

SoilOptix® Custom Layers: What is Loam, Leakability & Plant Available Water?

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As part of the SoilOptix® technology deliverable, soil texture layers are provided. This includes percentage of Clay, Sand and Silt (Figure 1). Additional layers may be derived from these properties however, which includes Loam (%), Leakability and Plant Available Water.

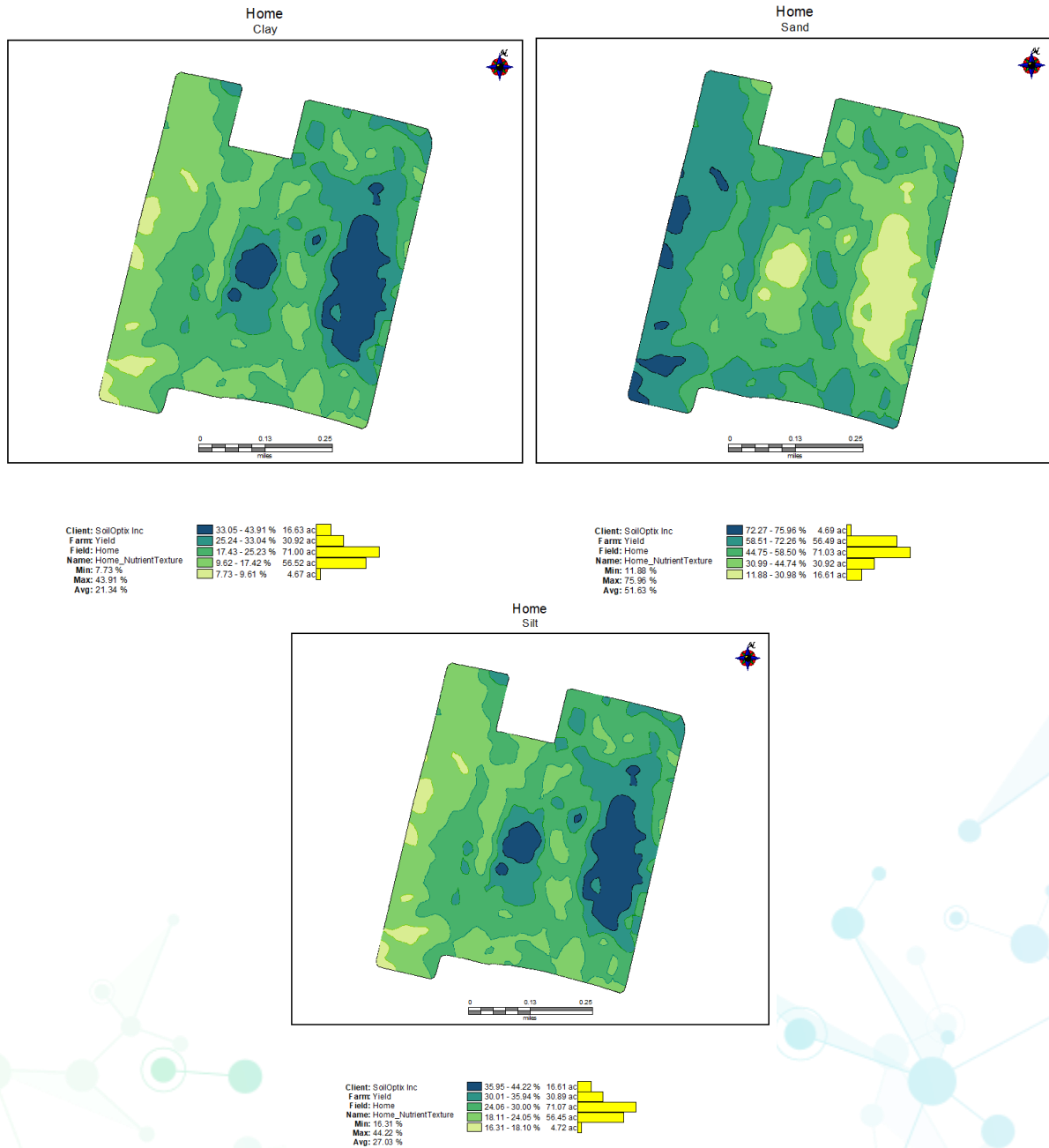


Figure 1: SoilOptix® layers: Percent of Clay, Sand & Silt

Loam

SoilOptix® determines the Loam layer through a simple addition of Clay + Silt. Its units continue through and is represented as a percentage. An example of this map is shown below in Figure 2.

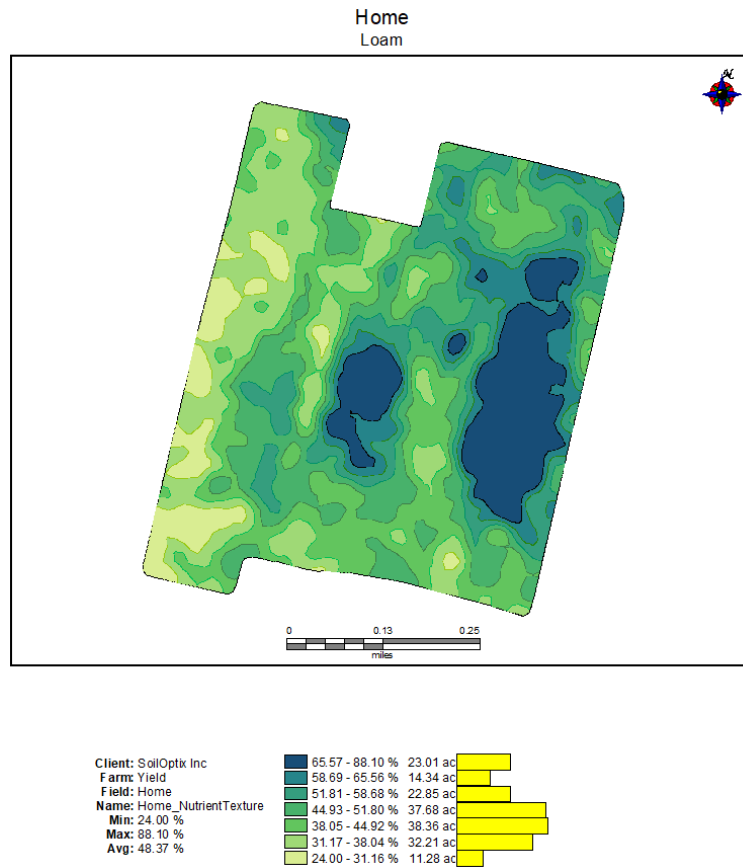


Figure 2: SoilOptix® Loam Layer

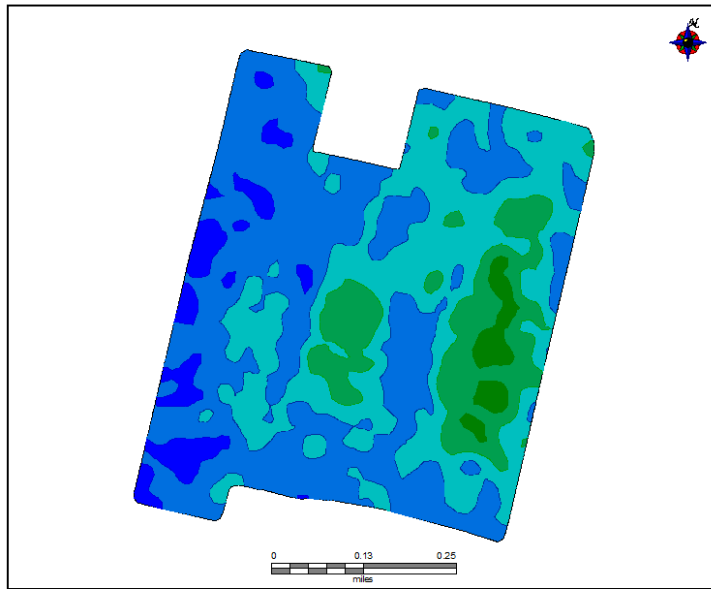
Leakability & Plant Available Water

These two custom layers involve Organic Matter, Clay and Silt and act as index layers (i.e. unitless). Leakability is an index of the potential for water to move through a given soil and acts as an inverse to Plant Available Water. The lower Leakability value, results in more likely water to leach through the soil, relative to other parts of the field. As an example, sand fields can have very low values for Leakability, resulting in the high movement of water in that soil.

Alternatively, Plant Available Water acts as a basic water retention model, where as PAWater increases these areas will hold more water. It is possible for this value to go over 100, indicating higher clay content and higher organic matter levels.

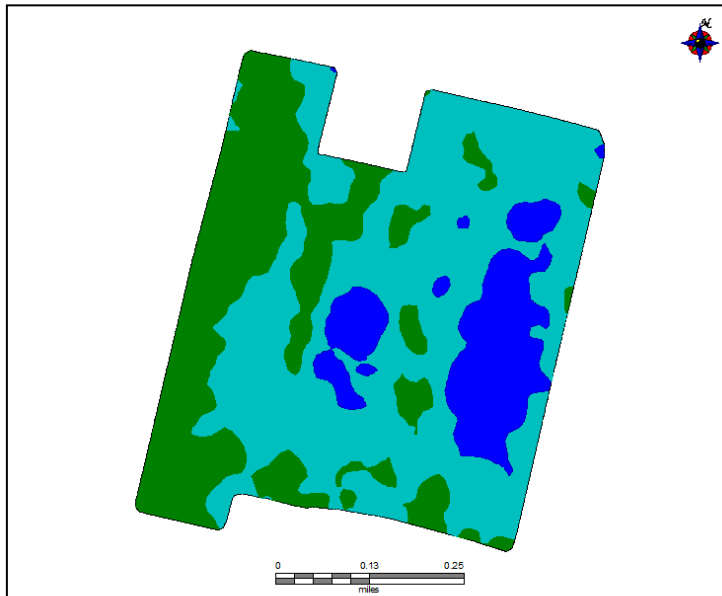
An example of each of these layers is shown below in Figure 3.

Home
Leakability



Client: SoilOptx Inc	50.0 - 57.2 Less Water Movement	4.27 ac
Farm: Home	40.0 - 49.9	23.25 ac
Field: Home	30.0 - 39.9	61.42 ac
Name: Home_NutrientTexture	20.0 - 29.9	80.46 ac
Min: 14.0	14.0 - 19.9 More Water Movement	10.35 ac
Max: 57.2		
Avg: 31.1		

Home
PAWater



Client: SoilOptx Inc	75.00 - 101.30 More Water Retention	24.55 ac
Farm: Home	50.00 - 74.99	100.09 ac
Field: Home	30.30 - 49.99 Less Water Retention	55.10 ac
Name: Home_NutrientTexture		
Min: 30.30		
Max: 101.30		
Avg: 58.10		

Figure 3: SoilOptix® Leakability & Plant Available Water Layers

The differences across various levels of Leakability and Plant Available Water are based on ranges of Organic Matter, and texture. The table below illustrates how these changes affect the index values of these custom properties.

Table 1: Expected Leakability and Plant Available Water ranges based on various OM and Texture levels.

	OM		Sand	Silt	Clay	Leakability	Plant Available Water
Low OM	1	Low Silt/Clay	90	5	5	8	13
Low OM	1	Medium Silt/Clay	60	20	20	23	43
Low OM	1	High Silt/Clay	10	45	45	48	93
Low OM	1	High Silt/Low Clay	5	90	5	8	98
Low OM	1	Low Silt/High Clay	5	5	90	93	98
Medium OM	3	Low Silt/Clay	90	5	5	14	19
Medium OM	3	Medium Silt/Clay	60	20	20	29	49
Medium OM	3	High Silt/Clay	10	45	45	54	99
Medium OM	3	High Silt/Low Clay	5	90	5	14	104
Medium OM	3	Low Silt/High Clay	5	5	90	99	104
High OM	10	Low Silt/Clay	90	5	5	35	40
High OM	10	Medium Silt/Clay	60	20	20	50	70
High OM	10	High Silt/Clay	10	45	45	75	120
High OM	10	High Silt/Low Clay	5	90	5	35	125
High OM	10	Low Silt/High Clay	5	5	90	120	125

Conclusion

These custom properties further extend the possibilities of the textural and physical properties which are reported from standard lab procedures. The utilization of these properties extends to the knowledge of the user; however, applications may include variable rate seeding scripts, irrigation management or combining with other precision agriculture datasets (e.g. normalized yield data).