

**YOUR
ISTRC SYSTEMTM
REPORT**



**BRAE BURN
COUNTRY CLUB**

October 11, 2013
Green 7
Lab ID: 13090053

Presented To:

Mr. Tim Strano, GCS

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October 11, 2013

Mr. Tim Strano, GCS
BRAE BURN COUNTRY CLUB
326 Fuller St.
West Newton, MA 02465

re: Lab ID: 13090053; ISTRC SYSTEM™ BenchMarking of undisturbed core samples from Green #7 – Left & Right of Green. ISTRC Rep: Mr. Gregg Mackintosh.

Dear Tim:

We have completed the ISTRC SYSTEM™ BenchMarking of the undisturbed core samples taken from Green 7.

The laboratory data can be found in its entirety at the end of this report. There are two sets of data. The first set of data consists of the physical evaluation, the evaluation of the root systems, and the measurement of the organic matter by layer. The second set of data contains the textural & particle size analysis. The textural analysis measures the percentage of gravel, sand, silt and clay comprising the soil. The particle size distribution analyzes the size distribution of the sand.

On the following pages we will discuss each of the tested greens. Included with the discussion are selected time lapse photos of the root zone, our Target Table with the green's physical properties and an inch-by-inch analysis of the Textural & Sand Particle Size Distribution. Table 1 compares the current test results to our recommended target range for modify native soil, push-up greens. The time lapse photos included on the following pages were taken during the drying process of the samples and selected photos have been included within the report to provide visual confirmation of the tested physical properties.

The Brae Burn Country Club was built in the late 1910's. The greens are native soil push-ups that have been gradually amended through years of topdressing & aerification. The original turf was Velvet bentgrass and is currently a combination of Bentgrass & *Poa annua*. Consistency in growth, firmness and speeds has been some of the challenges over the years. The greens are relatively small, but surface drainage is good. Samples were submitted from the right side & left side of Green #7. Green #7 has been tested on an annual basis since 2006 and the data from July 2013 and July 2011 have been included within the report as a basis for comparison.



The Left Side of Green #7 has a lower 1st tier (0-4 in.) infiltration rate, lower air porosity and higher water holding properties than the Right Side. With similar OM contents and water holding properties the key variable in the physical properties for both sides is compaction, as measured by the bulk density. At this time it is difficult to say why the Left Side is more compacted, but often it either reflects the design features of the green, shade/air movement differences and/or traffic patterns.



Table 1.

ISTRC Comparison Table

Green #7 1 st tier (0-4")	Modified Soil Greens (1 st tier Sample)	September 2013		July 2013	July 2011
		Left	Right		
Infiltration Rate [In/hr]	At least 4	4.23 [well lower than the sample labeled right side of the green]	15.77 [excellent –the time lapse photo of the right side sample is an excellent confirmation of its tested physical properties]	0.69	7.15
Air Porosity [Non-Capillary]	At least 14%	16.13% [lower than the right sample, but is well higher than the sample submitted in July]	21.83% [excellent]	11.80%	18.66%
Water Porosity [Capillary]	Less than 30%	30.67% [at our upper target range]	28.59% [workable for a soil green]	32.62%	32.56%
Bulk Density [g/cc]	1.35 to 1.45	1.41 [high for the amount of OM – would benefit from less compaction]	1.37 [more in line with what is should be given the amount of OM]	1.44	1.28
Water Holding	Less than 25%	21.70% [workable]	20.91% [workable]	22.66%	25.42%
Organic Content: 0-1"	1.5% to 3.0%	3.34% [high]	3.23% [high]	2.36%	2.52%
Organic Content: 1-2"	1.0% to 2.0%	3.58% [high]	3.22% [high]	2.89%	4.55%
Organic Content: 2-3"	0.5% to 2.0%	2.53% [high]	2.31% [high]	2.22%	3.04%
Organic Content: 3-4"	0.5% to 2.0%	3.76% [high]	3.35% [high]	3.58%	5.40%
Root Mass	at least ½ in.	3/8 in.	3/8 in.	3/8 in.	5/8 in.
Feeder Roots	at least 3.5 in.	3 ½ in. Sparse	3 ½ in. Sparse	3 ½ in.	3 in.

	-med. density		Sparse	Sparse
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	Textural Analysis				Sand Particle Size Distribution						
	Sand	Silt	Clay	Gravel	Very Coarse	Coarse	Medium	Medium	Med/Fine	Fine	Very Fine
USDA (mm)	.05 to 2.00	.002 to .05	<.002	2.00	1.00	0.50	0.25	0.10	0.15	0.10	0.05
U.S. Sieve (mesh)	270 to 18	(Pan)	(Pan)	10	18	35	60	80	100	140	270
SAMPLE NAME	% Retained on Sieve										
25 - 1.0 in	97.33	0.02	2.65	0.00	5.17	23.82	52.50	9.26	3.15	2.18	1.25
1.0 - 2.0 in	93.17	0.06	6.77	0.00	10.87	31.45	38.50	7.50	2.40	1.45	1.00
2.0 - 3.0 in	94.12	1.97	3.91	0.00	7.70	26.50	39.75	9.50	4.07	3.75	2.85
3.0 - 4.0 in	89.14	3.88	6.42	0.56	9.00	21.25	29.50	10.57	5.00	5.82	8.00
25 - 1.0 in	98.03	0.33	1.64	0.00	5.37	25.20	54.37	8.50	2.12	1.50	0.97
1.0 - 2.0 in	99.90	0.02	0.08	0.00	9.05	32.12	42.30	10.00	2.48	2.50	1.45
2.0 - 3.0 in	93.09	2.32	4.59	0.00	6.30	23.72	41.50	10.50	4.25	3.87	2.95
3.0 - 4.0 in	93.27	1.93	4.80	0.00	6.45	21.00	33.00	15.25	5.12	6.45	6.00

LG #7's
1st tier

RG #7's
1st tier

Specifications	89 to 100	5 Max.	3 Max.	3 Max.	10 Max.	At least 60	20 Max.	5 Max.		
es	89 to 100	10 Max. w/ Fine & V.F.	3 Max.	3 Max.	10 Max.	15 to 25	40+	10 to 15	20 - #80	5 Max.
		10 Max. w/ Fine & V.F.	10 Max.	65 to 85 Optimum				10 Max. w/Silt & Clay		

Particle Distribution

Above is the inch-by-inch analysis of the Textural & Sand Particle Size Distribution for the samples labeled Left of Green #7 - 1st tier and Right of Green #7 - 1st tier. A complete inch-by-inch analysis for both tested greens is also attached to the end of the report. The lower box contains the USGA specifications & ISTRC Guidelines - the upper set is the USGA specifications and the lower set is the expanded guidelines from ISTRC. As documented over the years, the greens have been successfully amended in their upper 3 inches with topdressing sand while the increases in Fine Sand, Very Fine Sand, Silt & Clay at the 4 inch depths highlights the transition to the native soil. This is a very important step in the maturation of a native soil greens and has been the foundation in the greens' above average air/water permeability. With minor exceptions, the particle distribution for the samples submitted from the left side of Green #7 and the right side are very similar.

Summary

A general discussion on Maintenance Practices is contained in Section V of **The ISTRC Guidebook**. We encourage you to reference the Guidebook for a wide range of topics relating to the root zone, environmental factors, and maintenance.

Over the years the cultural program has done a tremendous job in promoting positive change in the physical properties and particle distribution in the upper 3 to 4 inches of the root zone. This is not only reflected in the above average 1st tier (0-4 in.) infiltration rates ranging from 4.23 to 15.77 inches per hour, but more importantly the balance between the air pores & water pores. Often times the perception with soil greens it is the fines (soil) limiting the agronomic health of the root zone; however our testing & research has shown more often than not the upper root zone of an older soil green has been amended with topdressing sand and the key variables in the 1st tier physical properties is the percentage & distribution of organic matter and the degrees of layering & compaction. Your greens are no different. The particle distribution in the upper 2 to 3 inches of the root zone has been amended to resemble a USGA green, but cumulative percentages of organic matter (sum of the upper 4") in excess of 11 percent highlights the need to remain pro-active.

Displacement aerification (hollow coring, deep verti-cutting, etc.) continues to be the most effective means for diluting organic matter and allowing for the introduction of a good quality topdressing sand while non-disruptive venting is an excellent way to help keep the root zone open & breathing and continually re-introduce new air pores. Given the need to dilute organic matter within the upper root zone, we would strongly recommend a pro-active program targeting at least 20 percent annual surface area displacement (calculation based on tine OD). To effectively achieve the displacement goals, a minimum of 2 to 3 aerifications per year will likely be required. For your reference we have attached a copy of our Aerification Displacement Calculator to the end of the report.

Non-disruptive venting, verti-cutting & topdressing will continue to be extremely beneficial to the health of the turf and in promoting gas exchange, particularly when done on a regular basis. Improving the ability for the root zone to breathe and by staying open & breathing longer throughout the year will not only encourage a deeper, more sustainable root system, but also enhance microbial activity to aid in the natural decomposition of the organic matter & thatch.

We would recommend that you continue to monitor your greens, tees and fairways with regular testing. The information derived from regular testing will allow you to monitor the aging process of the root zone, evaluate the effectiveness of the current cultural practices, modify the program based on hard data and detect problems before they affect the overall health of the turf.

If you have any questions or need any additional information we encourage you to give us a call. We are always available to answer questions and discuss ideas with you. Our service is not confined to analyzing undisturbed cores. We do not charge for telephone calls and we encourage our client superintendents to use us as a resource.

Sincerely,

I.S.T.R.C.

by: 

Matt Pulis, M.S.
Agronomist

ISTRC Report 2013 Summary

for
Brae Burn CC (West Newton, MA)
Tim Strano, CGCS

Infiltration Rate: ISTRC recommends at 4" per hour

July 2013:

Test area had an initial infiltration rate of 0.69"/hour.

September 2013:

After a single air injection greens improved to 4.23"

Over a 600% improvement!

After a Double air injection, greens improved to 15.77"

Over a 2200% increase!

14.87" In/hr difference change in 2 months!

Air Porosity: ISTRC recommends at least 14%

July 2013:

Test area had an initial air porosity of 11.8%

September 2013:

Test area had improved air porosity to 16.13% after a single Injection.

Over a 27% increase

Test area had improved air porosity to 21.83% after a double injection.

Close to a 46% improvement

2:1 Ratio change in 2 months!

Water Porosity: ISTRC recommends less than 30%

July 2013

Test area had an initial water porosity of 32.62%

September 2013:

Test area had improved water porosity to 30.67% after one air injection

Test area improved water porosity to 28.59%...finally below the recommended rate.

***July 2013: Water to Air Ratio was (32.62%:11.80%) 3:1
Sept 2013(Dbl): Air to Water Ratio was (21.83%:28.59) 1.31:1!!!***