

SUMMER 2017
Data Collection Report
Soil & Water Consulting



— Est. 1947 —

Tucson Country Club



SOIL and WATER CONSULTING

Course Name: Tucson Country Club

Date of Visit: June 2, 2017

	<u>6/25/16</u>	<u>9/6/16</u>	<u>3/20/17</u>	<u>6/2/17</u>
Humidity/Air Temperature	22%/99°	20%/90°	20%/92°	20%/90°
Greens Temperature	78°	n/t	78°	82°
Fairway Temperature	78°	n/t	79°	80°

	Acceptable Range For Water Sample	Potable Lake <u>6/25/16</u>	Effluent Lake <u>6/25/16</u>	Effluent Lake <u>9/6/16</u>	Hole #1 <u>3/20/17</u>	Hole #4 <u>6/2/17</u>
EC	<2.25 mmhos/cm	0.40	0.13	0.46	0.33	0.37
Sodium		45.59	91.06	82.85	29.04	37.46
Calcium	20 - 60 ppm	32.28	47.90	17.75	32.35	32.68
Magnesium	10 - 25 ppm	2.00	7.27	1.06	2.64	1.80
Potassium	5 - 20 ppm	2.55	4.56	1.45	3.55	3.06
Nitrate	10 - 25 ppm	n/t	1.62	1.70	0.98	<0.10
Phosphorus	5 - 20 ppm	n/t	0.21	<0.20	<0.20	0.24
Sulfur	30 - 90 ppm	35.16	87.81	23.87	29.10	28.66
Bicarbonate	<120 ppm	146.66	206.92	195.82	118.79	131.41
Boron	<0.67 ppm	0.08	0.19	0.15	0.05	0.06
Chloride	<177 ppm	21.62	61.10	16.00	12.25	14.98



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TEE	Acceptable Range For Alkaline Soils Sample	6 6/25/16	7 9/6/16	1 3/20/17	4 6/2/17
Organic Matter (Humus)	2 - 3%	2.60	2.17	2.56	2.49
Sulfur	12 - 16 ppm	30.00	34.00	17.00	35.00
Olsen - Phosphorus	13 - 20 ppm	13.00	9.00	19.00	14.00
Calcium - TEC of 6 - 12	1,000 lbs/acre	4,178.00	3,536.00	3,360.00	4,572.00
Magnesium	>7% base saturation or at least 200 lbs/acre	7.68%/242	6.79%/184	9.71%/246	8.245/286
Potassium - TEC of 0 - 35	100 ppm	136.00	180.00	116.00	193.00
Copper	>0.8 ppm	1.20	1.37	1.15	1.32
Manganese	>1 ppm	3.00	2.00	3.00	2.00
Zinc	>1 - 2 ppm	5.30	4.63	6.98	4.80

FAIRWAY	Acceptable Range For Alkaline Soils Sample	6 6/25/16	7 9/6/16	1 3/20/17	4 6/2/17
Organic Matter (Humus)	2 - 3%	3.65	2.35	2.37	3.64
Sulfur	12 - 16 ppm	71.00	47.00	23.00	53.00
Olsen - Phosphorus	13 - 20 ppm	14.00	10.00	34.00	27.00
Calcium - TEC of 6 - 12	1,000 lbs/acre	5,012.00	3,364.00	3,054.00	3,394.00
Magnesium	>7% base saturation or at least 200 lbs/acre	8.62%/342	8.10%/214	10.23%/250	10.31%/290
Potassium - TEC of 0 - 35	100 ppm	371.00	245.00	229.00	269.00
Copper	>0.8 ppm	1.37	1.94	1.50	1.18
Manganese	>1 ppm	5.00	3.00	3.00	2.00
Zinc	>1 - 2 ppm	5.36	4.15	4.47	7.58

GREENS	Acceptable Range For Alkaline Soils Sample	6 6/25/16	7 9/6/16	1 3/20/17	4 6/2/17
Organic Matter (Humus)	2 - 3%	0.77	0.42	0.80	0.62
Sulfur	12 - 16 ppm	12.00	11.00	11.00	11.00
Olsen - Phosphorus	13 - 20 ppm	13.00	9.00	17.00	11.00
Calcium - TEC of 6 - 12	1,000 lbs/acre	2,502.00	2,090.00	2,134.00	2,232.00
Magnesium	>7% base saturation or at least 200 lbs/acre	6.76%/132	7.31%/126	9.40%/166	8.62%/162
Potassium - TEC of 0 - 35	150 ppm	278.00	353.00	284.00	370.00
Copper	>0.8 ppm	1.06	1.50	1.40	1.73
Manganese	4 ppm or more	2.00	2.00	2.00	2.00
Zinc	>1 - 2 ppm	3.20	2.98	4.55	5.36



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TEE	Acceptable Range For Saturated Paste Sample	1,10 (avg) 3/20/17	4,13 (avg) 6/2/17
Nitrate - Ryegrass	5 - 10 ppm	<0.5	
Nitrate - Bermudagrass	10 -15 ppm		<0.5
Phosphorus	2 - 10 ppm	1.15	2.00
Potassium	40 - 100 ppm	14.27	13.61
Calcium	60 - 200 ppm	55.38	43.38
Magnesium	20 - 70 ppm	6.47	6.64
Sodium	0 - 30 ppm	59.97	116.33
Soluble Salts	<1,920 ppm	344.50	471.00
Bicarbonate	<60 ppm	230.62	214.76
Chloride	<1,000 ppm	30.50	51.50
SAR	<4%	2.02	4.30

FAIRWAY	Acceptable Range For Saturated Paste Sample	1,10 (avg) 3/20/17	4,13 (avg) 6/2/17
Nitrate - Ryegrass	5 - 10 ppm	<0.5	
Nitrate - Bermudagrass	10 -15 ppm		<0.7
Phosphorus	2 - 10 ppm	1.64	2.81
Potassium	40 - 100 ppm	29.45	41.32
Calcium	60 - 200 ppm	59.26	60.07
Magnesium	20 - 70 ppm	8.71	10.19
Sodium	0 - 30 ppm	91.04	138.95
Soluble Salts	<1,920 ppm	456.50	652.00
Bicarbonate	<60 ppm	261.12	178.15
Chloride	<1,000 ppm	39.50	85.50
SAR	<4%	2.94	4.38

GREENS	Acceptable Range For Saturated Paste Sample	1,10 (avg) 3/20/17	4,13 (avg) 6/2/17
Nitrate - Bentgrass	1-3 ppm	<0.5	<0.5
Phosphorus	2 - 7 ppm	2.31	1.95
Potassium	25-40 ppm	13.61	20.37
Calcium	50- 75 ppm	17.55	26.72
Magnesium	15-30 ppm	2.73	4.06
Sodium	0 - 30 ppm	34.12	38.15
Soluble Salts	<1,000 ppm	171.50	233.50
Bicarbonate	<60 ppm	102.50	125.68
Chloride	<200 ppm	13.50	23.00
SAR	<4%	2.00	1.84



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TEE	Acceptable Range For Tissue Sample	4,13 (avg) 6/2/17
Nitrogen	2.49%-4.56%	3.82
Phosphorus	0.26% - 0.38%	0.54
Potassium	0.95% - 1.97%	1.94
Calcium	0.50%-0.90%	0.76
Magnesium	0.13%-0.16%	0.21
Sulfur	0.32% - 0.51%	0.46
Boron	6-12 ppm	22.30
Iron	104-316 ppm	247.50
Manganese	45-80 ppm	40.25
Copper	2-10 ppm	11.20
Zinc	46-122 ppm	43.60
Aluminum	135-397 ppm	144.50
Sodium	622-1709 ppm	1,715.00

FAIRWAY	Acceptable Range For Tissue Sample	4,13 (avg) 6/2/17
Nitrogen	2.49%-4.56%	4.87
Phosphorus	0.26% - 0.38%	0.63
Potassium	0.95% - 1.97%	2.43
Calcium	0.50%-0.90%	0.46
Magnesium	0.13%-0.16%	0.22
Sulfur	0.32% - 0.51%	0.54
Boron	6-12 ppm	18.70
Iron	104-316 ppm	245.00
Manganese	45-80 ppm	32.45
Copper	2-10 ppm	13.65
Zinc	46-122 ppm	53.75
Aluminum	135-397 ppm	125.00
Sodium	622-1709 ppm	1,395.00

GREENS	Acceptable Range For Tissue Sample	4,13 (avg) 6/2/17
Nitrogen	3.0%-6.5%	4.23
Phosphorus	0.2%-0.55%	0.56
Potassium	0.86%-2.55%	2.14
Calcium	0.21%-0.50%	0.47
Magnesium	0.09%-0.22%	0.16
Sulfur	0.23%-0.39%	0.44
Boron	5-24 ppm	17.70
Iron	99-500 ppm	358.00
Manganese	30-160 ppm	91.20
Copper	9-40 ppm	20.50
Zinc	5-60 ppm	47.45
Aluminum	63- 408 ppm	117.50
Sodium	506- 2264 ppm	735.00



RECOMMENDATIONS



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Thoughts on the course visit

I was able to play the entire 18 holes on Sunday the 4th of June. The playability of the course was excellent and I can see why the members had all compliments on conditions as I talked to some while sampling. The rough was dry but that had more to do with the recent well issues, I suppose. However, it does make sense to keep the areas away from play dry as you head into the monsoon season where you will easily catch up. You had just used the roto-knife on the bermudagrass areas and it does leave a little scalping (as shown in the picture below) but it has a huge upside for the long term conditions.

We looked through your shop yard buildings at recent fertilizer and chemical orders and you seem to be properly stocked for the next few months based on this round of data. Available Magnesium still tested low so your K-Mag application will be perfect and your plan for monthly applications of 21-0-0 on the bermudagrass will be right on time. As often as you can, spray acidifiers and water them in prior to the monsoon rain events that will help on any area of the course.

The greens looked healthy and only potassium was a little low at this time. The more you water (or if it rains) the more you should apply 0-0-50. It will allow you to reduce brushing and verti-cutting as the temperatures stay at 100+ for a sustained amount of time. They were rolling very smoothly. You had watered the greens the night before so it was difficult to judge their "softness" but it certainly wasn't an issue with ballmarks.



Notes from the visit

- Greens Mowing Height- 0.100"
- Recent fertility was Endo roots, K-mag, gypsum at aerification 3 weeks prior.
- Fairways mowing height- 0.375"
- Recent Fertility was 200 pounds of 0-0-22 with another application coming in Summer.
- Played golf 6/4 - very few wet spots, great fairways and smooth greens.

Fertilizer and Product Recommendations

Tees & Fairways (ONE TIME IN SUMMER)

Magnesium/Potassium- 300 pounds of product per acre.(0-0-22; K-Mag)

*** Spray Epsom salts in tank mixes that will allow.**

Greens (Monthly applications)

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

***Synthetic acid spray and water in every two weeks. Spray Epsom salts in tank mixes that will allow.**