COURSE CONSULTING SERVICE

Onsite Visit Report

Conestoga Golf Club
Mesquite, Nevada

Visit Date: July 28, 2021

Present:

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

Executive Summary

Thank you for the invitation to conduct my first Course Consulting Service (CCS) visit to the Conestoga Golf Club on behalf of the USGA Green Section. The purpose of the Course Consulting Service is to collect and distribute information on the proper construction and maintenance of golf courses. Each visit offers an impartial yet concerned perspective regarding turfgrass growth requirements, practical information on maintenance practices to address your needs, and sharing information from other courses that we visit that may be helpful to your operation. This information is provided free of bias since the USGA is not affiliated with manufacturers or suppliers. In short, we are a tool to help your superintendent and management team provide better turf for better golf.

First impressions are always important, and I am happy to report that my first impression of this golf course is that it is well maintained with better turf health and cover than most. It was great to see excellent turfgrass health and density across all playing areas from tees to fairways to roughs to greens. Additionally, it was impressive to see the level of detail on the golf course. It was surprising to hear that there are only ten fulltime employees and three seasonal employees. Compliments are extended to Mr. Buckner and his entire agronomic team for producing such good conditions with a low staff level compared to other 18-hole-equivalent golf courses. During this initial visit, we were able to spend time discussing all golf course playing areas as well as have a high-level discussion on long-term capital planning and infrastructure upgrades. A brief summary of these topics is offered below:

- **Long-range capital planning.** We discussed the importance of a long-range capital infrastructure improvement plan that will outline course improvement projects over the next five to 20 years. The first section of this report will offer some details on such a capital replacement program and will offer a few areas of priority such as irrigation and bunkers.
- **Putting greens.** The Tifdwarf putting greens have excellent health and density. It is clear the cultural practices over the last few years have done a fine job of diluting surface organic matter. However, it appears that in prior years, there was not enough aeration and sand topdressing and therefore there are high organic matter levels that are limiting water infiltration. We will discuss methods to improve water infiltration and surface management practices to improve the putting surfaces.
- **Putting green collars.** Mr. Buckner has done a nice job of maintaining healthy bermudagrass collars and lowering the elevation through aeration and rolling to avoid the collar dams that trap water on greens.
- **Fairways.** Bermudagrass in fairways is in excellent condition. These are some of the best fairways I have seen recently. We will discuss transition strategies to recover the bermudagrass in the spring as well as surface management practices to reduce the mower scalping.
- **Roughs.** The bermudagrass roughs are also in good condition, but there are localized low-lying areas with concentrated golf cart traffic that have resulted in weak and thin bermudagrass. We will discuss a number of aeration and drainage strategies to improve these areas and encourage some form of golf cart policy to reduce the damage from cart traffic.

- **Tees.** The bermudagrass tees are in healthy condition and, after about 14 years, it was good to see the tees do not have any significant crowning. The primary topic on tees in this report will offer some data on forward tees which would go a long way for the demographic playing at Conestoga Golf Club.
- **Irrigation.** It is now time to begin planning for replacing some components of the irrigation system such as sprinklers, satellites and the pump station.
- **Bunkers.** In my opinion, the project that would yield the most benefits at Conestoga would be a bunker renovation. The bunkers are too large, too deep and too difficult for golfers to walk into and out of, especially golfers of maturing age.

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Long-Range Capital Planning

Recommendations

It was recommended to develop a long-range master plan to improve the general appearance and playing quality of the golf course and more accurately plan future improvement programs. There are actually two types of long-range master plans: architectural and non-architectural.

1. **Architectural Plans**

   Architectural plans take into the account design features of the golf course including:

   - Greens
   - Tees
   - Bunkers
   - Course routing
   - Water features

2. **Non-Architectural Plans**

   Non-architectural plans take into account the following seven main factors:

   - Irrigation system
   - Drainage
   - Equipment
   - Maintenance facility
   - Labor
   - Cart paths
   - Trees

3. **Items for Inclusion at Conestoga**

   It is important to consider both architectural and non-architectural items to ensure the long-term success of improvement projects and avoid doing projects over. Based on our tour of the course, the following items are offered for your consideration for incorporation into a long-range master plan:

   - **Bunkers.** Redesign bunkers to reduce labor and sand costs associated with bunker maintenance and improve the bunker design to make them more golfer-friendly.
   - **Irrigation.** The pump station is in poor condition and system components such as sprinklers, valves and satellites will need to be replaced within the next few years.
   - **Labor.** With only ten fulltime staff, there is no labor for small projects, golf course detail, thatch and organic matter cultural practices, and proper irrigation management.
   - **Drainage.** Low-lying areas on the golf course need more drainage.

Putting Greens

Observations

1. **Healthy Tifdwarf Bermudagrass**

   We were able to walk on most all greens on the golf course and take a number of core samples to evaluate the health of the Tifdwarf bermudagrass. Without a doubt, the Tifdwarf bermudagrass in these greens is very healthy with deep rhizomes down 2 to 3 inches beneath the surface and roots extending to 6 to 7 inches in most areas.

Left: Deep roots extending to at least 6 inches were found in greens.

Above: The thatch depth is about 1.25 inch, which is higher than ideal.

2. **Thatch and Organic Matter**

   The greens contain elevated thatch and organic matter in the top 3 inches of the greens. However, within the top 1 inch of greens, it is clear that there is adequate sand to dilute thatch and organic matter which is indicative of the more routine sand topdressing program deployed by Mr. Buckner and his agronomic team.

3. **Recent Drill & Fill Event**

   The day prior to our course tour, the greens received a Drill & Fill® process whereby deep drills were cored in greens, removing the existing sand and replacing with new sand. This process has a history of showing beneficial impact on putting green drainage and water infiltration.

4. **Surface Scalping**

   Given that the greens are very healthy and are growing aggressively, we saw some scalping from mowers following the recent vertical mowing event.

The greens were scalped by the recent mowing following the Drill & Fill and vertical mowing. The elevated thatch and aggressive growth are contributing to mower scalping.

5. **Black Layer**

   We observed some black layer, which is an anaerobic condition indicative of waterlogged conditions on the very front part of No. 12 green.

6. **Physical Soil Tests**

   Physical soil tests collected in 2017 revealed elevated organic matter in the top 4 inches of greens. Consequently, the capillary porosity (number of pores filled with water in the top 4 inches) of this profile was very high at a level of 40 to 45%. This is much higher than what is considered ideal (ideally the capillary porosity is 25 to 30%).

7. **Salts**

   A handheld salinity meter revealed that despite the elevated organic matter and poor water infiltration in the top 3 to 4 inches, the greens generally do not contain elevated salinity, although we did observe a few areas where water accumulates with some elevated salts. Given the water salinity is about 2.6 to 2.7 dS/m, these greens will always have high enough salinity levels to at least slow the growth of the overseeded *Poa trivialis,* and there is definitely a favorable environment for the rapid blight disease.

Recommendations

1. **Thatch and Organic Matter Management**

   Recommendations for thatch and organic matter management will include three primary items: (1) more surface disruption through aeration, (2) continuing with your routine sand topdressing program, and (3) lowering the nitrogen inputs. Please consider the following:

   - **More surface disruption.** It is recommended to conduct two aerations annually as you have been in late June and late July. During each of these two aeration events, it is recommended to make three passes over the greens. It is recommended to conduct deep tine aeration to penetrate 8 to 9 inches in greens. It is recommended to make two passes with either a solid tine or hollow tine 5/8-inch diameter on a tight spacing of 1.5 x 2" over the greens. After the first pass, topdress the greens and clean the surfaces and about two days later, conduct a second pass at a 30° offset and again topdress to fill the holes. This process will disrupt about 16 to 17%. Conducting this twice annually will disrupt over 30% of the putting surfaces and will go a long ways to diluting organic matter in the top 3 to 4 inches and improving water infiltration.

- **Sand topdressing.** You have clearly done a very fine job of routine sand topdressing and it is suggested to continue. We discussed omitting sand topdressing in December, January and potentially February, depending on temperatures. During the summer months, it would be great to slightly increase the frequency of your sand topdressing to as often as once weekly, which will help to combat the mower scalping.
- **Nitrogen inputs.** With the high organic matter levels in greens, once temperatures turn warm and especially when some humidity arrives, there will be a fast mineralization of the organic nitrogen into a usable form. As such, it is recommended to omit nitrogen from the putting green program after early-June and only spot fertilize where needed. Immediately prior to the two aeration events, it is recommended to apply about 2/10 pound of nitrogen per 1,000 square feet, but it is advised to apply no more than this amount. Some superintendents have found that NO nitrogen is needed around aeration events and given the elevated organic matter in these greens and therefore the potential for high mineralization rates, I would err on the low side for nitrogen inputs. From early June through two weeks after overseeding, there should be very minimal nitrogen inputs.

2. Surface Management

Surface management on the bermudagrass greens will include vertical mowing and growth regulation. Please consider the following comments for each of these practices:

- **Vertical mowing.** We discussed tightening the vertical mowing blades to use only two spacers separating the blades, which will allow you to impact a greater amount of surface area. In general, vertical mowing blades should be set from as low as even with the bottom of the rollers to as deep as about 0.090 inches below the bottom of the rollers for routine vertical mowing events. The objective of the routine vertical mowing events is not necessarily thatch reduction, but merely to cut leaf blades growing horizontally along the ground and stolons that have grown on top of one another. Ideally, this light-intensity operation will be conducted once weekly throughout the bermudagrass growing season and can be combined with sand topdressing. It is recommended to conduct a more aggressive vertical mowing event immediately prior to your two aeration events. For these events, set the blades about 0.200 to 0.250 inches below the bottom of the rollers. Golf courses with Tifdwarf bermudagrass will also frequently conduct vertical mowing immediately prior to overseeding. For this practice, blades are typically set 1/8 inch below the bottom of the rollers but conducted in multiple directions, making as many as six to eight passes over the greens to create plenty of channels in which to incorporate the new seed.
- **Growth regulation.** From early June through overseeding, it is recommended to use a combination of trinexapac-ethyl and the plant growth regulator Anuew™ in combination. The trinexapac-ethyl is often applied at 2-4 ounces per acre and Anuew, applied at 4 to 8 ounces per acre every 10 to 14 days. It is recommended to omit these applications 7 to 10 days prior to your two summer aeration events, and resume about two weeks after these events. Immediately prior to overseeding it is recommended to increase the trinexapac-ethyl rate to about 20 ounces per acre.

3. **Combatting Rapid Blight Disease**

   To help mitigate damage from rapid blight disease, it is recommended to spray Insignia® fungicide within one week of the first mowing on greens. Hopefully you will not need additional applications but, if needed, continue to spray either Insignia or Velista® fungicides for rapid blight control.

   - Use a granular calcium sulfate application at overseeding and continue about every two weeks through mid-November.
   - Keep up with your small-diameter venting operations on greens and even more frequently in low-lying areas where water tends to accumulate.
   - Here is a research reference for your review on Rapid Blight: Microsoft Word - Rapid_Blight_2014_revised.docx (ucr.edu)

Putting Green Collars

Observations

1. **Recent Aeration**

   It was great to see the putting green collars were recently core aerated and rolled to help lower the elevation and also encourage better water infiltration. It is quite common for putting green collars to become raised in elevation when compared to the adjacent putting greens and therefore trap water on the greens and impact playability. It is good to see that Mr. Buckner and his team have been actively managing the raised collars and I do not see any areas with significant issues with collar dams.

Recommendations

1. **Continued Core Aeration and Rolling**

   Given that the collars are not severely elevated over the greens, it is recommended to continue with your current plan to core aerate several times per year and use a heavy roller to flatten the collars.

Fairways

Observations

1. **Excellent Bermudagrass Health**

   The Tifway 419 bermudagrass health across all the fairways is excellent in late July. These are some of the healthiest bermudagrass fairways I have seen recently.

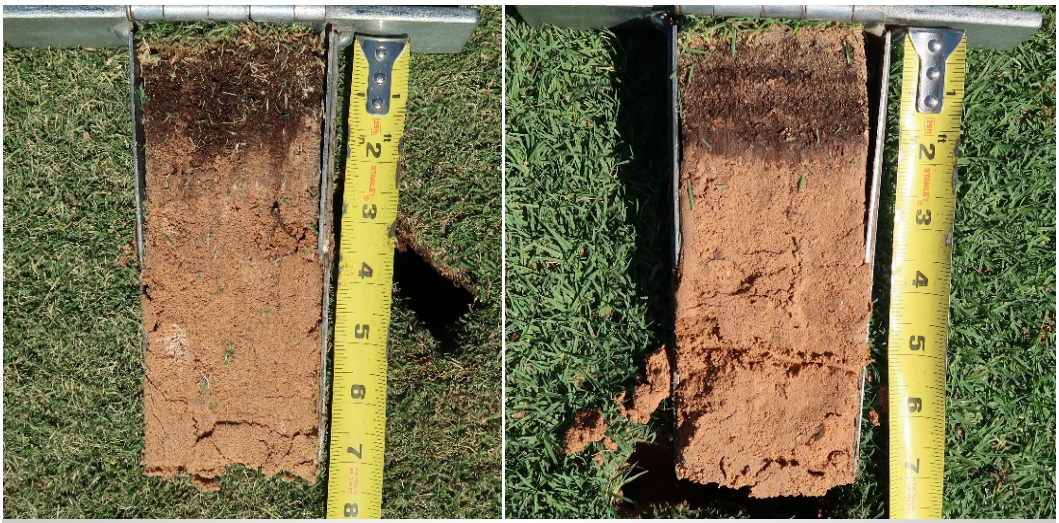
2. **Bermudagrass Scalping**

   Given the health of the bermudagrass and the aggressive growth with the recent higher humidity, we did observe some scalping from mowers as they try to keep up with growth.

The bermudagrass in the fairways is growing aggressively and it is difficult for mowers to deliver a good quality cut given the high growth rate.

3. Soil Profiles

Several soil profiles collected from fairways yielded different results. Most soil profiles collected from the top 7 inches of fairways show a thick organic matter layer at a 2- to 3-inch depth overlying a fine native sand. However, in other areas we observed a much higher silt and clay content at about the 5- to 6-inch depth. Additionally, Mr. Buckner noted that in most areas there is a silt/clay layer that resides about 1 foot beneath the native sandier soil.



Although these profiles appear similar, the soil on the left is a fine sand and silt while the soil on the right has a much heavier silt/clay layer at the 5-inch depth.

4. Salinity

In general, salinity was not elevated in fairways, but we did observe localized areas, typically low-lying areas, with elevated salts as measured by a handheld salinity meter. It is good to report that at least at this time, the salts are not high enough to harm bermudagrass or the overseeded ryegrass. However, we observed a different scenario in localized areas in roughs, which will be discussed in the next section of this report.

Recommendations

1. Bermudagrass Transition

It was great to hear you used the Manuscript® herbicide to slowly transition from overseeded ryegrass to bermudagrass this spring and early summer and this program yielded good results. I wish to just slightly modify this program and include some additional mechanical tools.

- It is recommended to begin with Manuscript at 2 ounces per acre the last week of February or the first week of March and continue on a three-week schedule until late May or early June when more than likely you will have greater than 85% bermudagrass cover. As a cleanup application, courses have found good success using Kerb® (pronamide) at 30 to 35 ounces per acre to finally remove any lingering ryegrass and *Poa annua*, and this application is often made in mid-to-late June.
- It is recommended to utilize the VC60 vertical mower and/or the fairway mower with vertical reels and set the blades about one half of mowing height. Begin light-intensity vertical mowing in late February and continue every three to four weeks through the transition. The goal with these vertical mowing events is to slowly thin the overseeded ryegrass without negatively impacting playability or aesthetics.
- It is also recommended to begin employing some form of small-diameter solid tine or slicing tine beginning in late February or early March and continue every three to four weeks if possible. These small voids go a long way to improving water infiltration and opening up sunlight exposure to the understory bermudagrass. This process will be even more useful in the roughs.
- Nitrogen inputs should increase about the second or third week of April. Use a combination of foliar and granular nitrogen inputs with the goal to apply about 2 to 3 pounds of nitrogen per 1,000 square feet from mid-to-late April through mid-June.
- Hopefully, by late June there will be very little ryegrass and bermudagrass will have filled in very nicely and you will be able to omit nitrogen applications until after overseeding. About three weeks after overseeding, begin nitrogen applications and plan to apply about 2 pounds of nitrogen per 1,000 square feet prior to Thanksgiving.
- Continue with foliar applications of urea and ferrous sulfate only as needed for color and recovery through the winter months. Ideally, you would not need any additional nitrogen until mid-April. After overseeding, you may consider utilizing a methylene-urea-based nitrogen with a low salt index and no burn potential.

2. Summer Surface Management

Once you have transitioned to 85% bermudagrass or more, which should be by mid-June, it is recommended to omit nitrogen for the remainder of the summer and only fertilize localized thin areas. It is also recommended to conduct light-intensity vertical mowing with blades set about one half of mowing height. These events should be of light intensity but ideally would be conducted about every three weeks to encourage more upright growth on the bermudagrass.

- If possible, you may consider a more aggressive vertical mowing event in close proximity to your greens' aeration in late July. This would help open up the turf canopy in preparation for overseeding.

- It is also recommended to use the trinexapac-ethyl at 15 to 20 ounces per acre once monthly beginning in late June and continuing through mid-August. You may consider omitting the growth regulator applications 10 to 14 days prior to overseeding to allow the bermudagrass to grow up slightly and enable a more effective scalping event.

3. **Aeration**

   Research has revealed that whether using a solid or hollow tine or using linear decompaction such as with the Imants® ShockWave machine, the benefits of these operations typically only last about six weeks. As such, given your limited labor resources, it is recommended to focus on solid tine aeration and slicing but conduct these operations as often as six to eight times annually on fairways and even more frequently in localized areas with high golf cart traffic.

Roughs

Observations

1. **Good Bermudagrass Health**

   It was not surprising to see weaker bermudagrass in roughs given the overseeding and higher height of cut. The higher height of cut on the ryegrass strongly competes with the understory bermudagrass. All golf courses that overseed roughs struggle at some level to recover bermudagrass each spring and early summer.

2. **Localized Thin Areas**

   We did observe localized areas in roughs with thin bermudagrass cover. Several examples include the left side of No. 17, the left side of No. 15, and the right side of No. 9. The one thing in common is these are all areas where water accumulates and there are elevated salts.

Thin, weak bermudagrass was observed in localized areas in roughs and most were located in low areas where water and salts accumulate.

- Salt levels on No. 9 were higher than at any course I have seen in the Western United States in several years. The soil salinity meter revealed levels from 15 to 18 mS/cm, which will easily kill ryegrass and will even harm bermudagrass.

- Soil profiles collected in these areas revealed inconsistent soil with multiple layers and very compacted conditions. It is clear that water is accumulating in these areas and the water evaporates from the surface, leaving behind elevated salts.

3. **Increased Cart Traffic and Limited Ingress/Egress from Cart Paths**

We observed most foursomes using four carts, which doubles the amount of turf damage from concentrated cart traffic. Additionally, there is limited area for carts to enter and exit the fairway on many holes.

While most courses have returned to golfers sharing carts, we observed four carts per foursome at Conestoga.

Recommendations

1. **Rough Transition**

A similar program to that described in the fairways section above is appropriate for the rough transition. However, it is important to note that you are encouraged to employ a more aggressive program to lower the height of cut in roughs during the spring months.

- Ideally, the height of cut would be reduced to about 5/8 inch by the middle of March to late March, and by early to mid-May, ideally, the rough height would be reduced to about 1/2 inch or even lower. This more aggressive approach to lowering heights in roughs will have a profound impact on improving your bermudagrass recovery from overseeding.
- Given the history of weak transition in rough areas, it is recommended to increase nitrogen inputs above and beyond what is applied to fairways. For example, it is recommended to apply 4 to 5 pounds of nitrogen per 1,000 square feet from mid-to-late April through mid-to-late June.

2. **Addressing Weak, Low-Lying Areas**

It is recommended to utilize a variety of different practices to improve the localized areas that accumulate water and salts in roughs.

- First and foremost, it is recommended to use a combination of the pull-behind aerator, deep watering and the deep tine aeration machine to decompact these areas. Ideally, this would be done eight to ten times per year in these localized areas.

- To facilitate salt leaching, it is recommended to utilize portable, low-precipitation-rate sprinklers to flush and utilize on adjacent mounds so that you can allow these low-lying areas to dry between irrigation events.
- In some areas, these practices will improve conditions significantly. However, in some areas such as the low-lying area on the left of No. 15 and the right side of No. 9, these practices will likely not be sufficient to significantly improve conditions. In these more severe areas, it will be necessary to install a robust drainage system to exit water. More specifically, drain lines should be cut on 12-foot centers and cut 24 to 36 inches beneath the soil surface. It is recommended to use a well-drained sand around the drainage pipe and fill to about 6 inches from the soil surface. Within the top 6 inches, it is recommended to utilize a sand and 20% peat mixture. This will avoid the chronic droughty areas that typically occur when using straight sand at the turf surface.
- In areas such as on the right side of No. 9, a more aggressive approach will be needed. In addition to drainage, you will need to remove 8 to 10 inches of soil in this area to remove multiple soil layers which all restrict water movement and result in elevated salts. Fill the void with a native sand or the local sand. It is recommended to test the local sand to ensure this would be a good fill material. Finally, sod the area with material harvested on site with the soil matching the native sand.

3. **Golf Carts**

   It is recommended to return to two carts per foursome. Many courses have already returned to sharing carts and for courses where personal carts are allowed, cart sharing is encouraged. Courses have also implemented additional trail fees for those golfers who prefer to use their own golf carts. A 20 to 30% surcharge for those golfers using a single- rider cart is one way to encourage cart sharing.

Tees

Observations

1. **Good Condition**

   After nearly 14 years, it is good to report that the bermudagrass health on tees is excellent. It was also good to see that, in general, the tees are large enough to handle the high play volume. Additionally, the tees are level and I did not observe any tees with significant crowning.

2. **Forward Tees**

   The forward tees at Conestoga Golf Club are over 5,000 yards. This golf course is much too long for the player swinging at 60 to 65 miles an hour, which is your forward tee player.

Recommendations

1. Forward Tee Placement

USGA agronomists are not golf course architects; however, the USGA has and will continue to promote improved pace of play initiatives, making the game more fun and reducing overall resource inputs that are making the game more expensive.

- In conjunction with results put forward by the PGA, the USGA has taken data from thousands of golfers and found a very simple and understandable way to promote teeing surfaces at distances associated with players' swing speeds. Forward tees should no longer be equated with gender as both younger and aging players should have the comparable feeling of joy when a par or birdie putt goes in the hole. More importantly, adding more forward tees on holes where appropriate will significantly improve the pace of play and the "fun factor" on the course. The chart below shows the distance from your current jade tees on every hole as well as the silver tees used by most of your male players.

Course Name:	Conestoga Silver and Jade Tees

Female Tee:	Jade
Swing Speed:	Average

Male Tee:	Silver
Swing Speed:	71-80

Female - Scorecard Distances from Jade

Hole	Par	Yardage
1	4	318
2	3	94
3	4	186
4	4	315
5	3	100
6	5	414
7	4	185
8	4	292
9	5	467
10	3	124
11	4	335
12	5	422
13	4	275
14	3	98
15	4	300
16	5	443
17	4	297
18	4	352
OUT	72	2371
IN	36	2646
TOT	72	5017

Male - Scorecard Distances from Silver

Hole	Par	Yardage
1	4	373
2	3	144
3	4	335
4	4	365
5	3	160
6	5	490
7	4	276
8	4	388
9	5	536
10	3	168
11	4	430
12	5	504
13	4	368
14	3	132
15	4	414
16	5	518
17	4	365
18	4	412
OUT	36	6378
IN	36	3311
TOT	72	6378

- The maximum distances for male and female golfers and approximate club distance are outlined below. Note: The maximum recommended hole length for female golfers is provided by PGA of America recommendations in their publication Setting Up Golf Courses for Success. Directly below the tables, the charts compare the estimated approach shot distance and estimated approach clubs for the average male (13 handicap) and average female (25 handicap) golfers. They also show whether the female and male golfers are expected to reach the putting green in regulation.

Figure 1: Maximum recommended hole distances for average female and average male golfers

	Par 3	Par 4	Par 5
Female (25 hdcp)	140	260	380
Male (13 hdcp)	210	400	590

Figure 2: Approximate club distances for average female and average male golfers

Club	Female Golfers (25 hdcp)	Male Golfers (13 hdcp)
Driver	140	210
Fairway Wood	120	190
Long Iron/Hybrid	105	170
Mid-Iron	100	140
Short Iron	80	120
Wedge	60	100

- The charts below identify where there may be distance issues for players using each set of markers. It is clear the copper tees are a more appropriate tee yardage for the majority of your male players who swing in the 71- to 81-mph range. From the copper tees, these players will likely be able to reach all greens in regulation.

Female Golfers - Jade Tee — Handicap - 25 — Swing Speed - 60 MPH

Hole	Par	Yards	Yards Over Rec. Max.	Est. Approach Shot Distance	Est. Approach Shot Club
1	4	318	✗ 58	178	Fwy Wood+
2	3	94	✓ --	94	Mid Iron
3	4	186	✓ --	46	Wedge
4	4	315	✗ 55	175	Fwy Wood+
5	3	100	✓ --	100	Hybrid/Long Iron
6	5	414	✗ 34	154	Fwy Wood+
7	4	185	✓ --	45	Wedge
8	4	292	✗ 32	152	Fwy Wood+
9	5	467	✗ 87	207	Fwy Wood+
10	3	124	✓ --	124	Fwy Wood+
11	4	335	✗ 75	195	Fwy Wood+
12	5	422	✗ 42	162	Fwy Wood+
13	4	275	✗ 15	135	Fwy Wood+
14	3	98	✓ --	98	Mid Iron
15	4	300	✗ 40	160	Fwy Wood+
16	5	443	✗ 63	183	Fwy Wood+
17	4	297	✗ 37	157	Fwy Wood+
18	4	352	✗ 92	212	Fwy Wood+
OUT	72	2,371	✗ 31		
IN	36	2,646	✗ 306		
TOT	72	5,017	✗ 337		

Male Golfers - Silver Tee — Handicap - 16-20 — Swing Speed - 71-80 MPH

Hole	Par	Yards	Yards Over Rec. Max.	Est. Approach Shot Distance	Est. Approach Shot Club
1	4	373	✗ 23	193	Fwy Wood+
2	3	144	✓ --	144	Fwy Wood
3	4	335	✓ --	155	Fwy Wood
4	4	365	✗ 15	185	Fwy Wood+
5	3	160	✓ --	160	Fwy Wood
6	5	490	✓ --	140	Fwy Wood
7	4	276	✓ --	96	Short Iron
8	4	388	✗ 38	208	Fwy Wood+
9	5	536	✗ 16	186	Fwy Wood+
10	3	168	✓ --	168	Fwy Wood
11	4	430	✗ 80	250	Fwy Wood+
12	5	504	✓ --	154	Fwy Wood
13	4	368	✗ 18	188	Fwy Wood+
14	3	132	✓ --	132	Hybrid/Long Iron
15	4	414	✗ 64	234	Fwy Wood+
16	5	518	✓ --	168	Fwy Wood
17	4	365	✗ 15	185	Fwy Wood+
18	4	412	✗ 62	232	Fwy Wood+
OUT	36	3,067	✗ 3228		
IN	36	3,311	✗ 161		
TOT	72	6,378	✗ 78		

- The proposed forward tee yardage is 4,244 (see next page). This yardage allows the player swinging at 60 to 65mph to reach greens in regulation and hit a few irons into greens. These yardages DO take into account the elevation change on holes, but not the wind.

Course Name:	Conestoga Copper and Proposed Forward Tees

Female Tee:	Proposed
Swing Speed:	Average

Male Tee:	Copper
Swing Speed:	71-80

Female - Scorecard Distances from Proposed

Hole	Par	Yardage
1	4	255
2	3	94
3	4	186
4	4	270
5	3	100
6	5	315
7	4	198
8	4	255
9	5	375
10	3	119
11	4	270
12	5	349
13	4	258
14	3	98
15	4	258
16	5	349
17	4	241
18	4	254
OUT	72	4244
IN	36	2196
TOT	72	4244

Male - Scorecard Distances from Copper

Hole	Par	Yardage
1	4	348
2	3	130
3	4	315
4	4	349
5	3	140
6	5	433
7	4	243
8	4	349
9	5	494
10	3	148
11	4	420
12	5	484
13	4	345
14	3	114
15	4	385
16	5	476
17	4	334
18	4	382
OUT	36	5889
IN	36	3088
TOT	72	5889

Female Golfers - Proposed Tee
Handicap - 25 Swing Speed - 60 MPH

Hole	Par	Yards	Yards Over Rec. Max.	Est. Approach Shot Distance	Est. Approach Shot Club
1	4	255	✓ --	115	Fwy Wood
2	3	94	✓ --	94	Mid Iron
3	4	186	✓ --	46	Wedge
4	4	270	✗ 10	130	Fwy Wood+
5	3	100	✓ --	100	Hybrid/Long Iron
6	5	315	✓ --	55	Wedge
7	4	198	✓ --	58	Wedge
8	4	255	✓ --	115	Fwy Wood
9	5	375	✓ --	115	Fwy Wood
10	3	119	✓ --	119	Fwy Wood
11	4	270	✗ 10	130	Fwy Wood+
12	5	349	✓ --	89	Mid Iron
13	4	258	✓ --	118	Fwy Wood
14	3	98	✓ --	98	Mid Iron
15	4	258	✓ --	118	Fwy Wood
16	5	349	✓ --	89	Mid Iron
17	4	241	✓ --	101	Hybrid/Long Iron
18	4	254	✓ --	114	Fwy Wood
OUT	72	4,244	✗ 1904		
IN	36	2,196	✓ --		
TOT	72	4,244	✓ --		

Male Golfers - Copper Tee
Handicap - 16-20 Swing Speed - 71-80 MPH

Hole	Par	Yards	Yards Over Rec. Max.	Est. Approach Shot Distance	Est. Approach Shot Club
1	4	348	✓ --	168	Fwy Wood
2	3	130	✓ --	130	Hybrid/Long Iron
3	4	315	✓ --	135	Hybrid/Long Iron
4	4	349	✓ --	169	Fwy Wood
5	3	140	✓ --	140	Fwy Wood
6	5	433	✓ --	83	Wedge
7	4	243	✓ --	63	Wedge
8	4	349	✓ --	169	Fwy Wood
9	5	494	✓ --	144	Fwy Wood
10	3	148	✓ --	148	Fwy Wood
11	4	420	✗ 70	240	Fwy Wood+
12	5	484	✓ --	134	Hybrid/Long Iron
13	4	345	✓ --	165	Fwy Wood
14	3	114	✓ --	114	Mid Iron
15	4	385	✗ 35	205	Fwy Wood+
16	5	476	✓ --	126	Hybrid/Long Iron
17	4	334	✓ --	154	Fwy Wood
18	4	382	✗ 32	202	Fwy Wood+
OUT	36	2,801	✗ 2739		
IN	36	3,088	✓ --		
TOT	72	5,889	✓ --		

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2. Additional Tips for the Forward Tees

In addition to the above numerical values that provide a very good blueprint for the future, it is worth reviewing several other recommendations that will further improve the forward tees. These include:

- **Use a color other than red.** The idea of using a numerical sequence and eliminating the colors was discussed. This has been viewed in the Denver area, with the photo to the right taken at Denver Country Club a few years ago. This idea has expanded to several golf courses viewed over the past few years, with very positive results noted.
- **Build the tees out of similar soil to the surrounding area.** Another trend that has been noted with positive results is building these tees out of soil that requires the same type of irrigation as the surrounding area. A combination of soil and sand will provide adequate drainage during the winter months but will not result in excess drought during the summer that would occur with a sand-based tee.
- **Build the tees of adequate size.** One of the mistakes often seen with forward tees is building a tee by simply mowing out an area or creating a small "bump-up" tee. It is best to create a new tee with at least 500 to 600 square feet if possible, with no more than a 6- to 8-inch lift. The sides of the tees need to simply flow into the fairway contours to avoid scalping.

Upper: Elimination of colors is a good way to encourage players to play the distance more closely associated with their swing speeds.

Lower: When forward tees are added onto fairways and built properly, they blend into the area.

Irrigation

Observations

1. Aging System

Irrigation system components are about 14 years old, and these components are nearing the expected end of their useful life.

- Nozzles typically will only last six to seven years and therefore many nozzles are well past their useful life.
- The sprinkler bodies and cases typically only last 18 to 20 years, and the satellites on the golf course have a similar useful life of 18 to 20 years.
- The pump station useful life is often 20 to 25 years, but after viewing the pump station at Conestoga, it looks as if it is already 25 years old.

The pump station is in poor condition and will very likely need to be replaced within the next few years.

2. **Low and Out-of-Level Sprinklers**

   We observed numerous sprinklers that are low to grade and out of level. This condition significantly impacts the distribution uniformity.

Recommendations

1. **Infrastructure Replacement Planning**

   It is strongly recommended to begin planning for replacement of certain irrigation components.

   - Many courses will phase in sprinkler replacement at 500 sprinklers per year for three to four years and utilize an outside contractor to install and level the sprinklers. This would be a great program for Conestoga and should begin in four to five years' time.
   - Mr. Buckner noted a leasing program for pump stations and given the poor condition of the pump station, it would be wise to consider beginning a lease within the next one to two years.
   - The satellites on the golf course will likely need to be replaced within the next five to six years.

2. **Underground Pipe and Wiring**

   The underground pipe and wiring should last from 25 to 30 years and maybe up to 33 to 34 years and therefore you likely have another 15 years until they will need to be replaced.

Irrigation Summary

In summary for irrigation, it is recommended to plan on raising and leveling sprinklers around greens. Ideally, you would be able to hire additional employees to help with this labor-intensive process. Within the next four to five years, it is recommended to plan on sprinkler replacement and utilizing an outside contractor to assist with this operation. At this time, it may also be wise to replace the satellites. Within the next one to two years, it is recommended to replace the pump station and consider the lease program.

Bunkers

Observations

1. **Size and Slope**

   The bunkers at Conestoga are too large and too deep for your primary customers - aging golfers. The bunkers are too difficult to walk into and out of and typically only have one access point. There is only one access point in which to facilitate ingress/egress of the mechanical bunker rake. The bunkers have flashed faces that easily erode. During our course tour, we observed numerous golfers that were unable to hit recovery shots due to the severity of the bunker slopes.

This right greenside bunker on No. 17 is typical of the bunker design with only one access point.

2. **Too Many Bunkers**

   With only about ten fulltime employees, there are simply too many bunkers and the area of the bunkers is too large for this low amount of staff.

3. **Bunker Lobes**

   Many of the bunkers contain bunker “lobes” or “fingers.” The turf on these localized areas must be mowed and trimmed by hand and therefore is very labor intensive. Bunkers of this size and shape would require five employees day in and day out to maintain the bunkers at a high level. This is simply not practical for Conestoga.

4. **Unlined Bunkers**

   The bunkers are unlined and therefore the bunker sand is contaminated and water infiltration through the sand is poor.

Recommendations

1. **Bunker Renovation**

   The one project I see offering significant long-term benefits to both ownership and golfers at Conestoga is a comprehensive bunker renovation project.

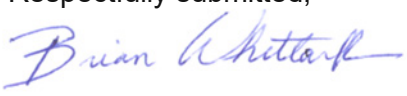
   - Such a project would include redesigning the bunkers to reduce the size by 40 to 50% across the golf course and eliminating the grass fingers to simplify bunker maintenance.
   - All the bunker perimeters should be able to be mowed by a riding mower. Additionally, softening the bunker slopes would reduce potential for erosion.
   - The bunker lips should be lowered to allow multiple ingress/egress points for golfers to easily walk into and out of the bunkers and to facilitate easy ingress/egress for the mechanical bunker rake.
   - The bunkers should be lined to protect the integrity of the sand and reduce sand erosion and contamination.

   While this project will be expensive, it is one that will yield long-term benefits through reduced labor associated with maintaining bunkers and significantly reduce the amount of costs associated with replacing bunker sand. Additionally, such a bunker renovation would improve the golf experience for your primary customer. You may consider reaching out to golf course architect Gary Brawley out of Arizona, who has done a fine job of working with Gary Panks golf courses and working with golf courses to renovate bunkers in a method consistent with what I have described above.

Closing Comments

It was a pleasure to spend the day with Mr. Buckner and tour the golf course for my first time at Conestoga. The golf course is in excellent health from tee to green with only some localized areas of turf thinning in roughs due to poor soil water infiltration and elevated salts. We discussed some important short-term modifications to transition programs and surface management on fairways and greens. We also discussed the importance of compiling a comprehensive long-term capital replacement program, with the priorities of bunker renovation and replacement of certain irrigation system components. I look forward to returning to Conestoga next year. Please do not hesitate to contact my office should you have any further questions or concerns. Best wishes for the upcoming overseed season.

Respectfully submitted,



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Additional Considerations

The USGA appreciates your support of the Course Consulting Service. Please visit the *Green Section Record* to access regional updates that detail agronomist observations across the region. Also, please visit the Water Resource Center to learn about golf's use of water and how your facility can help conserve and protect our most important natural resource.

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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.