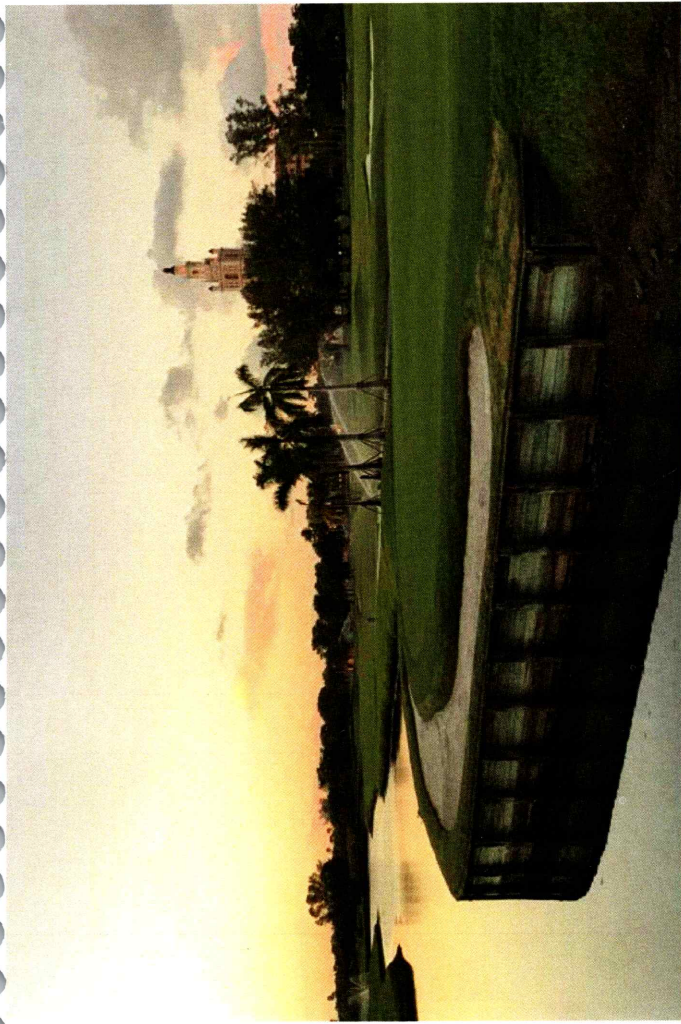


**CORAL
GABLES®**
THE CITY BEAUTIFUL

BrightView Companies Inc. **@ The Biltmore**

January 28th 2020

BrightView
Golf Maintenance



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- USGA Site Inspection Report

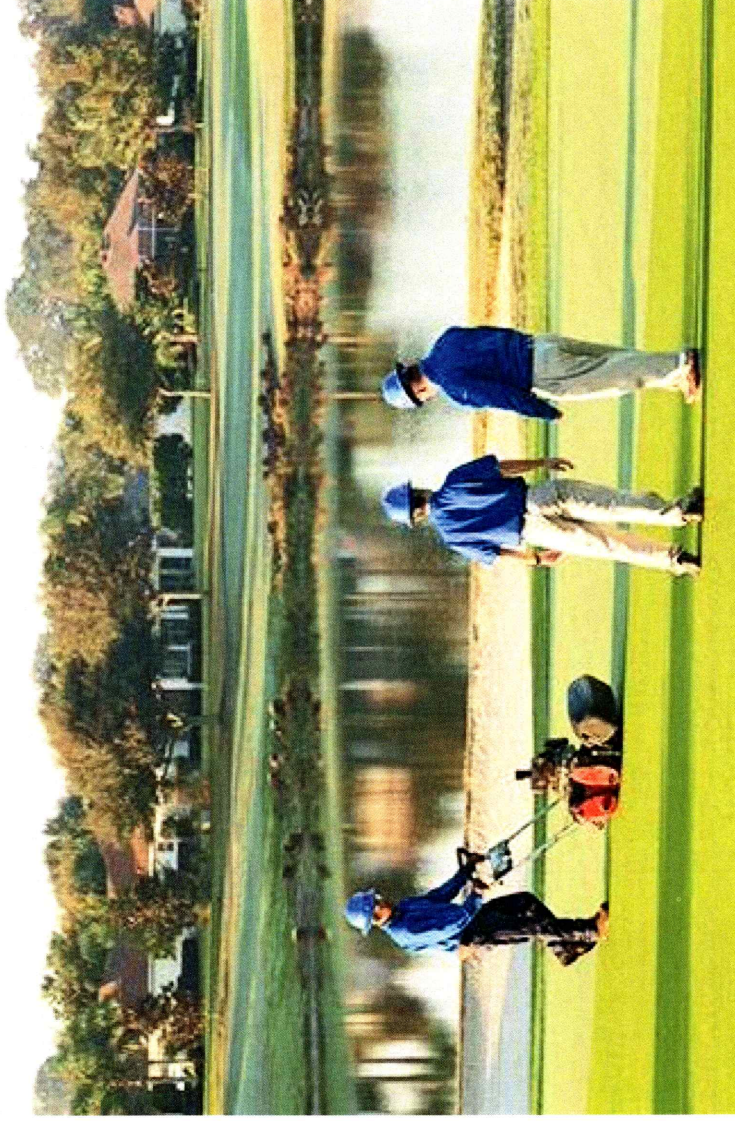


BrightView Companies Inc. Overview

- 140 Years Combined Experience as World's Largest Horticultural Services Company.
 - \$2.5 Billion Annual Revenue
 - 23,000 Employees with 60,000 Client Properties
 - 200 Market Locations
 - Only Full Scale Design, Development and Maintenance Services for Golf Courses and Landscapes Nationwide.

BrightView Golf Maintenance

- 40+ Years experience
- 80+ Golf Course Partners – nearly 50% municipal

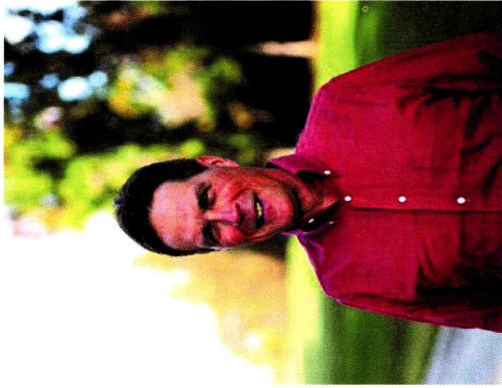


- Staffed Ph.D. Agronomist
- Customized, science based Agronomic Planning
- Proprietary operations systems / methods
- Unparalleled buying power
- Long-term partnership approach

Golf Digest Top 75 Best Public Golf Courses in Florida Maintained by BrightView Golf.

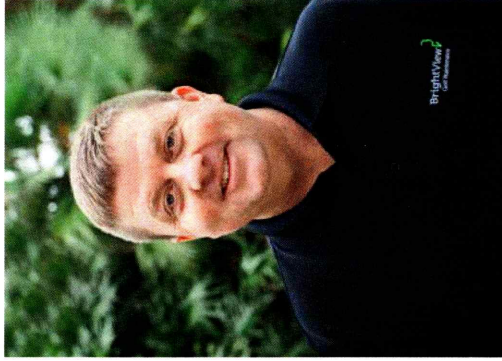
Course	Location	Type	Holes
Biltmore Hotel Golf Course	Coral Gables, FL	Resort	18
Osprey Point Golf Course	Boca Raton, FL	Municipal	27
Palm Beach County (4 courses)	West Palm Beach, FL	Municipal	72
North Palm Beach Country Club	North Palm Beach, FL	Municipal	18
Omni Orlando Resort at ChampionsGate Golf	Davenport, FL	Resort	54

Operations Support Team



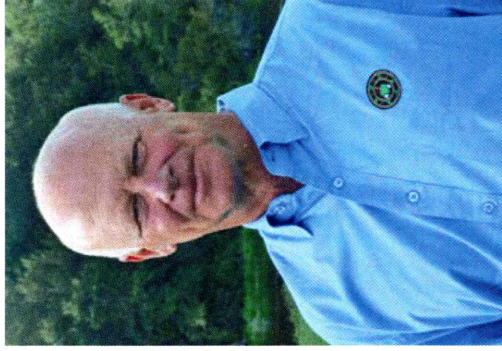
Greg Pieschala
President

Greg provides the resources, support and company culture that allow BrightView's professionals to excel in serving our customers.



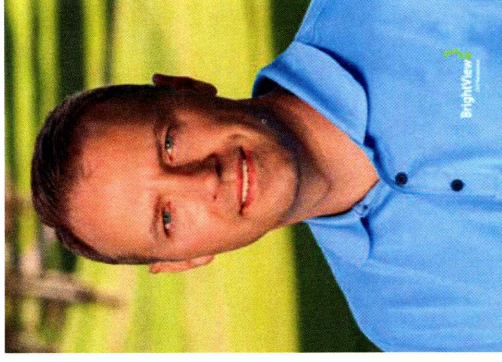
Mike Harbin
CGCS
South Area Director

Works to ensure that every partnership in this area starts off and continues on a course for success.



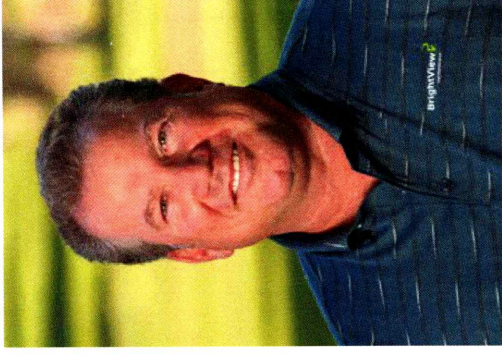
Erik Larsen
Business
Development Exec.
South

Erik is responsible for creating new business opportunities in the Southeast, along with maintaining and communicating market conditions in the region.



Dr. Todd Bunnell, PhD
VP of Agronomy

Works closely with the superintendents to develop sound and efficient agronomic programs for each course based on annual and ongoing on-site analyses.



Terry McGuire
VP Operations

Responsible for overall performance and quality control. Trains all staff members in our Maintenance Operations Standards and makes annual visits to our clients' courses.

CITY OF CORAL GABLES

- MEMORANDUM -

TO: PETER IGLESIAS, CITY MANAGER **DATE:** JANUARY 23, 2020

FROM: FRED COUCEYRO, COMMUNITY RECREATION DIRECTOR **SUBJECT:** BILTMORE GOLF COURSE

CC: ED SANTAMARIA, ASSISTANT CITY MANAGER
MIRIAM RAMOS, CITY ATTORNEY

On Tuesday, January 21, I conducted a follow-up visit to the Biltmore Golf Course for a status check golf course inspection with Troy Hall, the City's Golf Superintendent. Our inspection consisted of a ride along the course with continuous stops along the course to inspect areas closer by foot. The Biltmore's Director of Golf Bob Coman, Biltmore Hotel Manager Matthias Kammerer and Course Superintendent Craig Ellison were present during our inspection.

This visit was a follow-up of previous visits taken in the summer and fall. During those visits, several conditions were observed and were noted in previous memorandums to the City Manager. The response from the course management was that several maintenance initiatives undertaken would take time for noticeable improvement and that the improvements would be noticeable in the winter months. During this visit, there were noticeable improvements in certain previously troubled areas. There has been an improvement in conditions since the initial inspection visit in May; however, the improvements to the overall course have not reached the overall level that was previously detailed by the course management.

The following was the observation of conditions:

The greens: The greens were in very good condition at the last site visit. The conditions have worsened since the last visit. The first noticeable decline is the collar definition of the greens. In many of the greens there is no definition on the borders of the green. It appears that the collars have not been mowed at the correct height. Assessing the rest of the greens was a bit difficult since the greens were top dressed with sand and spiked just prior to our visit. Although, the sand covered the green surfaces there were several greens that appeared thin in spots and a few greens had damaged areas that resulted in patches or repair areas. A few of the greens were still in very good condition such as the last three holes (#16, 17, and 18) and the first two holes (#1, 2). Overall, the greens conditions can no longer be categorized as very good. During our visit, a golfer noticed the inspection team and informed us: "the greens don't look good".

Response- Whereas overall the putting greens have been in very good condition, during this time of year, they are not in the same condition as they were during visits made in the summer and fall during the active growing season. This is primarily characterized by thinning of turf and the development of black algae on certain greens (#5, 10, and 11). This is most common during the winter months in South Florida when bermudagrass growth has declined and caused primarily by excessive moisture and lack of sunlight as evidenced by recent weather conditions (approx. 7" of rain in last 45 days vs. historical average of less than 1"). To manage these conditions we have been and continue to apply fungicides for algae and disease control and perform frequent spiking and light sand topdressing weekly until Spring. Additionally, we are walk mowing collars that are thin and compacted and will continue this practice until overall turfgrass health is restored.



#11 Green as of 1/18/2020

The fairways: Many of the previous issues to the fairways were worked on. The heavy prevalence of weeds has been eradicated in most fairway areas with just a few trouble spots. Goose grass and tropical signal grass is still present in play areas (tees, fairways, slopes and roughs). Several fairways still have limited growth, and, in many areas, there have been instances where it appears that other grasses are growing through which resulting in a mounding effect with patches of different shades of green color. This condition is seen on many of the fairways. There are also certain fairways where one half of the fairway is patchy and the other half is in good condition (#5, 12, and 18). There are a few fairways which are in very good condition (#6, 11, 15, 16), and a couple that have been improved from the last visit (#2, #8). The remaining fairways not mentioned all have different degrees of the issues observed. From observation, many of the fairway surfaces had a black muck surface under the grass, evidence of top dressing was not apparent.

Response- Significant progress has been made in managing weeds on the course. The number one agronomic challenge with the fairways and roughs continues to be combatting grassy weeds, primarily goosegrass and tropical signalgrass. The presence of these weeds in the soil is unlimited and is managed through the use of pre-emergent and post-emergent herbicides as well as in some cases hand removal. We have lessened the use of chemical post-emergent removal due to the slow recovery of bermudagrass once the weed is dead; however we continue to hand remove weeds in priority areas. The black muck surface referred to in the report is displaced soil from earthworm activity which has no product labeled for treatment on golf courses. The patchiness identified is varying types and levels of bermudagrass density and will lessen as the newly grassed fairways mature.



#17 Fairway as of 1/18/2020

The tee boxes: This was the most troublesome area during the first site visit. During the previous site visit, sodding of several tees had taken place and growth was needed for some of the tees that were not sodded. The sodding has helped improve the condition of several tee boxes. One third of the holes had tee boxes which were in good condition for all the tees and had well maintained areas (#1, 3, 14, 17, and 18). A few of the holes had a majority of tee boxes in good condition with one tee box observed with issues such as weeds or patchy growth. Another prevalent issue on many of the tee boxes were the weedy conditions or bare areas surrounding sod areas — the collars around the tee boxes.

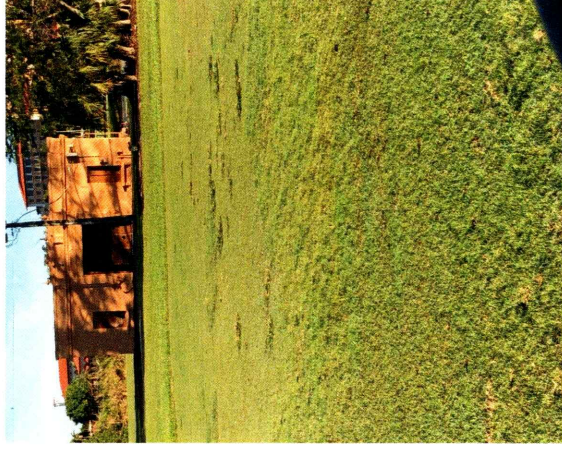
Response- Overall tees continue to improve and as mentioned above weed removal by hand is ongoing on tee surfaces and surrounds. Additionally, tees are showing significant wear due to amount of play and slow recovery during cooler temperatures.



#2 Ladies Tee as of 1/26/2020

The roughs: The weeds are less visible in the rough areas, although there are still areas where there are noticeable weed grasses. The growth in certain parts of the rough areas with Bermuda grass are thin and patchy. The St. Augustine areas have better growth and less patchiness.

Response- Rough areas were not renovated during course closure and due to the amount of traffic and time of year are showing signs of winter stress. We will continue to monitor and manage traffic.



#17 between Tee and Fairway as of 1/26/2020

The bunkers: The bunkers continue to be in excellent condition.

Response- Agreed.



#5 Fairway Bunker

Slopes and landing areas: As detailed in the description of the fairways, there are still landing areas which need more growth and weed control, the number of these areas has diminished. There has been better growth on the slopes, with a few of the slopes being sodded. An interesting sodding project on the first hole installing St. Augustine to combat shade and a deterioration of the green has been initiated. The effectiveness of this solution will have to be monitored as it is an unconventional approach.

Response- the St. Augustine sod installed on back of #1 green was done as a second attempt to maintain turf in this heavily shaded area. We will continue to monitor its performance.



#1 St Augustine sodded slope

Practice Area: This area was only briefly observed during this site visit. The school and teaching areas looked to have improved from the brief observation.

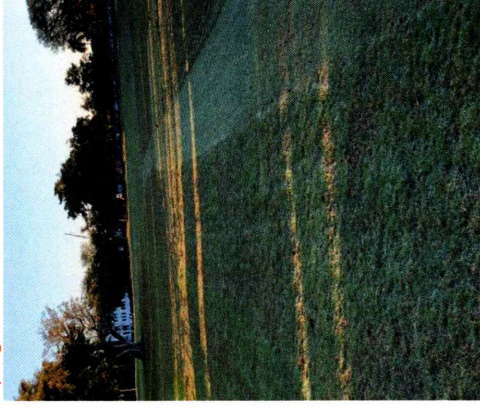
Response- Agreed.



Driving Range Floor as of 1/26/2020

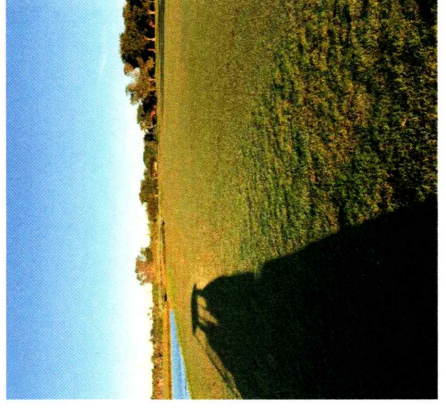
Following the previous inspections, recommendations were given to assist in improvements. My comments on the status of these recommendation are italicized and in parenthesis below:

- Continue to spray out the weeds in all areas now that the rye grass overseed has died off due to the heat. *(There are still some difficulties with weeds. Although there is a marked improvement in weed control, there are certain areas that continue to have weed presence.)*
 - Response- we have made two applications of pre-emergent herbicide in last 45 days and will continue to hand remove weeds in priority areas until post emergent herbicides can be applied in the spring.



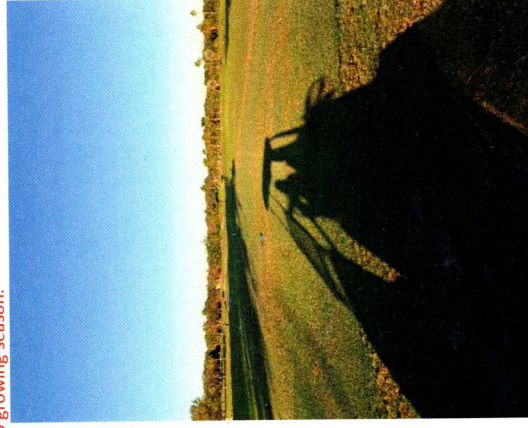
#5 Rough as of 1/26/2020

- Continue to keep on schedule with the pre-emergent herbicide applications on all areas except for greens. Every 3 months is industry standard recommendation. *(Staff reported that the pre-emergent herbicide application schedule is current and will continue.)*
 - Response- All applications are based on PHD Agronomist plan development and most recent diagnostics test results. Next pre-emergent herbicide application is scheduled for 2nd week of March.



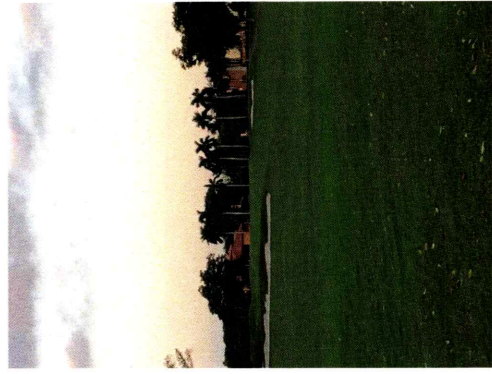
#7 rough and fairways as of 1/26/2020

- The industry standard for an 18-hole golf course at the maintenance level of the Biltmore is 18 maintenance workers per 18 holes plus a Superintendent and an assistant. After a previous memo, we were told they are budgeted for only 16 workers and are currently at that number. *(The Golf Course Supervisor has not reported a change in staff number. This continues to be a recommendation for this golf course which has been further strengthened by the conditions observed.)*
 - Response- Since October of last year we have employed 18 full time staff and 1 part time staff.
- Course staff must aerify the tees, fairways and greens and have the closure time to do this at least twice over the summer. This will help the Bermuda grass fill in those spots where not enough time was given for them to mature last summer/fall. *(This recommendation remains.)*
 - Response- Three complete aerifications on tees, fairways and greens were performed during 2019 growing season.



#8 blue and white tee as of 1/28/2020

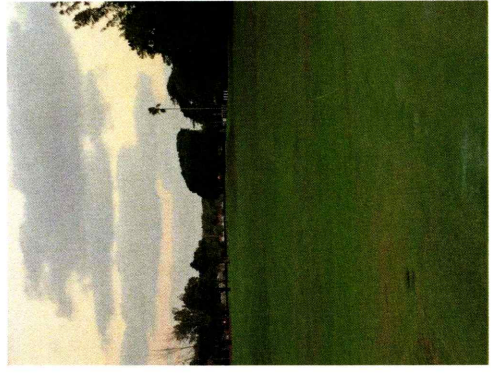
- The fairways and tees both have a need for topdressing sand. It is recommended that all fairways and tees get top dress sanded completely this summer. This will help improve soil quality, smooth the playing surfaces and give weak areas a level surface that promotes lateral growth. This is a standard operating practice for other PGA condition level courses. *(This continues to be a recommendation for this golf course. It is believed that top dressing as recommended would have assisted with the mounding and patchiness of several fairways.)*
 - Response- Tees were aerified and top-dressed 3 cycles during 2019 growing season. All areas will be evaluated for 2020 growing season cultural programs and methods.



#18 Rough and Fairway as of 1/18/2020

New recommendations as of this visit:

- The green collars were deteriorated in many holes. The need for additional walk mowers will assist in improving this condition. There is a need to purchase additional walking mowers. The current inventory is not enough to mow in a timely manner. Walk mowing the greens during the week will decrease the pressure from the heavy triplex riding mower being used currently.
 - **Response- We are currently walk mowing collars which are thin and/or compacted and will continue this process.**



#11 collar and fairway as of 1/18/2020

- Send course soil samples to certified laboratory and follow recommendations based on sample results. This may help fairway conditions.
 - Response- All applications of fertilizer and pesticides are based upon diagnostic sampling pulled from the golf course. This includes soil (physical and chemical), water, and turf tissue sampling performed twice per year (see below for latest soil test results). Additional copies of these results are available upon request.

Central Florida Soil Laboratory
 P.O. Box 2508
 Bartow, Florida 33831
 (863) 533-5579

Harrell's Fertilizer
 P.O. Box 807
 Lakeland, FL 33801

Soil
Biltmore

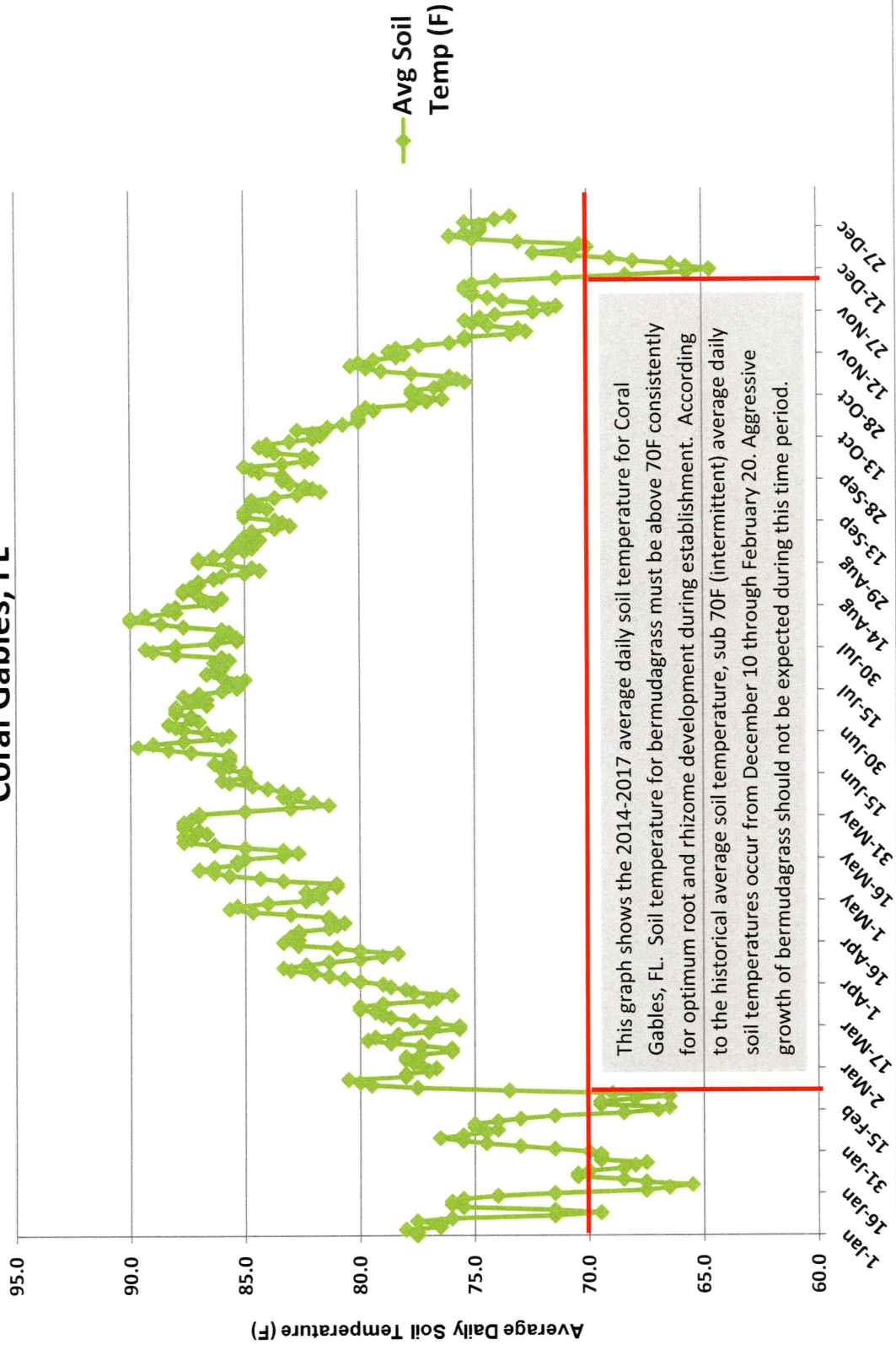
Date Received: 12/16/19
 Date Reported: 12/18/19

I.D.	pH	Ca	Mg	Na	K	P	Zn	Mn	Fe	C.E.C.	Calculated Base Saturation (%)			
											Ca	Mg	Na	K
T 5	6.9	3501	178	146	71	89	14	11	4	9.9	88.5	7.4	3.2	0.9
T 13	7.4	4400	140	125	43	82	14	11	4	11.9	82.4	4.8	2.3	0.5
F 1	7.3	46528	465	383	125	72	9	37	5	119.0	97.6	1.6	0.7	0.1
F 16	7.1	35509	414	463	132	90	10	20	6	91.5	96.9	1.9	1.1	0.2
G 1	7.6	1194	82	73	24	166	1	4	5	3.5	85.0	9.6	4.5	0.9
G 8	7.8	893	70	50	15	111	1	2	4	2.6	84.3	10.9	4.1	0.7
G 9	7.6	668	58	55	17	73	1	2	4	2.0	81.4	11.7	5.8	1.1
G 15	7.6	1023	82	56	17	117	1	3	5	3.0	84.2	11.1	4.0	0.7
PG	7.6	759	63	61	19	84	1	2	4	2.3	82.0	11.2	5.7	1.1
CH by Clock	7.5	859	71	50	28	68	1	2	5	2.6	83.1	11.3	4.2	1.4
K														
L														

- The maintenance budget in terms of staff equipment, and agricultural materials should be reviewed. The renovation increased the size of the greens from 2.7 acres to 4.1 acres. The bunkers also increased from 70 to 89. This is a large increase in maintenance that will cost more money to have high level conditions. The budget per acre needs to be commensurate with the golf courses that the Management offers as comparisons for fee setting.
 - Response- Above and beyond the operating budget, significant additional resources have been allocated in preparation for this golf season which include sod, mulch, tree and shrub landscaping, fertigation, etc. Further, an entirely new state of the art equipment inventory has been purchased dedicated for use at the Biltmore. Lastly BrightView is in the process of reviewing its ongoing resource requirements with Biltmore Executive Team.
- The course needs some closure for maintenance periodically. In the past, the course to block off tee times on Monday mornings until 10am so maintenance could occur. This practice should be reviewed and perhaps re-initiated.
 - Response- Course closures for maintenance are discussed and initiated frequently based upon situational needs.

Conclusion: Following previous visits, the management stated that there would be vast improvement of conditions by the end of the fall. This visit illustrates that although several issues have been improved, there are issues with maintenance remaining in several areas. The overall improvement of the course has not occurred in the time period between site visits. The greens, which were one of the strengths of the course have seen a worsening of conditions. In its current state, the course conditions are not up to the expectations for a golf course in the category that the Biltmore is classified in. This classification is based on the fees charged and the fee comparisons to golf courses that the course management lists in its management agreement.

Average Daily Soil Temperature, 2014-2017 Coral Gables, FL



PLANT ANALYSIS

Send To: Harrells/ValleyCrest Golf Course Maintenance Mr. Craig Ellison, Jr. Baltimore Golf Course 1210 Anastasia Ave Coral Gables, FL 33134	Grower: No Grower Listed	Report No.: 19-290-4010 Cust No.: 24746 Lab No.: 442337 Report Date : 10/18/201 Received Date: 10/17/201 Page : 1 of 1
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Sample Id : **Tissue Sample Grns Pg.um,1** Growth Stage :
 Farm: Crop :
 Field id: Plant Part:

Test	Analysis	Plant Test Ratings				Normal Range	Actual Ratio		Expected Ratio
		Deficient	Low	Sufficient	High	Very High			
Nitrogen %	3.29						N/S	13.2	
Sulfur %	0.25						N/K	3.1	
Phosphorus %	0.25						P/S	1.0	
Potassium %	1.06						P/Zn	59.5	
Magnesium %	0.20						K/Mg	5.3	
Calcium %	0.81						K/Mn	111.6	
Sodium %	0.05						Ca/B	405.0	
Boron ppm	20						Fe/Mn	9.7	
Zinc ppm	42						Ca/K	0.8	
Manganese ppm	95						Ca/Mg	4.1	
Iron ppm	926								
Copper ppm	26								
Aluminum ppm	454								

Send to :	Project :	Report No :
Harrells/ValleyCrest Golf Course Maintenance	Analytical Testing	19-289-0134
Mr. Craig Ellison, Jr.		Cust No : 24746
Biltmore Golf Course		Date Printed : 10/18/2019
1210 Anastasia Ave		Date Received : 10/16/2019
Coral Gables, FL 33134		Page : 1 of 4
		Lab Number : 95598

IRRIGATION WATER

Sample Id : **Direct from Pump Line**

CATIONS	mg/L	meq/L
Sodium	Na	102
Calcium	Ca	132
Magnesium	Mg	11.3
Potassium	K	6.62
Ammonium	NH ₄	0
	NH ₄ - N	0.100
SUM OF CATIONS		
		12.14

ANIONS	mg/L	meq/L
Chloride	Cl	231
Sulfate	SO ₄	43.6
	S	15
Bicarbonate	HCO ₃	325
Carbonate	CO ₃	0
Nitrate	NO ₃	20
	NO ₃ - N	4.58
Phosphate	PO ₄	0.771
	P	0.251
SUM OF ANIONS		
		13.09

Hydrogen Ion Activity	pH	6.76
Equilibrium Reaction	pHc	5.97
Electrical Conductivity	ECw	1.28 dS/m
Total Dissolved Solids	TDS	819 mg/L
Adj Na Adsorption Ratio	SARadj	3.40
Sodium Adsorption Ratio	SAR	2.29
Hardness		376 ppm

Copper	Cu	0.005 mg/L
Zinc	Zn	0.050 mg/L
Manganese	Mn	0.010 mg/L
Iron	Fe	0.100 mg/L
Boron	B	0.105 mg/L
Fluoride	F	
Aluminum	Al	0.100 mg/L
Molybdenum	Mo	0.075 mg/L

mg/L = parts per million parts water
Hardness is determined from calculations using the calcium and magnesium concentrations in the water.
TDS calculated by ECw * 640

Send to :	Project :	Report No :
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IRRIGATION WATER

Sample Id : **Direct from Pump Line**

WATER ANALYSIS INTERPRETATION, AGRICULTURAL

Potential Problem	Units	Test Result	Degree of Restriction on Use					
			Criteria		Graphical Results			
			None	Slight to Moderate	Severe	None	Slight to Moderate	Severe
Salinity								
ECw ¹	dS/m	1.28	< 0.7	0.7 - 3	> 3			
Specific Ion Toxicity								
Sodium (Na) ¹								
Surface irrigation	SARadj	3.40	< 3	3 - 9	> 9			
Sprinkler irrigation ²	meq/L	4.44	< 3	3 - 6	> 6			
Chloride (Cl) ¹								
Surface irrigation	meq/L	6.51	< 4	4 - 10	> 10			
Sprinkler irrigation ²	meq/L	6.51	< 3	3 - 5	> 5			
Boron (B) ¹	mg/L	0.105	< 0.7	0.7 - 3	> 3			
Fluoride (F) ¹			< 1	1 - 5	> 5			
Clogging of Drip Systems or Unsightly Residues								
Iron (Fe) ³	mg/L	0.100	< 0.3	0.3 - 1.5	> 1.5			
Manganese (Mn) ³	mg/L	0.010	< 0.2	0.2 - 1.5	> 1.5			
pH - pHc ⁴		0.79	<= 0	> 0				
Reduced Water Infiltration ⁵ (Ratio based on adjSAR / ECw)		2.66	< 4	4 - 10	> 10			
Alkalinity								
Bicarbonate (HCO ₃) + Carbonate (CO ₃) ⁶	meq/L	5.33	< 2	2 - 8.5	> 8.5			
Potential Low Nutrient Issues (Soilless media) ⁷								
Sulfate	mg/L	43.6	> 48	48 - 20	< 20			
Magnesium	mg/L	11.3	> 10	10 - 4	< 4			
Boron	mg/L	0.105	> 0.3	0.3 - 0.05	< 0.05			

1. Crop tolerance to salinity, sodium, chloride, boron and fluoride varies widely. Most tree crops are sensitive to sodium and chloride while many annual crops are not. Soil conditions, irrigation method and climate must be considered.
2. Leaf burn from foliar and root absorption will be enhanced under conditions of : low humidity, high temperature and high air movement .
3. Elevated iron in combination with sulfides or tannins can result in bacterial slimes that can clog drip systems. Removal of iron and manganese often involves oxidation (aeration or chlorination) followed by filtering.
4. Positive pH - pHc (saturation index) values indicate the potential for calcium and magnesium carbonate precipitates that might impair efficiency of irrigation systems with small orificed parts and/or may leave unsightly lime deposits on leaves. Problems can be reduced by mineral acid addition.
5. Infiltration problems are most likely when water with low ECw and/or high SAR adj. is used on mineral soils containing some silt and clay. Evaluation of infiltration problems should include analysis of both irrigation water and soil-water extracts. Treatment may involve injecting gypsum into the water or applying gypsum to the soil surface.
6. Bicarbonate when excessive may result in difficulty in controlling soil pH and may impair root assimilation of minor elements.
7. Sulfur, magnesium and /or boron may become limiting if not supplied by soil or fertilizer. Use soil and leaf analysis to confirm need.

Comments :

Send to :	Project :	Report No :
Harrells/ValleyCrest Golf Course Maintenance	Analytical Testing	19-289-0134
Mr. Craig Ellison, Jr.		Cust No : 24746
Biltmore Golf Course		Date Printed : 10/18/2019
1210 Anastasia Ave		Date Received : 10/16/2019
Coral Gables, FL 33134		Page : 3 of 4
		Lab Number : 95599

Sample Id : **From Mix Station Hose**

IRRIGATION WATER

CATIONS	mg/L	meq/L
Sodium	Na	113
Calcium	Ca	140
Magnesium	Mg	12.7
Potassium	K	6.83
Ammonium	NH ₄	0
	NH ₄ - N	0.100
SUM OF CATIONS		
		13.14

ANIONS	mg/L	meq/L
Chloride	Cl	227
Sulfate	SO ₄	54.8
	S	18
Bicarbonate	HCO ₃	323
Carbonate	CO ₃	0
Nitrate	NO ₃	14
	NO ₃ - N	3.27
Phosphate	PO ₄	1.07
	P	0.348
SUM OF ANIONS		
		13.09

Hydrogen Ion Activity	pH	6.92
Equilibrium Reaction	pHc	6.01
Electrical Conductivity	ECw	1.26 dS/m
Total Dissolved Solids	TDS	806 mg/L
Adj Na Adsorption Ratio	SARadj	3.64
Sodium Adsorption Ratio	SAR	2.45
Hardness		402 ppm

mg/L = parts per million parts water
Hardness is determined from calculations using the calcium and magnesium concentrations in the water.
TDS calculated by ECw * 640

Copper	Cu	0.005 mg/L
Zinc	Zn	1.26 mg/L
Manganese	Mn	0.010 mg/L
Iron	Fe	0.100 mg/L
Boron	B	0.085 mg/L
Fluoride	F	
Aluminum	Al	0.100 mg/L
Molybdenum	Mo	0.082 mg/L

IRRIGATION WATER

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Coral Gables, FL 33134		Page : 4 of 4
		Lab Number : 95599

Sample Id : **From Mix Station Hose**

WATER ANALYSIS INTERPRETATION, AGRICULTURAL

Potential Problem	Units	Test Result	Degree of Restriction on Use		Graphical Results
			Criteria	None	
			None	Slight to Moderate	Severe
Salinity					
ECw ¹	dS/m	1.26	< 0.7	0.7 - 3	> 3
Specific Ion Toxicity					
Sodium (Na)¹					
Surface irrigation	SARadj	3.64	< 3	3 - 9	> 9
Sprinkler irrigation ²	meq/L	4.92	< 3	3 - 6	> 6
Chloride (Cl)¹					
Surface irrigation	meq/L	6.39	< 4	4 - 10	> 10
Sprinkler irrigation ²	meq/L	6.39	< 3	3 - 5	> 5
Boron (B)¹	mg/L	0.085	< 0.7	0.7 - 3	> 3
Fluoride (F)¹			< 1	1 - 5	> 5
Clogging of Drip Systems or Unsightly Residues					
Iron (Fe)³	mg/L	0.100	< 0.3	0.3 - 1.5	> 1.5
Manganese (Mn)³	mg/L	0.010	< 0.2	0.2 - 1.5	> 1.5
pH - pHc⁴		0.91	<= 0	> 0	
Reduced Water Infiltration⁵ (Ratio based on adjSAR / ECw)		2.89	< 4	4 - 10	> 10
Alkalinity					
Bicarbonate (HCO₃) + Carbonate (CO₃)⁶	meq/L	5.30	< 2	2 - 8.5	> 8.5
Potential Low Nutrient Issues (Soilless media)⁷					
Sulfate	mg/L	54.8	> 48	48 - 20	< 20
Magnesium	mg/L	12.7	> 10	10 - 4	< 4
Boron	mg/L	0.085	> 0.3	0.3 - 0.05	< 0.05

1. Crop tolerance to salinity, sodium, chloride, boron and fluoride varies widely. Most tree crops are sensitive to sodium and chloride while many annual crops are not. Soil conditions, irrigation method and climate must be considered.
2. Leaf burn from foliar and root absorption will be enhanced under conditions of : low humidity, high temperature and high air movement.
3. Elevated iron in combination with sulfides or tannins can result in bacterial slimes that can clog drip systems. Removal of iron and manganese often involves oxidation (aeration or chlorination) followed by filtering.
4. Positive pH - pHc (saturation index) values indicate the potential for calcium and magnesium carbonate precipitates that might impair efficiency of irrigation systems with small orificed parts and/or may leave unsightly lime deposits on leaves. Problems can be reduced by mineral acid addition.
5. Infiltration problems are most likely when water with low ECw and/or high SAR adj. is used on mineral soils containing some silt and clay. Evaluation of infiltration problems should include analysis of both irrigation water and soil-water extracts. Treatment may involve injecting gypsum into the water or applying gypsum to the soil surface.
6. Bicarbonate when excessive may result in difficulty in controlling soil pH and may impair root assimilation of minor elements.
7. Sulfur, magnesium and /or boron may become limiting if not supplied by soil or fertilizer. Use soil and leaf analysis to confirm need.

Comments :

Client :
Harrells/ValleyCrest Golf Course Maintenance
Mr. David Plunkett
Heritage Pine Golf Course
P.O. Box 807
Lakeland FL 33815

Grower :
Biltmore G.C.

Report No: 18-072-0531
Cust No: 21669
Date Printed: 11/14/2019
Date Received : 11/13/2019
PO:
Page : 1 of 2

SOIL ANALYSIS

Lab Number : 07416			Field Id :			Sample Id : 15 FWY				
Test	Method	Results	SOIL TEST RATINGS					Calculated Cation Exchange Capacity		
			Very Low	Low	Medium	Optimum	Very High	38.8 meq/100g		
Soil pH	1:1	7.6						%Saturation		
Buffer pH								%sat meq		
Phosphorus (P)	M3	110 LB/ACRE						K 0.4 0.2		
Potassium (K)	M3	130 LB/ACRE						Ca 95.2 36.9		
Calcium (Ca)	M3	14776 LB/ACRE						Mg 3.3 1.3		
Magnesium (Mg)	M3	308 LB/ACRE						H 0.0 0.0		
Sulfur (S)	M3	64 LB/ACRE						Na 1.1 0.4		
Boron (B)	M3	2.4 LB/ACRE								
Copper (Cu)	M3	4.8 LB/ACRE						K/Mg Ratio: 0.13		
Iron (Fe)	M3	110 LB/ACRE						Ca/Mg Ratio: 28.85		
Manganese (Mn)	M3	26 LB/ACRE								
Zinc (Zn)	M3	32.6 LB/ACRE								
Sodium (Na)	M3	192 LB/ACRE								
Soluble Salts										
Organic Matter	LOI	4.9% ENR 142								
Nitrate Nitrogen										

SOIL FERTILITY GUIDELINES

Crop :		Rec Units:										
(lbs)	LIME	(tons)	N	P ₂ O ₅	K ₂ O	Mg	S	B	Cu	Mn	Zn	Fe
Crop :		Rec Units:										

Comments :

Due to the magnesium and/or calcium carbonate levels in the soil, the calculated CEC and cation saturation percentages may not be accurately estimated. If you have questions, please call the lab.

Client :
Harrells/ValleyCrest Golf Course Maintenance
Mr. David Plunkett
Heritage Pine Golf Course
P.O. Box 807
Lakeland FL 33815

Grower :
Blitmore G.C.

Report No: 18-072-0531
Cust No: 21669
Date Printed: 11/14/2019
Date Received : 11/13/2019
PO:
Page : 2 of 2

SOIL ANALYSIS

Lab Number : 07417		Field Id :		Sample Id : 18 FWY				
Test	Method	Results	SOIL TEST RATINGS					Calculated Cation Exchange Capacity
			Very Low	Low	Medium	Optimum	Very High	39.0 meq/100g
Soil pH	1:1	7.7						%Saturation
Buffer pH								%sat meq
Phosphorus (P)	M3	122 LB/ACRE						K 0.4 0.2
Potassium (K)	M3	120 LB/ACRE						Ca 95.4 37.2
Calcium (Ca)	M3	14882 LB/ACRE						Mg 3.1 1.2
Magnesium (Mg)	M3	288 LB/ACRE						H 0.0 0.0
Sulfur (S)	M3	56 LB/ACRE						Na 1.1 0.4
Boron (B)	M3	2.6 LB/ACRE						K/Mg Ratio: 0.13
Copper (Cu)	M3	4.4 LB/ACRE						Ca/Mg Ratio: 30.77
Iron (Fe)	M3	114 LB/ACRE						
Manganese (Mn)	M3	20 LB/ACRE						
Zinc (Zn)	M3	34.6 LB/ACRE						
Sodium (Na)	M3	204 LB/ACRE						
Soluble Salts								
Organic Matter	LOI	6.9% ENR 182						
Nitrate Nitrogen								

SOIL FERTILITY GUIDELINES

Crop :		Rec Units:										
(lbs)	LIME	(tons)	N	P ₂ O ₅	K ₂ O	Mg	S	B	Cu	Mn	Zn	Fe
Crop :		Rec Units:										
Comments :												

Due to the magnesium and/or calcium carbonate levels in the soil, the calculated CEC and cation saturation percentages may not be accurately estimated. If you have questions, please call the lab.

Send to : Harrells/ValleyCrest Golf Course Maintenance Mr. Craig Ellison, Jr. Biltmore Golf Course 1210 Anastasia Ave Coral Gables, FL 33134	Project : Analytical Testing	Report No : 19-099-0325 Cust No : 24746 Date Printed : 04/15/2019 Date Received : 04/09/2019 Page : 1 of 2 Lab Number : 94871
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IRRIGATION WATER

Sample Id : **Water (need chloride levels)**

CATIONS	mg/L	meq/L
Sodium	Na	218
Calcium	Ca	143
Magnesium	Mg	19.8
Potassium	K	7.67
Ammonium	NH ₄	0
	NH ₄ - N	0.100
SUM OF CATIONS		
		18.46

ANIONS	mg/L	meq/L
Chloride	Cl	344
Sulfate	SO ₄	54.8
	S	18
Bicarbonate	HCO ₃	306
Carbonate	CO ₃	50.0
Nitrate	NO ₃	12
	NO ₃ - N	2.64
Phosphate	PO ₄	0.306
	P	0.100
SUM OF ANIONS		
		16.88

Hydrogen Ion Activity	pH	7.26
Equilibrium Reaction	pHc	6.11
Electrical Conductivity	ECw	1.60 dS/m
Total Dissolved Solids	TDS	1024 mg/L
Adj Na Adsorption Ratio	SARadj	6.35
Sodium Adsorption Ratio	SAR	4.53
Hardness		439 ppm

Copper	Cu	0.005 mg/L
Zinc	Zn	0.050 mg/L
Manganese	Mn	0.010 mg/L
Iron	Fe	0.100 mg/L
Boron	B	0.092 mg/L
Fluoride	F	
Aluminum	Al	0.100 mg/L
Molybdenum	Mo	0.024 mg/L

mg/L = parts per million parts water
Hardness is determined from calculations using the calcium and magnesium concentrations in the water.
TDS calculated by ECw * 640

Send to :	Project :	Report No :
Harrells/ValleyCrest Golf Course Maintenance	Analytical Testing	19-099-0325
Mr. Craig Ellison, Jr.		Cust No : 24746
Biltmore Golf Course		Date Printed : 04/15/2019
1210 Anastasia Ave		Date Received : 04/09/2019
Coral Gables, FL 33134		Page : 2 of 2
		Lab Number : 94871

IRRIGATION WATER

Sample Id : **Water (need chloride levels)**

WATER ANALYSIS INTERPRETATION, AGRICULTURAL

Potential Problem	Units	Test Result	Degree of Restriction on Use			Graphical Results
			None	Slight to Moderate	Severe	
Salinity						
ECw ¹	dS/m	1.60	< 0.7	0.7 - 3	> 3	
Specific Ion Toxicity						
Sodium (Na)¹						
Surface irrigation	SARadj	6.35	< 3	3 - 9	> 9	
Sprinkler irrigation ²	meq/L	9.48	< 3	3 - 6	> 6	
Chloride (Cl)¹						
Surface irrigation	meq/L	9.69	< 4	4 - 10	> 10	
Sprinkler irrigation ²	meq/L	9.69	< 3	3 - 5	> 5	
Boron (B)¹	mg/L	0.092	< 0.7	0.7 - 3	> 3	
Fluoride (F)¹						
			< 1	1 - 5	> 5	
Clogging of Drip Systems or Unsightly Residues						
Iron (Fe) ³	mg/L	0.100	< 0.3	0.3 - 1.5	> 1.5	
Manganese (Mn) ³	mg/L	0.010	< 0.2	0.2 - 1.5	> 1.5	
pH - pHc ⁴		1.15	<= 0	> 0		
Reduced Water Infiltration⁵ (Ratio based on adjSAR / ECw)						
		3.97	< 4	4 - 10	> 10	
Alkalinity						
Bicarbonate (HCO ₃) + Carbonate (CO ₃) ⁶	meq/L	5.85	< 2	2 - 8.5	> 8.5	
Potential Low Nutrient Issues (Soiless media)⁷						
Sulfate	mg/L	54.8	> 48	48 - 20	< 20	
Magnesium	mg/L	19.8	> 10	10 - 4	< 4	
Boron	mg/L	0.092	> 0.3	0.3 - 0.05	< 0.05	

1. Crop tolerance to salinity, sodium, chloride, boron and fluoride varies widely. Most tree crops are sensitive to sodium and chloride while many annual crops are not. Soil conditions, irrigation method and climate must be considered.
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Comments :

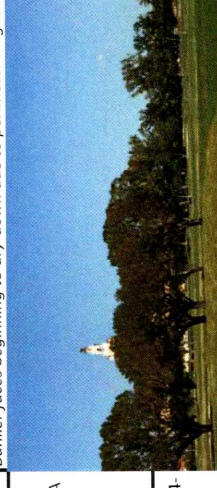
BRIGHTVIEW GOLF COURSE MAINTENANCE AGRONOMIC SITE VISIT SUMMARY REPORT		
GOLF COURSE NAME: The Biltmore Golf Course VISIT DATE: January 18 2019 ATTENDEES PRESENT: Craig Ellison & Todd Bunnell		
TOP PRIORITIES		
1	Moisture Management	Focus on moisture on putting greens. Add supplemental water where needed.
2	New Sprigs	Continue "grow-in" plan on sprigged areas.
3	Bunker Surrounds	Ensure irrigation coverage and quantity is sufficient for complete establishment of new sod.
Golf Greens		
Site Description/Problem		
1	Moisture Management and Amendments	New putting greens are beginning to show those areas that will "dry-out". Supplemental hand watering should be performed daily (morning hours) to these areas. Confirm low soil moisture levels on these areas with POGO. As we discussed, it will be important to perform a "deep flush" (>1" irrigation) during periods of limited rainfall. This deep flush will accomplish two goals: flush salts and promote continued deep rooting due to lower soil salinity levels. Soil nutrient samples from greens will dictate the need for any soil amendment applications this winter.
2	Putting Greens - Winter Cultural Activities	Soil profile looks great. Continue with light topdressing on greens every 1-2 weeks as possible throughout winter months. Light and frequent topdressing will be important for greens speed and smoothness. As rainfall amounts and frequency decrease, promote soil oxygenation via needle tining or spiking. Needle tines are best for soil oxygenation, while spiking is best for algae prevention and turf density. Both practices should be performed along with light topdressing events. Consider rotating these practices every 7-10 days. Will need to gain course access for both of these activities.
3	Putting Greens - Fertility and Control Products	During winter months, TifEagle bermudagrass will require 0.06 to 0.08 lbs N/1000 ft ² /week. Add TitlePhyte into spray program biweekly. Due to slower growth vigor of bermudagrass, susceptibility to Leaf Spot and other foliar diseases is increased. Therefore include a preventative fungicide (Chlorothalonil, Mancozeb, Iprodione) in weekly sprays. Monthly, consider a systemic product such as Xzemplar or Strobe for longer-term control.
4	2019 Fairy Ring Program	Fairy Ring will likely be an active problem on the new greens at Biltmore. Plan for monthly applications of Tartan at 2 fl oz/1000 ft ² when avg daily soil temperatures are between 55-60F (mid January). Repeat these applications every 4 weeks. Additionally plan for an application of Fame SC at 16 fl oz/A following core aerification. Fairy Ring often flares following core aerification. Wetting agents should be added to all of these applications.
5	Diagnostics	Take soil nutrient samples (6 greens, 2 fairways and 2 tees; Harrells) and a water quality sample (Harrells) in January (if not taken in December) to see the impacts of the grow-in on the soil chemistry status. Nematode samples should be collected in February/March or when average daily soil temperature is 70-75F.

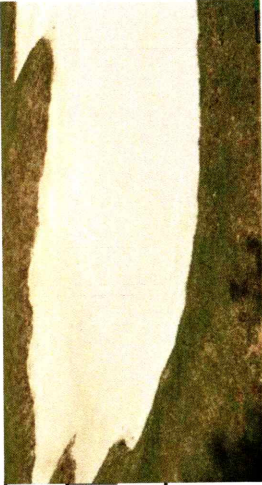
Soil Profile



6	Mechanical Damage - Greens Perimeters	Watch greens perimeters carefully for mechanical damage from mowers and/or rollers. Perform additional spiking, needle tining and topdressing (Harrell's MaXand) to promote recovery and discourage algae.
Fairways/Tees		
Site Description/Problem		Recommended Action(s)
1	Grow-in Ag Plan	Supplemental "grow-in" ag plan has been created to continue to promote establishment of new sprigs. All fairways should be sprayed biweekly with Urea(0.2 lbs N/1000 ft ²), soluble K and Fe/Mn. Weak a fairways should receive supplemental granular fertilizer (12-10-11) and foliar sprays (28-5-18) weekly as outlined by supplemental grow-in ag plan.
2	Foliar Sprays on Fairways & Tees	Biweekly foliar sprays applied to all fairways and tees using Urea and Iron/Mn product. Include soluble SOP (SiteOne) at 10 lbs/A. Add pigments as needed for color.
3	Weak Fairways and Continued Grow-In	As per above, several fairways do not have complete coverage due to late sprigging date. Continue to "push" these fairways with weekly applications of 12-10-11 or similar. In addition, spike or slice areas frequently to promote lateral growth and reduce algae growth.
4	Weed Control	Due to slowed growth and young age of bermudagrass on tees and fairways, suggest spot applications only for grassy weeds: Goosegrass - In 25 gallons of water, mix 24 fl oz Speedzone Red + 3.5 ml Pylex + 2 lbs 21-0-0 (in 25 gal) and spray to run-off. Best to water-in application to reduce bermudagrass and ryegrass injury. Sedge - Sedge can be targeted with Sedgehammer/Sedgemaster ONLY due to presence of ryegrass.
5	PRE Herbicide	Due to immaturity of bermudagrass and need to additional lateral growth, 2019 PRE herbicide program should be ONLY Ronstar until 100% coverage is achieved. Apply Ronstar at 3 lbs ai/A in January and again in April (90 days following 1st application).
6	Moisture	Due to need for additional bermudagrass growth, maintain adequate soil moisture in fairways and tees. Prefer fairways and tees to be maintained on the wetter side as opposed to drier side.
7	Transition	Once average daily soil temperatures are >70F, ultra-low rates of Revolver should be added to fairway sprays to begin to slow growth and competition from ryegrass. Begin with 1-2 fl oz/A and increase as needed for transitioning ryegrass.
Rough/Other Areas		
Site Description/Problem		Recommended Action(s)
1	2019 PRE Herbicide Program - Rough	Ronstar should be applied in January to all rough. In March/April, Prodiame 4L should be applied at 24 fl oz/A to established rough ONLY . In June and July, apply Specticle at 4 fl oz/A to established rough ONLY . Add Sulfentrazone at 12 fl oz/A to July application.
2	Bunker Faces & Surrounds	Confirm adequate irrigation is being applied to all newly sodded bunker faces/surrounds. In addition, apply 5-4-0 to newly sodded bunker faces and surrounds to continue to promote establishment.

Bunker faces beginning to dry-down due to perimeter irrigation being reduced.





3	Weed Control	See above.
Driving Range/Practice Area		
Recommended Action(s)		
1	Driving Range Landing Area	Late sprigging date and irrigation difficulties at sprigging and resulting application of Ronstar has impacted bermudagrass sprig ryegrass germination in some areas. Apply activated charcoal to these areas and spike/slice area in multiple directions. Water areas deeply to promote infiltration of charcoal to bind any remaining PRE herbicide. Following application of Charcoal, seed areas with perennial ryegrass at 10-15 lbs/1000 ft2 and bermudagrass at 1 lb/1000 ft2. Rope off areas to allow for germination and establishment of ryegrass and bermudagrass. Bermudagrass will be very slow to germinate and establish - ryegrass will act as a nurse grass to help hold moisture to assist with bermudagrass seed.

The Biltmore Golf Club – Agronomic Site Visit Report

March 18, 2019

Present: Craig Ellison and Todd Bunnell

Putting Greens - Putting greens are in excellent condition and maturing very well. Continue to follow Agronomic Plan for foliar nutrition program and fungicide program. Adjust Plant Growth Regulator (PGR) rates as necessary for greens speeds and shoot growth management. Monitor clipping yield to help with PGR rate adjustment.

- Spring Cultural - Continue with light topdressing on greens every 1-2 weeks. Light and frequent topdressing will be important for greens speed and smoothness. This should be performed on dry turf to allow for sand migration below turf canopy. To promote soil oxygenation, perform needle tining or spiking at least every 2 weeks (note needle tines are best for soil oxygenation, while spiking is best for algae prevention and turf density). Both practices should be performed along with light topdressing events. Note - maintenance blocks will be necessary to perform these important cultural practices.
- Summer Aeration - Due to young age of putting greens, an aggressive core aeration program is not necessary. Per 2019 maintenance schedule, greens will be aerified with $\frac{3}{4}$ " solid tines (and holes filled with topdressing sand) in June and July to create sand channels, dilute organic matter, and promote good rooting depth via proper soil oxygenation. Most important is the proper incorporation and distribution of topdressing sand into the solid tine holes. Lastly, in September, greens will be aerified with $\frac{1}{4}$ " hollow tines.
- Spring Fertility - During spring months, TifEagle bermudagrass will require ~0.06-0.08 lbs N/1000 ft²/week applied via foliar sprays using soluble or liquid complete fertilizer. Add TitlePhyte into spray program biweekly. Follow Ag Plan for fungicide applications.
- Collar Encroachment - Continue edging putting green perimeters (TifEagle/419 interface) biweekly in order to suppress the encroachment of 419.
- Back of #1 Putting Green - Enhanced moisture management (daily hand watering) has improved turfgrass on back of #1 putting green. Probe the back of this green to confirm depth of root zone mix. Additionally, collar between putting green and bunker is poorly graded (especially the 1/3rd of the collar on the bunker side). The poor grading makes mowing of the collar very difficult with a Tri-Plex mower. Mechanical damage to turf is expected.

Profile of putting greens at Biltmore. Very good.



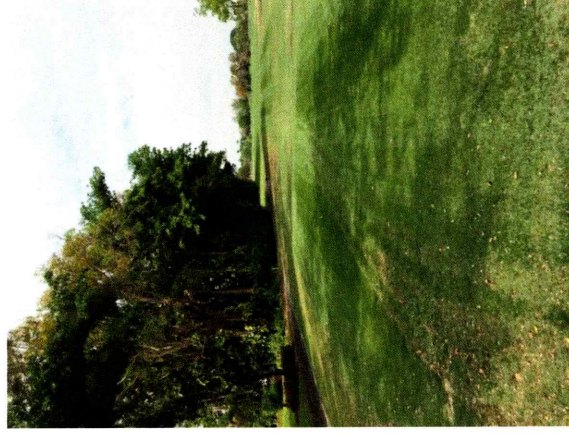
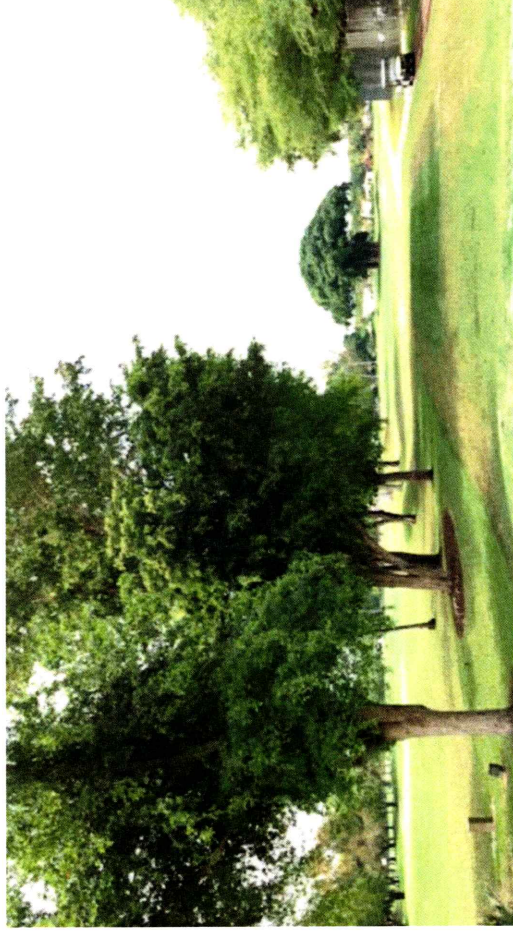
Greens/Collar interface on the back of 1 putting green.



Fairways/Tees – Overall bermudagrass in most fairways and tees are progressing nicely. The recent warm temperatures and rainfall have triggered consistent bermudagrass growth.

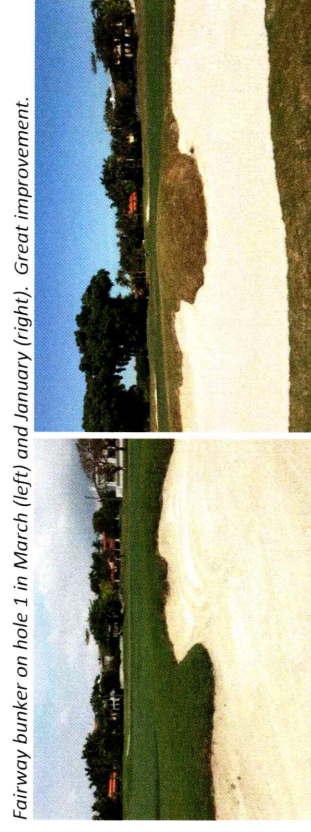
- Ryegrass Transition - Bermudagrass in fairways and most tees continues to improve in density, even amongst ryegrass overseeding. Overseed is scheduled to be sprayed out on April 15th. A pre-emptive cultural program should be implemented between now and April 15th to push bermudagrass growth: 1) Cultural - slowly lower height of cut to reduce shade from p. ryegrass; 2) Cultural – continue slicking all overseeded areas monthly. 3) Fertility - continue to apply foliar sprays along with additional granular applications of 13-2-0 and/or 12-10-11 to help with lateral growth of bermudagrass, especially in weak/thin areas.
- Shaded Tees - Several tees have significant shade, especially during winter months. This shade, combined with competition from perennial ryegrass overseeded has left these tees very thin with bermudagrass. These tees include 1, 13, and 15. Significant tree trimming/removal must be considered if these tees are to remain bermudagrass. A second option is to sod these tees to seashore paspalum (more shade tolerance compared to bermudagrass), however tree removal/thinning is still recommended. This would be similar to the back tee on hole #4.
- Foliar Sprays and Fertiligation - Continue foliar sprays (Urea + PGR + Minors) every 2-3 weeks. Recommend, reducing/eliminating fertiligation as growth and color will occur more naturally with improved weather and temperatures.

Shade impacting bermudagrass base on tees of holes 1 and 15.



Rough

- Fairway Contour Lines - Once new fairway contour lines are finalized, begin spraying out ryegrass in rough (outside contour lines) with MSM at 0.25 oz/A. Make this application ASAP as to not allow the ryegrass to outcompete bermudagrass (being maintained at a higher height). Repeat again in 2-3 weeks if needed for complete removal of ryegrass.
- Weed Control – Specticle applications should continue in roughs. Additionally, continue spot applications for weed control until after April 15th. After April 15th, more aggressive weed control can be targeted via boom applications of herbicides.
- Mole Crickets - Continue to target adults with either Orthene (not watered-in) or Provaunt 12 oz/A + AgStone 1 gal/A (watered-in). Successful control of active adults PRIOR TO EGG LAY will reduce reproduction and upcoming nymph hatch. When cricket activity is seen this spring, identify multiple locations (3 to 5) as scouting locations. Mix 2 tablespoons of Lemon Joy dish soap/gallon water and drench over a 4 ft2 area. Wait 3 to 5 minutes for mole crickets adults or nymphs to appear. Peak egg hatch and nymph emergence will be several weeks after finding females carrying hard, BB-like eggs. Continue soap flushes until nymphs emerge. Within 5 days of nymph emergence, spray QP Imidacloprid or Imidacloprid 2F Select at 25.6 fl oz/A + QP Bifenthrin or Bifen G/N 7.9F Select at 40 fl oz/A. If possible, add AgStone at 1 gal/A to improve penetration of insecticide. Water-in application immediately.
- Bunker Faces and Surrounds - Moisture management has improved greatly on new bunker faces/surrounds. Continue to improve moisture management by adding supplemental water. For chronically dry bunker faces/surrounds (18 fairway bunker), hand water with wetting agent tablets at least once weekly. In addition, begin applying 5-4-0 to bunker faces and surrounds monthly.
- Weak Areas in Rough and Tie-in Areas from Construction - Several "tie-in" areas from construction are weak/thin. These areas should be spiked and/or aerified and aggressively fertilized (13-2-0 or 12-10-11) now that soil temps are >65F. Rough area short and right of #14 green is a great example. Some areas might need some sod to help with speed of recovery.



Fairway bunker on hole 1 in March (left) and January (right). Great improvement.

Moisture management on 18 fairway bunker is still challenging. Hand water with a wetting agent tablet weekly.



Haul road in rough on 14 (near putting green)



Driving Range Tee and Floor

- Tropical Signalgrass on driving range tee - Apply Xonerate to seashore paspalum tee for control of tropical signalgrass. Apply Xonerate at 14.5 fl oz/A twice, 14 days apart. Add Dismiss/Sulfentrazone at 4-6 fl oz/A for added control.
- Driving Range Floor Remediation - After April 15th, apply Metsulfuron at 0.25 oz/A (+NIS). Repeat in 2 weeks if needed for complete control. This will allow time for bermudagrass to recover prior to ryegrass dying completely. Thereafter, identify the areas requiring sprigging and section off in 2 to 4 quadrants based upon irrigation coverage. Once these areas are identified, eradicate weeds, prepare soil (tilling), apply a PRE herbicide (Ronstar) and sprig at 800-1000 bu/A. A step-by-step protocol will be developed once quadrants are identified. A higher sprigging rate will ensure quicker establishment. Traffic will need to be completely restricted to foot traffic for the first 8 weeks, minimum, to allow establishment of sprigs.

BRIGHTVIEW GOLF COURSE MAINTENANCE AGRONOMIC SITE VISIT SUMMARY REPORT

GOLF COURSE NAME: The Biltmore GC
VISIT DATE: October 24, 2019

VISIT DATE: OCTOBER 24 2019

ATTENDEES PRESENT: Craig Ellison & Todd Bunnell

ATTENDEES PRESENT

PRIORITIES	
Planting Greens	Winter cultural practices: spiking, needle line and topdressing.
Planting Greens: Moisture	Daily moisture monitoring and soil salinity management.
Plant Sprays: Tree/Flows	Biweekly foliar sprays on trees and fairways. Increase N to 0.20 to 0.25 lbs N/1000 ft ² .

Recommended Action(s)

Putting greens are in good health. Continue weekly foliar spray/PCR/plant protection program. Target 0.08 lbs N/1000 ft²/week. Continue light topdressing every 7-10 days to promote smoothness and greens speed. Lastly, spiking and/or cordless tining should be performed every 7-10 days throughout winter months to promote soil oxygenation and root growth. Avoid any aggressive verticuting or dragging of sand. All sand applications should be light and able to be watered in.

Fall/winter plant protectant program has been updated on Ag Plan. Some new technologies are available and should be incorporated into agronomic plan. Dithane/Chlorothalonil applications should be made immediately to address emerging surface algae development. Cultural practices (topdressing and spiking/needle tine) will help with reducing algae as well.

As dry season is approaching, resume daily soil moisture monitoring on putting greens. Supplemental hand watering should be applied to areas at or approaching wilting point threshold. Overall, nightly overhead irrigation should be adjusted to down with reduced temperatures and ET levels.

The following should be taken this fall: Nematode assays, soil nutrient samples and continue monthly plant tissue monitoring

Some isolated Fairy Rings were observed on some putting greens. Spot apply Biskway as a drench at 0.5 fl oz/1 gallon water. Fairy ring activity is quite shallow, therefore minimal post-application irrigation is required. Repeat in 3 weeks if needed. ALSO, new ag plan has multiple applications of Tarten fungicide beginning in February for preventative Fairy Ring control in 2020.

Use Pogo to monitor soil salinity. Deep flushes should be performed as soil salinity increases. Following soil flushes, apply a granular application of 0-0-18 (Kmg/SOP/Gypsum).

Due to high salts in irrigation water, recommend increasing wetting agent rate to 1.5-2 gal/A and applying every 3-4 weeks. In addition, to assist with flushing of salts, mix Harrell's Cal Plus (3-0-0) to the wetting agent soil application at 1.5-2 gal/A.

Putting green soil profile is favorable with no observed layers and minimal organic layer development. As TriEagle continues to mature, more aggressive cultural programs will be required to manage organic matter development. More aggressive core aeration and verticutting will be recommended in summer 2020.

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Description/Problem	Recommended Action(s)
Teens and Fairways - Weekly Foliar Sprays - Teens and Fairways	Teens and Fairways will be sprayed biweekly with Urea (N at 0.25 lbs N/1000ft ²) + Wetting Agent + Fe for color. FGR should be added as needed for growth regulation. Per discussion, now if time to increase Nitrogen rate to 2.5 lbs urea/A (~0.25 lbs N/1000 ft ²).

NOV - Prodiamine at 16-24 fl oz/A; JAN - Ronstar 3 lbs ai/A; MARCH - Prodiamine 4L at 0.75 lbs ai/A; (24 fl oz/A); MAY - Ronstar 3 lbs ai/A; JULY - Specticle Flo 4 fl oz/A + Sulfentrazone 6 fl oz/A; SEPT - Specticle Flo 4 fl oz/A + Sulfentrazone 6 fl oz/A.

DEC - Kerb SC 20 fl oz/A + Kerb SC 20 fl oz/A (4 weeks apart); JAN - Ronstar 3 lbs a/A, MARCH - Prodlamine 4L at 0.75 lbs a/A (24 fl oz/A); MAY - Ronstar 3 lbs a/A; JULY - Prodlamine 4L at 0.75 lbs a/A (24 fl oz/A) + Sulfentrazone 12 fl oz/A; OCT - Ronstar at 2 lbs a/A.

Turfgrass area between 1 and 5 fairway is not conducive for maintenance at fairway height a this time. Root removal, core aeration and topdressing will be required before the turf will be able to tolerate fairway height of cut. Summer of 2020 would be the best time to begin these practices to smooth surface for fairway maintenance.

Recommend trialing some sand topdressing with high earthworm casting pressure to evaluate impact of a consistent sand topdressing program to discourage earthworm activity. If topdressing is a success, then consider expanding to larger acreages. In addition, could out-front brushes be added to fairway mowers to "break up" castings prior to mowing? Mowing should be performed on dry turf as well (possible).

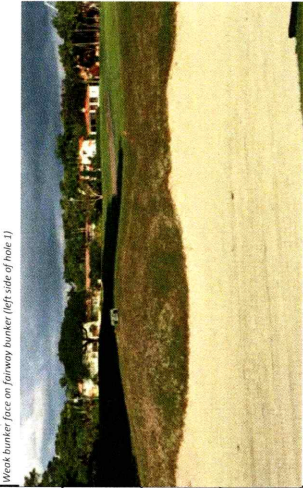
Greens profile favorable. Continue with light topdressing throughout winter months.



Fairy Ring present on a few putting greens.



6	Fairway/Rough Definition	Fairway height of cut (0.50") and step-cut (1.0") is too close in height, resulting in lack of definition between fairway, step cut and rough. This definition if further reduced by the time of year when bermudagrass grows in (see below) and elimination of step-cut would improve definition between fairway and rough (0.5" height adjacent to 2.5" height; rather than 0.5" height adjacent 1.0" height adjacent to 2.5" height).
7	Traffic Management	Traffic management is important during winter months. Rotating entry/exit points from cartpaths should be performed as needed.
Rough/Other Areas		
Site Description/Problem		
1	Late 2019 and 2020 Proposed PRE Herbicide Program - Rough	NOV - Prodimamine at 16-24 fl oz/A; JAN - Ronstar 3 lbs ai/A; MARCH - Prodimamine 4L at 0.75 lbs ai/A (24 fl oz/A); MAY - Specticle Flo 4 fl oz/A; JUL/AUG - Specticle Flo 4 fl oz/A + Sulfentrazone 6 fl oz/A; SEPT/OCT - Prodimamine 4L at 0.75 lbs ai/A (24 fl oz/A) + Sulfentrazone 6 fl oz/A.
2	Weak/Thin Rough Areas	Per discussion, calculate square footage of any areas in rough and tee surrounds that would require sodding. Areas include: 1) shaded tee surrounds that could be exposed to St. Augustinegrass (2 feet); 2) thin areas in rough where bunkers were eliminated (i.e. holes 3 and 4); 3) any other high profile areas around greens and tees. Provide this square footage of bermudagrass and St. Augustinegrass to Jim P.
3	Bunker Faces & Surrounds	Overall maintenance of bunker faces/surrounds is dramatically improved. Continue to apply 5-4-0 to bunker faces and surrounds monthly. Addition of foliar sprays w/ wetting agent will assist with bunker face turf health and density. The left fairway bunker on 1 is still weak due to intense shade from overhanging ficus tree. Recommend seashore paspalum as a more shade tolerant turfgrass.
4	POST Weed Sprays - Golf Course Wide	Mechanically remove any large goosegrass plants in high profile areas. OWDF and Downweed: Speedzone Red at 3qt/A or 24 fl oz/25 gal water. Repeat every 7-10 days. Spot spray for Goose - per 25 gallon - 2 oz Sencor + 3 ml Pylex. Spray to wet and repeat in 10-14 days. Tropical Signalgrass and Crabgrass: Manuscript 9.6 fl oz + Quinclorac 75DF at 4 oz per 10 gal water applied to 10,000 ft2 (plus Adios surfactant).
5	Driving Range Landing Area	Bermudagrass is establishing well where sprigged in September. Continue weekly spot applications of fertilizer. Due to high variability in imported soil, light and frequent irrigation cycles will be required to promote bermudagrass lateral spread. Keep area open until mid November. At that time, evaluate whether additional traffic management. It is important that Celebration has ample time to establish rhizomes prior to extensive traffic.
6	Back Bunker on 1 Putting Green	The bunker face and collar continue to decline due to the poor grading of the bunker complex. Pernal edge is being consider to solidify this bunker face to allow proper grading of a new collar. This will be an improvement over the existing bunker face/surround.



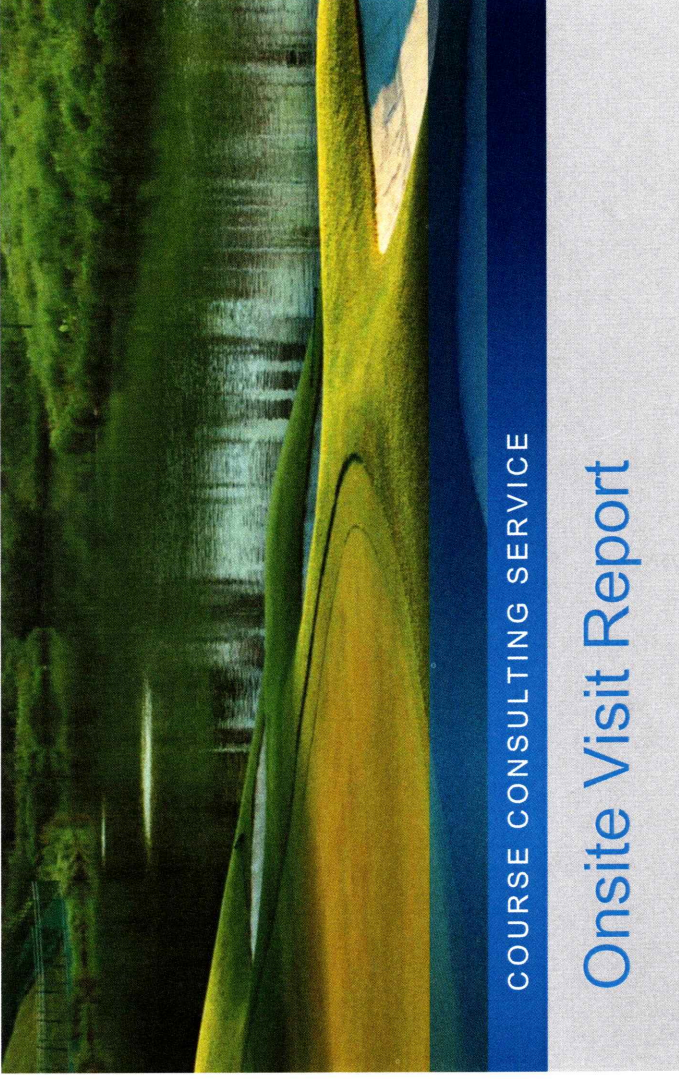
Weak bunker face on fairway bunker (left side of hole 1)



Highly variable soils in driving range landing area



Weak/thin bermudagrass along 2 tee. Consider St. Augustinegrass here.



The Biltmore Golf Course
Coral Gables, Florida

Visit Date: September 20, 2019

Present:

Bob Coman, The Biltmore Hotel Golf Management, LLC
Mike Harbin, Area Director, Brightview Golf Maintenance
Craig Ellison, Superintendent, Brightview Golf Maintenance
Steve Kammerer, Southeast Regional Director, 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

My last visit to The Biltmore was directly prior to a restoration project initiated in June of 2018. The restoration project involved tees, fairways, bunkers and total conversion of all putting greens to USGA specifications, excepting target greens, including new drainage. Under tight timelines following the sprigging of the last set of fairways with Tifway™ bermudagrass, overseeding was performed almost one month afterward. The golf course opened for play December 13, 2018, 65 to 84 days following sprigging of fairways and bermudagrass tees.

Almost one year following this restoration project, the focus for this visit was to provide an overall assessment of course conditions approximately nine months following opening. I was also asked to offer recommendations for actions which can enhance playability just prior to the onset of peak play, November 1, 2020. I will also include recommendations to consider coming out of the winter, going into spring transition and summer play for next year.

Executive Summary

With exception of a few issues, which will be discussed in this report, the golf course is largely in very good to excellent condition going into peak play (November through February).

- I noticed no obvious signs of neglect that would be cause for concern with the current maintenance being performed.
- Putting greens are in very good to excellent condition pertaining to playability. The root system, while still immature, requires greater watering events, fertilization, disease and nematode prevention.
- Tees and fairways are in good condition but for some localized thin turfgrass areas as a result of overseeding stress, weeds and their removal, and some variability in either environment (shade), density and timing of sprigging.
- Overseeding of the tees and fairways last year with perennial ryegrass so soon following sprigging (1.5 to 2.5 months), set establishment back and likely led to thin areas of bermudagrass in early summer leading up to now (September 20, 2019).
- Overseeding this fall is strongly discouraged. I have confidence that the bermudagrass will be significantly stronger and superior this upcoming spring through next year at this time, absent overseeding.
- Roughs are in good to fair condition consisting of a mixture of existing Tifway, Celebration® and common bermudagrass with some variable texture and growth characteristics more noticeable maintained at a 3-inch height of cut.
- Restoring the golf course to the original 84 bunkers consisted of reconstruction of partial turfgrass faces and installation of new sand and drainage, resulting in greater sand firmness consistency and fewer bunker face washouts following heavy rain events.
- Work continues on the driving range, which was raised 4 feet with additional drainage, with recent addition of more soil and sprigs to facilitate increased turfgrass cover in lower areas.

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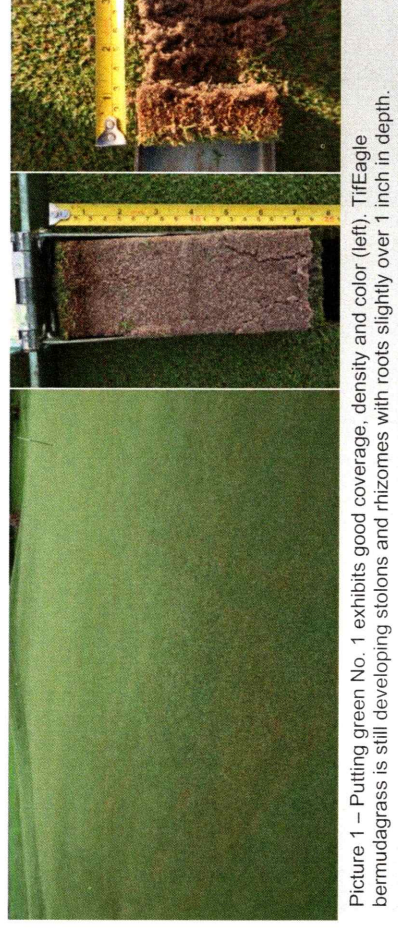
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Putting Greens

Observations

1. The putting greens were in very good condition.

- Unlike the fairways, the TifEagle™ bermudagrass, although also sprigged, was not overseeded following establishment. As a result, good coverage and density were observed.
- Watching several golfers, speeds and smoothness are very good. It was communicated that speeds are meeting expectations of the golf course and golfers.



2. Fertility and management.

- Nitrogen is applied at a target of 6 pounds per year equal to potassium at the same rate of 6 pounds.
 - Primo® growth regulator, trinexapac-ethyl, helps increase density, texture and uniformity of ball speeds on golf courses week to week, day to day. Primo is being applied at 4.0 ounces per acre once per week.
- ### 3. Taking a turfgrass soil profile, approximately 0.5 inches of thatch containing healthy stolons and rhizomes exists above the sand mix. Roots are not fully developed but concentrated to a 1-inch depth with white, healthy roots. For comparison, most golf courses I visit in Florida have an average 2-inch root depth.
- ### 4. The putting greens design has some elevated areas with a steep slope down off of adjacent collars. These areas can be especially difficult to mow with triplex mowers.
- On putting green No. 9, there was some scalping damage outside of the perimeter down the collar due to the steep slope mowing challenge. This area is being mowed with the fairway mower.

Recommendations

1. **As the putting green turfgrass is still establishing, irrigation frequency and fertilization requirements will be higher than would be for a mature green.**
 - Applications of fertilizer through the winter that contain readily available potassium, phosphorous and manganese are advised.
 - During the summer months, either a controlled-release granular fertilizer or more frequent applications of a nitrogen-based fertilization may be required until the thatch and root system increases in density.
2. **During the summer months, reduce the Primo rates and increase the frequency of applications to approximately twice per week. This will further improve the texture and density.**
 - Two 1.5-ounce applications of Primo twice per week per acre will perform better than the current 4.0 ounces per acre once a week.
 - Anuew™ is another turfgrass growth regulator similar to Primo in mode of activity with foliar uptake.
 - ♦ Many of the golf courses I visit have incorporated Anuew into their program for either management of off-types or to extend residual benefits and consistency of speeds.
 - ♦ Utilizing Anuew in combination with Primo, then alternating to Primo alone, then back to the combination results in improved consistency and speeds on a seven-day interval. Results with this approach at the least equal, but more often exceed, more frequent applications of Primo alone or the need for additional mowings. Double mowing and rolling are stressful to putting greens. If the same speeds can be achieved with one mowing in conjunction with this combination of growth regulators, the health of the grass will improve further.
3. **Utilize a soil moisture probe through the winter coupled with continued needle time aeration to ensure uniform moisture levels.**
 - Directed hand watering of dry areas coupled with spot treatments of wetting agents can help prevent unnecessary watering, resulting in getting good areas overly wet to address dry areas. This is especially valuable in minimizing root-borne diseases like Pythium root rot.
4. **Utilization of walk-behind mowers for the cleanup laps of the putting greens and especially outside the collars with steep slopes can help to minimize scalping and mower slippage.**

Tees

Observations

1. Tees were sprigged at the same time as the earlier sprigging of the fairways, the third week of September, with Tifway bermudagrass.
2. Tees are being mowed and maintained at 0.525 inches.

3. Some tees, such as in areas impacted by tree shade, were sodded with Platinum™ seashore paspalum to include tee No. 1, No. 4, the back of No. 11 tee, the middle tee of No. 12, and the back of tee Nos. 13 and 15.

- Seashore paspalum is much more tolerant of shade compared to bermudagrass. The higher quality of the seashore paspalum in comparison to surrounding Tifway bermudagrass adjacent to trees is very apparent. The seashore paspalum was sodded versus the bermudagrass tees which were sprigged.



4. Bermudagrass tees, similar to the fairways, were overseeded with perennial ryegrass slightly more than one month after sprigging. As a result, the bermudagrass tees are thin in comparison to the seashore paspalum tees which were established from sod and were not overseeded.

Recommendations

1. Discontinue overseeding of bermudagrass tees.
 - Overseeding so soon after sprigging puts additional stress and pressure on the bermudagrass tees in comparison to the seashore paspalum tees which were not overseeded.
 - Following a full summer and winter without overseeding, the bermudagrass tees should fill in significantly and present greater turf coverage and density.
2. Extra attention to thin bermudagrass tees coming out of the spring with increased fertility and more frequent but lower rates of growth regulators like trinexapac-ethyl will help improve density.

Fairways

Observations

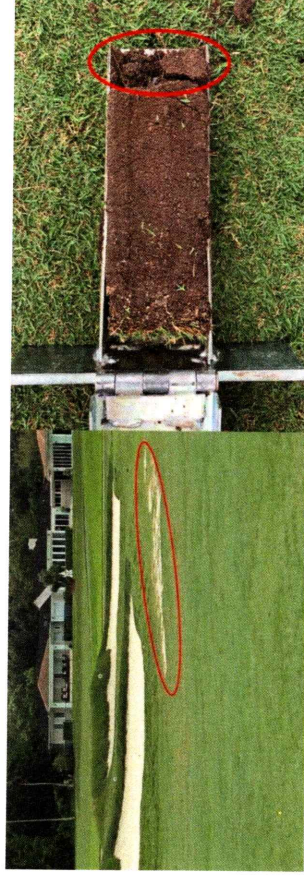
1. The existing fairways, prior to reestablishment for the restoration, were treated five times with three different non-selective herbicides starting on June 4, 2018, as an added precaution to kill the existing vegetation.

- There were areas consisting of St. Augustinegrass, such as off hole No. 5 and No. 9, killed to accommodate conversion to bermudagrass.

2. **Tifway bermudagrass sprigs were distributed over the top of the dead vegetation over three periods at varying densities:**

- September 20 – 22, 2018: A portion on No. 7, hole Nos. 8, 12, 13, 14, 15, 16 and 17 were sprigged at a density of 800 bushels to the acre.
- September 26 – 29, 2018: Hole No. 6, the rest of No. 7, No. 9, No. 10, No. 18 and the short game area were sprigged at 800 bushels per acre.
- October 5 – 9, 2018: Hole Nos. 1 through 5 and the driving range were sprigged at a higher density of 1,200 bushels per acre in consideration of the later timing and less time prior to fall and overseeding with perennial ryegrass.

3. **To avoid damage to sodded areas, such as around the putting greens and bunkers, equipment was kept off of these areas. This resulted in lower sprig densities in proximity to sodded areas. Some of these areas are noticeably thin as compared to other areas.**



Picture 3 – Thin area of fairway approaching sodded area around greenside bunkers as a result of inadvertent reduction in sprig density (left). One year following sprigging, representative turf soil profile indicates deep rooting approaching 8 inches (right).

4. **Overseeding. To deliver a dense, desirable fairway as quickly as possible for opening day on December 13, all fairways were overseeded with perennial ryegrass at a rate of 400 pounds per acre in November.**

- The fairways were maintained to favor the perennial ryegrass until May.
- Two sequential applications of an herbicide, Revolver[®], specific to slowly kill the ryegrass were made to facilitate transition from the ryegrass to the bermudagrass.
- 5. **Fairways are mowed at a height of 0.550 inches.**
 - Depending on the area, bermudagrass coverage and density are somewhat variable, with some areas better than others.
 - An additional 6,000 square feet of sod and more sprigs were used to repair weak areas in preparation for the approaching peak season this November.

6. **Weeds.** Despite some sporadic weeds, primarily tropical signalgrass and goosegrass, weed control was good. Weed control is especially challenging following sprigging or when the turfgrass coverage is thin.

- Good, dense turfgrass is the best defense against weed emergence from seed. Thin turfgrass allows more sunlight arriving at the soil layer, leading to increased potential for weed seed germination and establishment.
- Some very effective preemergence herbicides, such as Specticle[®], require total turfgrass coverage and a deep, dense root system for their use.

7. **Fertility.** Fairways are receiving a total of approximately 8 pounds of nitrogen per year, alternating 0.25 pounds of granular fertilizer with foliar applications every two weeks.

Recommendations

1. It is amazing to me that the bermudagrass sprigs survived to the extent that I observed with such a set of circumstances with the late sprigging and almost immediate overseeding afterwards. In my 30 years in this industry, I have never observed this set of circumstances before.

2. I strongly advise against any further overseeding. The variable quality of the fairways is worst on the last fairways sprigged. These fairways only had about 1.5 months to root and initiate any kind of vegetative growth before they were put in direct competition with the cool-season perennial ryegrass.

- Less than 1.5 to 2 months following sprigging from late September to early October, the Tifway was not mature enough to be fully established. Last year's overseeding set the bermudagrass back coming out of the winter and is the most obvious cause of the significant variability in coverage and density in these areas.

- Bermudagrass in southern Florida does not go dormant but growth slows considerably during the winter months when rounds are typically highest. Assimilation of carbohydrates from photosynthesis, due to shorter photoperiods and cooler temperatures, produces little growth as a self-preservation response.

- All the activities needed to encourage germination and establishment of perennial ryegrass negatively impact bermudagrass as these inputs push bermudagrass carbohydrate consumption and depletion over the course of the winter. This results in weaker bermudagrass coming out of the winter and spring transition than going in. Recent turfgrass research indicates that [perennial ryegrass produces natural chemicals that can have a negative effect on bermudagrass.](#)

- Bermudagrass that goes through the winter with minimal stress and relatively constant environmental conditions leads to stronger, denser, healthier bermudagrass through the spring to summer months.

- I am confident that the bermudagrass fairways will be much better this coming spring and summer with the benefit of not having perennial ryegrass competition through the winter.

3. **For the summer months, coming out of spring transition in 2020, incorporating controlled-release nitrogen can help maintain consistent levels of nitrogen across all areas of the fairways.**

- When a turfgrass plant and root system are weak, nitrogen can leach past the rootzone with heavy rainfall events. These areas are less able to capture the same amount of nitrogen and other nutrients as compared to the stronger areas.

Roughs

Observations

1. The original roughs were not changed during the restoration, outside of some areas being contracted or expanded per design changes to fairway areas on a hole-by-hole basis.
2. The roughs are being mowed to produce a 3-inch height of cut. This is intended to provide good visual contrast between the roughs, the intermediate cut at 1 inch, and the fairways.
3. There is a mixture of different bermudagrasses in the roughs, Tifway, some Celebration® and common bermudagrass.
4. **Weeds.** Brightview's Area Director, Mike Harbin, communicated that there was heavy weed pressure in the roughs coming out of the restoration.
 - Three herbicide applications of Ronstar®WP, oxadiazon, were sprayed sequentially to reduce subsequent emergence of seedlings and future weed populations. These applications resulted in some transient but dramatic discoloration of the turf during the summer.
 - Additional effort is ongoing, applying spot applications of postemergence herbicides to reduce and eliminate small weed populations.

Recommendations

1. **It is extremely difficult to maintain a quality, even playing surface with bermudagrass at 3 inches.**
 - With varieties like Celebration, the growth habit becomes puffy and uneven at heights above 1.25 inches. At heights above 1.25 inches, extra labor and attention with scalping, vertical mowing and continuing growth regulator applications on a step-up rate schedule are required to enhance canopy density and uniformity.



Picture 4 – Rough cut maintained at 3-inch height of cut exhibiting variable bumpy playing surface (A) and variable heights within a 10-foot area as a result of different bermudagrass types (B, C and D).

- Each bermudagrass variety can be distinctly different due to many different factors. As an example, common bermudagrass, considered the world's worst weed, doesn't produce a good playing surface compared to other hybridized varieties. At high heights of cut, common bermudagrass tends to predominate over time. See [The Turf World's Greatest Weed](#) for more information.
2. **For next spring going to the summer, scalp the roughs down to somewhere between 0.5 to 0.75 inches. After the first cut, brush or stand up remaining grass for an additional cut in a different direction.**
 - Remove the clippings following this scalping.
 - Set an in peak season target height at ideally 1.25 to no more than 1.75 inches.
 - To produce a tight canopy providing both good density and visual contrast with the fairways:
 - ◆ Initiate Primo applications starting at 3 to 5 ounces per acre. Three weeks later, step up the rate by 2 to 3 ounces per acre once new green leaf tissue is observed.
 - ◆ There will be approximately four Primo applications prior to the end of July.
 - ◆ After the maximum target rate of Primo is applied, step down the rates at the same interval until the end of October, then discontinue applications.
 - ◆ The height of cut should also be slowly increased in conjunction with the Primo applications until the target height is achieved at the end of October.
 3. **There are two extremely effective oxadiazon formulations that have reduced potential of phytotoxicity without sacrificing efficacy – Ronstar 2G or Starfighter® 2G.**
 - Alternative to applying Ronstar 2G in-house, Southeastern Turf of Jacksonville, Florida, performs custom dry applications of a 2% oxadiazon granule on biodac carrier as either Ronstar or Starfighter 2G.
 - As both Ronstar and Starfighter 2G granules have a biodac carrier, neither are dependent on additional release dependent on a fertilizer granule. The granule size and carrier of these 2G formulations are uniform, thus both perform similarly resulting in slow herbicide release and minimal burn potential.
 - Southeastern Turf will custom apply Starfighter 2G for the same price as Ronstar 2G product minus the custom application. Contact John Wicker of Southeastern Turf at (904) 629-1302 for more information.

Bunkers and Driving Range

Observations

1. **All 84 bunkers were "touched" during the restoration.**
 - Faces were modified back to a design with grass slopes in lieu of steep sand faces, thereby reducing potential problems with sand moisture inconsistencies between the bunker faces and bottoms.

- Reducing the slope of the sand faces has also reduced face collapse and repair events.
 - New drainage lines were installed.
 - On top of a sand trap liner, new G-angle sand was installed.
2. **The preexisting driving range incurred frequent flooding and drainage issues. The new driving range was reconstructed to include:**
- Elevation was raised an additional 4 feet using soil and spoils from the golf course.
 - Four additional drains were installed.
 - Target areas were sodded with seashore paspalum.
 - Another area was sprigged with Celebration bermudagrass, an aggressively growing, quickly establishing bermudagrass variety.
3. **Following the driving range reconstruction, some water issues from heavy rain events still occurred.**
- Additional soil was brought into these problem areas.
 - Celebration sprigs were just applied the week prior to my visit. Some green tissue was observed indicating some rooting was already occurring.

Summary

Thank you for having me for a half-day Course Consulting Service visit. I really enjoyed my time at the hotel and golf course, all the hospitality that everyone at The Biltmore offers, and the interactions with everyone. I am confident that the bermudagrass cover of the fairways will improve with the recommendations made. As I also work with Riviera Country Club, I will try to check back next year to see how everything is progressing. Please contact me with any questions regarding my visit or this report.

Respectfully submitted,



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USGA Green Section

Distribution:

Bob Coman, The Biltmore Hotel Golf Management, LLC

Additional Considerations

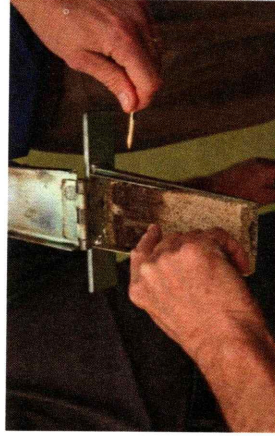
USGA Green Section Record

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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.

