



December 20, 2023

Company  
Address Line 1  
Address Line 2  
City, State, Zip

Cover Letter

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Best Regards,

Eric Foerster's Signature

Eric Foerster CGCS, MG  
TORV, LLC  
970.409.9874  
eric@torv.me



## Green

* The average total available Nitrogen is 4.7 ppm. This is below the optimal range of 5 ppm - 10 ppm for soil nitrogen. Consider additional applications of nitrate or ammonium based fertilizers to increase soil nitrogen levels.
* Deficits were noted in the following 2 measurements: Potassium (ppm) and Phosphorus (ppm). See the “Required element per area” table within the Green section for an indication of how much fertilizer should be added to each sampled area. [TODO: Add custom comment.]
* No other anomalies were highlighted in the analysis. [TODO: Add custom comment.]

## Tee

* The average total available Nitrogen is 4.7 ppm. This is below the optimal range of 5 ppm - 10 ppm for soil nitrogen. Consider additional applications of nitrate or ammonium based fertilizers to increase soil nitrogen levels.
* Deficits were noted in the following 2 measurements: Potassium (ppm) and Sulfur (ppm). See the “Required element per area” table within the Tee section for an indication of how much fertilizer should be added to each sampled area. [TODO: Add custom comment.]
* No other anomalies were highlighted in the analysis. [TODO: Add custom comment.]

## Fairway

* The average total available Nitrogen is 14.2 ppm. This is above the optimal range of 5 ppm - 10 ppm for soil nitrogen. Excessive soil nitrogen may result in unwanted turfgrass growth and increased organic matter.
* No deficits were noted in the values tied to MLSN values. [TODO: Add custom comment.]
* No other anomalies were highlighted in the analysis. [TODO: Add custom comment.]

## Rough

* The average total available Nitrogen is 14.4 ppm. This is above the optimal range of 5 ppm - 10 ppm for soil nitrogen. Excessive soil nitrogen may result in unwanted turfgrass growth and increased organic matter.
* No deficits were noted in the values tied to MLSN values. [TODO: Add custom comment.]
* The average Organic Matter (%) measurement is above 4.5%. [TODO: Add custom comment]

## Organic Matter

The mean OM measurements can be summarised as follows:

* Comparing the **GREEN** samples taken on May 24th, 2023 to their most recent previous samples (October 10th, 2022)
  + At a depth of **0-2 cm**, the OM content decreased from 9.39% to 8.09%
  + At a depth of **2-4 cm**, the OM content decreased from 4.16% to 3.33%
  + At a depth of **4-6 cm**, the OM content decreased from 1.46% to 1.25%
* Comparing the **ROUGH** samples taken on May 24th, 2023 to their most recent previous samples (October 10th, 2022)
  + At a depth of **0-2 cm**, the OM content increased from 21.08% to 23.81%
  + At a depth of **2-4 cm**, the OM content increased from 12.4% to 13.36%
  + At a depth of **4-6 cm**, the OM content decreased from 9.23% to 7.5%
* Comparing the **TEE** samples taken on May 24th, 2023 to their most recent previous samples (October 10th, 2022)
  + At a depth of **0-2 cm**, the OM content increased from 5% to 5.59%
  + At a depth of **2-4 cm**, the OM content increased from 3.95% to 5.05%
  + At a depth of **4-6 cm**, the OM content increased from 2.58% to 3.24%

Like calibrating a TDR measurement for soil moisture content based on subjective observations, the OM246 test should be thought of in the same context. Playability and overall green performance should be considered.

Using a known amount of topdressing applied, we can estimate/calculate the Amount of topdressing needed to maintain, increase, or decrease the organic matter.

* Consider obtaining an accurate topdressing rate per year to make this calculation possible. What is the estimated depth of all topdressing applications applied this year?
* [This video from the USGA](https://www.asianturfgrass.com/post/sand-topdressing-by-depth/) shows how to calculate the depth along with the required conversion equations.
* Cultural decisions such as aerification, verticutting, topdressing amounts/frequency can be influenced by tracking organic matter over time and established goals for organic matter targets.

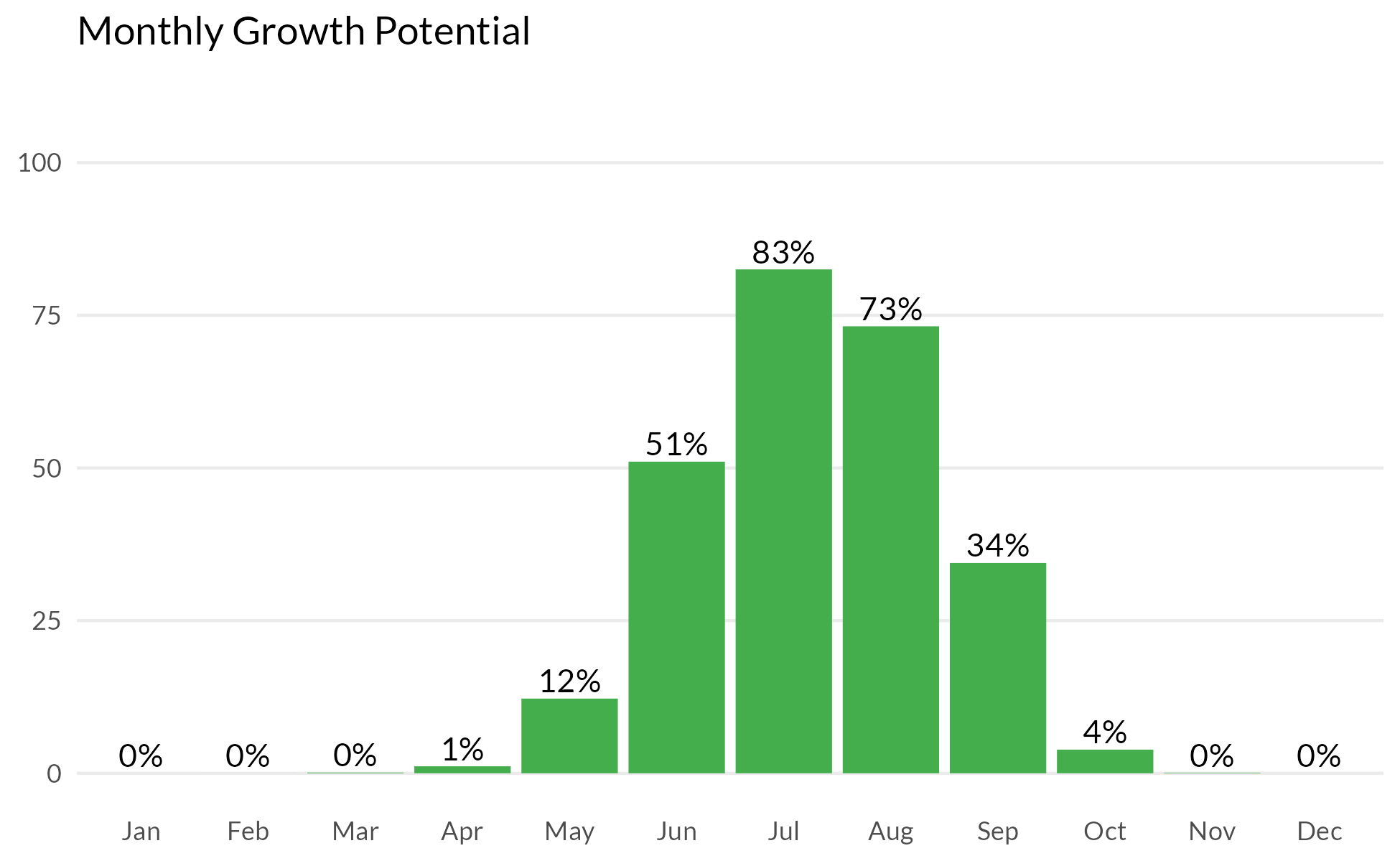
[TODO: Additional comments]

## Water

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The temperature data is provided by NOAA using 30-year climate normals and is site-specific to your location. Pace Turf, LLC (Gelernter and Stowell, 2005) developed the growth potential model to explain the myriad of ways in which weather impacts turf growth. The model considers turf growth to be good when the GP is between 50% and 100% (the best possible growth occurs at a GP of 100%). However, when weather conditions are either too hot or too cold for optimal turf growth, the GP falls below 50%, and turf becomes progressively more stressed. When the GP falls to 10% or lower, growth is extremely limited. Appearing below is your model specific to Maroon Creek Club.

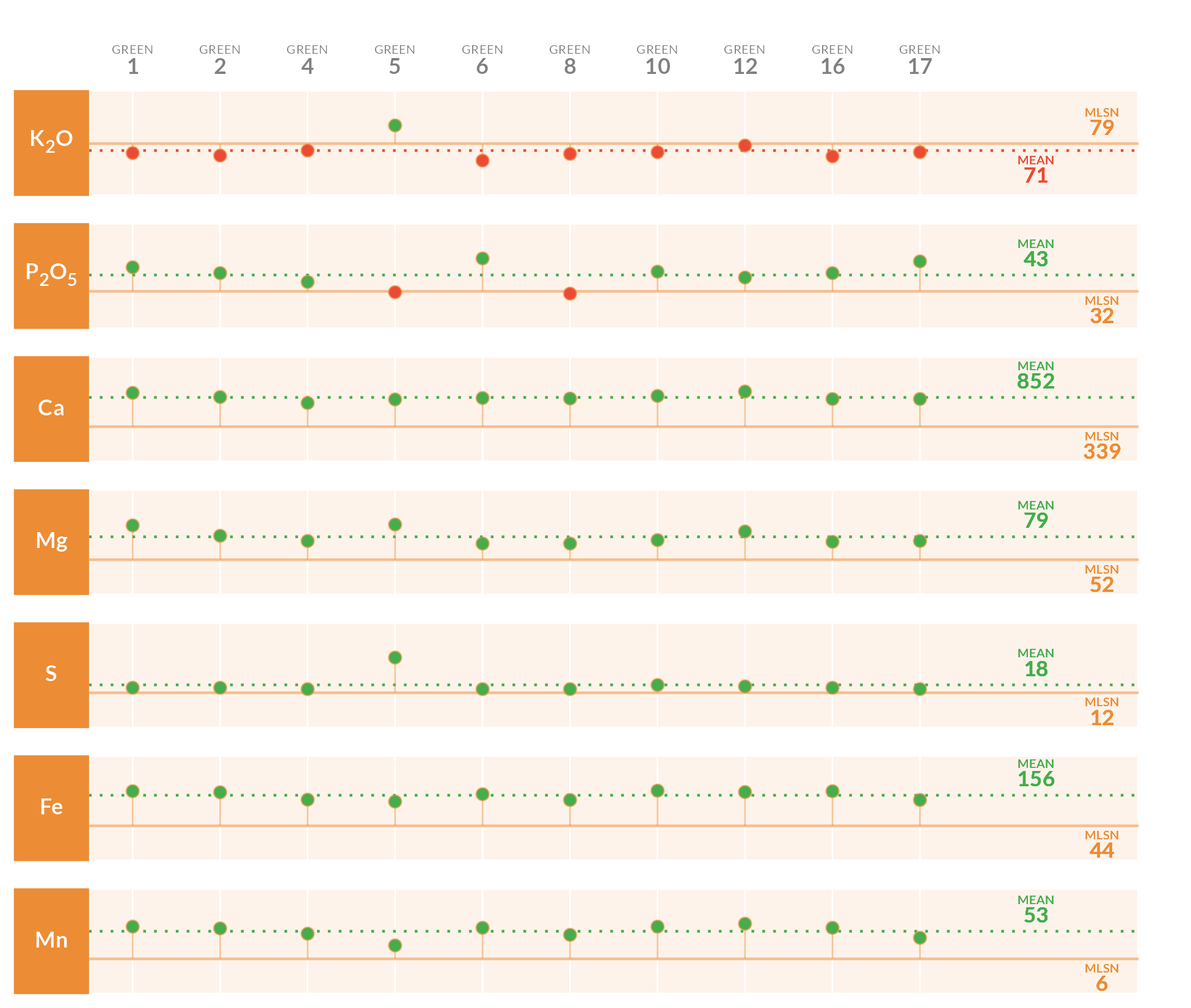




## Measurement results and MLSN values

The following graph shows how the samples taken from each GREEN compare to the calculated MLSN values and required elemental inputs based on the provided nitrogen input and the Turf Growth Potential Model.

* **Red** dots highlight samples where a deficit was found
* **Orange** dots represent samples which are within 1% of the desired MLSN value
* **Green** dots indicate that the samples met the MLSN requirements

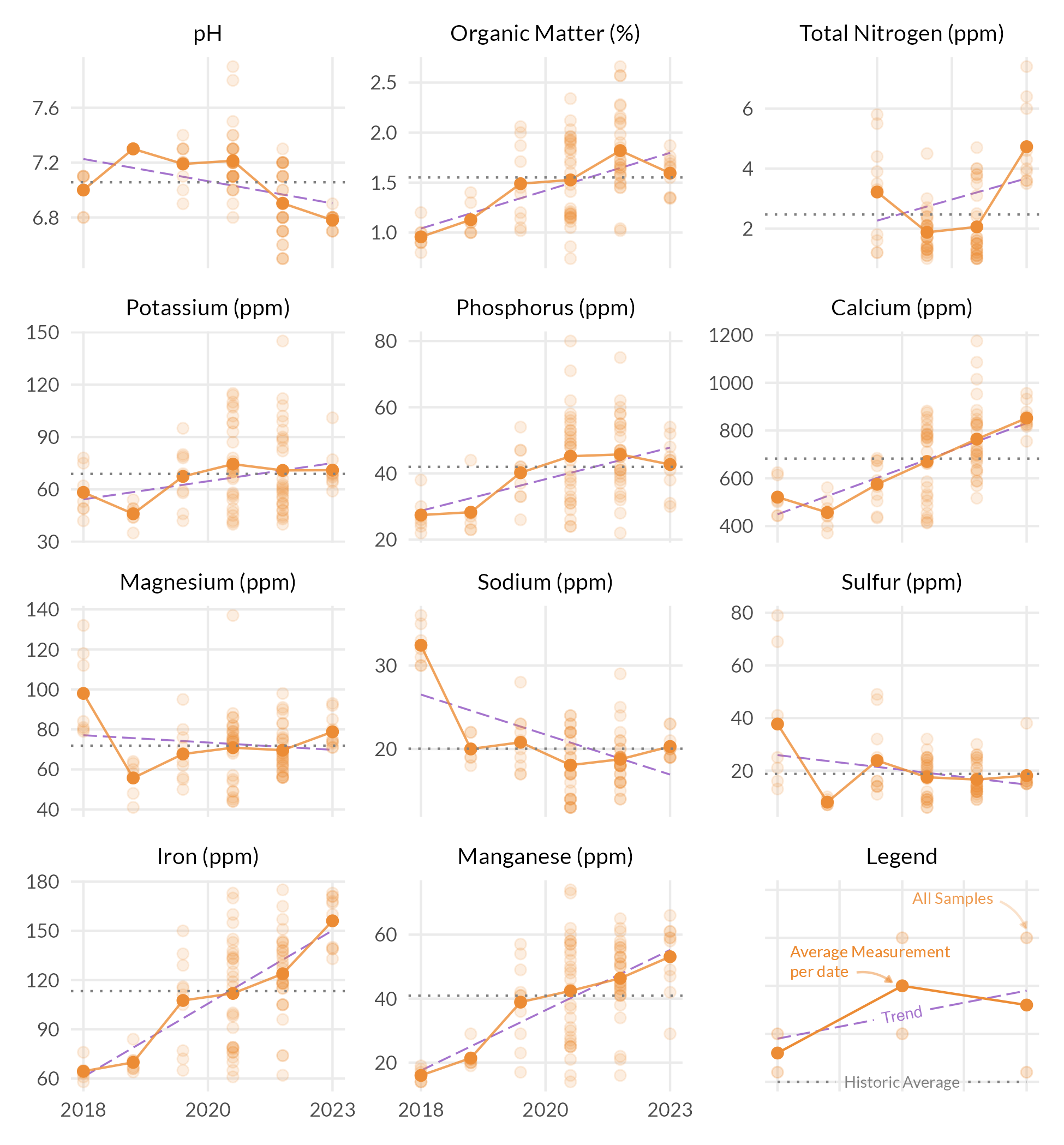


## Required element per area (lbs. per 1000 sq.ft.)

This table specifies the amount of fertilizer required to remedy the deficits highlighted by the analysis.

| **Area** | **K2O** | **P2O5** | **Ca** | **Mg** | **S** | **Fe** | **Mn** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | 0.41 | - | - | - | - | - | - |
| **2** | 0.52 | - | - | - | - | - | - |
| **4** | 0.3 | - | - | - | - | - | - |
| **5** | - | 0.04 | - | - | - | - | - |
| **6** | 0.74 | - | - | - | - | - | - |
| **8** | 0.45 | 0.11 | - | - | - | - | - |
| **10** | 0.37 | - | - | - | - | - | - |
| **12** | 0.08 | - | - | - | - | - | - |
| **16** | 0.55 | - | - | - | - | - | - |
| **17** | 0.37 | - | - | - | - | - | - |
| **Average** | **0.42** | **0.07** |  |  |  |  |  |
| Note: The symbol " - " means no deficit was found; an empty cell means no data was provided. The Average values are the means across all areas where a deficit was found. | | | | | | | |



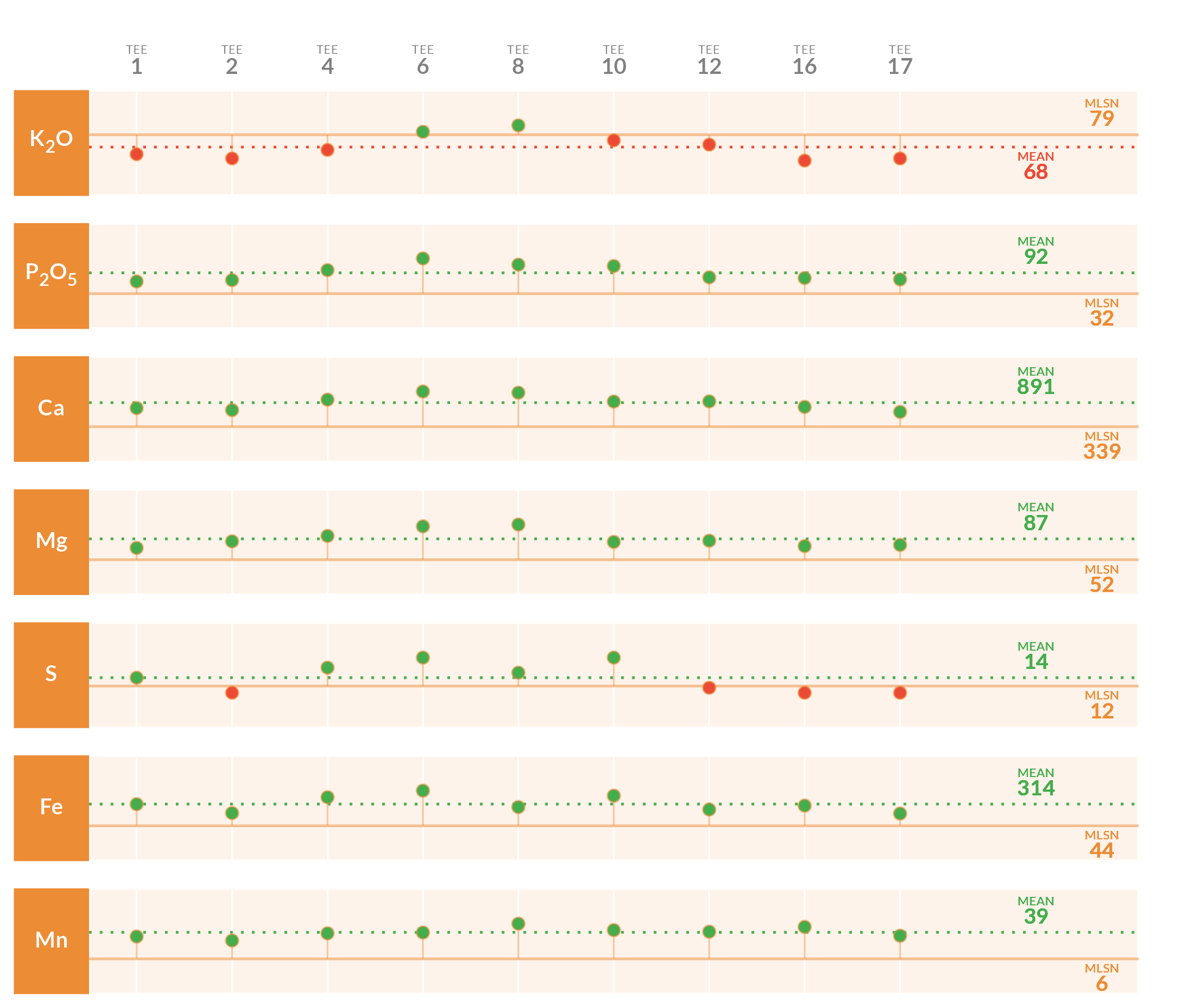




## Measurement results and MLSN values

The following graph shows how the samples taken from each TEE compare to the calculated MLSN values and required elemental inputs based on the provided nitrogen input and the Turf Growth Potential Model.

* **Red** dots highlight samples where a deficit was found
* **Orange** dots represent samples which are within 1% of the desired MLSN value
* **Green** dots indicate that the samples met the MLSN requirements

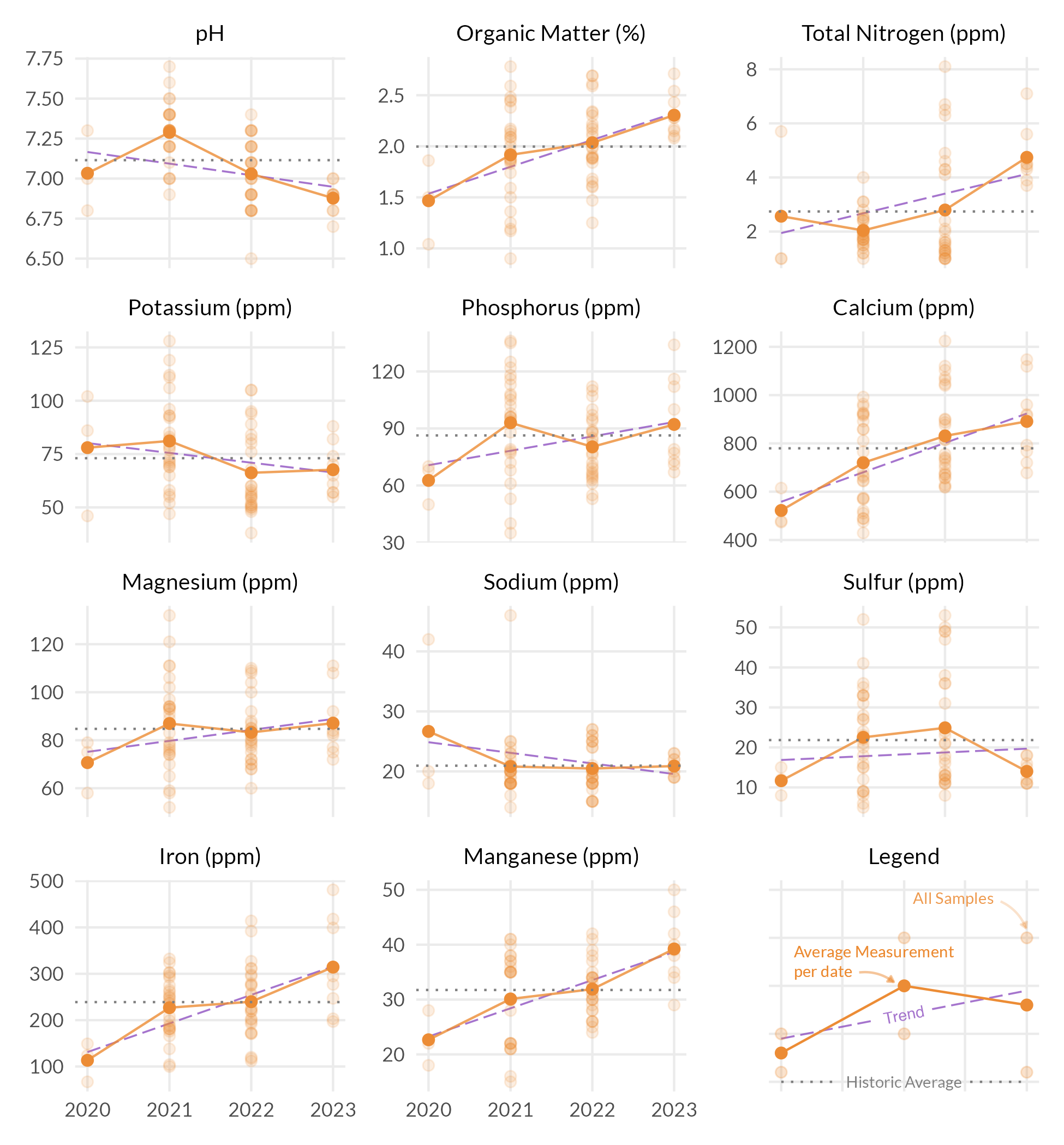


## Required element per area (lbs. per 1000 sq.ft.)

This table specifies the amount of fertilizer required to remedy the deficits highlighted by the analysis.

| **Area** | **K2O** | **P2O5** | **Ca** | **Mg** | **S** | **Fe** | **Mn** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | 0.66 | - | - | - | - | - | - |
| **2** | 0.81 | - | - | - | 0.04 | - | - |
| **4** | 0.52 | - | - | - | - | - | - |
| **6** | - | - | - | - | - | - | - |
| **8** | - | - | - | - | - | - | - |
| **10** | 0.19 | - | - | - | - | - | - |
| **12** | 0.34 | - | - | - | 0.01 | - | - |
| **16** | 0.88 | - | - | - | 0.04 | - | - |
| **17** | 0.81 | - | - | - | 0.04 | - | - |
| **Average** | **0.6** |  |  |  | **0.03** |  |  |
| Note: The symbol " - " means no deficit was found; an empty cell means no data was provided. The Average values are the means across all areas where a deficit was found. | | | | | | | |



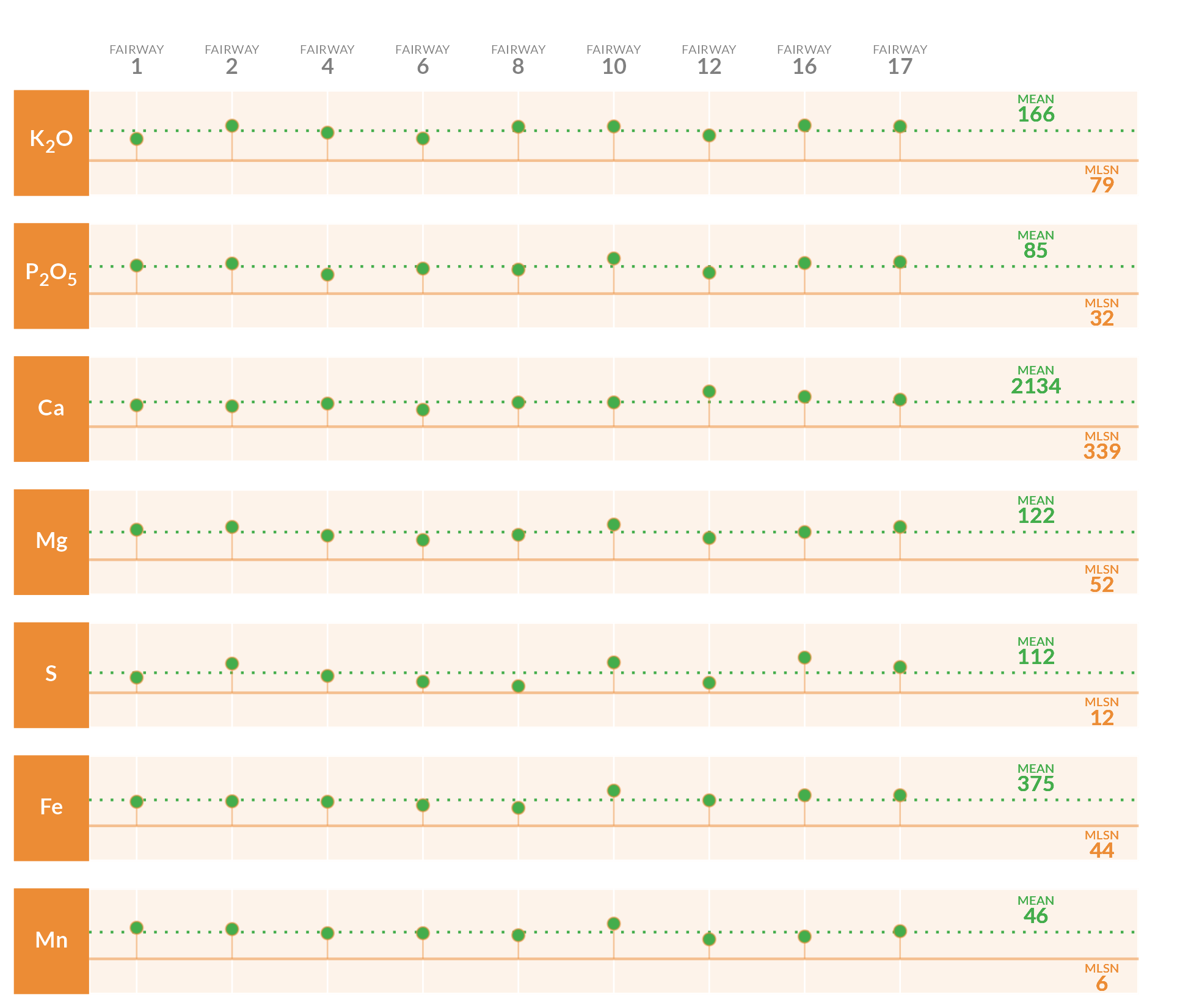




## Measurement results and MLSN values

The following graph shows how the samples taken from each FAIRWAY compare to the calculated MLSN values and required elemental inputs based on the provided nitrogen input and the Turf Growth Potential Model.

* **Red** dots highlight samples where a deficit was found
* **Orange** dots represent samples which are within 1% of the desired MLSN value
* **Green** dots indicate that the samples met the MLSN requirements



## Required element per area (lbs. per 1000 sq.ft.)

This table specifies the amount of fertilizer required to remedy the deficits highlighted by the analysis.

| **Area** | **K2O** | **P2O5** | **Ca** | **Mg** | **S** | **Fe** | **Mn** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | - | - | - | - | - | - | - |
| **2** | - | - | - | - | - | - | - |
| **4** | - | - | - | - | - | - | - |
| **6** | - | - | - | - | - | - | - |
| **8** | - | - | - | - | - | - | - |
| **10** | - | - | - | - | - | - | - |
| **12** | - | - | - | - | - | - | - |
| **16** | - | - | - | - | - | - | - |
| **17** | - | - | - | - | - | - | - |
| **Average** |  |  |  |  |  |  |  |
| Note: The symbol " - " means no deficit was found; an empty cell means no data was provided. The Average values are the means across all areas where a deficit was found. | | | | | | | |



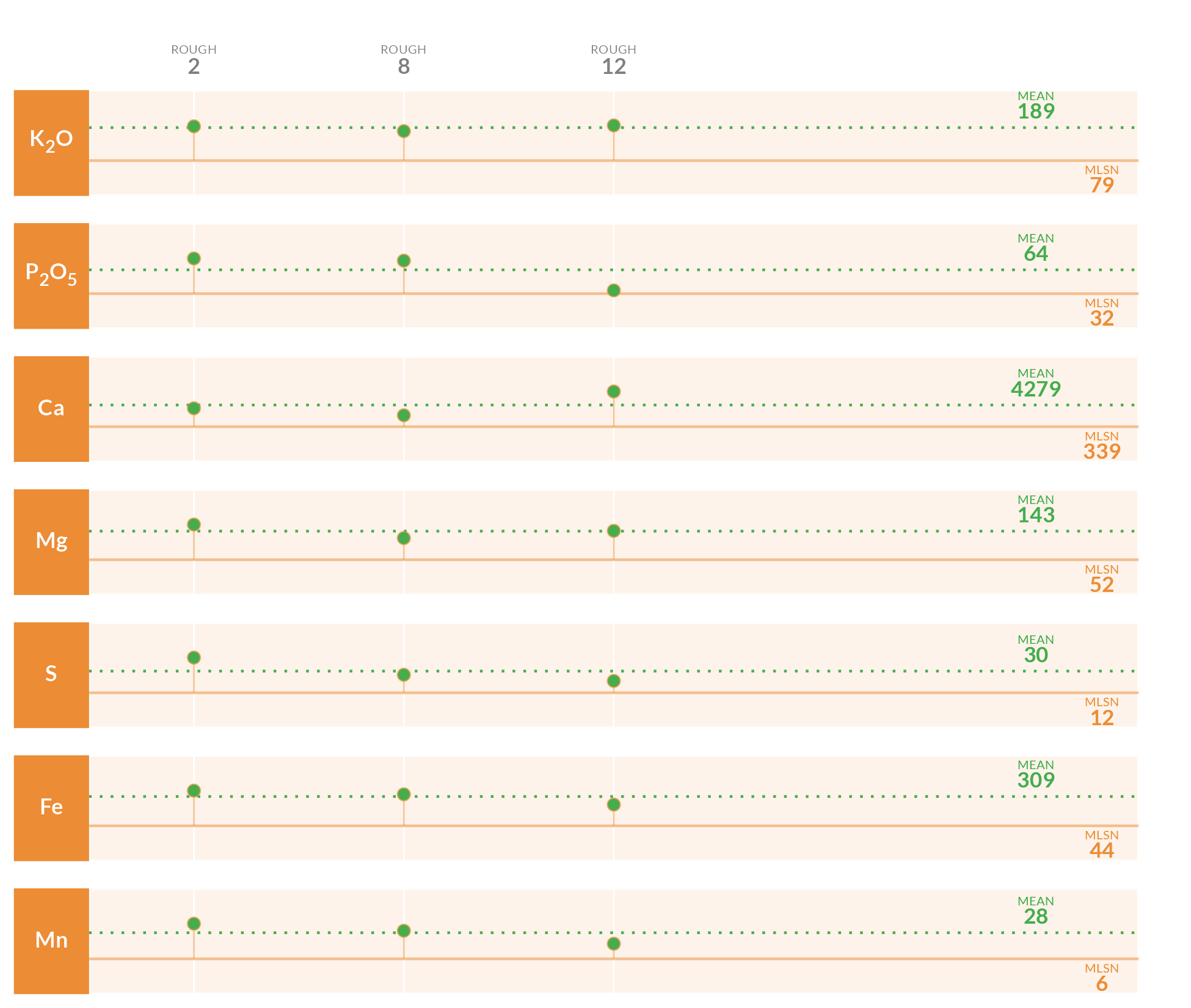




## Measurement results and MLSN values

The following graph shows how the samples taken from each ROUGH compare to the calculated MLSN values and required elemental inputs based on the provided nitrogen input and the Turf Growth Potential Model.

* **Red** dots highlight samples where a deficit was found
* **Orange** dots represent samples which are within 1% of the desired MLSN value
* **Green** dots indicate that the samples met the MLSN requirements

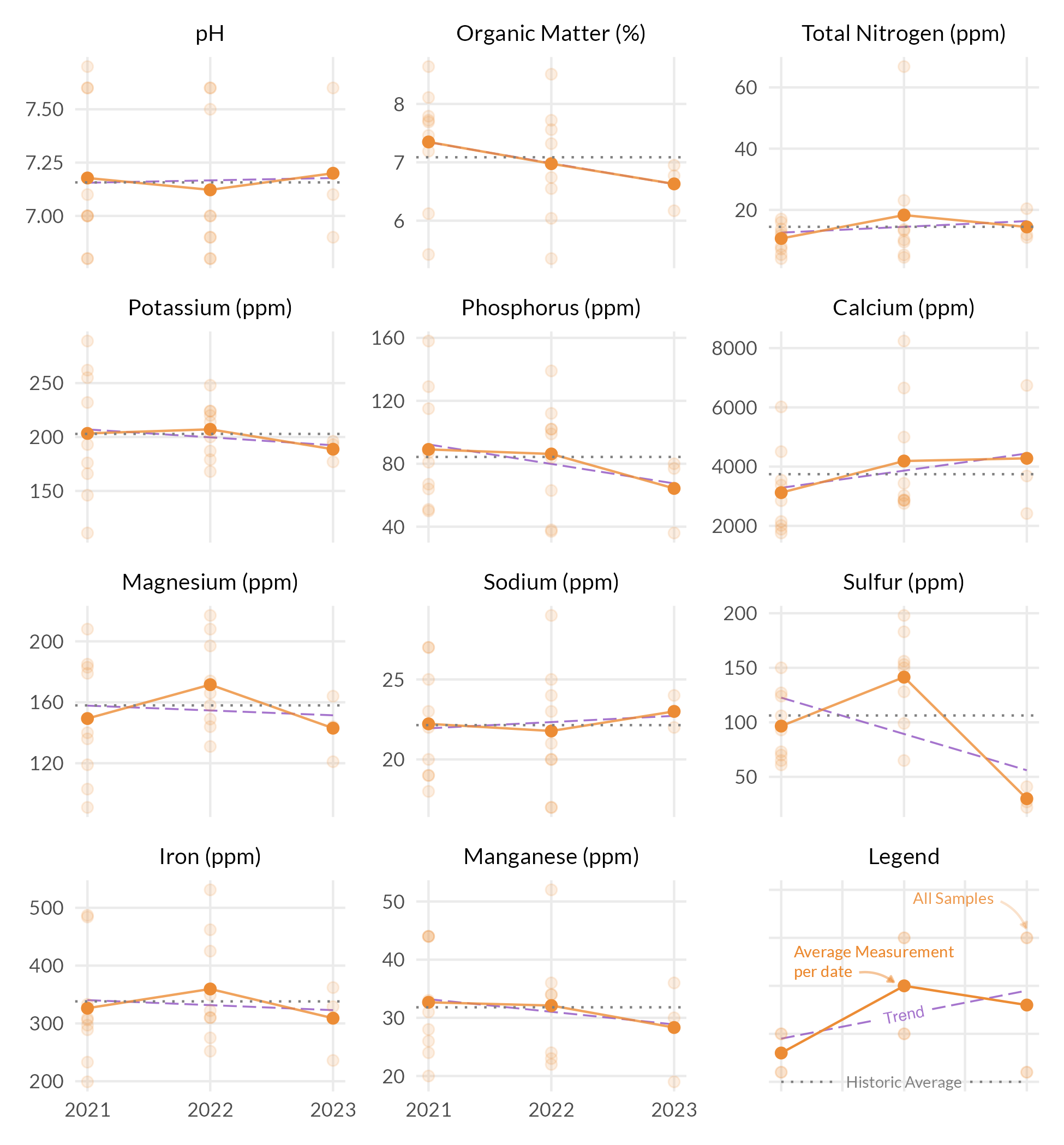


## Required element per area (lbs. per 1000 sq.ft.)

This table specifies the amount of fertilizer required to remedy the deficits highlighted by the analysis.

| **Area** | **K2O** | **P2O5** | **Ca** | **Mg** | **S** | **Fe** | **Mn** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **2** | - | - | - | - | - | - | - |
| **8** | - | - | - | - | - | - | - |
| **12** | - | - | - | - | - | - | - |
| **Average** |  |  |  |  |  |  |  |
| Note: The symbol " - " means no deficit was found; an empty cell means no data was provided. The Average values are the means across all areas where a deficit was found. | | | | | | | |







These measurements are neither good nor bad. Information such as fertilizer applied, cultural practices, sand applied, verti-cutting, aerification, etc. can be used to see how these practices have changed the OM% by depth. Ideally, once a desired OM% has been identified based on playability and turf performance, fertility and cultural practices can be adjusted to maintain the desired OM%.

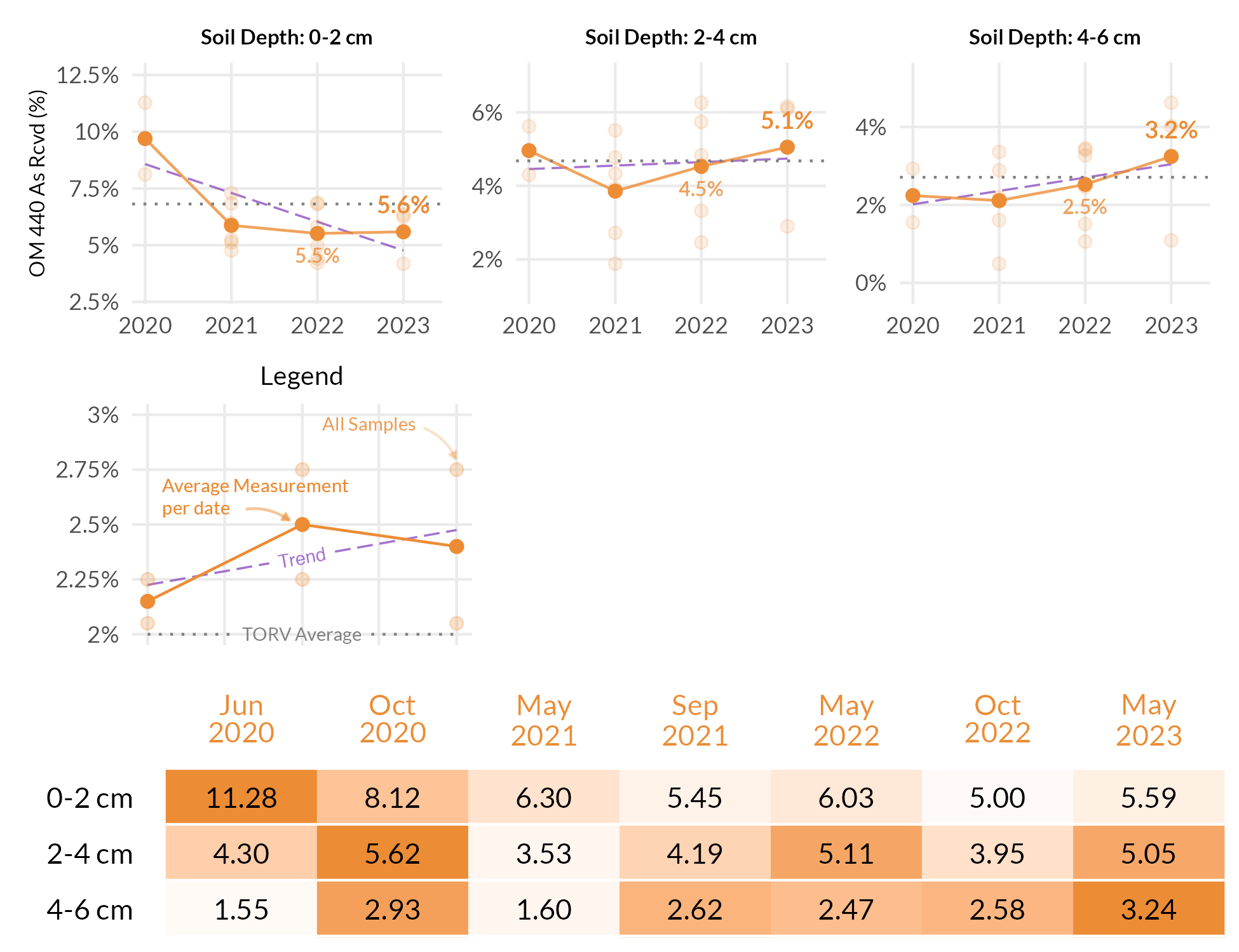
The S325 test package includes the entire sample submitted. This includes leaves, stems, and roots. This differs from the standard soil test which filters out most of the components. This is the reason why the percentages appear higher than that on a standard soil test.





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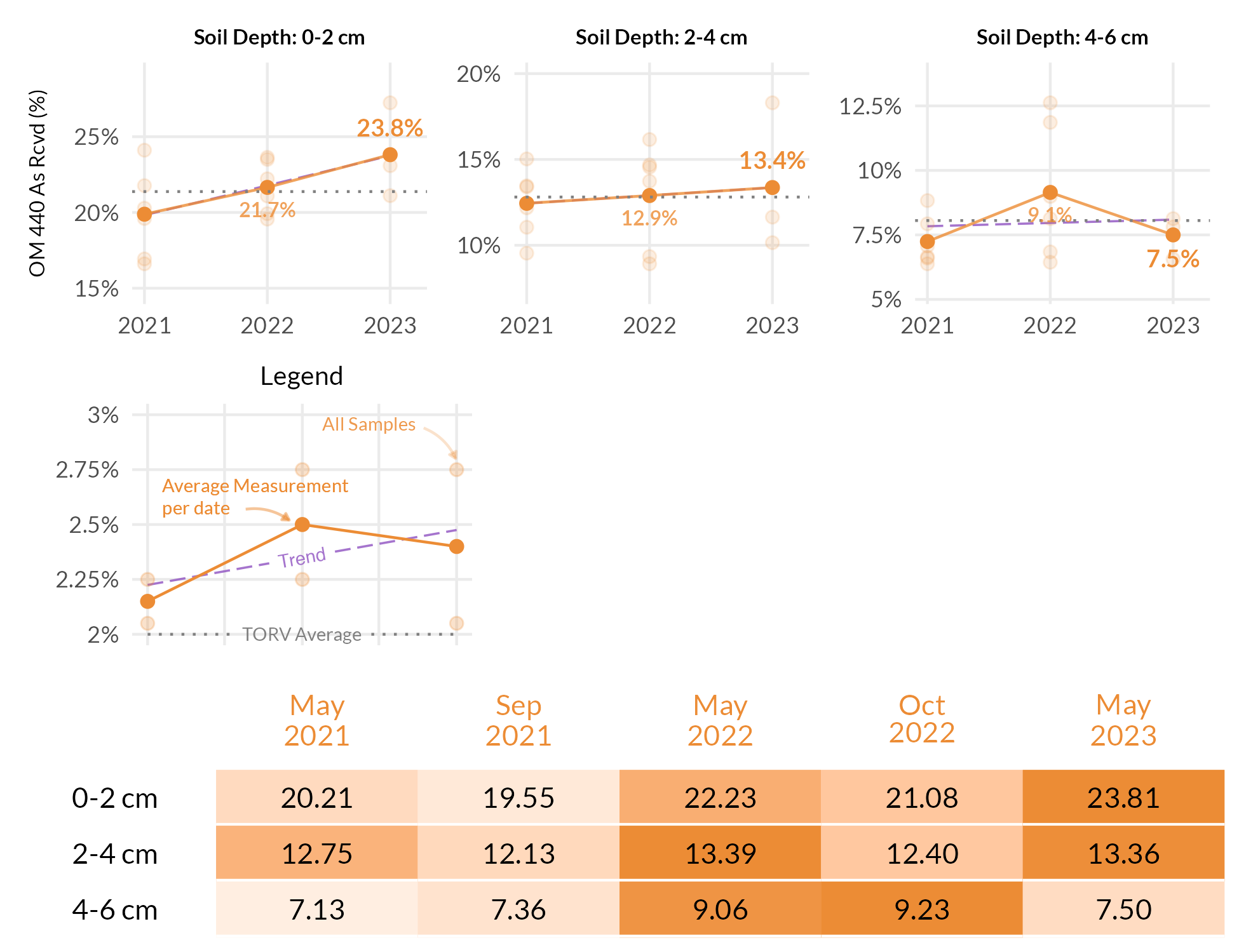
The S325 test package includes the entire sample submitted. This includes leaves, stems, and roots. This differs from the standard soil test which filters out most of the components. This is the reason why the percentages appear higher than that on a standard soil test.





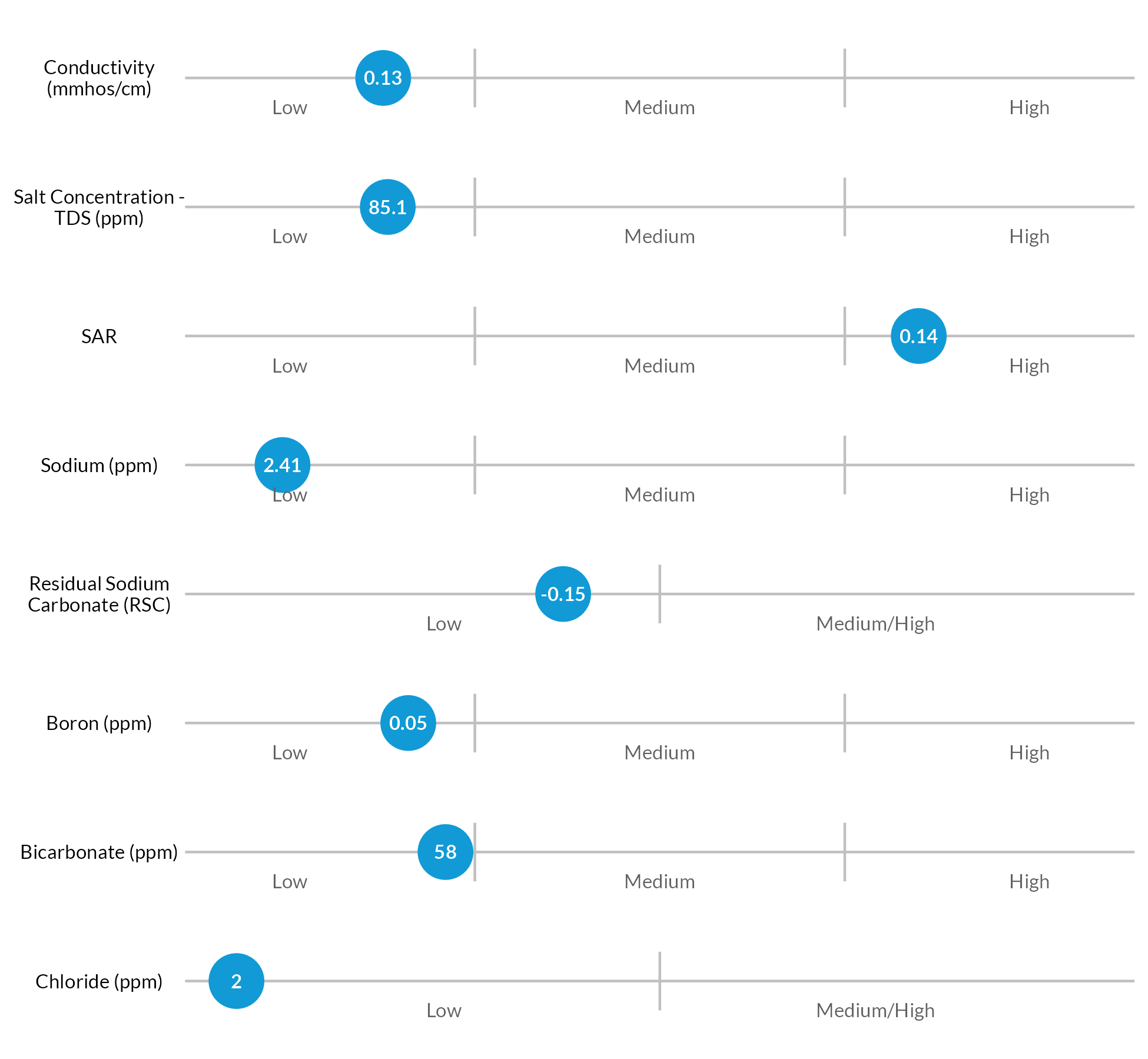
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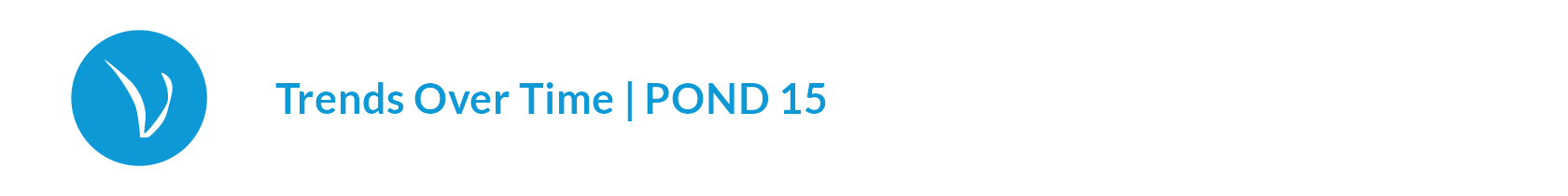
The S325 test package includes the entire sample submitted. This includes leaves, stems, and roots. This differs from the standard soil test which filters out most of the components. This is the reason why the percentages appear higher than that on a standard soil test.

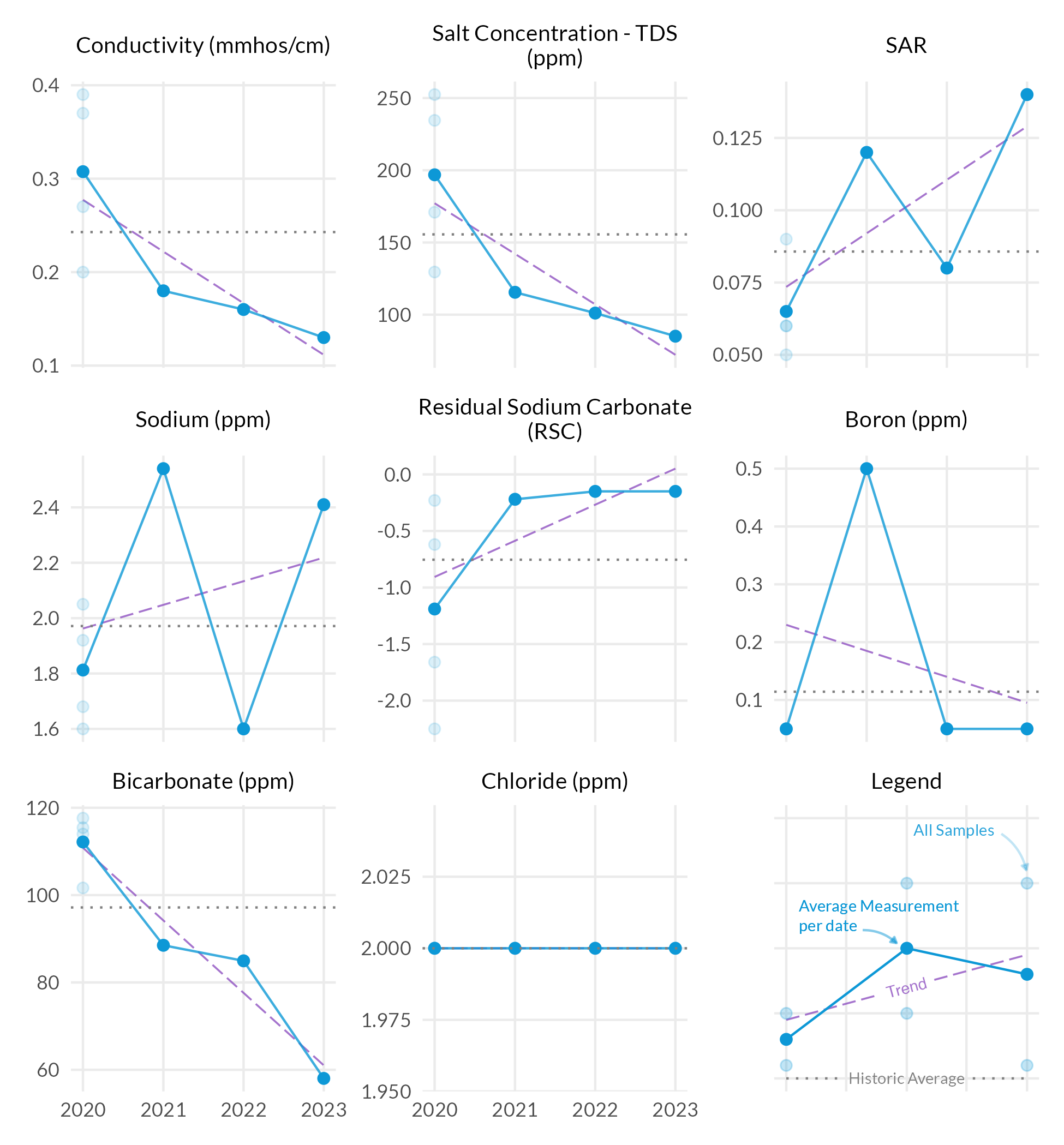




FAO Handbook 29 is the Food and Agricultural Organization of the United Nations and widely is recognized as the leading source for irrigation water quality guidelines. Below are the water sample results as shown in comparison to the FAO guidelines for likelihood of soil problems.









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