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Rootzone
Performance Metrics

Prepared For:
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Stonebridge Country Club
Naples, FL

Visited On:
May 5, 2026

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What is RPM?

Samples were taken from putting greens on Stonebridge Country Club Holes 9 & 18 on May 5, 2026 and subjected to Rootzone Performance Metrics (RPM) testing.

These tests provide an in-depth evaluation of several important soil properties, within the putting surface and upper rootzone, including:

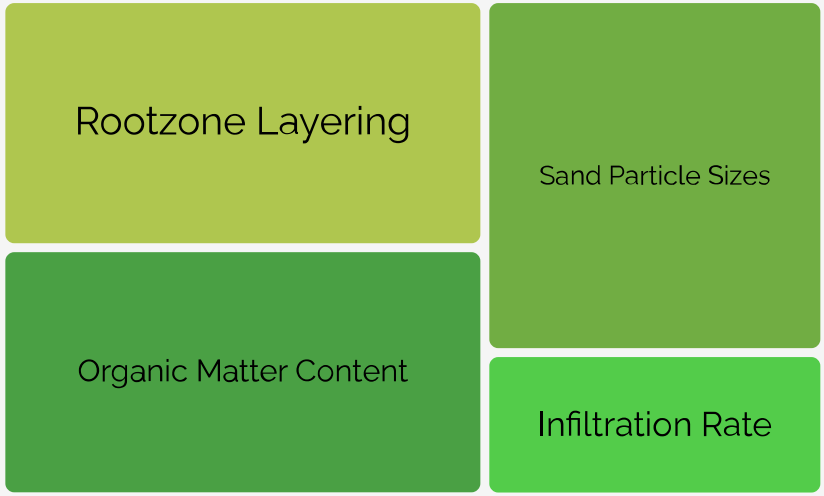
1. Visual evaluation of rootzone layering & root density
2. Organic matter (%) determined by loss on ignition
3. Sand particle size distribution through sieve gradation
4. Infiltration & percolation (Ksat) of intact cores

Unlike traditional soil tests, RPM soil testing measures all surface organic material within the upper thatch layer, underlying mat (stain) layers and original mix. Understanding these properties and how they change over time can help you finetune your soil cultivation and fertility programs, as well as help develop your long-range goals.

For more information on these procedures see:

1. A Standard Method for Measuring Putting Green Surface Organic Matter
2. Documenting Changes in USGA Specification Rootzone Properties in Ultradwarf Bermudagrass Greens

RootZone Performance Metrics



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RootZone Performance Metrics

Scorecard

The “Scorecard” is a subjective analysis of your rootzone performance at this time, as compared to other bermudagrass greens throughout the region.

- Roots were nearly 2.5 inches deep and appeared fibrous and healthy
- Thatch layer values are average for our region while stain layers are still maturing at this time
    - Thatch layer (0-2 cm)
        - Stonebridge CC greens - 10.5%
        - Spring avg FL golf courses - 10.5%
    - Stain layer (2-4 cm)
        - Stonebridge CC greens - 3.6%
        - Spring avg FL golf courses - 4.7%
    - Stain layer (4-6 cm)
        - Stonebridge CC greens - 0.8%
        - Spring avg FL golf courses - 2.7%
- The OM% in each rootzone layer increased since the previous fall sampling, which is normal since bermudagrass grows year-round in our region and aggressive cultivation is limited to summer months
- Uniform sand particle size distribution occurs in each layer and conforms to USGA construction recommendations
- Very good infiltration rate (5.5 inches/hour) was observed in the upper rootzone at this time – Hole 9: 5.4 inches/hour, Hole 18: 5.7 inches/hour

Root Length & Density

Organic Matter

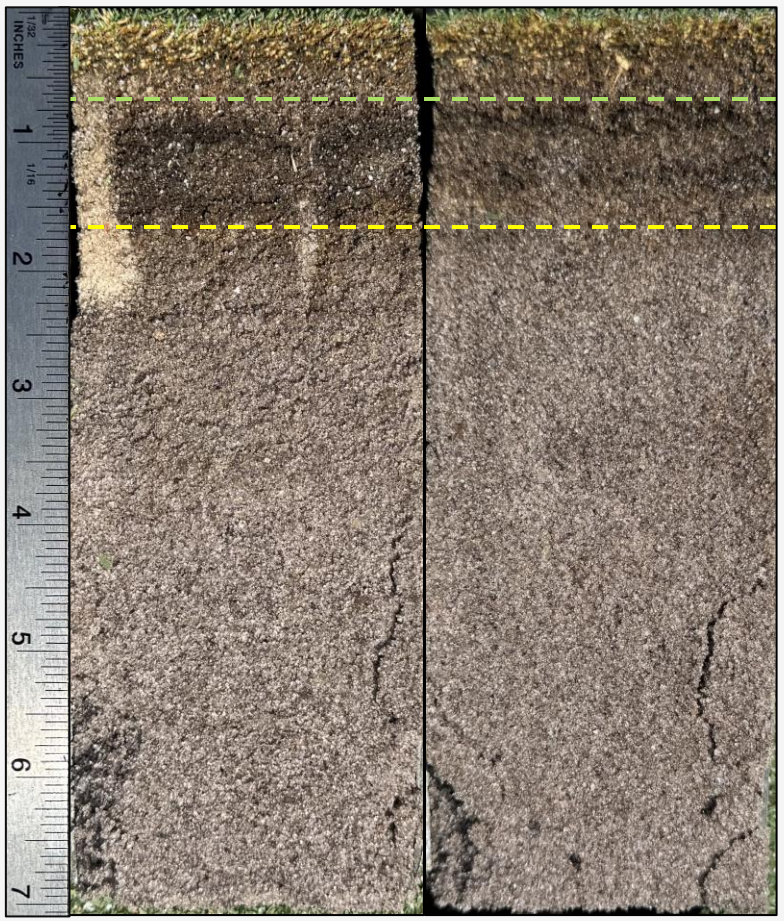
Sand Particle Sizes

Infiltration Rate

1 ROOTZONE LAYERING

Rootzone Layer Depths

Roots were nearly 2.5 inches deep and appeared fibrous and healthy



Thatch Layer – Thatch layer extends to nearly 0.75-inch below the surface and comprised of living and dead bermudagrass stems & roots, intermixed with sand

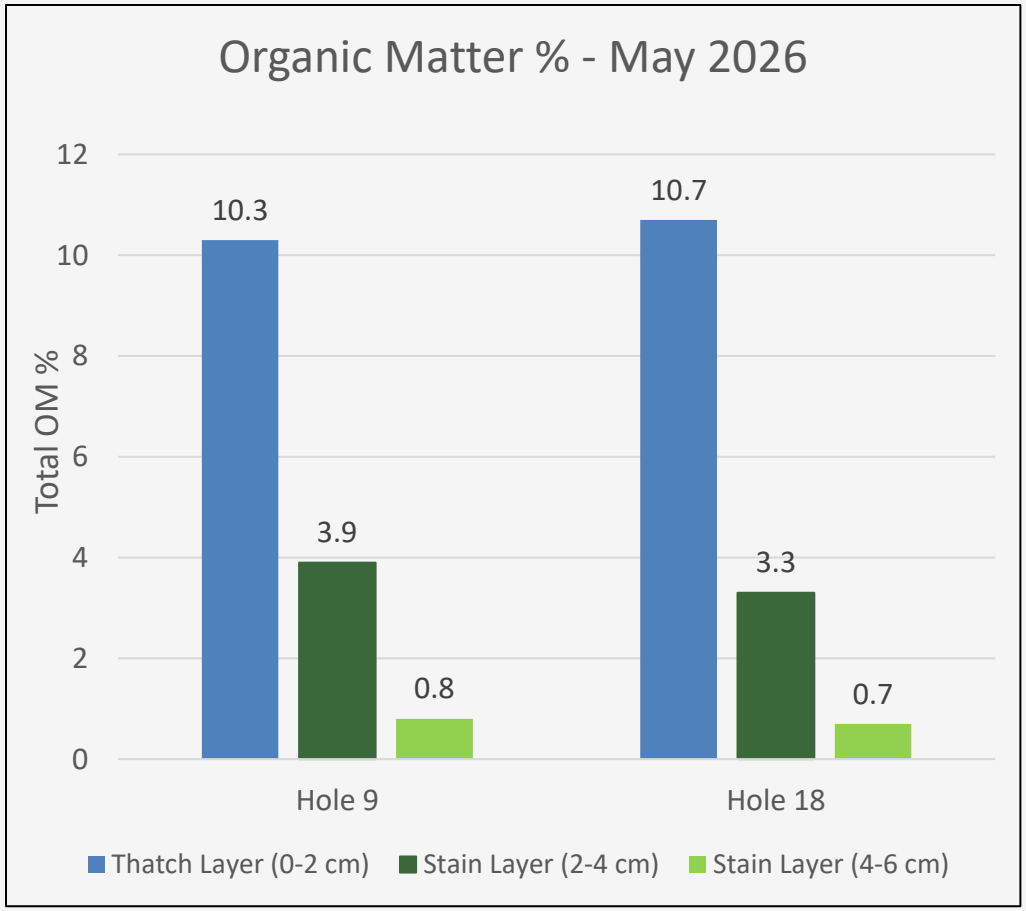
Stain Layer – Stain layer comprised of dead/dying stems, living roots and humus, intermixed with sand has begun to form on these new greens and extends to a depth of nearly 1.5 inches below the surface

Original Mix - Original mix from recent renovation comprised of sand and peat

2 TOTAL ORGANIC MATTER

Organic Matter % - May 2026

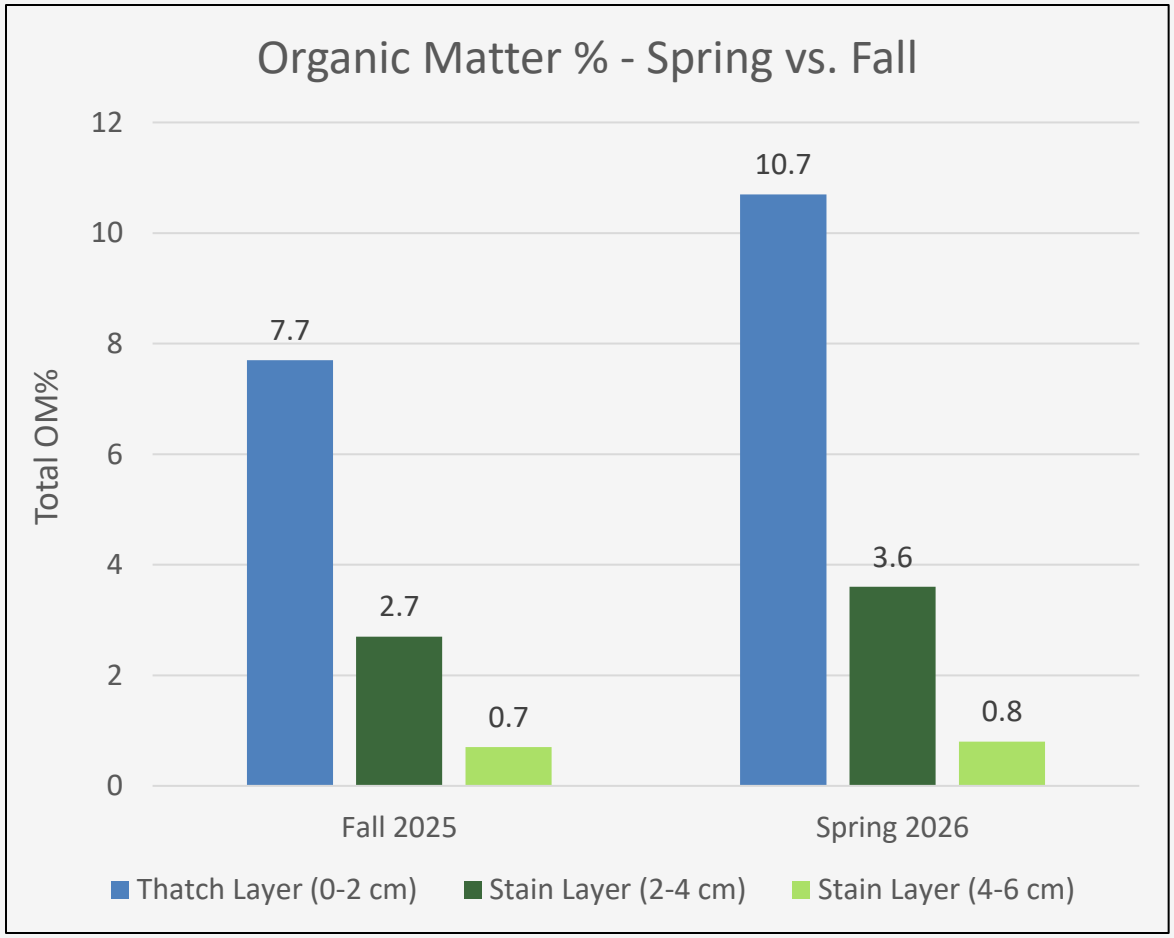
- Thatch layer and stain layer OM% values are listed below, along with average values from other golf course greens in our region
  - Thatch layer (0-2 cm)
    - Stonebridge CC greens - 10.5%
    - Spring avg FL golf courses - 10.5%
  - Stain layer (2-4 cm)
    - Stonebridge CC greens - 3.6%
    - Spring avg FL golf courses - 4.7%
  - Stain layer (4-6 cm)
    - Stonebridge CC greens - 0.8%
    - Spring avg FL golf courses - 2.7%
- Thatch layer OM% was average for our region and upper stain layer was slightly less than average
- Lower stain layer OM% is still low due to their young age and represents original mix properties
- For more information on average values and how to interpret this information see Page 9



2 TOTAL ORGANIC MATTER

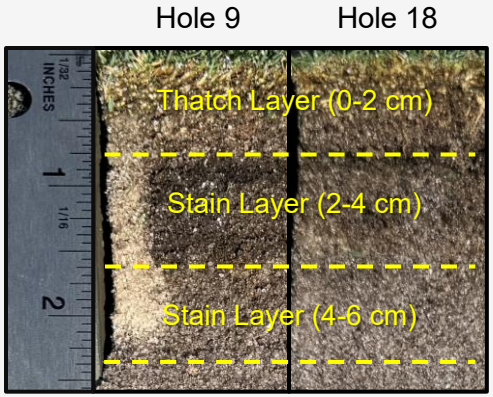
Avg OM% - Spring vs. Fall

- The OM% in each rootzone layer increased since the previous fall sampling, which is normal since bermudagrass grows year-round in our region and aggressive cultivation is limited to summer months
- Putting greens are developing properly and should respond well to normal summertime cultivation programs



3 PARTICLE SIZE DISTRIBUTION

Sand Sizes



- Uniform sand particle size distribution occurs in each layer and conforms to USGA construction recommendations
- Less very coarse sand occurs in upper rootzone than original mix, which is normal, as mowers remove larger sand particles after topdressing

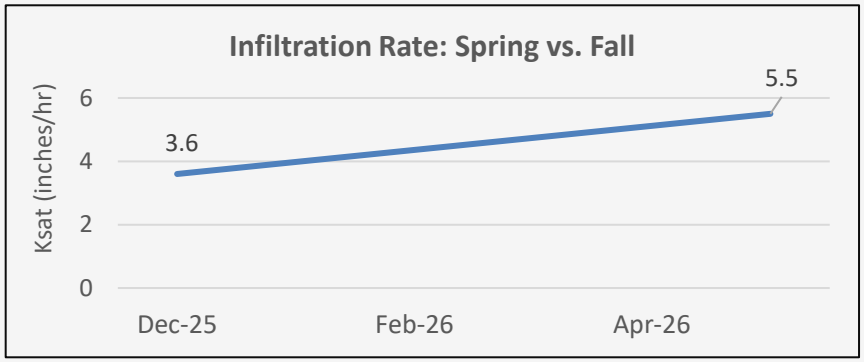
Sand particle size distribution of Stonebridge Country Club 9 & 18 rootzone layers

		Sand (%)						
Rootzone Layer	**Hole**	**Fine Gravel**	**Very Coarse**	**Coarse**	**Medium**	**Fine**	**Very Fine**	**Silt & Clay**
Thatch (0-2 cm)	9	0.0	1.7	39.5	33.3	18.8	5.7	1.0
	18	0.0	1.6	37.6	33.8	19.8	6.1	1.0
Stain (2-4 cm)	9	0.0	2.8	41.3	32.3	17.6	5.4	0.5
	18	0.1	3.5	40.9	31.5	17.8	5.8	0.5
Stain (4-6 cm)	9	0.1	5.1	40.6	32.4	17.4	3.9	0.4
	18	0.2	5.1	42.3	31.1	17.2	3.8	0.4
USGA Construction Recommendations		≤10		≥60		≤20	≤10	

4 SOIL PERMEABILITY

Infiltration Rate (Ksat)

- Very good infiltration rate (5.5 inches/hour) was observed in the upper rootzone at this time
  - Hole 9 - 5.4 inches/hour
  - Hole 18 - 5.7 inches/hour
- Infiltration rate increased slightly since the previous fall 2025 sampling



- Infiltration rates remained similar after samples were cored in the lab (data not shown), showing that thatch layer reduced infiltration less than stain layer

Saturated hydraulic conductivity (Ksat) from intact cores on Stonebridge Country Club 9 & 18 greens

	Infiltration Rate (inches/hour)	
Hole & Sample	**Fall 2025**	**Spring 2026**
Hole 9 - A	1.9	5.6
Hole 9 - B	2.1	10.2
Hole 9 - C	0.3	4.6
Hole 9 - D	2.5	1.0
Avg Ksat - Hole 9	**1.7**	**5.4**
Hole 18 - A	7.4	5.3
Hole 18 - B	6.8	3.8
Hole 18 - C	1.3	7.1
Hole 18 - D	6.2	6.7
Avg Ksat - Hole 18	**5.4**	**5.7**
Avg Ksat	**3.6**	**5.5**

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Observations & Recommendations

- Stonebridge greens are still quite young and developing an appropriate organic “pad” of thatch and organic matter, but I feel that effective summertime cultivation programs are in place
- Be careful to consider the “20% Rule” (see Page 11), which is somewhat customary for our region and not to be overly excessive with cultivations at this time
    - Early summer is more appropriate for aggressive practices than late summer, as soil temperatures are still <85 F, which encourages bermudagrass root growth and turf recovery
    - Late summer cultivations are slower to recover than early summer and can lead to increased surface thinning, especially if putting greens become drought-stressed at that time
- Soil fertility should supply necessary nutrients for turf growth but be careful not to overly stimulate turf growth, as this leads to more organic matter accumulation
- Ninja-tine aerification are good supplements to standard cultivation programs and can be implemented throughout the year if needed

Discussion

Soil physical properties affect both putting green playability and turf health. Each golf course is unique regarding the desired level of playability and there are no adapted industry standards at this time. The Scorecard on Page 3 is a subjective guideline and based more on turf health from observations on other golf courses in our region. Your programs may create values outside of these averages to provide desired playability but may also negatively affect soil physical properties.

- **Organic Matter** - Average OM% represents a variety of otherwise healthy putting greens in Florida and it ranged from 4.5-13.2% in the thatch layer. Outlier greens were not included in this average and these consisted of new greens with v. low OM% or from greens with excessive OM% from prolonged inadequate cultivation. For more information on this subject, see Are You Managing Putting Green Organic Matter or Is It Managing You?

- **Sand Sizes** - USGA particle size recommendations are meant as guidelines for initial construction. There are no standards for mature putting greens and the values listed from your putting greens do not necessarily mean there will be long-term concerns. It is common for finer sand particles to accumulate in the upper rootzone over time, as mowers remove coarser sand particles that remain above the turf canopy after topdressing.

- **Infiltration Rate** - The USGA recommends a Ksat of >6 inches/hour as a guideline for ***new*** greens. Upper rootzones of mature greens may have diminished infiltration rates from increased OM% and finer sand particle sizes over time. Our soil lab has recorded infiltration rates from 0.1 to >6 inches/hour on functioning putting greens in Florida.

  Drainage occurs laterally via surface flow across a putting green and downwards through soil, so putting greens with good surface flow can perform well with slower infiltration rates. Flatter surfaces may be more impaired than sloped areas on greens with lower infiltration rates. Also, periods of lower evapotranspiration (ET) rates such as December and January, in Florida, may be more prone to turf stress and diseases on greens with lower infiltration rates (<0.5”/hour). Cultural practices such as venting and applying fungicides more frequently may be necessary during those periods.

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Additional Resources

Table from "Core Aeration by the Numbers" - USGA Green Section Record July/Aug 2001

Surface Area Impacted By Tine/Blade Size and Spacing					
Tine Diameter (inches)	**Spacing (inches)**	**Holes/ft²**	**Area Impacted by One Tine (in²)**	**Total Area Impacted (%)**	**Aerifications Needed for 20%**
1/4	1 X 1	144	0.049	4.9	4.1
1/4	1 X 2	72	0.049	2.5	8.1
1/4	2 X 2	36	0.049	1.2	16.3
3/8	1 X 1	144	0.110	11.0	1.8
3/8	1 X 2	72	0.110	5.5	3.6
3/8	2 X 2	36	0.110	2.8	7.2
1/2	1 X 1	144	0.196	19.6	1.0
1/2	1 X 2	72	0.196	9.8	2.0
1/2	2 X 2	36	0.196	4.9	4.1
5/8	1 X 1	144	0.307	30.7	0.7
5/8	1 X 2	72	0.307	15.3	1.3
5/8	2 X 2	36	0.307	7.8	2.6
Verticut 9/64 Blades	1 X 1	NA	NA	14.1	1.4
Verticut 5/64 Blades	1 X 1	NA	NA	7.8	2.6