

FALL 2016
Data Collection Report
Soil & Water Consulting



The Revere Golf Club



SOIL and WATER CONSULTING

Course Name: Revere Golf Club

Date of Visit: September 26, 2016

	<u>9/29/15</u>	<u>3/24/16</u>	<u>9/26/16</u>
Humidity/Air Temperature	20%/100°	15%/75°	15%/90°
Greens Temperature	72.2°	43.1°	62°
Fairway Temperature	74.5°	46.5°	68°

WATER	Acceptable Range For Water Sample	Hole #2 <u>9/29/15</u>	Hole #14 <u>3/24/16</u>	Hole #7 <u>9/26/16</u>
EC	<2.25 mmhos/cm	1.96	2.13	1.99
Sodium		246.80	293.60	244.20
Calcium	20 - 60 ppm	89.60	94.61	90.45
Magnesium	10 - 25 ppm	28.18	26.70	29.52
Potassium	5 - 20 ppm	19.09	20.80	21.82
Phosphorus	0.1 - 0.4 ppm	1.80	0.80	2.15
Nitrate	5 - 50 ppm	12.69	8.78	12.12
Sulfur	30 - 90 ppm	289.41	275.76	366.00
Bicarbonate	<120 ppm	160.93	177.10	72.71
Boron	<0.67 ppm	0.33	0.40	0.36
Chloride	<177 ppm	305.86	469.77	376.16



Lexington Course



SOIL and WATER CONSULTING

TEE	Acceptable Range For Alkaline Soils Sample	2 9/29/15	14 3/24/16	7 9/26/16
Organic Matter (Humus)	2 - 3%	3.65	3.34	4.26
Sulfur	12 - 16 ppm	81.00	104.00	81.00
Olsen - Phosphorus	13 - 20 ppm	10.00	18.00	21.00
Calcium - TEC of 6 - 12	1,000 lbs/acre	2,692.00	5,332.00	3,560.00
Magnesium	>7% base saturation or at least 200 lbs/acre	8.44%/236	10.76%/474	7.04%/380
Potassium - TEC of 0 - 35	100 ppm	757.00	364.00	366.00
Copper	>0.8 ppm	0.71	1.53	1.74
Manganese	>1 ppm	2.00	3.00	1.00
Zinc	>1 - 2 ppm	12.98	7.32	8.68

FAIRWAY	Acceptable Range For Alkaline Soils Sample	2 9/29/15	14 3/24/16	7 9/26/16
Organic Matter (Humus)	2 - 3%	1.80	3.79	4.86
Sulfur	12 - 16 ppm	5,580.00	604.00	1,445.00
Olsen - Phosphorus	13 - 20 ppm	17.00	38.00	41.00
Calcium - TEC of 6 - 12	1,000 lbs/acre	18,716.00	6,854.00	8,050.00
Magnesium	>7% base saturation or at least 200 lbs/acre	3.87%/796	10.95%/642	9.38%/636
Potassium - TEC of 0 - 35	100 ppm	718.00	517.00	794.00
Copper	>0.8 ppm	2.20	1.70	0.96
Manganese	>1 ppm	12.00	5.00	2.00
Zinc	>1 - 2 ppm	15.00	5.63	7.45

GREENS	Acceptable Range For Alkaline Soils Sample	2 9/29/15	14 3/24/16	7 9/26/16
Organic Matter (Humus)	2 - 3%	1.81	1.77	1.82
Sulfur	12 - 16 ppm	59.00	81.00	70.00
Olsen - Phosphorus	13 - 20 ppm	28.00	8.00	7.00
Calcium - TEC of 6 - 12	1,000 lbs/acre	2,340.00	3,100.00	2,690.00
Magnesium	>7% base saturation or at least 200 lbs/acre	8.57%/206	8.05%/246	8.0%/206
Potassium - TEC of 0 - 35	150 ppm	638.00	726.00	605.00
Copper	>0.8 ppm	0.69	0.53	0.81
Manganese	4 ppm or more	3.00	2.00	2.00
Zinc	>1 - 2 ppm	213.00	10.32	10.71



SOIL and WATER CONSULTING

TEE	Acceptable Range For Saturated Paste Sample	1,14 (avg) 3/24/16	7,16 (avg) 9/26/16
Nitrate - Ryegrass	5 - 10 ppm	<0.5	<0.5
Nitrate - Bermudagrass	10 -15 ppm		
Phosphorus	2 - 10 ppm	0.47	2.48
Potassium	40 - 100 ppm	36.87	35.88
Calcium	60 - 200 ppm	133.93	163.31
Magnesium	20 - 70 ppm	35.52	47.12
Sodium	0 - 30 ppm	860.53	313.53
Soluble Salts	<1,920 ppm	907.94	1,535.50
Bicarbonate	<60 ppm	207.44	251.36
Chloride	<1,000 ppm	476.50	423.00
SAR	<4%	6.96	5.56

FAIRWAY	Acceptable Range For Saturated Paste Sample	1,14 (avg) 3/24/16	7,16 (avg) 9/26/16
Nitrate - Ryegrass	5 - 10 ppm	<12.0	1.10
Nitrate - Bermudagrass	10 -15 ppm		
Phosphorus	2 - 10 ppm	0.42	1.50
Potassium	40 - 100 ppm	86.46	52.56
Calcium	60 - 200 ppm	563.71	368.48
Magnesium	20 - 70 ppm	124.14	76.86
Sodium	0 - 30 ppm	659.46	351.73
Soluble Salts	<1,920 ppm	3,212.50	2,083.00
Bicarbonate	<60 ppm	224.52	179.37
Chloride	<1,000 ppm	804.50	263.50
SAR	<4%	6.56	4.35

GREENS	Acceptable Range For Saturated Paste Sample	1,14 (avg) 3/24/16	7,16 (avg) 9/26/16
Nitrate - Bentgrass	1-3 ppm	<0.5	<0.5
Phosphorus	2 - 7 ppm	1.87	0.86
Potassium	25-40 ppm	22.37	14.83
Calcium	50- 75 ppm	102.58	47.70
Magnesium	15-30 ppm	27.61	12.15
Sodium	0 - 30 ppm	198.94	91.13
Soluble Salts	<1,000 ppm	940.00	439.00
Bicarbonate	<60 ppm	123.24	104.94
Chloride	<200 ppm	182.00	60.00
SAR	<4%	4.54	3.07



SOIL and WATER CONSULTING

TEE	Acceptable Range For Tissue Sample	7,16 (avg) 9/26/16
Nitrogen	3.34%-5.10%	5.93
Phosphorus	0.35% - 0.55%	0.60
Potassium	2.0% - 3.42%	2.88
Calcium	0.25%-0.5%	0.69
Magnesium	0.16%-0.32%	0.35
Sulfur	0.27% - 0.56%	0.58
Boron	5-17 ppm	24.10
Iron	97-934 ppm	186.50
Manganese	30-73 ppm	32.00
Copper	6-38 ppm	15.10
Zinc	16-84ppm	136.00
Aluminum	52-92 ppm	101.00
Sodium	229-1107 ppm	6,535.00

FAIRWAY	Acceptable Range For Tissue Sample	7,16 (avg) 9/26/16
Nitrogen	3.34%-5.10%	5.72
Phosphorus	0.35% - 0.55%	0.65
Potassium	2.0% - 3.42%	2.86
Calcium	0.25%-0.5%	0.65
Magnesium	0.16%-0.32%	0.28
Sulfur	0.27% - 0.56%	0.59
Boron	5-17 ppm	40.10
Iron	97-934 ppm	419.50
Manganese	30-73 ppm	71.65
Copper	6-38 ppm	13.70
Zinc	16-84ppm	90.00
Aluminum	52-92 ppm	126.00
Sodium	229-1107 ppm	6,120.00

GREENS	Acceptable Range For Tissue Sample	7,16 (avg) 9/26/16
Nitrogen	3.0%-6.5%	4.67
Phosphorus	0.2%-0.55%	0.57
Potassium	0.86%-2.55%	1.77
Calcium	0.21%-0.50%	0.86
Magnesium	0.09%-0.22%	0.28
Sulfur	0.23%-0.39%	0.56
Boron	5-24 ppm	21.35
Iron	99-500 ppm	574.00
Manganese	30-160 ppm	77.70
Copper	9-40 ppm	18.70
Zinc	5-60 ppm	80.00
Aluminum	63- 408 ppm	391.50
Sodium	506- 2264 ppm	3,565.00



SOIL and WATER CONSULTING

Concord Course



SOIL and WATER CONSULTING

TEE	Acceptable Range For Saturated Paste Sample	14 3/24/16	16 9/26/16
Nitrate - Ryegrass	5 - 10 ppm	1.00	<0.5
Nitrate - Bermudagrass	10 -15 ppm		
Phosphorus	2 - 10 ppm	2.53	1.17
Potassium	40 - 100 ppm	36.10	24.27
Calcium	60 - 200 ppm	113.49	68.42
Magnesium	20 - 70 ppm	31.91	19.25
Sodium	0 - 30 ppm	329.05	237.48
Soluble Salts	<1,920 ppm	1,247.00	964.00
Bicarbonate	<60 ppm	192.79	197.67
Chloride	<1,000 ppm	396.00	175.00
SAR	<4%	7.03	6.53

FAIRWAY	Acceptable Range For Saturated Paste Sample	14 3/24/16	16 9/26/16
Nitrate - Ryegrass	5 - 10 ppm	4.30	<0.5
Nitrate - Bermudagrass	10 -15 ppm		
Phosphorus	2 - 10 ppm	0.46	0.25
Potassium	40 - 100 ppm	101.63	41.47
Calcium	60 - 200 ppm	584.59	384.07
Magnesium	20 - 70 ppm	120.76	71.39
Sodium	0 - 30 ppm	730.50	308.61
Soluble Salts	<1,920 ppm	3,392.00	2,016.00
Bicarbonate	<60 ppm	207.43	173.27
Chloride	<1,000 ppm	825.00	161.00
SAR	<4%	7.18	3.79

GREENS	Acceptable Range For Saturated Paste Sample	14 3/24/16	16 9/26/16
Nitrate - Bentgrass	1-3 ppm	0.60	<0.5
Phosphorus	2 - 7 ppm	1.15	1.08
Potassium	25-40 ppm	23.29	16.52
Calcium	50- 75 ppm	109.33	60.21
Magnesium	15-30 ppm	28.09	16.64
Sodium	0 - 30 ppm	186.63	99.58
Soluble Salts	<1,000 ppm	947.00	531.00
Bicarbonate	<60 ppm	131.78	124.46
Chloride	<200 ppm	179.00	74.00
SAR	<4%	4.12	2.93



SOIL and WATER CONSULTING

TEE	Acceptable Range For Tissue Sample	16 9/26/16
Nitrogen	3.34%-5.10%	<i>Not Tested</i>
Phosphorus	0.35% - 0.55%	
Potassium	2.0% - 3.42%	
Calcium	0.25%-0.5%	
Magnesium	0.16%-0.32%	
Sulfur	0.27% - 0.56%	
Boron	5-17 ppm	
Iron	97-934 ppm	
Manganese	30-73 ppm	
Copper	6-38 ppm	
Zinc	16-84ppm	
Aluminum	52-92 ppm	
Sodium	229-1107 ppm	

FAIRWAY	Acceptable Range For Tissue Sample	16 9/26/16
Nitrogen	3.34%-5.10%	<i>Not Tested</i>
Phosphorus	0.35% - 0.55%	
Potassium	2.0% - 3.42%	
Calcium	0.25%-0.5%	
Magnesium	0.16%-0.32%	
Sulfur	0.27% - 0.56%	
Boron	5-17 ppm	
Iron	97-934 ppm	
Manganese	30-73 ppm	
Copper	6-38 ppm	
Zinc	16-84ppm	
Aluminum	52-92 ppm	
Sodium	229-1107 ppm	

GREENS	Acceptable Range For Tissue Sample	16 9/26/16
Nitrogen	3.0%-6.5%	4.24
Phosphorus	0.2%-0.55%	0.64
Potassium	0.86%-2.55%	1.67
Calcium	0.21%-0.50%	1.21
Magnesium	0.09%-0.22%	0.35
Sulfur	0.23%-0.39%	0.72
Boron	5-24 ppm	25.00
Iron	99-500 ppm	929.00
Manganese	30-160 ppm	68.20
Copper	9-40 ppm	19.10
Zinc	5-60 ppm	86.60
Aluminum	63- 408 ppm	571.00
Sodium	506- 2264 ppm	4,970.00



RECOMMENDATIONS



SOIL and WATER CONSULTING

Thoughts on the course visit

On this visit, I really began to notice the past 2 ½ years of your work coming together. The Lexington course was open for play and the overseeding had come in very well. With the cooler than normal soil and air temperatures in September, it should be an excellent Fall on that course. The Concord was recently seeded and was in the beginning stages of germination. As we drove the courses there was much less "trouble" to discuss than in previous visits. Surely there is always more to do to the irrigation system and some infrastructure items, but the playability and aesthetics of the golf was as good as I have seen it since we began working together.

The lab data was much better with regards to sodium build up in the soil. The use of the sulfur burner is worth the effort and expense and I am sure you are on a more routine amendment and flushing program on the greens. Even the picture below of the T-1 seed germinated in the slits shows this. It is very difficult to get bentgrass seed to germinate with salty water and poor water movement through the top layer on the greens. The sodium level in the water hasn't changed but the ability to use the moisture in the water and keep it moving has obviously improved.

The recommendations for the tees and fairways will help put the bermudagrass to bed for the winter and give the ryegrass something to hold on to as it gets colder. For the greens, continue to increase Phosphorus levels through Fall and into winter as weather dictates.



Notes from the visit

- Greens mowing height @ 0.120"
- Recent greens fertility was gypsum and 10-4-16 within a month.
- Seeded greens with ¾'s of a pound of T-1.
- Using some Floratine Products in greens program.
- Fairways mowing height @ 0.750".
- 800 pounds per acre of ryegrass rate.
- Recent fertility to fairways was 8-30-15 and will use an 18-5-0 after overseed is matured.
- Using the sulfur burner until 10/31 - later than last year.

Fertilizer and Product Recommendations

Tees & Fairways

Potassium- 150 pounds of product per acre. (0-0-50)

* Add Manganese Sulfate to winter sprays. Also, using acidifiers (like pHacid or Blast) monthly will help both the ryegrass and the soil while you aren't using as much sulfur treated water.

Greens (Monthly applications)

Phosphorus- 3 pounds of product per 1,000 square feet. (11-55-00)

Calcium- 5 pounds of product per 1,000 square feet. (Gypsum)

Potassium- 2 pounds of product per 1,000 square feet (0-0-50)

Manganese- 2 pounds of product per 1,000 square feet. Techmagnum.(Manganese Sulfate)

* **Epsom salts and pHacid spray and water in monthly.**