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The soil profile: Lindbergh High School

Editor's note: *This is the newest installment of a series that is accompanied by soil test audits of a selected field. Our goal is to evaluate the soil and water tests from a selected sports field and build a fertility program based on the soil profile. We encourage all sports field managers who would like to be interviewed for this piece to contact the magazine. Logan Labs and author Joel Simmons will provide free soil test work and consulting to the selected site.*

WHAT DOES IT TAKE to build a premium high school sports field? It takes a good plan, a lot of soil, and many pieces of heavy equipment. There is grass, miles of irrigation piping and drainage lines. Fertilizers, soil amendments, time and hard work are in the recipe, but perhaps the most important aspect to building a quality field, one designed for longevity, is the vision and leadership of a large group of people. This is exactly what happened when Lindbergh High School in St. Louis set out to reconstruct their original football field, one that dated back to the 1940's.

A project to add an Early Childhood Learning Center on campus forced them to undertake the responsibility of constructing a large stormwater retention basin. The location of the stormwater basin facilitated the need to rebuild their original football field. As anyone who has worked in a public school setting knows a project of this size involves many people and too often this means conflicts, confusion and a lot of finger pointing.

That didn't happen here; the school board hired Rich Moffitt of Moffitt and Associates to oversee the project. Moffitt is a former STMA President and has many years experience in the management and construction of sports fields including a long stint as the Director of Grounds at St. Louis University. Moffitt had a lot of ideas as to how he wanted to build this field. "I really wanted the field to be natural grass and when the district discovered the cost of a synthetic field they made the decision to allow to us to go forward with a 90/10 turf type tall fescue and bluegrass field." Anyone who has grown cool-season grass in St. Louis knows that it is a challenge to keep its alive through the heat of the summer. "The field was going to be used primarily for soccer so I thought the best choice was to go with cool season grasses knowing that the opportunities for easier maintenance and recovery would be better," Moffitt said.

Moffitt described the process they went through to get the field built and commented on how the school really understood that quality was an investment, not a cost. "To get a group this size in a public school system, with all the political ramifications, to create the vision and to complete a project like this was magnificent," Moffitt said.

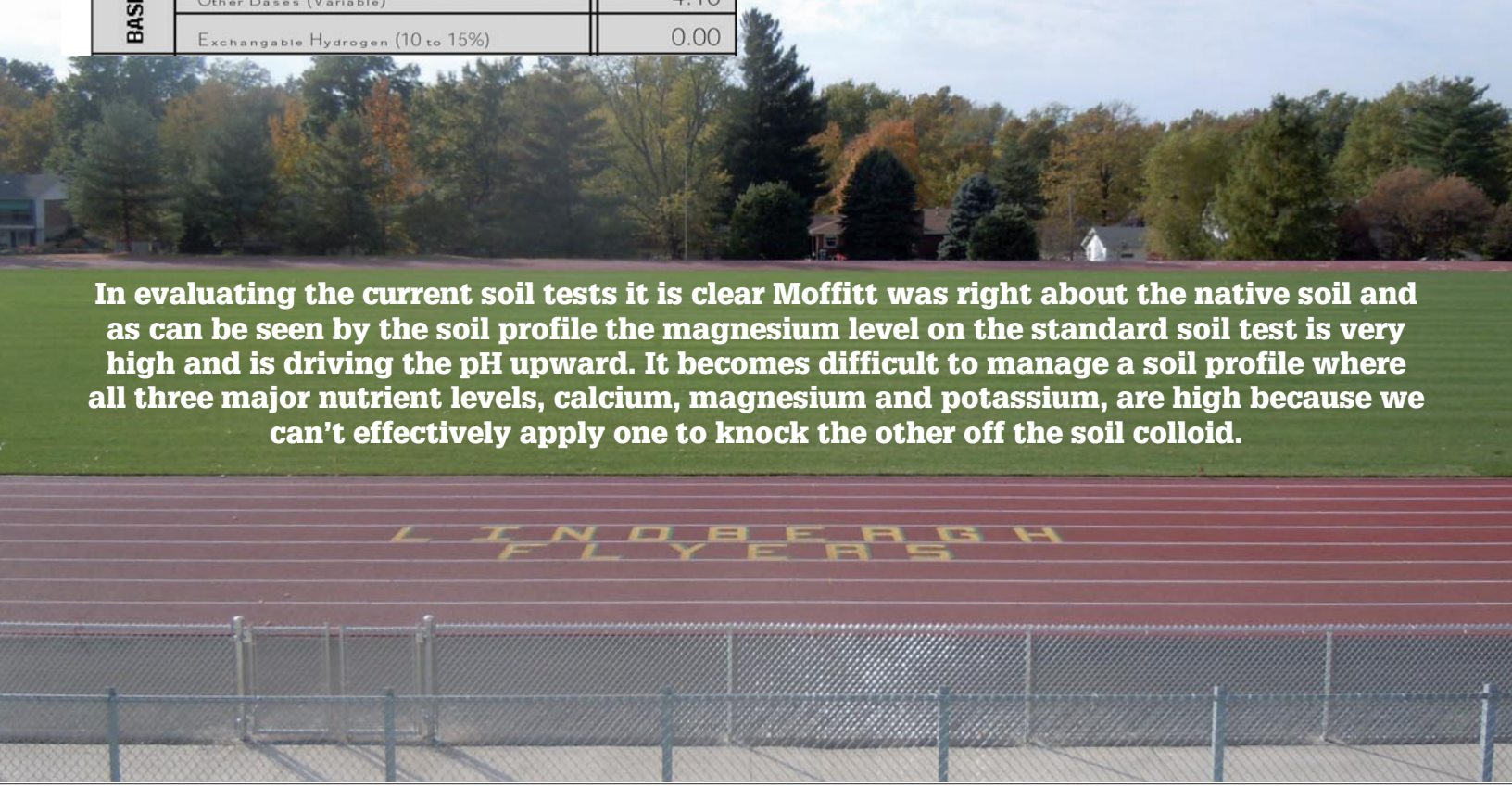
Construction of the field began in the summer of 2010; the track that circled the field was dug down to 3 inches and rebuilt with a new rubber running surface. "The native soil in

Soil Report

	pH or Soil Sample		7.30
	Organic Matter, Percent		4.56
ANIONS	SULFUR:	p.p.m.	121
	Mehlich III Phosphorous:	as (P_2O_5) lbs / acre	437
EXCHANGEABLE CATIONS	CALCIUM: lbs / acre	Desired Value	4388
		Value Found	4568
		Deficit	
	MAGNESIUM: lbs / acre	Desired Value	464
		Value Found	786
		Deficit	
	POTASSIUM: lbs / acre	Desired Value	503
		Value Found	498
		Deficit	-5
	SODIUM:	lbs / acre	64
BASE SATURATION %	Calcium (60 to 70%)		70.79
	Magnesium (10 to 20%)		20.30
	Potassium (2 to 5%)		3.96
	Sodium (.5 to 3%)		0.87
	Other Bases (Variable)		4.10
	Exchangable Hydrogen (10 to 15%)		0.00

Saturated Paste Report

	Bicarbonate (HCO3)	ppm	273
ANIONS	SULFUR	ppm	41.62
	PHOSPHORUS	ppm	< 0.1
SOLUBLE CATIONS	CALCIUM	ppm	76.12
		meq/l	3.81
	MAGNESIUM	ppm	22.16
		meq/l	1.85
	POTASSIUM:	ppm	18.16
		meq/l	0.47
	SODIUM	ppm	31.66
		meq/l	1.38
PERCENT	Calcium		50.74
	Magnesium		24.62
	Potassium		6.29
	Sodium		18.35



In evaluating the current soil tests it is clear Moffitt was right about the native soil and as can be seen by the soil profile the magnesium level on the standard soil test is very high and is driving the pH upward. It becomes difficult to manage a soil profile where all three major nutrient levels, calcium, magnesium and potassium, are high because we can't effectively apply one to knock the other off the soil colloid.

the area is not always great for sports, nor is the water, and the old field was tight and over-used making maintenance hard and costly," Moffitt said. "We brought in a lot of soil and ran soil tests and we were focused on organic matter content and were hoping for at least 2.5-3%, which we were able to find; the pH was where we wanted it but the soil was a little tight and the core chemistry needed some help."

The field was amended with EarthWorks Renovate Plus, a construction amendment that contains dry kelp meal, compost and humic acids to aid the digestion of carbon in the soil. This product also uses rock minerals to provide sustainable phosphorus, potassium and trace elements, and provides porosity to allow air and water to move through the profile.

"We didn't do a lot of pre-plant work, we used Renovate Plus and a good starter fertilizer, we could have gone at this with a little less expense but the school district saw the value in the pre-plant program and we had a great establishment," Moffitt said. The field was soded with big rolls of a fescue/bluegrass seed blend from a local sod producer in the fall of 2010 and will be ready for play by this spring.

In evaluating the current soil tests it is clear Moffitt was right about the native soil and as can be seen by the soil profile the magnesium level on the standard soil test is very high and is driving the pH upward. It becomes difficult to manage a soil profile where all three major nutrient levels, calcium, magnesium and potassium, are high because we can't effectively apply one to knock the other off the soil colloid. Often when magnesium is high it is at the expense of calcium and limestone can be used to knock off the excess Mg and bring the soil into balance. What can be seen on these soil tests is that both sulfur and sodium are high (ideal levels of both are in the low 20 ppm's for sulfur and low 20 lbs/acre for sodium) which is an indication of the potential for a tight, compacted soil profile.

When reviewing the water soluble paste extract a few "red flags" show up specifically the very low phosphorous readings, high bicarbonates and the very high sodium to potassium percentage. The phosphorous was addressed at pre-plant with the sustainable rock phosphate but will need to be a focus from a soluble standpoint when the maintenance program is established. High sodium levels, especially when percentages of sodium are higher than the percentage of potassium can lead to sodium induced wilt and root dysfunctions. Bicarbonates can seal the soil surface leading toward localized dry spots and poor air movement through the root zone.

A maintenance strategy using a flushing program of a high quality liquid humic acid product, 10 lbs per 1000 square feet of gypsum along with a good penetrating soil surfac-

Monitoring the soil testing data will allow for the appropriate adjustments to be made to maintain the high quality standards expected here at Lindbergh High School.

tant as often as monthly, will be a big help in keeping the sodium and bicarbonates at bay and keeping this exceptional field where they want it to be. Retesting a new field at least a few times per season is very important because there are so many changes happening as the pre-plant works through and the grass continues to establish. Monitoring the soil testing data will allow for the appropriate adjustments to be made to maintain the high quality standards expected at Lindbergh High School.

"We had originally designed it to be a sand-based field but the cost was restrictive. The soil we brought in was good but a little tight and we knew with a little amending we could build a product that will provide the school district what they wanted for the long term," Moffitt said. "I am a believer in the use organic-based fertilizers along with some synthetics when needed, this has been the approach we've taken on most of our projects and it has provided great results. We try to make a fertility program that simply lasts and doesn't run out all at once." ■

Joel Simmons is the president of EarthWorks Natural Organic Products and Soil First consulting and teaches the Soil First Academy all across North America. He holds a Masters Degree from Penn State University and is a former Penn State county extension agent and instructor of soils at Rutgers University. He may be reached at joel@soil first.com.