the country.

For questions regarding this report or any other aspect of the USGA Course Consulting Service, please do not hesitate to contact our office.