EarthWorks™
A Deeper Respect

October 16, 2020

To Whom it May Concern:

Land management and management of our waterways go hand in hand. In fact the first function of any plant ground cover is water filtration and erosion control, which is another form of water filtration! As stated by the Lawn Institute on their website, "The biology of turfgrass makes lawns a near ideal medium for the biodegradation of all sorts of environmental contamination."

The Long Island Sound Study, an organization conducting a long term study of water runoff and its contribution to algal blooms and eutrophication, defines stormwater runoff as a non-point source of nitrogen loading. It also defines agricultural runoff as a non-point source. Agricultural runoff is water runoff from agricultural fields where *ground cover is not present.* In other words: agriculture fertilizer, including nitrogen, will leave the field with rainwater and enter the waterways in the presence of *any* bare soil. It is in fact plant roots and the microbiological system that lives among plant roots that filter, stabilize, and utilize nitrogen and other solutes, whether contaminants or plant essential nutrients.

It has come to my attention there is concern that a natural turfgrass field will contribute to contaminated water runoff. The specific concern is over a phenomenon called "nitrogen loading," where nitrogen is dissolved into runoff water and enters waterways, eventually making its way to surrounding marshes, bays, and the ocean.

Below are the major differences between a constructed synthetic turf field and natural turfgrass field, as related to runoff water, percolation, and ultimate discharge to waterways:

Much like the scenario of the bare soil agricultural field that adds solutes and suspended particles to runoff water, a synthetic turf field will allow stormwater to enter the waterway without the chance to be filtered, contributing solutes and suspended particles. So any solutes that are in that water (i.e. nitrogen), will immediately enter the waterway system. In fact, because synthetic turf field is man-made, an engineered internal drainage system will move water as quickly and efficiently as possible to be discharged without any biological filtration.

On the other hand, turfgrass, like an iceberg, is mostly below the surface. It grows long, intertwined, fibrous roots that, in conjunction with root zone microbiology, filter contaminants from runoff water. In fact, the filtration abilities of turfgrass are utilized by many communities that irrigate effluent water onto turfgrass, specifically to remove nitrogen.

Evident on the soil test from the West Tis School and North sites, resilient natural turfgrass fields are properly maintained with very little soluble nitrogen in the soil. It is because of the living system that is a natural turfgrass field, the soluble nitrogen, (the waterway pollutant of concern) is not higher. If runoff water simply flowed through an *abiotic* (non-living, plastic) system it would carry more contaminant.

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As published by the International Turfgrass Society in their Research Journal Volume 10, 2005; researches A. Martin Petrovic and Zachary M. Easton write:

> "With established turfgrass, clippings are generally the largest sink of N, accounting for 25-60% of applied N. Miltner et al. (1996) recovered well over 50% of N in clipping, verdure, and thatch. The N bound in turfgrass tissue does not generally represent a threat to water quality as it is utilized by the plant and prevented from entering water supplies."

Further turfgrass builds organic matter on earth, commonly called topsoil. This organic matter, soil carbon, is made of the very same carbon dioxide that is in excess in the atmosphere. This excess causes destructive weather events across the globe. Turfgrass and it's accompanying root zone microbial team captures and transforms carbon dioxide making our natural grass fields Climate Change Mitigators.

For these reasons, your community should strongly consider utilizing natural turfgrass fields: the preferred and responsible choice.

Respectfully,

Jack Higgins
EarthWorks Agronomist

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Soil Report

Job Name: **The Field Fund Inc** | **Date:** 4/25/2019

Company: Soil First Consulting | **Submitted By:** Jack Higgins

Sample Location			Chimark					
Sample ID								
Lab Number			253					
Sample Depth in inches			6					
Total Exchange Capacity (M. E.)			2.47					
pH of Soil Sample			6.2					
Organic Matter, Percent			3.53					
ANIONS	**SULFUR:**	p.p.m.	12					
	Mehlich III Phosphorous:	as (P_2O_5) lbs / acre	246					
EXCHANGEABLE CATIONS	**CALCIUM:** lbs / acre	Desired Value	671					
		Value Found	558					
		Deficit	-113					
	MAGNESIUM: lbs / acre	Desired Value	200					
		Value Found	122					
		Deficit	-78					
	POTASSIUM: lbs / acre	Desired Value	200					
		Value Found	70					
		Deficit	-130					
	SODIUM:	lbs / acre	24					
BASE SATURATION %	Calcium (60 to 70%)		56.47					
	Magnesium (10 to 20%)		20.58					
	Potassium (2 to 5%)		3.63					
	Sodium (.5 to 3%)		2.11					
	Other Bases (Variable)		5.20					
	Exchangable Hydrogen (10 to 15%)		12.00					
TRACE ELEMENTS	Boron (p.p.m.)		< 0.2					
	Iron (p.p.m.)		155					
	Manganese (p.p.m.)		10					
	Copper (p.p.m.)		0.77					
	Zinc (p.p.m.)		6.86					
	Aluminum (p.p.m.)		537					
OTHER								

Logan Labs, LLC

Soil Report

Job Name: **The Field Fund Inc** Date: 4/25/2019

Company: Soil First Consulting Submitted By: Jack Higgins

	Sample Location		Edgartown				
	Sample ID						
	Lab Number		254				
	Sample Depth in inches		6				
	Total Exchange Capacity (M. E.)		3.44				
	pH of Soil Sample		6.4				
	Organic Matter, Percent		5.09				
ANIONS	**SULFUR:**	p.p.m.	13				
	Mehlich III Phosphorous:	as (P_2O_5) lbs / acre	400				
EXCHANGEABLE CATIONS	**CALCIUM:** lbs / acre	Desired Value	936				
		Value Found	815				
		Deficit	-121				
	MAGNESIUM: lbs / acre	Desired Value	200				
		Value Found	173				
		Deficit	-27				
	POTASSIUM: lbs / acre	Desired Value	200				
		Value Found	112				
		Deficit	-88				
	SODIUM:	lbs / acre	28				
BASE SATURATION %	Calcium (60 to 70%)		59.17				
	Magnesium (10 to 20%)		20.93				
	Potassium (2 to 5%)		4.17				
	Sodium (.5 to 3%)		1.78				
	Other Bases (Variable)		5.00				
	Exchangable Hydrogen (10 to 15%)		9.00				
TRACE ELEMENTS	Boron (p.p.m.)		0.31				
	Iron (p.p.m.)		241				
	Manganese (p.p.m.)		9				
	Copper (p.p.m.)		1.34				
	Zinc (p.p.m.)		4.06				
	Aluminum (p.p.m.)		677				
OTHER							

Logan Labs, LLC

Soil Report

Job Name: **The Field Fund Inc**

Date: 4/25/2019

Company: Soil First Consulting

Submitted By: Jack Higgins

Sample Location			Oaks Bluff				
Sample ID			Front				
Lab Number			255				
Sample Depth in inches			6				
Total Exchange Capacity (M. E.)			3.87				
pH of Soil Sample			6.5				
Organic Matter, Percent			4.29				
ANIONS	**SULFUR:**	p.p.m.	12				
	Mehlich III Phosphorous:	as (P_2O_5) lbs / acre	205				
EXCHANGEABLE CATIONS	**CALCIUM:** lbs / acre	Desired Value Value Found Deficit	1051 1012 -39				
	MAGNESIUM: lbs / acre	Desired Value Value Found Deficit	200 160 -40				
	POTASSIUM: lbs / acre	Desired Value Value Found Deficit	200 112 -88				
	SODIUM:	lbs / acre	22				
BASE SATURATION %	Calcium (60 to 70%)		65.43				
	Magnesium (10 to 20%)		17.24				
	Potassium (2 to 5%)		3.71				
	Sodium (.5 to 3%)		1.26				
	Other Bases (Variable)		4.90				
	Exchangable Hydrogen (10 to 15%)		7.50				
TRACE ELEMENTS	Boron (p.p.m.)		0.3				
	Iron (p.p.m.)		433				
	Manganese (p.p.m.)		11				
	Copper (p.p.m.)		1.11				
	Zinc (p.p.m.)		3.6				
	Aluminum (p.p.m.)		615				
OTHER	Ammonium (p.p.m.)		0.6				
	Nitrate (p.p.m.)		1.5				

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Soil Report

Job Name: **The Field Fund Inc** Date: 4/25/2019

Company: Soil First Consulting Submitted By: Jack Higgins

	Sample Location		Oaks Bluff				
	Sample ID		Back				
	Lab Number		256				
	Sample Depth in inches		6				
	Total Exchange Capacity (M. E.)		3.42				
	pH of Soil Sample		6.5				
	Organic Matter, Percent		3.83				
ANIONS	**SULFUR:**	p.p.m.	12				
	Mehlich III Phosphorous:	as (P_2O_5) lbs / acre	220				
EXCHANGEABLE CATIONS	**CALCIUM:** lbs / acre	Desired Value	931				
		Value Found	864				
		Deficit	-67				
	MAGNESIUM: lbs / acre	Desired Value	200				
		Value Found	155				
		Deficit	-45				
	POTASSIUM: lbs / acre	Desired Value	200				
		Value Found	113				
		Deficit	-87				
	SODIUM:	lbs / acre	22				
BASE SATURATION %	Calcium (60 to 70%)		63.07				
	Magnesium (10 to 20%)		18.86				
	Potassium (2 to 5%)		4.23				
	Sodium (.5 to 3%)		1.39				
	Other Bases (Variable)		4.90				
	Exchangable Hydrogen (10 to 15%)		7.50				
TRACE ELEMENTS	Boron (p.p.m.)		0.3				
	Iron (p.p.m.)		483				
	Manganese (p.p.m.)		12				
	Copper (p.p.m.)		1.03				
	Zinc (p.p.m.)		3.34				
	Aluminum (p.p.m.)		597				
OTHER	Ammonium (p.p.m.)		0.4				
	Nitrate (p.p.m.)		1.6				

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Soil Report

Job Name: **The Field Fund Inc**

Date: 4/25/2019

Company: Soil First Consulting

Submitted By: Jack Higgins

	Sample Location		West Tis				
	Sample ID		Town				
	Lab Number		257				
	Sample Depth in inches		6				
	Total Exchange Capacity (M. E.)		4.62				
	pH of Soil Sample		6.7				
	Organic Matter, Percent		5.16				
ANIONS	**SULFUR:**	p.p.m.	13				
	Mehlich III Phosphorous:	as (P_2O_5) lbs / acre	71				
EXCHANGEABLE CATIONS	**CALCIUM:** lbs / acre	Desired Value	1257				
		Value Found	1208				
		Deficit	-49				
	MAGNESIUM: lbs / acre	Desired Value	200				
		Value Found	230				
		Deficit					
	POTASSIUM: lbs / acre	Desired Value	200				
		Value Found	128				
		Deficit	-72				
	SODIUM:	lbs / acre	24				
BASE SATURATION %	Calcium (60 to 70%)		65.32				
	Magnesium (10 to 20%)		20.73				
	Potassium (2 to 5%)		3.55				
	Sodium (.5 to 3%)		1.14				
	Other Bases (Variable)		4.70				
	Exchangable Hydrogen (10 to 15%)		4.50				
TRACE ELEMENTS	Boron (p.p.m.)		0.23				
	Iron (p.p.m.)		137				
	Manganese (p.p.m.)		2				
	Copper (p.p.m.)		0.39				
	Zinc (p.p.m.)		2.44				
	Aluminum (p.p.m.)		809				
OTHER							

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Soil Report

Job Name: **The Field Fund Inc**

Date: 4/25/2019

Company: Soil First Consulting

Submitted By: Jack Higgins

	Sample Location		West Tis				
	Sample ID		School				
	Lab Number		258				
	Sample Depth in inches		6				
	Total Exchange Capacity (M. E.)		3.44				
	pH of Soil Sample		6.1				
	Organic Matter, Percent		5.47				
ANIONS	**SULFUR:**	p.p.m.	13				
	Mehlich III Phosphorous:	as (P_2O_5) lbs / acre	92				
EXCHANGEABLE CATIONS	**CALCIUM:** lbs / acre	Desired Value	935				
		Value Found	792				
		Deficit	-143				
	MAGNESIUM: lbs / acre	Desired Value	200				
		Value Found	149				
		Deficit	-51				
	POTASSIUM: lbs / acre	Desired Value	200				
		Value Found	117				
		Deficit	-83				
	SODIUM:	lbs / acre	21				
BASE SATURATION %	Calcium (60 to 70%)		57.58				
	Magnesium (10 to 20%)		18.05				
	Potassium (2 to 5%)		4.36				
	Sodium (.5 to 3%)		1.35				
	Other Bases (Variable)		5.20				
	Exchangable Hydrogen (10 to 15%)		13.50				
TRACE ELEMENTS	Boron (p.p.m.)		0.33				
	Iron (p.p.m.)		366				
	Manganese (p.p.m.)		3				
	Copper (p.p.m.)		0.52				
	Zinc (p.p.m.)		2.92				
	Aluminum (p.p.m.)		774				
OTHER	Ammonium (p.p.m.)		0.6				
	Nitrate (p.p.m.)		4				

Logan Labs, LLC

Soil Report

Job Name: **The Field Fund Inc** Date: 4/25/2019

Company: Soil First Consulting Submitted By: Jack Higgins

Sample Location			West Tis				
Sample ID			North				
Lab Number			259				
Sample Depth in inches			6				
Total Exchange Capacity (M. E.)			2.51				
pH of Soil Sample			6.2				
Organic Matter, Percent			5.19				
ANIONS	**SULFUR:**	p.p.m.	12				
	Mehlich III Phosphorous:	as (P_2O_5) lbs / acre	62				
EXCHANGEABLE CATIONS	**CALCIUM:** lbs / acre	Desired Value	682				
		Value Found	540				
		Deficit	-142				
	MAGNESIUM: lbs / acre	Desired Value	200				
		Value Found	129				
		Deficit	-71				
	POTASSIUM: lbs / acre	Desired Value	200				
		Value Found	113				
		Deficit	-87				
	SODIUM:	lbs / acre	21				
BASE SATURATION %	Calcium (60 to 70%)		53.80				
	Magnesium (10 to 20%)		21.42				
	Potassium (2 to 5%)		5.77				
	Sodium (.5 to 3%)		1.83				
	Other Bases (Variable)		5.20				
	Exchangable Hydrogen (10 to 15%)		12.00				
TRACE ELEMENTS	Boron (p.p.m.)		0.23				
	Iron (p.p.m.)		274				
	Manganese (p.p.m.)		4				
	Copper (p.p.m.)		0.55				
	Zinc (p.p.m.)		3.21				
	Aluminum (p.p.m.)		691				
OTHER	Ammonium (p.p.m.)		0.7				
	Nitrate (p.p.m.)		1.4				

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