LOYD RAY FARMS INSPECTION, OPERATIONS & MAINTENANCE LOG SHEET

IMPORTANT: AN INSPECTION, OPERATIONS & MAINTENANCE LOG SHOULD BE COMPLETED FOR EVERY SITE VISIT; PLEASE REVIEW PREVIOUS LOG ENTRY AND PROVIDE INFORMATION TO UPDATE OR RESOLVE ANY ONGOING ISSUES NOTED (INCLUDING BUT NOT LIMITED TO MAINTENANCE, REPAIRS, OR CORRECTIVE ACTIONS).

Entry Made By: Mar	vin		Date: Thursday 12-20-2018			ote monitor Sta AM (isit start 10:3)		Remote Monitor End: 11:30PM Site Visit end 1:45 PM		
Condition: Temperature 34 to 51 we are 44 at 1:30 PM x □ Cloudy and rain					ning 🗆 Balmy					
Precip Last 24 Hrs 1:30PM			d raining at	Wi	ind:	(mph): calm 5	5-8 mp	h		
PURPOSE OF VISIT/ITE	MS IN	ISPECTED,	OPERVATION	ıs						
Site visit to do a system check. I met with Bryan of ProPump and he installed fans and circuit boards in										
Phase converter. We restarted system and we are running. The Gravity Flare is off										
Equipment Observed	ENVIRONMENTAL SYSTEM OBSERVATIONS: Equipment Observed: Operational Status									
Fluidyne Aeration Sys		ncluding:								
Jet Motive Pump	S				☑ Auto ☐ Hand On ☐ Off ☐ In Fault					
Blower				\boxtimes	☑ Auto ☐ Hand On ☐ Off ☐ In Fault:					
CP-1 (Control Par	nel)				□ Auto □ Hand On □ Off □ In Fault					
Flush Pumps				$\frac{1}{\Box}$	□ Auto ⊠ Hond On □ Off □ In Foult					
•					☐ Auto ☐ Hand On ☐ Off ☐ In Fault					
Digester Mixing Pum	hz				Aut	to 🗌 Hand Oi	n 🗆 (Off 🗌 In Fault		
CP-1 DATA & SET POI	NTS;									
Cycles	Set P	oint	Current		Mo	dified Set Pt	Note	es .		
Static	60		60							
Anoxic	90		90							
Aerobic										
Blower Jet Motive Pumps	☐ Continuous ☐ Cycle Continuous ☐ Both ☐ Pump #1 ☐ Pump # 2									
	- Continuous Elboth Elfump#1 Elfump#2									
Digester Pumps		ontinuous	⊠ Both □ S	eque	ntia	<u>I</u>				
MOTOR DATA:										
Aerobic		Run Tim	e Set Sp	peed		Notes				
let Metive Rumn	# 1			601	u- T					

Jet Motive Pump # 2	60Hz	
Blower	30Hz	
Anaerobic		
Mixing Pump 4A	60 Hz	
Mixing Pump 4B	60 Hz	

BIOGAS & POWER SYSTEMS OBSERVATIONS:

Equipment Observed:	Operational Status							
Unison Gas Skid	Flow Rate	ow Rate Total Flow C		Outlet Press.	Gauge Press.			
Fault? □ Yes ☒ No	20.9							
Microturbine	Speed	Exit Temp	Inlet Pressure	Inlet Temp	Power Out			
Fault? □ Yes ☒ No	95852	1174		99	43.7 kw			
Biogas System	BlueSens%	Flare On	Flare Flow	Total Flow	Flare Temp			
		⊠Y□N	31.2	29.1	301			

UNISON GAS CONDITIONING LOG

Data -5	FIT 311 5 to 10 inWC	PIT 331 88 to 110psig	PIT 351	Pressure	Panel	HM 331	
Data		88 to 110ncia			i allei	11101 331	
		oo to Trobaig	88 to 110 psig	Differential	Door	Hours	
	0.1	97.39	91.8	2.0	200.	7060	
Temperature TI	E 141	TE 311	TE 321	TE 331	TE 341	TE 342	TE 31
Data 32	2 to 45 F	40 to 115 F	35 to 75 F	80 to 220 F	33 to 45 F	65 to 90 F	35 to 115 F
3	35.1	83.1	46.6	186.5	35.2	88.3	
G.yco.	T 141	PI 141	FI 141	TI 142	PI 142	TI 111	PI 111
Piping 32	2 to 45 F	35 to 52 psig	2.5 to 3.5 gpm	35 to 50 F	33 to 50 psig	38 to 52 F	30 to 48 psig
011	1 231	TI 231	PI 232	TI 232	PI 233	TI 233	PI 234
Piping 90	0 to 110 psig	178 to 215 F	85 to 105 psig	130 to 180 F	80 to 100	168 to 185 F	78 to 100psig
					psig		
Gas Pi	PIT 311	TI 311	TI 321	PDI 321	PI 331	TI 331	PI 332
343	10 to10inWC	40 to 115 F	35 to 75 F	0 to 6 inWC	90 to 110	80 to 220 F	90 to 110psig
Piping	10 (010)))	40 (0 115)	33 (0 73)	0 10 0 11100 0	psig	80 10 220 1	30 to 110p3ig
					. 0		
Gas	T 341	PI 341	TI 342	PI 342	TE 343	PI 343	
	0 to 220 F	90 to 110	115 to 155 F	90 to 110 psig	33 to 45 F	90 to 110	
Piping		psig				psig	
Gas	T 351	PI 351	Check	LI 721	LI 231	LI 741	
Piping 65	5 to 90 F	88 to 15 psig	Indicators				

PERSONNEL PRESENT:

Name	Affiliation	Phone Number/Email

LOYD RAY FARMS INSPECTION, OPERATIONS & MAINTENANCE LOG SHEET

IMPORTANT: AN INSPECTION, OPERATIONS & MAINTENANCE LOG SHOULD BE COMPLETED FOR EVERY SITE VISIT; PLEASE REVIEW PREVIOUS LOG ENTRY AND PROVIDE INFORMATION TO UPDATE OR RESOLVE ANY ONGOING ISSUES NOTED (INCLUDING BUT NOT LIMITED TO MAINTENANCE, REPAIRS, OR CORRECTIVE ACTIONS).

Entry Made By: Mar	vin	l l	Date: Friday Remote monitor St. 7:00 AM Site Visit start 11:3					Remote Monitor End: 11:30PM Site Visit end 12:30 PM	
Condition: Temperat			Cloudy and ra	ining	ning 🗆 Balmy				
Precip Last 24Hrs.	Precip Last 24Hrs. 1.9 inches and shoers of and on at 12:30PM				Wind: (mph): calm 5-8 mph				
PURPOSE OF VISIT/ITE	MS IN	ISPECTED,	OPERVATION	IS					
Site visit to do a system check. I met with Matt Arsenault of Duke U. We have been running solid since we									
replaced PC Fans ye								Ü	
ENVIRONMENTAL SYS	ENVIRONMENTAL SYSTEM OBSERVATIONS:								
Equipment Observed				O	Operational Status				
Fluidyne Aeration Sys Jet Motive Pump		ncluding:		$+$ _					
Jet Motive Fullip	ა 				□ Auto □ Hand On □ Off □ In Fault				
Blower					☑ Auto ☐ Hand On ☐ Off ☐ In Fault:				
CP-1 (Control Par	nel)				☑ Auto ☐ Hand On ☐ Off ☐ In Fault				
Flush Pumps				+	☐ Auto ☐ Hand On ☐ Off ☐ In Fault				
,	25			_					
Digester Mixing Pum	μς				Au	to 🗌 Hand Or	1 🗆 🤇	Off 🗌 In Fault	
CP-1 DATA & SET POI	NTS;								
Cycles	Set P	oint	Current		Mo	dified Set Pt	Note	S	
Static	60		60						
Anoxic	90		90						
Aerobic	180 180								
Blower	☐ Continuous ☒ Cycle								
Jet Motive Pumps	□ Continuous ⊠ Both □ Pump #1 □ Pump # 2								
Digester Pumps	☐ Continuous ☒ Both ☐ Sequential								
MOTOR DATA:									
Aerobic		Run Tim	e Set S	peed		Notes			
Jet Motive Pump # 1			Hz						

Jet Motive Pump # 2	60Hz	
Blower	30Hz	
Anaerobic		
Mixing Pump 4A	60 Hz	
Mixing Pump 4B	60 Hz	

BIOGAS & POWER SYSTEMS OBSERVATIONS:

Equipment Observed:	Operational S	Operational Status							
Unison Gas Skid	Flow Rate	Total Flow	Total Flow Comp. Press.		Gauge Press.				
Fault? ☐ Yes ☒ No	20.9								
Microturbine	Speed	Exit Temp	Inlet Pressure	Inlet Temp	Power Out				
Fault? ☐ Yes ☒ No	95852	1174		99	43.7 kw				
Biogas System	BlueSens%	Flare On	Flare Flow	Total Flow	Flare Temp				
		⊠Y□N	31.2	29.1	301				

UNISON GAS CONDITIONING LOG

Data -5	FIT 311 5 to 10 inWC	PIT 331 88 to 110psig	PIT 351	Pressure	Panel	HM 331	
Data		88 to 110ncia			i allei	11101 331	
		oo to Trobaig	88 to 110 psig	Differential	Door	Hours	
	0.1	97.39	91.8	2.0	200.	7060	
Temperature TI	E 141	TE 311	TE 321	TE 331	TE 341	TE 342	TE 31
Data 32	2 to 45 F	40 to 115 F	35 to 75 F	80 to 220 F	33 to 45 F	65 to 90 F	35 to 115 F
3	35.1	83.1	46.6	186.5	35.2	88.3	
G.yco.	T 141	PI 141	FI 141	TI 142	PI 142	TI 111	PI 111
Piping 32	2 to 45 F	35 to 52 psig	2.5 to 3.5 gpm	35 to 50 F	33 to 50 psig	38 to 52 F	30 to 48 psig
011	1 231	TI 231	PI 232	TI 232	PI 233	TI 233	PI 234
Piping 90	0 to 110 psig	178 to 215 F	85 to 105 psig	130 to 180 F	80 to 100	168 to 185 F	78 to 100psig
					psig		
Gas Pi	PIT 311	TI 311	TI 321	PDI 321	PI 331	TI 331	PI 332
343	10 to10inWC	40 to 115 F	35 to 75 F	0 to 6 inWC	90 to 110	80 to 220 F	90 to 110psig
Piping	10 (010)))	40 (0 115)	33 (0 73)	0 10 0 11100 0	psig	80 10 220 1	30 to 110p3ig
					. 0		
Gas	T 341	PI 341	TI 342	PI 342	TE 343	PI 343	
	0 to 220 F	90 to 110	115 to 155 F	90 to 110 psig	33 to 45 F	90 to 110	
Piping		psig				psig	
Gas	T 351	PI 351	Check	LI 721	LI 231	LI 741	
Piping 65	5 to 90 F	88 to 15 psig	Indicators				

PERSONNEL PRESENT:

	A CC111	-1 1 1- 11
Name	Affiliation	Phone Number/Email

LOYD RAY FARMS INSPECTION, OPERATIONS & MAINTENANCE LOG SHEET

IMPORTANT: AN INSPECTION, OPERATIONS & MAINTENANCE LOG SHOULD BE COMPLETED FOR EVERY SITE VISIT; PLEASE REVIEW PREVIOUS LOG ENTRY AND PROVIDE INFORMATION TO UPDATE OR RESOLVE ANY ONGOING ISSUES NOTED (INCLUDING BUT NOT LIMITED TO MAINTENANCE, REPAIRS, OR CORRECTIVE ACTIONS).

Entry Made By: Mar	vin		Sunday)-2018	7	7:00	ote monitor Sta AM Visit start 2:00		Remote Monitor End: 11:30PM Site Visit end 3:30 PM		
Condition: Temperat	ture 44	1 x □ 0	Cloudy and	rainin	ning 🗆 Balmy					
Precip Last 24Hrs. 2018	1.8 ir	iches sinc	e 12-21-	W	Vind	(mph): calm 5	5-8 mpl	h		
PURPOSE OF VISIT/ITE	EMS IN	ISPECTED,	OPERVATIO	ONS						
Site visit to do a system check The Gravity Flare is off. System was working but computer was down.										
ENVIRONMENTAL SYS	тем с	DBSERVATI	ONS:							
Equipment Observed	d:			0	Operational Status					
Fluidyne Aeration Sys	stem, I	ncluding:								
Jet Motive Pump	S			D	☑ Auto ☐ Hand On ☐ Off ☐ In Fault					
Blower				×	☑ Auto ☐ Hand On ☐ Off ☐ In Fault:					
CP-1 (Control Par	nel)				☑ Auto ☐ Hand On ☐ Off ☐ In Fault					
Flush Pumps					☐ Auto ☐ Hand On ☐ Off ☐ In Fault					
Digester Mixing Pum	ps			Σ	☐ Auto ☐ Hand On ☐ Off ☐ In Fault					
CP-1 DATA & SET POI	utc.									
Cycles	Set P	oint	Current		М	odified Set Pt	Notes	s		
Static	60		60					-		
Anoxic	90		90							
Aerobic	180									
Blower	☐ Continuous ☒ Cycle									
Jet Motive Pumps	OS ☐ Continuous ☐ Both ☐ Pump #1 ☐ Pump # 2									
Digester Pumps	☐ Continuous ☒ Both ☐ Sequential									
MOTOR DATA:										
Aerobic		Run Tim	e Set	Speed	d	Notes				
let Metive Rumn	.#1			_	٦ ــ ــ					

Jet Motive Pump # 2	60Hz	
Blower	30Hz	
Anaerobic		
Mixing Pump 4A	60 Hz	
Mixing Pump 4B	60 Hz	

BIOGAS & POWER SYSTEMS OBSERVATIONS:

Equipment Observed:	Operational Sta	Operational Status							
Unison Gas Skid	Flow Rate	Total Flow	Comp. Press.	Outlet Press.	Gauge Press.				
Fault? □ Yes ☒ No	20.9								
Microturbine	Speed	Exit Temp	Inlet Pressure	Inlet Temp	Power Out				
Fault? □ Yes ☒ No	95852	1174		99	43.7 kw				
Biogas System	BlueSens%	Flare On	Flare Flow	Total Flow	Flare Temp				
		⊠Y□N	31.2	29.1	301				

UNISON GAS CONDITIONING LOG

Data -5	FIT 311 5 to 10 inWC	PIT 331 88 to 110psig	PIT 351	Pressure	Panel	HM 331	
Data		88 to 110ncia			i allei	11101 331	
		oo to Trobaig	88 to 110 psig	Differential	Door	Hours	
	0.1	97.39	91.8	2.0	200.	7060	
Temperature TI	E 141	TE 311	TE 321	TE 331	TE 341	TE 342	TE 31
Data 32	2 to 45 F	40 to 115 F	35 to 75 F	80 to 220 F	33 to 45 F	65 to 90 F	35 to 115 F
3	35.1	83.1	46.6	186.5	35.2	88.3	
G.yco.	T 141	PI 141	FI 141	TI 142	PI 142	TI 111	PI 111
Piping 32	2 to 45 F	35 to 52 psig	2.5 to 3.5 gpm	35 to 50 F	33 to 50 psig	38 to 52 F	30 to 48 psig
011	1 231	TI 231	PI 232	TI 232	PI 233	TI 233	PI 234
Piping 90	0 to 110 psig	178 to 215 F	85 to 105 psig	130 to 180 F	80 to 100	168 to 185 F	78 to 100psig
					psig		
Gas Pi	PIT 311	TI 311	TI 321	PDI 321	PI 331	TI 331	PI 332
343	10 to10inWC	40 to 115 F	35 to 75 F	0 to 6 inWC	90 to 110	80 to 220 F	90 to 110psig
Piping	10 (010)))	40 (0 115)	33 (0 73)	0 10 0 11100 0	psig	80 10 220 1	30 to 110p3ig
					. 0		
Gas	T 341	PI 341	TI 342	PI 342	TE 343	PI 343	
	0 to 220 F	90 to 110	115 to 155 F	90 to 110 psig	33 to 45 F	90 to 110	
Piping		psig				psig	
Gas	T 351	PI 351	Check	LI 721	LI 231	LI 741	
Piping 65	5 to 90 F	88 to 15 psig	Indicators				

PERSONNEL PRESENT:

Name	Affiliation	Phone Number/Email					

LOYD RAY FARMS INSPECTION, OPERATIONS & MAINTENANCE LOG SHEET

IMPORTANT: AN INSPECTION, OPERATIONS & MAINTENANCE LOG SHOULD BE COMPLETED FOR EVERY SITE VISIT; PLEASE REVIEW PREVIOUS LOG ENTRY AND PROVIDE INFORMATION TO UPDATE OR RESOLVE ANY ONGOING ISSUES NOTED (INCLUDING BUT NOT LIMITED TO MAINTENANCE, REPAIRS, OR CORRECTIVE ACTIONS).

Entry Made By: Mar		Monday 1-2018	Remote monitor Sta 7:00 AM Site Visit start 3:00	11	emote Monitor End: 1:30PM te Visit end 5:15 PM			
Condition: Temperat to 56	ure 44 x 🗆 (Cloudy and rain						
Precip Last 24Hrs.	0.7 inches		Wind: (mph): calm 5	6-8 mph				
•								
PURPOSE OF VISIT/ITE	MS INSPECTED,	OPERVATIONS						
Site visit to do a sys	stem check The G	Gravity Flare is o	off. System was work	ing but co	mputer was down			
again. Rebooted it		•	•		putouo uo			
again Resource it	again checked i	cam viewer wit	ar name, at nome					
ENVIRONMENTAL SYS	TEM OBSERVATI	ONS:						
Equipment Observed			Operational Status					
Fluidyne Aeration Sys								
Jet Motive Pump	S		□ Auto □ Hand On □ Off □ In Fault					
Blower								
			□ Auto □ Hand On □ Off □ In Fault:					
CP-1 (Control Par	nel)		□ Auto □ Hand On □ Off □ In Fault					
Flush Pumps			☐ Auto ☑ Hand On ☐ Off ☐ In Fault					
Digester Mixing Pump	os		⊠ Auto ☐ Hand Or	n 🗆 Off	☐ In Fault			
CP-1 DATA & SET POIN	-	Commont	Mandified Cat Dt	Notes				
Cycles Static	Set Point 60	Current 60	Modified Set Pt	Notes				
Anoxic	90	90						
Arobic	180	180						
Blower		l						
Jet Motive Pumps	☐ Continuous	⊠ Cycle	#4 - - - #2					
•	☐ Continuous		mp #1					
Digester Pumps	☐ Continuous	⊠ Both □ Sec	quential					
MOTOR DATA:								
Aerobic	Run Tim	ne Set Spe	ed Notes					

60Hz

60Hz

Jet Motive Pump # 1
Jet Motive Pump # 2

Blower	30Hz	
Anaerobic		
Mixing Pump 4A	60 Hz	
Mixing Pump 4B	60 Hz	

BIOGAS & POWER SYSTEMS OBSERVATIONS:

Equipment Observed:	Operational Sta	Operational Status							
Unison Gas Skid	Flow Rate	Total Flow	Comp. Press.	Outlet Press.	Gauge Press.				
Fault? □ Yes ☒ No	20.9								
Microturbine	Speed	Exit Temp	Inlet Pressure	Inlet Temp	Power Out				
Fault? □ Yes ☒ No	95852	1174		99	43.7 kw				
Biogas System	BlueSens%	Flare On	Flare Flow	Total Flow	Flare Temp				
		⊠Y□N	31.2	29.1	301				

UNISON GAS CONDITIONING LOG

Pressure	PIT 311	PIT 331	PIT 351	Pressure	Panel	HM 331	
Data	-5 to 10 inWC	88 to 110psig	88 to 110 psig	Differential	Door	Hours	
Data	-0.1	97.39	91.8	2.0	D 00.	7060	
Temperature	TE 141	TE 311	TE 321	TE 331	TE 341	TE 342	TE 31
Data	32 to 45 F	40 to 115 F	35 to 75 F	80 to 220 F	33 to 45 F	65 to 90 F	35 to 115 F
Data	35.1	83.1	46.6	186.5	35.2	88.3	
Glycol	TI 141	PI 141	FI 141	TI 142	PI 142	TI 111	PI 111
Piping	32 to 45 F	35 to 52 psig	2.5 to 3.5 gpm	35 to 50 F	33 to 50 psig	38 to 52 F	30 to 48 psig
Oil	PI 231	TI 231	PI 232	TI 232	PI 233	TI 233	PI 234
Piping	90 to 110 psig	178 to 215 F	85 to 105 psig	130 to 180 F	80 to 100 psig	168 to 185 F	78 to 100psig
Gas	PIT 311	TI 311	TI 321	PDI 321	PI 331	TI 331	PI 332
Piping	-10 to10inWC	40 to 115 F	35 to 75 F	0 to 6 inWC	90 to 110 psig	80 to 220 F	90 to 110psig
Gas	TI 341	PI 341	TI 342	PI 342	TE 343	PI 343	
Piping	80 to 220 F	90 to 110 psig	115 to 155 F	90 to 110 psig	33 to 45 F	90 to 110 psig	
Gas Piping	TI 351 65 to 90 F	PI 351 88 to 15 psig	Check Indicators	LI 721	LI 231	LI 741	

PERSONNEL PRESENT:

Name	Affiliation	Phone Number/Email

APPENDIX B – Sample Collection Dataset (Digitally Attached)

January 31, 2019

Appendix B.

Wastewater Sample Reports

Karnersville, North Carolina 27284 _____2018

Cavanaugh & Associates
530 N. Trade Street Ste 205
Winston-Salem, NC 27101
Attention: Kevin Harward/AP

Research & Analytical Laboratories, Inc.

TERMS: NET 30
"PAST DUE INVOICES ACCRUE
INTEREST AT 1 ½ % INTEREST PER
MONTH UNTIL PAID
SHOULD COLLECTION BE REQUIRED,
CUSTOMER AGREES TO PAY
ALL EXPENSES INCURRED INCLUDING
ATTORNEY'S FEES"

RE: _____

INVOICE NO. 15080M Post Office Box 473 Phone: 336/996-2841 Samples collected 08/17/18 TEST # 134 Copper, Tot (01042) 54900-01 54900-02 54900-03 TOTAL Copper, Tot (01042) ANALYSES 3 15.00 45.00 TEST # 192 Zinc, Tot (01092) 54900-01 54900-02 54900-03 TOTAL Zinc, Tot (01092) ANALYSES 3 15.00 45.00 TEST # 73 Phos, Tot (00665) 54900-01 54900-02 54900-03 TOTAL Phos, Tot (00665) ANALYSES 3 16.00 48.00 TEST # 81 TSS (00530) _____ 54900-01 54900-02 54900-03 TOTAL TSS (00530) ANALYSES 3 15.00 45.00 TEST # 70 pH 54900-01 54900-02 54900-03 TOTAL pH (00400) ANALYSES 3 5.00 15.00 TEST # 10 Fec Coli-MPN (31615) _____ 54900-01 54900-02 54900-03 TOTAL Fec Coli-MPN (31615) ANALYSES 3 16.00 48.00 TEST # 50 NH-3-N (00610) 54900-01 54900-02 54900-03 TOTAL NH-3-N (00610) ANALYSES 3 15.00 45.00 Analysis of three (3) samples for: Total Nitrogen
@ \$30.00/sample 90.00 381.00 TOTAL INVOICE



Report of Analysi

9/18/201



For: Cavanaugh & Associates

530 N. Trade Street, Suite 205 Winston-Salem, NC 27101

Attn: Marvin Cavanaugh

Client Sample ID:

Influent

Site:

Cavanaugh & Assoc

Lab Sample ID: 54900-01

Collection Date: 8/17/2018

10:30

<u>Parameter</u>	<u>Method</u>	Result	<u>Units</u>	Rep Limit	Analyst	Analysis Date/	<u>Time</u>	
Ammonia Nitrogen	SM 4500 NH3 D-1997	1170	mg/L	0.1	FK	9/6/2018		
Copper, Total	EPA 200.7	0.714	mg/L	0.005	JF	8/22/2018		
Fecal Coliform - MPN	SM 9221 C E-2006	>160000000	MPN/100ml	2	BJ	8/17/2018	1530	
Nitrate + Nitrite	SM 4500 NO3 E-2000	0.357	mg/L	0.05	DW	9/11/2018		
рН	SM 4500 H+B-2000	7.21	Std. Units		AP	8/17/2018	1641	
Total Kjedjahl Nitrogen	SM 4500 N Org B (NH3 D- 1997)	1340	mg/L	0.1	FK	9/10/2018		
Total Nitrogen	Calc	1340	mg/L	1				
Total Phosphorous	SM 4500 P E-1999	142	mg/L	0.05	BJ	8/22/2018		
Total Suspended Solids (TSS)	SM 2540 D-1997	1060	mg/L	5	AW	8/21/2018		
Zinc, Total	EPA 200.7	4.41	mg/L	0.01	JF	8/22/2018		

Client Sample ID:

Digester

Site:

Cavanaugh & Assoc

Lab Sample ID: 54900-02

Collection Date: 8/17/2018 10:40

Parameter Method Result Units Rep Limit Analyst Analysis Date/Time Ammonia Nitrogen SM 4500 NH3 D-1997 1890 mg/L 9/6/2018 Copper, Total EPA 200.7 15.1 mg/L 0.005 JF 8/22/2018 Fecal Coliform - MPN SM 9221 C E-2006 460 MPN/100ml BJ 8/17/2018 1530 Nitrate + Nitrite SM 4500 NO3 E-2000 < 0.05 mg/L 0.05 DW 9/11/2018 pH SM 4500 H+B-2000 8.08 Std. Units AP 8/17/2018 1644

P.O. Box 473 106 Short Street Kernersville, North Carolina 27284

Tel: 336-996-2841

Fax: 336-996-0326

www.randalabs.com

Page 1



RESEARCH & Analytical Laboratories, Inc.

Report of Analysis

Client Sample ID: Digester

Lab Sample ID: 54900-02

Site:

Cavanaugh & Assoc

Collection Date: 8/17/2018

10:40

<u>Parameter</u>	Method	Result	<u>Units</u>	Rep Limit	Analyst	Analysis Date/Time
Total Kjedjahl Nitrogen	SM 4500 N Org B (NH3 D- 1997)	2920	mg/L	0.1	FK	9/7/2018
Total Nitrogen	Calc	2460	mg/L	1		
Total Phosphorous	SM 4500 P E-1999	2460	mg/L	0.05	BJ	8/22/2018
Total Suspended Solids (TSS)	SM 2540 D-1997	50000	mg/L	5	AW	8/22/2018
Zinc, Total	EPA 200.7	103	mg/L	0.01	JF	8/22/2018

Client Sample ID:

Site:

Effluent

Cavanaugh & Assoc

Lab Sample ID: 54900-03

Collection Date: 8/17/2018

11:00

<u>Parameter</u>	Method	Result	<u>Units</u>	Rep Limit	Analyst A	Analysis Date	/Time
Ammonia Nitrogen	SM 4500 NH3 D-1997	689	mg/L	0.1	FK	9/6/2018	
Copper, Total	EPA 200.7	0.088	mg/L	0.005	LP	8/29/2018	
Fecal Coliform - MPN	SM 9221 C E-2006	1400000	MPN/100ml	2	ВЈ	8/17/2018	1530
Nitrate + Nitrite	SM 4500 NO3 E-2000	0.270	mg/L	0.05	DW	9/11/2018	
рН	SM 4500 H+B-2000	8.23	Std. Units		AP	8/17/2018	1648
Total Kjedjahl Nitrogen	SM 4500 N Org B (NH3 D- 1997)	1080	mg/L	0.1	FK	9/7/2018	
Total Nitrogen	Calc	1080	mg/L	1			
Total Phosphorous	SM 4500 P E-1999	62.2	mg/L	0.05	ВЈ	8/22/2018	
Total Suspended Solids (TSS)	SM 2540 D-1997	848	mg/L	5	AW	8/21/2018	
Zinc, Total	EPA 200.7	0.489	mg/L	0.01	LP	8/29/2018	



RESEARCH & ANALYTICAL LABORATORIES, INC. Analytical / Process Consultations Phone (336) 996-2841

CHAIN OF CUSTODY RECORD

					3 330								WATER / W	ASTEWATE	R MISC.
COMPANY CA JA WAL STREET ADDRESS	16H E	+A55	50,	PA	-		JOB N	ê F					///////////////////////////////////////	//	
STREET ADDRESS					-	1 12	PROJ	ECT				/_/		[ž]	
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11), 2/5 700/	51)	- 0	110		71	01	SAIVIP	CER NAME (PLEASE PRINT)	ERS		8	8/	\2\2\2\2\2\2\2\2\2\2\2\2\2\2\2\2\2\2\2		
CONTACT	VAL	-111	PHO	NE	//	01	SAMP	LER SIGNATURE	- IAIN		12/3	18/6] §	
maria		m :10	336	118	42	04	M	LER NAME (PLEASE PRINT) BY A CALAN RUGHL LER SIGNATURE SAMPLE LOCATION / I.D.	OF CONTAINERS		18/3/		\&\&\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	20/	
SAMPLE NUMBER	TATE	42 C107	ooup op	TEMP	RES	CHLORINE	SAMPLE		— _Р	1/3	0/5/5	\$ 2	0/0/0/0/0/0/		
(LAB USE ONLY)	DATE	TIME	COMPIGRA	δ.C	(mg/L)	(Y or N)	(S or W)		Š	/		\$/ * /	~/~/~/~/6/		REQUESTED ANALYSIS
5 SONRES	8/17/16	16:3	OA	5	491	000	1	INFLUENT							TOF N
	99/			-											TKN
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								SAMPLE TEMPERATURE AT R	ECEIP	rΞ	30				*
													Feb 26 20	19	OFFICIAL COPY

Research & Analytical Laboratories, Inc.

PO Box 473

Kernersville, NC 27285

Phone 336.996.2841 Fax 336.996.0326

Email: info@randalabs.com

Date: December 27, 2018

INVOICE

Bill To:

Cavanaugh & Associates 530 N. Trade Street, Suite 205 Winston Salem, NC 27101

Attention: Accounts Payable

	DESCRIPTION		AMOU	T
Project: LRF				
Samples collected: 11/20/1	8			
Analysis of three (3) sample	es for:			
Ammonia Nitrogen Copper, Total Fecal Coliform- MPN Nitrate + Nitrite PH Total Kjedjahl Nitrogen Total Phosphorous Total Suspended Solids Zinc, Total	\$20.00/sample \$20.00/sample \$20.00/sample \$20.00/sample \$10.00/sample \$20.00/sample \$15.00/sample \$20.00/sample		\$	60.00 60.00 60.00 30.00 60.00 60.00 45.00 60.00
		TOTAL INVOICE	\$	495.00

Make all checks payable to: Research & Analytical Laboratories, Inc.

TERMS: NET 30

"Past due invoices accrue interest at 1 1/2% interest per month until paid, should collection be required, customer agrees to pay all expenses incurred including attorney fees."



Report of Analysis

12/20/201

For: Cavanaugh & Associates

530 N. Trade Street, Suite 205 Winston-Salem, NC 27101

Attn: Kevin Harward

Client Sample ID: Influent

Site:

Cavanaugh & Assoc

Lab Sample ID: 59394-01

Collection Date: 11/20/2018 10:00

<u>Parameter</u>	Method	Result	<u>Units</u>	Rep Limit	Analyst	Analysis Date	/Time
Ammonia Nitrogen	SM 4500 NH3 D-1997	1770	mg/L	0.1	FK	12/17/2018	
Copper, Total	EPA 200.7	1.65	mg/L	0.1	SK	11/26/2018	
Fecal Coliform - MPN	SM 9221 C E-2006	330000	MPN/100ml	2	BJ	11/20/2018	1710
Nitrate + Nitrite	SM 4500 NO3 E-2000	<0.05	mg/L	0.05	DW	11/27/2018	
рН	SM 4500 H+B-2000	7.29	Std. Units		LP	11/20/2018	1550
Total Kjedjahl Nitrogen	SM 4500 N Org B (NH3 D- 1997)	2430	mg/L	0.1	FK	12/17/2018	
Total Nitrogen	Calc	2430	mg/L	0.1			
Total Phosphorous	SM 4500 P E-1999	481	mg/L	0.05	ВЈ	11/21/2018	
Total Suspended Solids (TSS)	SM 2540 D-1997	3620	mg/L	5	LP	11/26/2018	
Zinc, Total	EPA 200.7	9.64	mg/L	0.2	SK	11/26/2018	



Report of Analysis

12/20/2018

For: Cavanaugh & Associates

530 N. Trade Street, Suite 205 Winston-Salem, NC 27101

Attn: Kevin Harward

Client Sample ID: Digester

Site:

Cavanaugh & Assoc

Lab Sample ID: 59394-02

Collection Date: 11/20/2018 10:15

<u>Parameter</u>	Method	Result	<u>Units</u>	Rep Limit	Analyst	Analysis Date	/Time
Ammonia Nitrogen	SM 4500 NH3 D-1997	2280	mg/L	0.1	FK	12/17/2018	
Copper, Total	EPA 200.7	9.42	mg/L	0.1	SK	11/26/2018	
Fecal Coliform - MPN	SM 9221 C E-2006	>1600000000	MPN/100ml	2	BJ	11/20/2018	1710
Nitrate + Nitrite	SM 4500 NO3 E-2000	0.056	mg/L	0.05	DW	11/27/2018	
pH	SM 4500 H+B-2000	6.73	Std. Units		LP	11/20/2018	1553
Total Kjedjahl Nitrogen	SM 4500 N Org B (NH3 D- 1997)	2900	mg/L	0.1	FK	12/17/2018	
Total Nitrogen	Calc	2900	mg/L	0.1			
Total Phosphorous	SM 4500 P E-1999	1140	mg/L	0.05	ВЈ	11/21/2018	
Total Suspended Solids (TSS)	SM 2540 D-1997	22900	mg/L	5	LP	11/26/2018	
Zinc, Total	EPA 200.7	58.8	mg/L	0.2	SK	11/26/2018	



Report of Analysis

12/20/2018

For: Cavanaugh & Associates

530 N. Trade Street, Suite 205 Winston-Salem, NC 27101

Attn: Kevin Harward

Client Sample ID: Effluent

Site:

Cavanaugh & Assoc

Lab Sample ID: 59394-03

Collection Date: 11/20/2018 10:30

Parameter	Method	Result	<u>Units</u>	Rep Limit	<u>Analyst</u>	Analysis Date/Time
Ammonia Nitrogen	SM 4500 NH3 D-1997	702	mg/L	0.1	FK	12/17/2018
Copper, Total	EPA 200.7	0.334	mg/L	0.1	SK	11/26/2018
Fecal Coliform - MPN	SM 9221 C E-2006	33000000	MPN/100ml	2	ВЈ	11/20/2018 1710
Nitrate + Nitrite	SM 4500 NO3 E-2000	<0.05	mg/L	0.05	DW	11/27/2018
рН	SM 4500 H+B-2000	8.17	Std. Units		LP	11/20/2018 1555
Total Kjedjahl Nitrogen	SM 4500 N Org B (NH3 D- 1997)	972	mg/L	0.1	FK	12/17/2018
Total Nitrogen	Calc	972	mg/L	0.1		
Total Phosphorous	SM 4500 P E-1999	215	mg/L	0.05	ВЈ	11/21/2018
Total Suspended Solids (TSS)	SM 2540 D-1997	1300	mg/L	5	LP	11/26/2018
Zinc, Total	EPA 200.7	2.32	mg/L	0.2	SK	11/26/2018



Research & Analytical Laboratories, Inc.

CHAIN OF CUSTODY RECORD

Analytical / Process Consultations Phone (336) 996-2841

1 110110	10007 000-2041		WATER / WASTEWATER MISC.
COMPANY CAVANAUS STREET ADDRESS PO DOX 11	1	JOB NO.	
STREET ADDRESS	- ASSOC.		
PO DOY 11	197	PROJECT LB /- SAMPLER NAME (PLEASE PRINT) BC 17 / TOXXO	
CITY, STATE, ZIP	, ,	SAMPLED NAME (DI/EASE DDINT)	
W-5 NO	27116	Bevin Howard	
CONTACT	PHONE	SAMPLER SIGNATURE	
Keyin Harvary	336-930-0/62	12/6/	
CITY, STATE, ZIP W-S CONTACT Kevin Harvar SAMPLE NUMBER (LAB USE ONLY) DATE	THE COURSE TEMP RES CHLORINE	SAMPLE	No. of Containers REQUESTED ANALYSIS
(LAB USE ONLY)	TIME COMP GRAB TEMP CI (mg/L) CHLORINE REMOVED (Y or N)		9 / 8/8/8/2/2/2/2/3/
5939401 1/20	10:00	Influent	REQUESTED ANALYSIS
18			TISV
			NOZ + NOZ Phosphorus T NH-3-N Fec Col. Coppe T 2ncT TSS
N	10:15	Discote	Phosphorus I
			NH-3-N
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January 31, 2019

Appendix C.

Soil Sample Reports

Report No. FY19-SL009269

	Re	port No). FY	19-SL	.009269							
FY19-SL009269				ons.	s E 7	5					70 rm Above Optimum	f. f. filizer dop.
Report No.	Advisor:	Advisor ID:		K Fertilizer Recommendation Application at the	ve. Common target pH value wering plants; and 6.5 for osphorus (P-I) and potassiu	South Bullian Britain On Inc.	N-P-K Fertilizer Recommendations*	5 lbs per 1000 sq ft 21-0-0 Group D			Below Optimum Optimum Above Optimum	orrmended here, choose or in the læt page of this repor ure nitrogen (N) levels. N fe on needs of the designated
ronomiv	Loyd Bryant Loyd Ray Farms Inc 2049 Center Rd. Boonville, NC 27011	Sampled County: Yadkin 205223		This report provides Test Results and Recommendations for each sample submitted for testing. Look for Lime Recommendations and N-P-K Fertilizer Recommendations. The lime recommendation is always listed next to the first crop and will be based on the higher target pH if the pH targets for crop 1 and crop 2 differ. Application at the	indicated rate will raise soil pH to the optimal level for the plant you specified and should be sufficient for 2 to 3 years, depending on soil type. Common target pH values are as follows: 5.0 for azalea, camella, rhodod endron and mt. laurel; 5.5 for centiped egrass; 6.0 for other lawn grasses, shrubbery, and; flowering plants; and 6.5 for vegetable gardens. NP-K Recommendations are based on the nitrogen (N) needs of the plants being grown and the soil test results for phosphorus (P-I) and potassium (Recommendations are based on the nitrogen (N) needs of the plants and adjust the soil test results for phosphorus (P-I) and potassium (Recommendations).	and adjust the land accordingly. The	N-P-K Fertilizer	5 lbs per 1000 s	Phosphorus Index (P-I) =87	Potassium Index (K4) =535		"If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report. Note: This sall test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.
Website: www.ncagr.gov/agronomi/	Client:	Client		nitted for testing. Look for d on the higher target pH	d should be sufficient for hippedegrass; 6.0 for othe eds of the plants being grades of the plants being grades.	formation.	Lime Recommendations	0.0 lb per 1,000 sq ft 0.0 lb per 1,000 sq ft			8.0	Cu-l S-l 147 36
	Mehlich-3 Extraction	: 11/01/2018 Farm: 2094		for each sample subnit crop and will be base	plant you spedified and mit laurel; 5.5 for certon the nitrogen (N) new	n and links to helpful in	기	00	Opfimum	pH range	5.8 6.5	Mn-1 Zn-1 153 616
Phone: (919) 733-2655	Predictive Home & Garden Soil Report	Links to Helpful Information Received: 10/22/2018 Completed:		and Recommendations by slisted next to the first	indicated rate will raise soil pH to the optimal level for the are as follows: 5.0 for azalea, camellia, rhodod endron an vegetable gardens. N-P-K Recommendations are based of the action of the avent of the solution of the avent of the solution.	Report" (last page of this report) for additional explanation and links to helpful information		Crop 1- Lawn (not centip.) Crop 2-	Test Results:	pH = 7.1	3.0	W/V CEC 1.07 10.7 g/cm ³ meq/100 cm
NCDA&CS Agronomic Division	Predictive	Linkste	Comments:	owdes Test Results immendation is alwa	will raise soil pH to s: 5.0 for azalea, can dens. N-P-K Recom 70 index for althoris	page of this report) f		Crop 2-	Test			Soil Class HM% Mineral 0.41
NCDA&CS Agr		Sumpled	Agronomist's Comments:	This report pri	are as follows vegetable gan	Report" (last p	Sample ID: 2		Lime History:		Loyd Bryant	Additional Test Results:

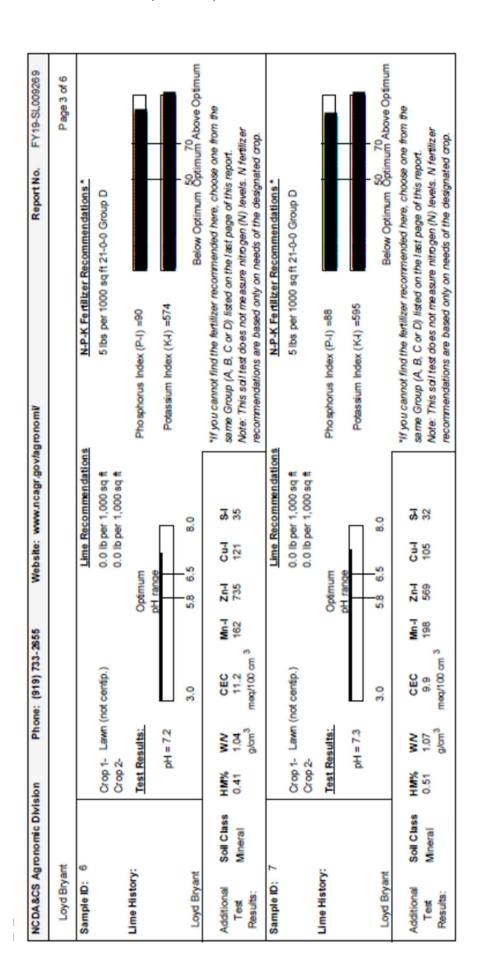
Reprogramming of the laboratory-information-management system that makes this report possible is being funded through a grant from the North Carolina Tobacco Trust Fund Commission.

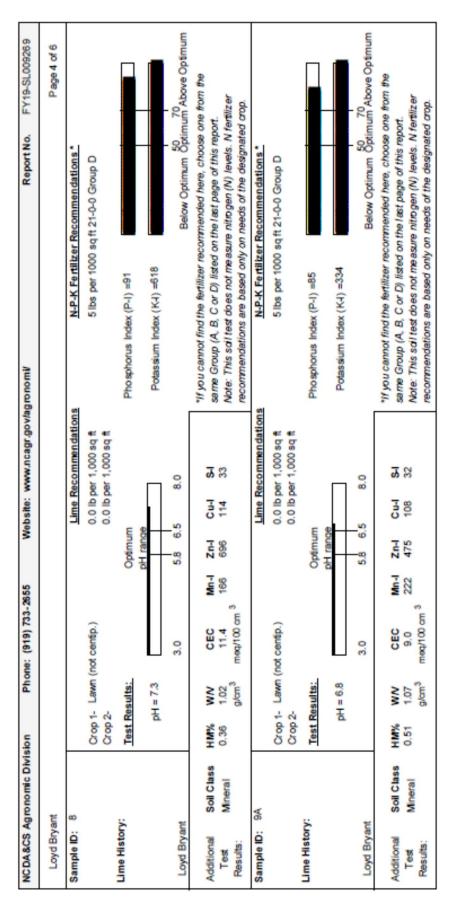
Thank you for using agronomic services to manage nutrients and safeguard environmental quality.

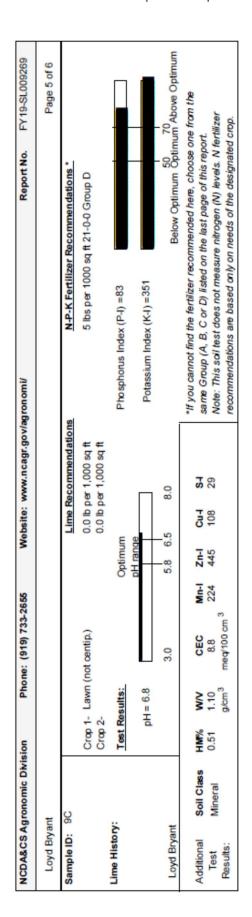
Steve Troxler, Commissioner of Agriculture



NCDA&CS A	NCDA&CS Agronomic Division	ion	Phon	Phone: (919) 733-2655	2655	×	bsite: v	Website: www.ncagr.gov/agronomi/	gronomi/ Report No. FY19-SL009269
Loyd Bryant	nt								Page 2 of 6
Sample ID:	4						Lime Re	Lime Recommendations	N-P-K Fertilizer Recommendations *
		Crop 1- Crop 2-	Lawn (r	Crop 1- Lawn (not centip.) Crop 2-			0.0 lb pe	0.0 lb per 1,000 sq ft 0.0 lb per 1,000 sq ft	5 lbs per 1000 sq ft 21-0-0 Group D
Lime History:		Test Results:	sults:			Optimum			Phosphorus Index (P-I) =89
		₫	pH = 7.1			DH range			Potassium Index (K-I) =539
Loyd Bryant				3.0		5.8 6.5		8.0	Below Optimum Optimum Above Optimum
Additional Test Results:	Soil Class Mineral	HM% 0.41	W/V 1.08 g/cm ³	CEC 10.7 meq/100 cm ³	Mn-1 150	Zn-1 608	Cu-1	3 58	"If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report. Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.
Sample ID:	5						Lime Re	Lime Recommendations	N-P-K Fertilizer Recommendations *
		Crop 1- Crop 2-	Lawn (r	Crop 1- Lawn (not centip.) Crop 2-			0.0 lb pe	0.0 lb per 1,000 sq ft 0.0 lb per 1,000 sq ft	5 lbs per 1000 sq ft 21-0-0 Group D
Lime History:		Test Results:	snits:			Optimum			Phosphorus Index (P-I) =116
		₫.	pH = 7.5			DH range			Potassium Index (K-I) =643
Loyd Bryant				3.0		5.8 6.5		8.0	Below Optimum Optimum Above Optimum
Additional Test Results:	Soil Class Mineral	HM% 0.46	1.10 g/cm ³	CEC 12.1 meq/100 cm ³	Mn-1 131	Zn-l 1601	Cu-1	36 36	"If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report. Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.



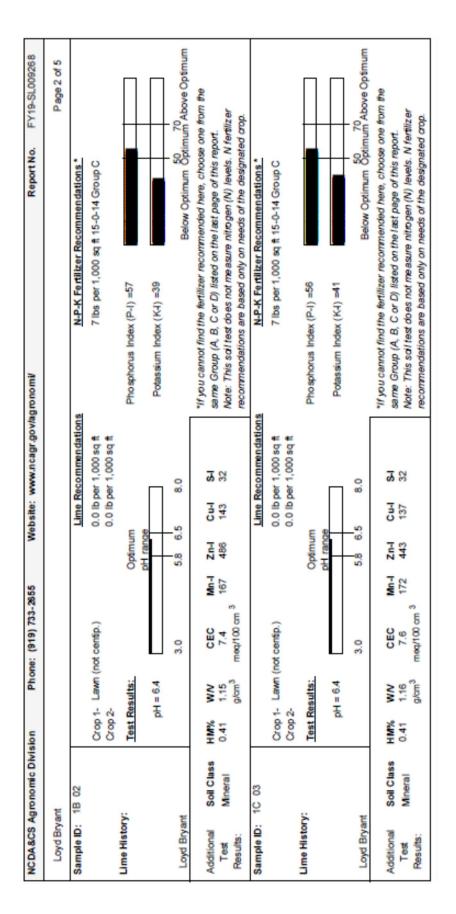


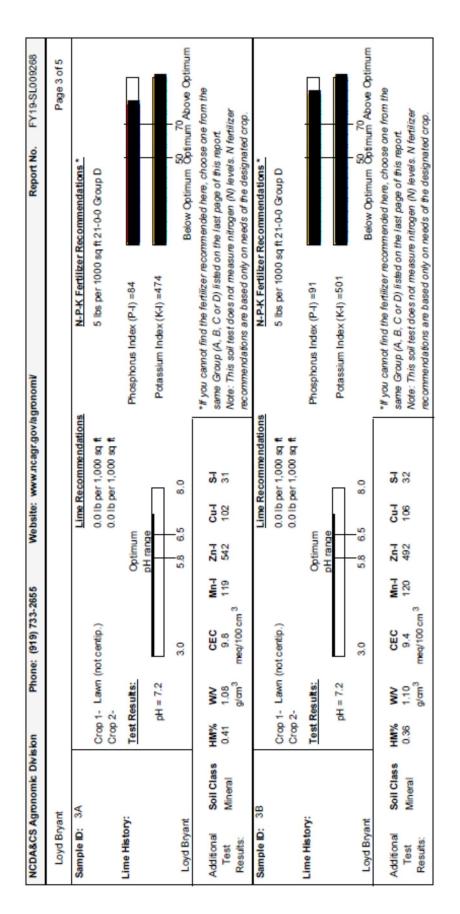


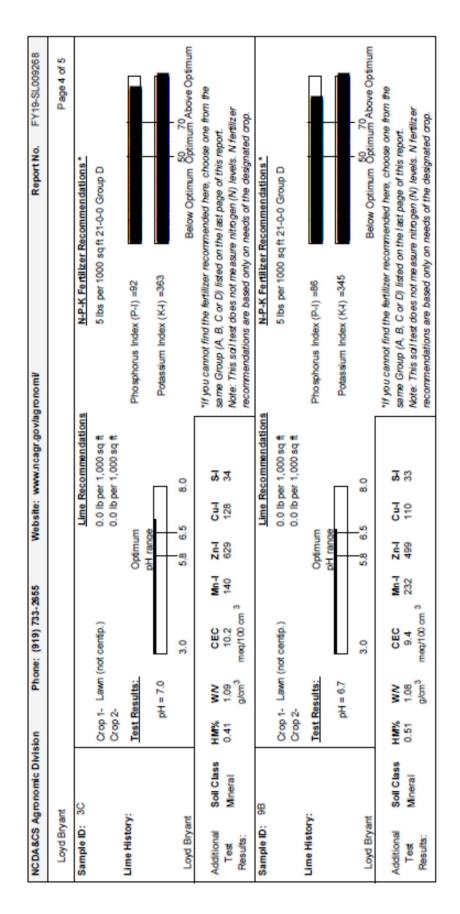
NCDA&CS Agronomic Division Phone: (919) 733-2655 Website: www.ncagr.gov/agronomi/	Report No. FY19-SL009269
Loyd Bryant	Page 6 of 6
Understanding the Soil Report	
<u>Lime</u> Application of lime at the recommended rate will raise soil pH to the optimum range. Do not apply too much lime. When soil pH	Report Abbreviations
becomes too high, lowering it is very difficult. Often, the best solution then is to choose plants that can tolerate a high pH.	CEC cation exchange capacity
Choosing dolomitic lime can be advantageous because it contains the nutrients calcium and magnesium. Pelleted lime is easier to	Cu-l copper index
spread uniformly than powdered lime.	HM% percent humic matter
Lime can be applied at any time of year, but because it reacts slowly, it is best to apply it several months before a new planting.	Mn-I manganese index
Mixing it into the soil will speed the reaction time. Lime applied to the soil surface takes much longer to correct soil pH.	
A surface application should not exceed 60 lb per 1,000 sq ft. If a soil report recommends more than this, apply 60 lb per 1,000 sq ft initially and the rest in similar increments every 6.9 months until the full rate is applied.	S-I sulfur index
Fertilizer	
Soli tests do not measure nitrogen (N) since it is very unstable in solis, the N recommendations provided on the soli report are based on plant needs if soil-test D.I and K.I values are administed (N-D-K).	
fertilizer is recommended if P-I and	with Plant Growth Cycle:
K-I values are less than optimum- Groups A - C below. Although a specific fertilizer grade may be recommended (e.g., 5-10-10), other	Bermidagrass: May July Sept
equivalent options are likely to be available (e.g., any fertilizer in Group A from Table 1).	Centipedegrass: May
	St. Augustine grass: May, August
Tips on Fertilizer Application	Tall fescue: Sept, Nov, Feb
 To determine how much fertilizer to buy, estimate (in feet) the length (L) and width (W) of the area to be treated: L × W = sq.ft. 	Zoysia: May, July
Square on cutives to make estimates easier. If the recommendation is 20 to per 1,000 squrand your area is 5,000 squr, men you need 100 lb (20 × 5) for your 5,000-sq-ft area.	Flowers/shrubs: pnor to planting or during
· Calibrate your spreader according to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle	Vegetables: prior to planting
This cross-hair pattern provides a more uniform application. After application, sweep up any fertilizer on hard surfaces and apply to fertilized areas so rainfall does not carry fertilizer to a storm.	
drain.	
Table 1. Groups of equivalent fertilizers that supply 1 lb of N per 1,000 sq ft *	4 Homeowner's Guide to Entilizer
Group A: low P-I+ low K-I Group B: low P-I+high K-I Group C: high P-I+low K-I Group D: N only	
5-10-5 @ 20 lb	Note 4: Pertilization of Lawns, Gardens & Ornamentals
18-46-0 @ 6 lb 15-0-14 @ 7 lb 21-0-0	
@ 10 lb 18-24-10 @ 6 lb 6-6-18 @ 18 lb 16-0-0	Caring for Your Lawn & Environment
@10 b 9-13-7 @11 lb 5-5-15 @20 lb 28-0-4	Carolina Lawns
8-10-8 @12 lb 9-17-8 @11 lb 10-0-14 @10 lb 12-6-6 @8 lb	Soil Acidity and Liming: Basic
* Since these rales supply 1 lb N per 1.000 so ft. use half the rate if centinede is the grass type.	Information for Farmers & Gardeners

Report No. FY19-SL009268

	- Report is		9-SL009268						
Report No. FY19-SL009268	Advisor: nc 11	Yadkin Advisor ID:	This report provides Test Results and Recommendations for each sample submitted for testing. Look for Lime Recommendations and N-P-K Fertilizer Recommendations. This report provides Test Results and Recommendation state on the first crop and will be based on the higher target pH if the pH targets for crop 1 and crop 2 differ. Application at the indicated rate will raise soil pH to the optimal level for the plant you specified and should be sufficient for 2 to 3 years, depending on soil type. Common target pH values are as follows: 5.0 for azalea, camellia, rhododendron and mt. laurel; 5.5 for centipedegrass; 6.0 for other lawn grasses, shrubbery, and; flowering plants; and 6.5 for vegetable gardens. N-P-K Recommendations are based on the nitrogen (N) needs of the plants being grown and the soil test results for phosphorus (P-I) and potassium (K-I); a 50 to 70 index for either is optimum. If the exact fertilizer cannot be found, find the closest match and adjust the rate accordingly. Refer to "Understanding the Soil Report" (last page of this report) for additional explanation and links to helpful information.	N-P-K Fertilizer Recommendations *	7 lbs per 1,000 sq ft 15-0-14 Group C	ex (P-I) =53	ex (K-I) =41	Below Optimum Optimum Above Optimum	*If you cannot find the fertilizer recommended here, choose one from the same Group (A, B, C or D) listed on the last page of this report. Note: This soil test does not measure nitrogen (N) levels. N fertilizer recommendations are based only on needs of the designated crop.
Website: www.ncagr.gov/agronomi/	Client: Loyd Bryant Loyd Ray Farms Inc 2049 Center Rd. Edion Boonville, NC 27011	Sampled County : Yadkin Client ID: 205223	itted for testing. Look for Lime Recommen don the higher target pH if the pH targets fd should be sufficient for 2 to 3 years, deportipedegrass; 6.0 for other lawn grasses, sticks of the plants being grown and the soil thind the closest match and adjust the rat formation.	Lime Recommendations	0.0 lb per 1,000 sq ft 0.0 lb per 1,000 sq ft	Phosphorus Index (P-I) =53	Potassium Index (K-I) =41	8.0	Cu-l S-l same Group (A, B 135 32 Note: This soil tes recommendations
Phone: (919) 733-2655 Webs	e & Garden DOF † Mehlich-3 Extraction	Il Information 018 Completed: 11/01/2018 Farm: 2094	ecommendations for each sample subrid next to the first crop and will be base imal level for the plant you specified an hododendron and mt. laurel; 5.5 for certions are based on the nitrogen (N) neetin. If the exact fertilizer cannot be foun tional explanation and links to helpful in	<u></u>	Crop 1- Lawn (not centip.) 0. Crop 2- 0.		pH range	3.0 5.8 6.5	CEC Mn-I Zn-I 7.2 165 782 meq/100 cm ³
NCDA&CS Agronomic Division	Predictive Home & Garden Soil Report	Links to Helpful Information Sampled: Received: 10/22/2018 Compl	Agronomist's Comments: This report provides Test Results and Recommendations for each sample submitted for te This report provides Test Results and Recommendations for each sample submitted for te The lime recommendation is always listed next to the first crop and will be based on the hi indicated rate will raise soil pH to the optimal level for the plant you specified and should be are as follows: 5.0 for azalea, camellia, rhododendron and mt. laurel; 5.5 for centipedegras vegetable gardens. N-P-K Recommendations are based on the nitrogen (N) needs of the p (K-I); a 50 to 70 index for either is optimum. If the exact fertilizer cannot be found, find the Report" (last page of this report) for additional explanation and links to helpful information.	Sample ID: 1A 01		Lime History: Test Results:	pH = 6.4	Loyd Bryant	Additional Soil Class HM% W/V Test Mineral 0.41 1.12 Results: g/cm³







Understanding the Soil Report Line describes the service of the s	Tropyed value of the state of t	Website: www.ncagr.gov/agronom/		Report No. FY1	FY19-SL009255
toum the seed	Loyd Bryant				Page 5 of 5
tonmin tonmin	Understanding the Soil Report				
to the seed to to	<u>Lime</u> Application of lime at the recommended rate will raise soil pH to the optimum range. Do not appli	y too much lime. When soil pH	Report Ab	breviations	
to to the seed of	becomes too high, lowering it is very diffault. Often, the best solution then is to choose plants that	can tolerate a high pH.	CEC	cation exchange cap	pacity
toum toum	Choosing dolomific lime can be advantageous because it contains the nutrients calcium and ma	gnesium. Pelleted lime is easier to	Cu-l	copper index	
to de	spread uniformly than powdered lime.		₩W₩	percent humic matte	be
to de	Lime can be applied at any time of year, but because it reacts slowly, it is best to apply it severa	I months before a new planting.	Mn-I	manganese index	
to go o	Mixing it into the soil will speed the reaction time. Lime applied to the soil surface takes much long	er to correct soil pH.	Hd	Hd lios	
to do not	A surface application should not exceed 60 lb per 1,000 sq ft. If a soil report recommends more	than this, apply 60 lb per 1,000 sq ft	<u>۳</u>	sulfur index	
be to	intally and the rest in similar increments every 5-9 months until the full rate is applied.		100	soluble sart index	
ton die ee	Fertilizer		Zu-l	zinc index	
	Soil tests do not measure nitrogen (N) since it is very unstable in soils; the N recommendations	provided on the soil report are based			
P-1 and mum- Groups A - C below. Although a specific fertilizer grade may be recommended (e.g., 5-10-10), other to be available (e.g., any fertilizer in Group A from Table 1). Infertilizer to buy, estimate (in feet) the length (L) and width (W) of the area to be treated: L × W = sq ft. estimates easier. If the recommendation is 20 lb per 1,000 sq ft and your area is 5,000 sq ft, then you our 5,000-sq-ft area. Seconding to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. our 5,000-sq-ft area. Seconding to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. our 5,000-sq-ft area. Seconding to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. our 5,000-sq-ft area. Seconding to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. our 5,000-sq-ft area. Seconding to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. our 5,000-sq-ft area. Seconding to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. Seconding to manufacturer settings. Apply half the total rate if county for the grass type.	on plant needs. If soil-test P-I and K-I values are adequate (>50), only nitrogen is recommended-	Group D below. A mixed (N-P-K)	Time Ferti	lizer Application to Co	incide
mum- Groups A C below. Although a specific fertilizer grade may be recommended (e.g., 5-10-10), other to be available (e.g., any fertilizer in Group A from Table 1). In the first set of the feeth of the length (L) and width (W) of the area to be treated: L × W = sq. ft. are setting the feeth of the length (L) and width (W) of the area to be treated: L × W = sq. ft. our 5,000-sq-ft area. Seconding to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. Ovides a more uniform application. Substituting the feeth of the feeth	fertilizer is recommended if P-1 and		with Plant	Growth Cycle:	
to be available (e.g., any fertilizer in Group A from Table 1). In fertilizer to buy, estimate (in feet) the length (L) and width (W) of the area to be treated: L × W = sq ft. as estimates easier. If the recommendation is 20 lb per 1,000 sq ft and your area is 5,000 sq ft, then you our 5,000-sq-ft area. according to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. according to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. ovides a more uniform application. and for the sample of the set of a point of the total rate in one direction; apply the rest at a 90° angle. The up any fertilizer on hard surfaces and apply to fertilized areas so rainfall does not carry fertilizer to a storm any fertilizer on hard surfaces and apply to fertilized areas so rainfall does not carry fertilizer to a storm fertilizers that supply 1 lb of N per 1,000 sq ft. Group B: low P-1 + high K-1 Group C: high P-1 + low K-1 Group D: Nonh 5-10-5 @ 20 lb 8-0-24 @ 12 lb 15-0-0 @ 5 lb 18-0-0 @	K-I values are less than optimum- Groups A - C below. Although a specific fertilizer grade may be	recommended (e.g., 5-10-10), other	Bermudag	rass: May, July, Sept	
in fertilizer to buy, estimate (in feet) the length (L) and width (W) of the area to be treated: L × W = sq ft. a estimates easier. If the recommendation is 20 lb per 1,000 sq ft and your area is 5,000 sq ft, then you our 5,000-sq-ft area. according to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. ovides a more uniform application. The per 1,000 sq ft is easier. If the recommendation is 20 lb broad areas so rainfall does not carry fertilizer to a storm any fertilizer on hard surfaces and apply to fertilized areas so rainfall does not carry fertilizer to a storm any fertilizer that supply 1 lb of N per 1,000 sq ft. Group B: low P-I + high K-I Group C: high P-I + low K-I Group D: N only 5-10-5 @ 20 lb 8-0-24 @ 12 lb 15-0-0 @ 5 lb 18-46-0 @ 6 lb 15-0-14 @ 7 lb 16-0-0 @ 6 lb 18-24-10 @ 6 lb 6-6-18 @ 18 lb 16-0-0 @ 6 lb 9-13-7 @ 11 lb 5-5-15 @ 20 lb 28-0-4 @ 4 lb 9-17-8 @ 11 lb 10-0-14 @ 10 lb 12-6-6 @ 8 lb 10-0-14 @ 10 lb N per 1,000 sq ft, use half the rate if centipede is the grass type.	equivalent options are likely to be available (e.g., any fertilizer in Group A from Table 1).		Centipede	grass: May	
in fertilizer to buy, estimate (in feet) the length (L) and width (W) of the area to be treated: L × W = sq ft. a estimates easier. If the recommendation is 20 lb per 1,000 sq ft and your area is 5,000 sq ft, then you our 5,000-sq-ft area. according to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. ovides a more uniform application. The per 1,000 sq ft is easier. If the recommendation is 20 lb broad areas so rainfall does not carry fertilizer to a storm any fertilizer on hard surfaces and apply to fertilized areas so rainfall does not carry fertilizer to a storm any fertilizers that supply 1 lb of N per 1,000 sq ft. Group B: low P-I + high K-I Group C: high P-I + low K-I Group D: N on N 5-10-5 @ 20 lb 8-0-24 @ 12 lb 15-0-0 @ 5 lb 16-0-0 @ 5 lb 18-24-10 @ 6 lb 15-0-14 @ 7 lb 16-0-0 @ 6 lb 16-0-0 @ 6 lb 15-0-14 @ 7 lb 16-0-0 @ 6 lb 16-0-14 @ 10 lb 12-6-6 @ 8 lb 17-8 @ 11 lb 10-0-14 @ 10 lb 12-6-6 @ 8 lb 12-6-6 @ 8 lb 11-6-0-14 @ 10 lb N per 1,000 sq ft, use half the rate if centipede is the grass type.	The second secon		St. August	ine grass: May, August	
e estimates easier. If the recommendation is 20 lb per 1,000 sq ft and your area is 5,000 sq ft, then you our 5,000-sq-ft area. according to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. Solides a more uniform application. The per 1,000 sq ft use half the recommendation is 20 lb ber 1,000 sq ft and your area is 5,000 sq ft, then you our 5,000-sq-ft area. Solides a more uniform application. The per 1,000 sq ft use half the recommendation is 20 lb ber 1,000 sq ft. The per 1,000 sq ft use half the rate if centipede is the grass type.	To determine hours on the feedings to have confined to feed the bonds (1) and until (MA of the	the books and the second of the second	Tall fescue	Sept, Nov, Feb	
our 5,000-sq-flanes. according to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. Solvides a more uniform application. up any fertilizers that supply 1 lb of N per 1,000 sq ft.* Group B: low P-I + high K-I Group D: N only 5-10-5 @ 20 lb 18-46-0 @ 6 lb 15-0-14 @ 7 lb 16-0-0 @ 6 lb 9-13-7 @ 11 lb 5-5-15 @ 20 lb 9-17-8 @ 11 lb 10-0-14 @ 10 lb 12-6-6 @ 8 lb lb N per 1,000 sq ft, use half the rate if centipede is the grass type.	Square of Curves to make estimates easier if the recommendation is 20 th part 1000 soft and	work area is 5,000 so f. then you	Zoysia: Mis	ay, July	
according to manufacturer settings. Apply half the total rate in one direction; apply the rest at a 90° angle. Solvides a more uniform application. The part fertilizers that supply 1 ib of N per 1,000 sq ft. Group B: low P-I + high K-I F-10-5 @ 20 lb F-10-5 @ 20 lb F-10-6 @ 5 lb F-10-6 @ 5 lb F-10-7 @ 11 lb F-5-15 @ 20 lb F-10-6 @ 8 lb F-10-7 @ 11 lb F-5-15 @ 20 lb F-10-6 @ 8 lb F-10-7 @ 11 lb F-5-15 @ 20 lb F-10-6 @ 8 lb F-10-7 @ 11 lb F-10-14 @ 10 lb F-10-6 @ 8 lb F-10-7 @ 11 lb F-10-14 @ 10 lb F-10-6 @ 8 lb F-10-7 @ 11 lb F-10-14 @ 10 lb F-10-6 @ 8 lb F-10-7 @ 11 lb F-10-14 @ 10 lb F-10-6 @ 8 lb F-10-7 @ 11 lb F-10-14 @ 10 lb F-10-6 @ 8 lb F-10-7 @ 8 lb F-10-8 @ 8 lb F-10-9 @ 8 lb F-10-9 @ 8 lb F-10-1000 sq ft, use half the rate if centipede is the grass type.	option of our control is the volin. Since our management is control of the contro	אמם מופמים מיסים אין יוופון אמם	Flowers/sr	inubs: prior to planting o	auring w
ovides a more uniform application. The party fertilizer on hard surfaces and apply to fertilized areas so rainfall does not carry fertilizer to a storm and fertilizers that supply 1 ib of N per 1,000 sq ft* Group B: low P-I + high K-I Group D: N only 5-10-5 @ 20 lb 18-46-0 @ 6 lb 15-0-14 @ 7 lb 16-0-0 @ 6 lb 9-13-7 @ 11 lb 5-5-15 @ 20 lb 9-17-8 @ 11 lb 10-0-14 @ 10 lb 12-6-6 @ 8 lb lb N per 1,000 sq ft, use half the rate if centipede is the grass type.	Calibrate vour soreader according to manufacturer settings. Apply half the total rate in one directions.	ection: apply the rest at a 90° angle.	une growin	g season	
ant fertilizer on hard surfaces and apply to fertilized areas so rainfall does not carry fertilizer to a storm Group B: low P-1+high K-1 Group D: high P-1+low K-1 Group D: N only 5-10-5 @ 20 lb 8-0-24 @ 12 lb 15-0-0 @ 7 lb 18-46-0 @ 6 lb 15-0-14 @ 7 lb 21-0-0 @ 5 lb 18-24-10 @ 6 lb 6-6-18 @ 18 lb 16-0-0 @ 6 lb 9-13-7 @ 11 lb 5-5-15 @ 20 lb 28-0-4 @ 4 lb 9-17-8 @ 11 lb 10-0-14 @ 10 lb 12-6-6 @ 8 lb Ib N per 1,000 sq ft, use half the rate if centipede is the grass type.	This cross-hair pattern provides a more uniform application.		vegetables	e protection	
Group B: low P-1+high K-1 Group C: high P-1+low K-1 Group D: N only 5-10-5 @ 20 lb 8-0-24 @ 12 lb 15-0-0 @ 7 lb 18-46-0 @ 6 lb 15-0-14 @ 7 lb 21-0-0 @ 5 lb 18-24-10 @ 6 lb 6-6-18 @ 18 lb 16-0-0 @ 6 lb 9-13-7 @ 11 lb 5-5-15 @ 20 lb 28-0-4 @ 4 lb 9-17-8 @ 11 lb 10-0-14 @ 10 lb 12-6-6 @ 8 lb lb N per 1,000 sq ft, use half the rate if centipede is the grass type.	 After application, sweep up any fertilizer on hard surfaces and apply to fertilized areas so rain drain. 	fall does not carry fertilizer to a storm			
Group B: low P-1+high K-1 Group C: high P-1+low K-1 Group D: N only 5-10-5 @ 20 lb 8-0-24 @ 12 lb 15-0-0 @ 7 lb 18-46-0 @ 6 lb 15-0-14 @ 7 lb 21-0-0 @ 5 lb 18-24-10 @ 6 lb 6-6-18 @ 18 lb 16-0-0 @ 6 lb 9-13-7 @ 11 lb 5-5-15 @ 20 lb 28-0-4 @ 4 lb 9-17-8 @ 11 lb 10-0-14 @ 10 lb 12-6-6 @ 8 lb lb N per 1,000 sq ft, use half the rate if centipede is the grass type.	Table 1. Groups of equivalent fertilizers that supply 1 lb of N per 1,000 sq ft*				
Group B: low P-1+high K-1 Group D: Nomb Group D: Nomb 5-10-5 @ 20 lb 8-0-24 @ 12 lb 15-0-0 @ 7 lb 18-46-0 @ 6 lb 15-0-14 @ 7 lb 21-0-0 @ 5 lb 18-24-10 @ 6 lb 6-6-18 @ 18 lb 16-0-0 @ 6 lb 9-13-7 @ 11 lb 5-5-15 @ 20 lb 28-0-4 @ 4 lb 9-17-8 @ 11 lb 10-0-14 @ 10 lb 12-6-6 @ 8 lb lb N per 1,000 sq ft, use half the rate if centpede is the grass type.			A Homeow	mer's Guide to Fertilize	u
@ 7 Ib @ 5 Ib @ 6 Ib @ 8 Ib	Group B: low P-1 + high K-1	N only	Note 4: Fe	rtilization of Lawns, Gar	dens &
(a) 5 (b) (c) 6 (c	@ 20 lb 5-10-5 @ 20 lb 8-0-24 @ 12 lb 15-0-0	0 7 lb	Ornament	8/8	
8) (9) (9) (9) (9) (9) (9) (9) (9) (9) (9	@30lb 18-46-0 @ 6lb 15-0-14 @ 7lb 21-0-0	0.5 lb	Carina for	Vour Loun & Environm	, to
(a) (b) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c	(# 1010 10-24-10 (# 1010 10-0-0	000	200		
	@ 10 ib 913.4 @ 11 ib 55-15 @ 20 ib 25-04	0 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Carolina L.	BWNS	
		5	Soil Acidif	r and Liming: Basic	
	* Since these rates supply 1 lb N per 1,000 sq ft, use half the rate if centipede is the grass type.		Information	n for Farmers & Garden	B-CS