Tennessee Department of Environment and Conservation,
Division of Water Resources
William R. Snodgrass-Tennessee Tower
312 Rosa L. Parks Avenue, 11th Floor, Nashville, TN 37243
(615) 532-0625

CONCENTRATED ANIMAL FEEDING OPERATION (CAFO)
STATE OPERATING PERMIT (SOP)
NOTICE OF INTENT (NOI)

Type of permit you are requesting: ☐ SOPCD0000 (designed to discharge) ■ SOPC00000 (no discharge) ☐ Unknown, please advise

Application type: ■ New Permit ☐ Permit Reissuance ☐ Permit Modification

If this NOI is submitted for Permit Modification or Reissuance provide the existing permit tracking number: _____

OPERATION IDENTIFICATION

Operation Name: Moore Farms	County: Weakley
Operation Location/ Physical Address: 3127 Paris Highway 54 Dresden, Tn 38225	Latitude: 36.295845
	Longitude: -88.613744

Name and distance to nearest receiving water(s): 2200 feet to tributary of Thompson Creek

If any other State or Federal Water/Wastewater Permits have been obtained for this site, list those permit numbers:
TNR121936

Animal Type: ☐ Poultry ■ Swine ☐ Dairy ☐ Beef ☐ Other _____

Number of Animals: 5200	Number of Barns: 2	Name of Integrator: Tosh Pork

Type of Animal Waste Management: (check all that apply)
☐ Dry
☐ Liquid
■ Liquid, Closed System (i.e. covered tank, under barn pit, etc.)

Attach the NMP ■ NMP Attached	Attach the closure plan ■ Closure Plan Attached	Attach a topographic map ■ Map Attached

PERMITTEE IDENTIFICATION

Official Contact (applicant): Ben Moore	Title or Position: Owner			
Mailing Address: 270 Watts Rd	City: Dresden	State: TN	Zip: 38225	☐ Correspondence ☐ Invoice
Phone number(s): 731-431-2022	E-mail: kbfarms2@frontiernet.net			
Optional Contact:	Title or Position:			
Address:	City:	State:	Zip:	☐ Correspondence ☐ Invoice
Phone number(s):	E-mail:			

APPLICATION CERTIFICATION AND SIGNATURE (must be signed in accordance with the requirements of Rule 0400-40-05-.14)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and title; print or type	Signature	Date
Ben Moore owner	Ben Moore	9-11-17

STATE USE ONLY

Received Date	Reviewer	EFO	T & E Aquatic Fauna	Tracking No.
	Impaired Receiving Stream	High Quality Water		NOC Date

CAFO NOTICE OF INTENT INSTRUCTIONS

Background. All operations defined as CAFOs (concentrated animal feeding operation) must seek coverage under a permit. Operations that meet the Class II size criteria (TDEC Rule 0400-40-05-.14) and that discharge or that propose to discharge (...if designed, constructed, operated or maintained such that a discharge will occur) need coverage under the General State Operating Permit (SOP) for Concentrated Animal Feeding Operations, Permit Number SOPCD0000. Operation meeting the size criteria for either a Class I or Class II operation that do not discharge and that do not propose to discharge, but otherwise meet criteria in state rules need coverage under the General State Operating Permit (SOP) for Concentrated Animal Feeding Operations (CAFOs), Permit Number SOPC00000. AFOs (animal feeding operations) meeting or exceeding the size thresholds in column 1 of table 0400-40-05-14.1 are considered large (Class I) CAFOs. Class I CAFOs that propose to discharge must apply for an individual NPDES permit (application forms are available at: http://www.state.tn.us/environment/permits/h2oforms.shtml). All other CAFOs must apply for a state permit using this form. This form must be submitted at least 180 days before a CAFO commences operation.

Complete the form. Type or print clearly, using black or blue ink; not markers or pencil. Answer each item or enter "N/A," for not applicable. If you need additional space, attach a separate piece of paper to the NOI. Applicants must submit a NMP (Nutrient Management Plan), and a closure plan along with this NOI. **The application will be considered incomplete without supplying all of the required information.**

Operation Identification. Describe and locate the project, use the legal or official name of the facility or site. Provide the latitude and longitude (expressed in decimal degrees) of the center of the site, which can be located on USGS quadrangle (i.e. topographic) maps. Topographic maps may be obtained at the USGS website: http://store.usgs.gov. Attach a copy of a portion of a 7.5 minute quad map (i.e. 1:24,000-scale topographic map), showing location of site, with boundaries at least one mile outside the site boundaries.

Permittee Identification. **Official Contact** – Provide the name, telephone number, address, and E-mail address of the person or corporation which proposes to operates or operates and/or profits from this AFO. **Facility Contact** – Provide the name, telephone number, address, and E-mail address of the person most familiar with the operation and with the facts reported in the NOI. This person may be contacted by the division, if necessary. Indicate where to send correspondence and invoices.

Fees. There is no application fee for this permit. An annual maintenance fee may be required and you will be invoiced at a later date.

Submitting the form and obtaining more information. Note that this form must be signed by the chief executive officer, owner, or highest ranking elected official. Submit a complete application to both the Tennessee Department of Agriculture (TDA) and to TDEC-WPC; keep a copy for your records. Original documents should be sent to TDEC-WPC and a copy should be sent to TDA, at the addresses below:

CAFO Notice of Intent TDEC Division of Water Resources William R. Snodgrass - Tennessee Tower 312 Rosa L. Parks Avenue, 11th Floor Nashville, TN 37243	CAFO Notice of Intent Water Resources TDA-Ellington Agricultural Center PO Box 40627 Nashville, TN 37204

Upon receipt of the required items the division will conduct a review of the material, and notify the applicant of any deficiencies. Notification may also come from the Tennessee Department of Agriculture, which reviews the NMP. When all the deficiencies have been corrected, the division will process the NOI and issue permit coverage.

The division has the right to inspect a facility when deemed necessary. In addition, the division has the right to revoke or suspend any permit for violation of permit conditions or any other provisions of the Tennessee Water Quality Control Act and other water pollution control rules.

The division is responsible for regulating any activity, which involves a potential discharge in order to protect waters of the State from pollution and to maintain the highest possible standards in water quality.

Obtaining more information/assistance For more information or assistance, contact your local Environmental Field Office (EFO), toll-free, at 1-888-891-8332 (TDEC) or at the number listed below.

EFO	Street Address	City	Zip Code	Telephone
Chattanooga	540 McCallie Avenue STE 550	Chattanooga	37402	(423) 634-5745
Columbia	1421 Hampshire Pike	Columbia	38401	(931) 380-3371
Cookeville	1221 South Willow Ave.	Cookeville	38506	(931) 432-4015
Jackson	1625 Hollywood Drive	Jackson	38305	(731) 512-1300
Johnson City	2305 Silverdale Road	Johnson City	37601	(423) 854-5400
Knoxville	3711 Middlebrook Pike	Knoxville	37921	(865) 594-6035
Memphis	8383 Wolf Lake Drive	Bartlett	38133	(901) 371-3000
Nashville	711 R S Gass Boulevard	Nashville	37216	(615) 687-7000

NRCS Natural Resources Conservation Service

Comprehensive Nutrient Management Plan (CNMP)
(Version 3, 8/17/2016 Format)

The Comprehensive Nutrient Management Plan (CNMP) is an important part of the conservation management system (CMS) for your Animal Feeding Operation (AFO). This CNMP documents the planning decisions and operation and maintenance information for the AFO.

Farm/Facility: Moore Farms
c/o Ben Moore
3127 Paris Highway 54
Dresden, TN 38225
731-431-2022

Owner/Operator: Ben Moore

Plan Period: Oct 2017 - Sep 2022

Certified Comprehensive Nutrient Management Plan (CNMP) Planner

As a Certified Comprehensive Nutrient Management Plan (CNMP) Planner, I certify that I have reviewed the *Comprehensive Nutrient Management Plan* and that the elements of the document are technically compatible, reasonable and can be implemented.

Signature: _____ Date: _____
Name:
Title: TSP Certification Credentials:

Conservation District (Optional)

As a Conservation District employee, I have reviewed the *Comprehensive Nutrient Management Plan* and concur that the plan meets the District's conservation goals.

Signature: _____ Date: _____
Name:
Title:

Owner/Operator

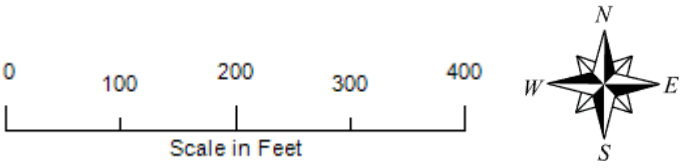
As the owner/operator of this CNMP, I, as the decision maker, have been involved in the planning process and agree that the items/practices listed in each element of the CNMP are needed. I understand that I am responsible for keeping all necessary records associated with implementation of this CNMP. It is my intention to implement/accomplish this CNMP in a timely manner as described in the plan.

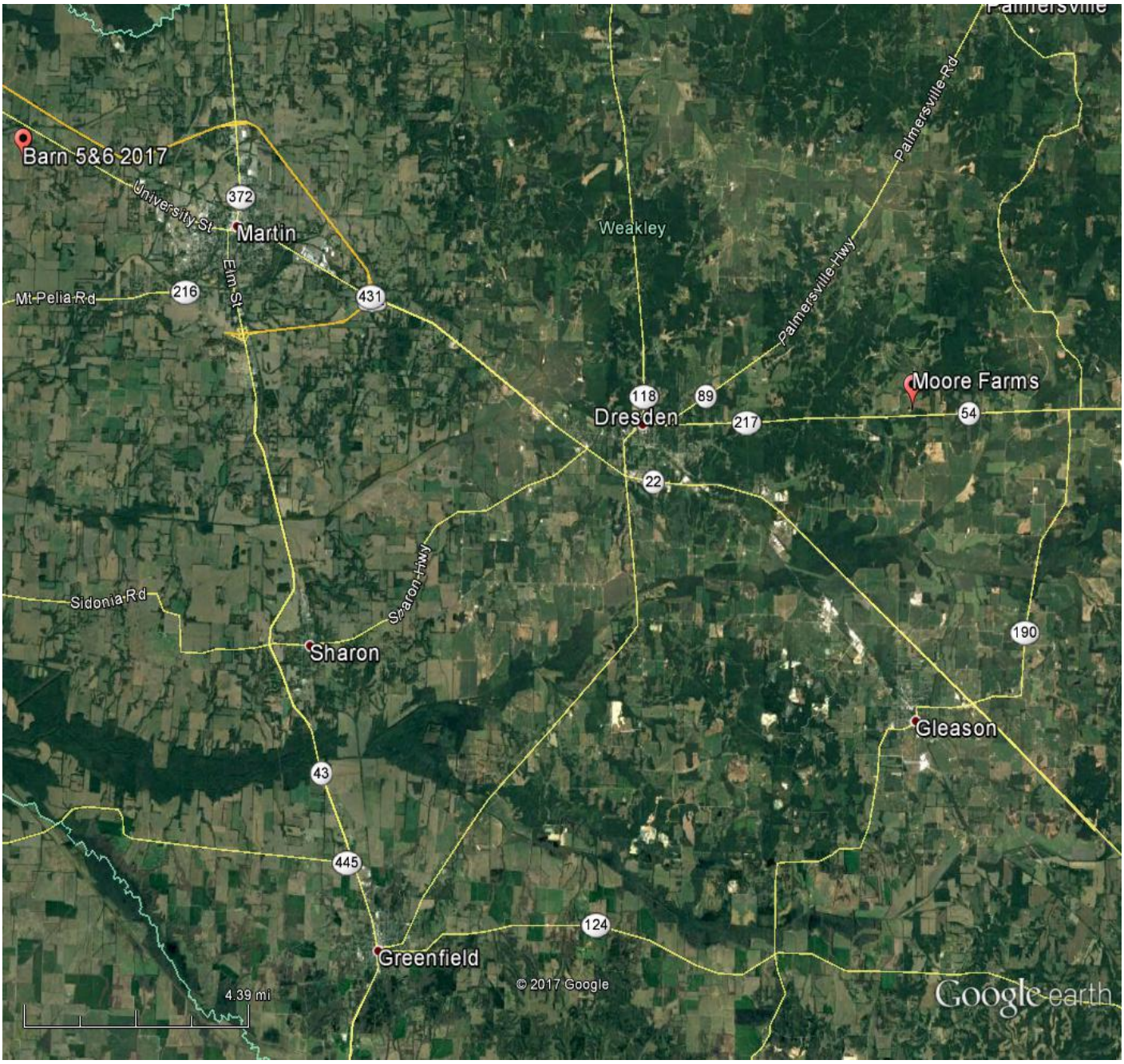
Signature: Ben Moore Date: 9-11-17
Name:

Table of Contents

Section 1. Farmstead (Production Area)

1.1. Maps of Existing and Planned Farmstead Conservation Practices




Barn 5&6 2017
University St
372
Martin
Elm St
Mt Pelia Rd
216
431
Weakley
Palmersville Rd
Palmersville Hwy
Moore Farms
118
89
Dresden
217
54
22
Sidonia Rd
Sharon
S-aron-Hwy
190
Gleason
43
445
124
Greenfield
4.39 mi
© 2017 Google
Google earth


N
W
E
S

1.2. Farmstead Conservation Practices -- Record of Decisions

Waste Storage Facility (313)

Facility(s)	Planned amount (No.)	Month	Year	Amount Applied	Date
3	3	3	2017	Already applied	
Total	3				

A waste impoundment structure has been constructed, according to NRCS specifications to temporarily store waste such as manure, wastewater, and contaminated runoff as a function of an agricultural waste management system which will protect the environment and public health and safety. Practice lifespan is 15 years. Refer to design drawings and practice standard 313 for additional information.

Composting Facility (317)

Create composting facility to properly dispose of dead hogs. Compost will need to be tested for nutrient levels. See Practice Standard 317.

Field(s)	Planned amount (No.)	Month	Year	Amount Applied	Date
1	1.0	3	2017		
Total	1.0				

All dead pigs must be immediately put in the compost facility and covered with a carbon matter. Suggested carbon matter is sawdust.

Critical Area Planting (342)

Barn(s)	Planned amount (No.)	Month	Year	Amount Applied	Date
1	1.0	3	2017	Applied	
2	1.0	3	2017	Applied	
Composter	1	3	2017	Applied	
3			2017		
Total	3.0				

Critical area planting will be done to stabilize the soil, reduce damage from sediment and runoff to downstream areas, and improve wildlife habitat and visual resources. Adapted vegetation such as

trees, shrubs, vines, grasses, or legumes will be established to limit severe erosion or sediment damage. See additional narrative for specific recommendations on seeding rates, dates, fertility requirements, and construction shaping required.

Or

Maintain areas around buildings and composter to ensure clean water is diverted from production areas and erosion is limited.

All NRCS conservation practices shall be installed, operated and maintained according to NRCS conservation practice standards and associated technical specifications.

1.3. Farmstead Conservation Practices – Implementation Requirements

Extension

W255

Disposing of Large Animal Mortalities in Tennessee

Forbes Walker, Associate Professor, and Shawn Hawkins, Assistant Professor
Biosystems Engineering and Soil Science

Animal deaths are a regrettable but sometimes unavoidable part of livestock production. Once an animal dies, it is important to handle and dispose of the carcass in a way that reduces the potential for impacting the health of humans and other livestock and minimizes the impact to the environment, such as pollution of groundwater or surface water. It is recommended that dead animals be disposed of within 48 hours of discovery in a way that follows state guidelines.

In May 2009, the Tennessee Department of Agriculture released its guidelines on handling mortalities in a short policy document entitled "Policy Concerning the Disposal of Dead Farm Animals and The Disposal Offal from Custom Slaughter Facilities." This document can be viewed at the Tennessee Department of Agriculture's website at: http://tn.gov/agriculture/publications/regulatory/animaldisposal.pdf

In Tennessee, dead animal carcasses are defined as a "solid waste," so are regulated by the Tennessee Department of the Environment and Conservation (TDEC), Division of Solid Waste. The disposal of dead animals falls under the solid waste regulations outlined by TDEC at its website: http://www.tennessee.gov/sos/rules/1200/1200-01/1200-01-07.20081126.pdf

The methods that livestock producers in Tennessee can choose to dispose of their dead animals include:

- On-farm burial
- Composting
- Landfilling
- Burning
- Incineration
- Rendering

the center of this base material with the extremities at least 2 feet away from the edge of the base material. Finally, the carcass should be covered with 2 feet of amendment that is mounded to divert rather than capture rainfall. The process will be complete in 3-9 months (only bones are left) and the material can then be land-applied.

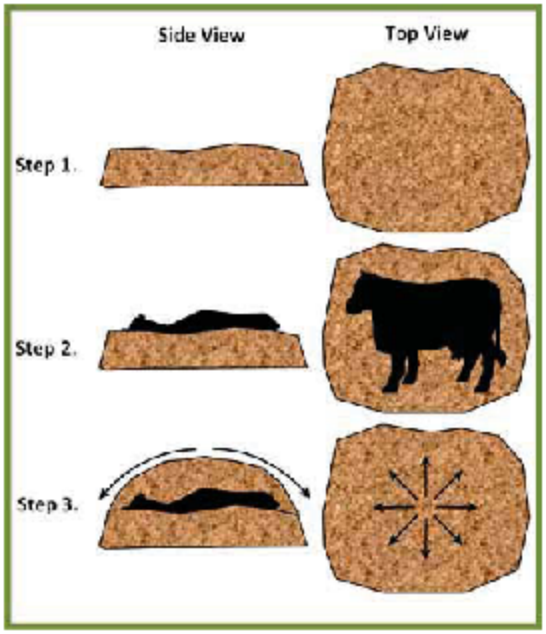


Figure 1. Top and side view schematics illustrating static pile composting of a large animal mortality. Rainfall drainage is illustrated in Step 3.

THE UNIVERSITY of TENNESSEE
INSTITUTE of AGRICULTURE

Visit the UT Extension website at
http://utextension.tennessee.edu

W-251 2/11 11-0123

Programs in agriculture and natural resources, 4-H youth development, family and consumer sciences, and resource development.
University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and county governments cooperating.
UT Extension provides equal opportunities in programs and employment.

1.4. Animal Inventory

Animal Group	Type or Production Phase	Number of Animals[a]	Average Weight (lbs)	Confinement Period	Manure Collected (%)[b]	Manure Storage
Pigs1	Wean-to-finish pig	2,600	140	Jan Early - Dec Late	100	Barn 1
Pigs 2	Wean-to-finish pig	2,600	140	Jan Early - Dec Late	100	Barn 2

a. The average number of animals present in the production facility at any one time.
b. If manure collected is less than 100%, this indicates that the animals spend a portion of the day outside of the production facility or the production facility is unoccupied one or more times during the confinement period.

1.5. Manure Storage Information

Storage ID	Type of Storage	Pumpable or Spreadable Capacity	Annual Manure Collected	Maximum Days of Storage
Barn 1	In-house storage pit	1,094,583 gal	800,000 gal	499
Barn 2	In-house storage pit	1,094,583 gal	800,000 gal	499

1.6. Planned Manure Exports

Month-Year	Manure Source	Amount	Receiving Operation	Location

(None)

1.7. Planned Manure Imports

Month-Year	Manure's Animal Type	Amount	Originating Operation	Location

(None)

1.8. Planned Internal Transfers of Manure

Month-Year	Manure Source	Amount	Manure Destination

(None)

1.9. Brief Description of or Additional Information about Animal Feeding Operation (Optional)

Ben Moore is planning to build 2 deep pit storage hog barns that hold 2600 head each. Tosh Pork will supply the pigs and the feed management. All manure will be applied to fields around the barns that Mr. Moore tends. The closest stream is 2200 feet away and eventually flows into Thompson Creek.

1.2. Sampling, Calibration and Other Statements

- Manure sampling frequency
  Manure test will be taken each time manure is sold.
- Soil testing frequency
  No soil testing is required
- Equipment calibration method and frequency
  No calibration required manure is sold.
- Clean water diversion
  No clean water will enter pit. It is sealed off from outside water.
- Measures to prevent direct contact of animals with water
  All animals will remain inside above the under floor pit.

1.3. Natural Resource Concerns

If checked, the indicated resource concerns have been identified and have been addressed in this plan.

Soil Quality Concerns

	Soil Quality Concern	*Activities to Address Concern*
	Ephemeral Gully Erosion	
	Gully Erosion	

	Soil Quality Concern	*Activities to Address Concern*
X	Sheet and Rill Erosion	New Barns have a silk fence around them during construction
	Stream/Ditchbank Erosion	
	Wind Erosion	

Water Quality Concerns

	Water Quality Concern	*Activities to Address Concern*
	Facility Wastewater Runoff	
	Manure Runoff (Field Application)	All fields in plan
	Manure Runoff (From Facilities)	
	Nutrients in Groundwater	
	Nutrients in Surface Water	
	Silage Leachate	
	Excessive Soil Test Phosphorus	
	Tile-Drained Fields	

Other Concerns Addressed

	Other Concern	*Activities to Address Concern*
	Acres Available for Manure Application	
	Aesthetics	
	Maximize Nutrient Utilization	
	Minimize Nutrient Costs	
X	Neighbor Relations	Closest Neighbor 1,800 feet away.

	Other Concern	*Activities to Address Concern*
	Profitability	
	Regulations	
	Soil Compaction	
	Time Available for Manure Application	Manure will be applied in fall or spring.
	Odors	
X	Air Quality	This facility shouldn't affect air quality
X	Biosecurity	Plan in place.

In Case of an Emergency Storage Facility Spill, Leak or Failure

Implement the following first containment steps:

a. Stop all other activities to address the spill.
b. Stop the flow. For example, use skid loader or tractor with blade to contain or divert spill or leak.
c. Call for help and excavator if needed.
d. Complete the clean-up and repair the necessary components.
e. Assess the extent of the emergency and request additional help if needed.

In Case of an Emergency Spill, Leak or Failure during Transport or Land Application

Implement the following first containment steps:

a. Stop all other activities to address the spill and stop the flow.
b. Call for help if needed.
c. If the spill posed a hazard to local traffic, call for local traffic control assistance and clear the road and roadside of spilled material.
d. Contain the spill or runoff from entering surface waters using straw bales, saw dust, soil or other appropriate materials.
e. If flow is coming from a tile, plug the tile with a tile plug immediately.
f. Assess the extent of the emergency and request additional help if needed.

Emergency Contacts

Department / Agency	Phone Number
Fire	731-364-9566
Rescue services	731-364-5002
State veterinarian	615-837-5183
Sheriff or local police	731-364-5454

Nearest available excavation equipment/supplies for responding to emergency

Equipment Type	Contact Person	Phone Number
Trackhoe	Kevin Dowdy	731-621-8468

Contacts to be made by the owner or operator within 24 hours

Organization	Phone Number
EPA Emergency Spill Hotline	1-800-424-8802
County Health Department	731-642-4025
Other State Emergency Agency	1-888-891-8332 TDEC's Water Pollution Control

Be prepared to provide the following information:

a. Your name and contact information.
b. Farm location (driving directions) and other pertinent information.
c. Description of emergency.
d. Estimate of the amounts, area covered, and distance traveled.
e. Whether manure has reached surface waters or major field drains.
f. Whether there is any obvious damage: employee injury, fish kill, or property damage.
g. Current status of containment efforts.

Biosecurity Measures

Biosecurity is critical to protecting livestock and poultry operations. Visitors must contact and check in with the producer before visiting the operation or entering any production or storage facility.

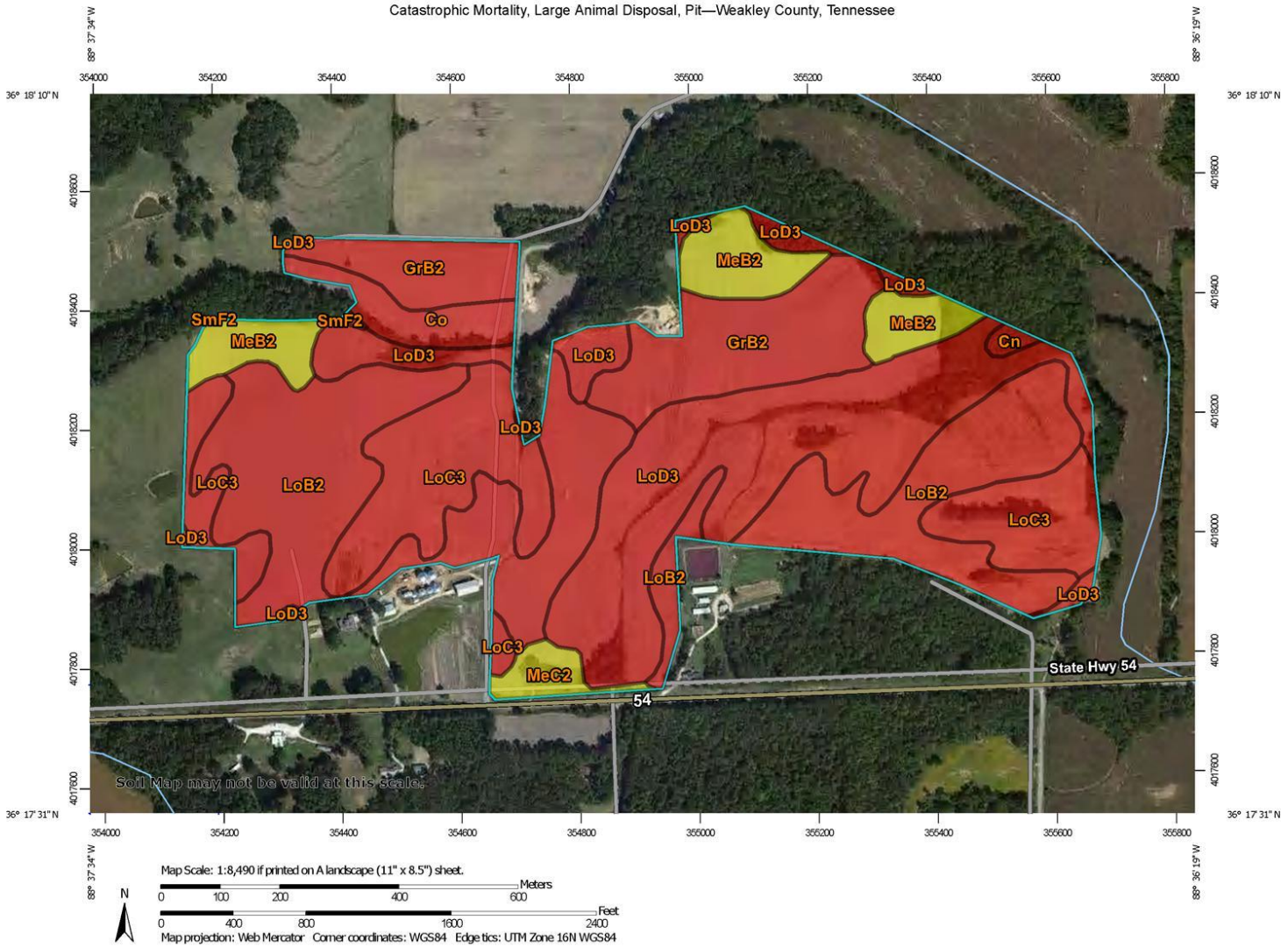
The following narrative describes how animal veterinary wastes (including medical equipment, empty containers, sharps and expired medications) will be managed at the operation.

Medicine will be disposed to as directed on label. Needles and other sharps will be put in to a sharps container. If any medicine is left it shall remain in the control rooms or in a building that is protected from outside environment and stored according to label.

Catastrophic Animal Mortality Management

Refer to NRCS standards, or state guidance, regarding appropriate catastrophic animal mortality handling methods.

Yellow areas are suitable for burial. Another option is Griffin Industries in Union City, Tn.



USDA **Natural Resources Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

9/7/2017
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Catastrophic Mortality, Large Animal Disposal, Pit— Summary by Map Unit — Weakley County, Tennessee (TN183)						
Map unit symbol	**Map unit name**	**Rating**	**Component name (percent)**	**Rating reasons (numeric values)**	**Acres in AOI**	**Percent of AOI**
	slopes, severely eroded			Water gathering surface (0.27)		
				Slope (0.16)		
				Dusty (0.06)		
				Unstable excavation walls (0.01)		
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded	Very limited	Loring (100%)	Wetness (1.00)	50.8	25.6%
				Slope (0.84)		
				Dusty (0.06)		
				Unstable excavation walls (0.01)		
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded, north	Somewhat limited	Memphis (88%)	Dusty (0.08)	14.5	7.3%
				Unstable excavation walls (0.01)		
			Lexington (6%)	Seepage (0.50)		
				Dusty (0.08)		
				Unstable excavation walls (0.01)		
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded	Somewhat limited	Memphis (100%)	Slope (0.16)	3.1	1.6%
				Dusty (0.05)		
				Unstable excavation walls (0.01)		
SmF2	Smithdale-Loring complex, 15 to 35 percent slopes, eroded	Very limited	Smithdale (75%)	Slope (1.00)	0.2	0.1%
				Seepage (0.50)		
				Dusty (0.03)		
				Unstable excavation walls (0.01)		
			Loring (25%)	Slope (1.00)		
				Wetness (1.00)		
				Dusty (0.05)		
				Unstable excavation walls (0.01)		
Totals for Area of Interest					**198.2**	**100.0%**

Catastrophic Mortality, Large Animal Disposal, Pit— Summary by Rating Value		
Rating	**Acres in AOI**	**Percent of AOI**
Very limited	180.6	91.1%
Somewhat limited	17.6	8.9%
Totals for Area of Interest	**198.2**	**100.0%**

Description

"Catastrophic mortality, large animal disposal, pit," is a method of disposing of dead animals by placing the carcasses in successive layers in an excavated pit. The carcasses are spread, compacted, and covered daily with a thin layer of soil that is excavated from the pit. When the pit is full, a final cover of soil material at least 2 feet thick is placed over the burial pit.

The interpretation is applicable to both heavily populated and sparsely populated areas. While some general observations may be made, onsite evaluation is required before the final site is selected. Improper site selection, design, or installation may cause contamination of ground water, seepage, and contamination of stream systems from surface drainage or floodwater. The risk of contamination can be reduced or eliminated by installing systems designed to eliminate or reduce the adverse effects of limiting soil properties. Ratings are for soils in their present condition. The present land use is not considered in the ratings.

Ratings are based on properties and qualities to the depth normally observed during soil mapping (approximately 6 or 7 feet). However, because pits may be as deep as 15 feet or more, geologic investigations are needed to determine the potential for pollution of ground water and to determine the design needed. These investigations, which are generally arranged by the pit developer, include examination of stratification, rock formations, and geologic conditions that might lead to the conducting of leachates to aquifers, wells, watercourses, and other water sources. The presence of hard, nonrippable bedrock, bedrock crevices, or highly permeable strata at or directly below the proposed pit bottom is undesirable because of the difficulty in excavation and the potential pollution of underground water.

Properties that influence the risk of pollution, ease of excavation, trafficability, and revegetation are major considerations. Soils that are flooded or have a water table within the depth of excavation present a potential pollution hazard and are difficult to excavate. Slope is an important consideration because it affects the work involved in road construction, the performance of the roads, and the control of surface water around the pit. It may also cause difficulty in constructing pits in which the pit bottom must be kept level and oriented to follow the contour of the land.

The ease with which the pit is dug and with which a soil can be used as daily and final cover is based largely on soil texture and consistence, which determine workability when the soil is dry and when it is wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and difficult to place as a uniformly thick cover over a layer of carcasses. The uppermost part of the final cover should be soil material that favors the growth of plants. It should not contain excess sodium or salts and should not be too acid. In comparison with other horizons, the surface layer in most soils has the best workability and the highest content of organic matter. Thus, it may be desirable to stockpile the surface layer for use in the final blanketing of the filled pit area.

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. "Not limited" indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected of a properly designed and installed system. "Somewhat limited" indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. "Very limited" indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings indicate the severity of the individual limitations. The ratings are shown in decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The map unit components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as listed for the map unit. The percent composition of each component in a particular map unit is presented to help the user better understand the percentage of each map unit that has the rating presented.

Other components with different ratings may be present in each map unit. The ratings for all components, regardless of the map unit aggregated rating, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey or from the Soil Data Mart site. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.

Rating Options

Aggregation Method: Dominant Condition

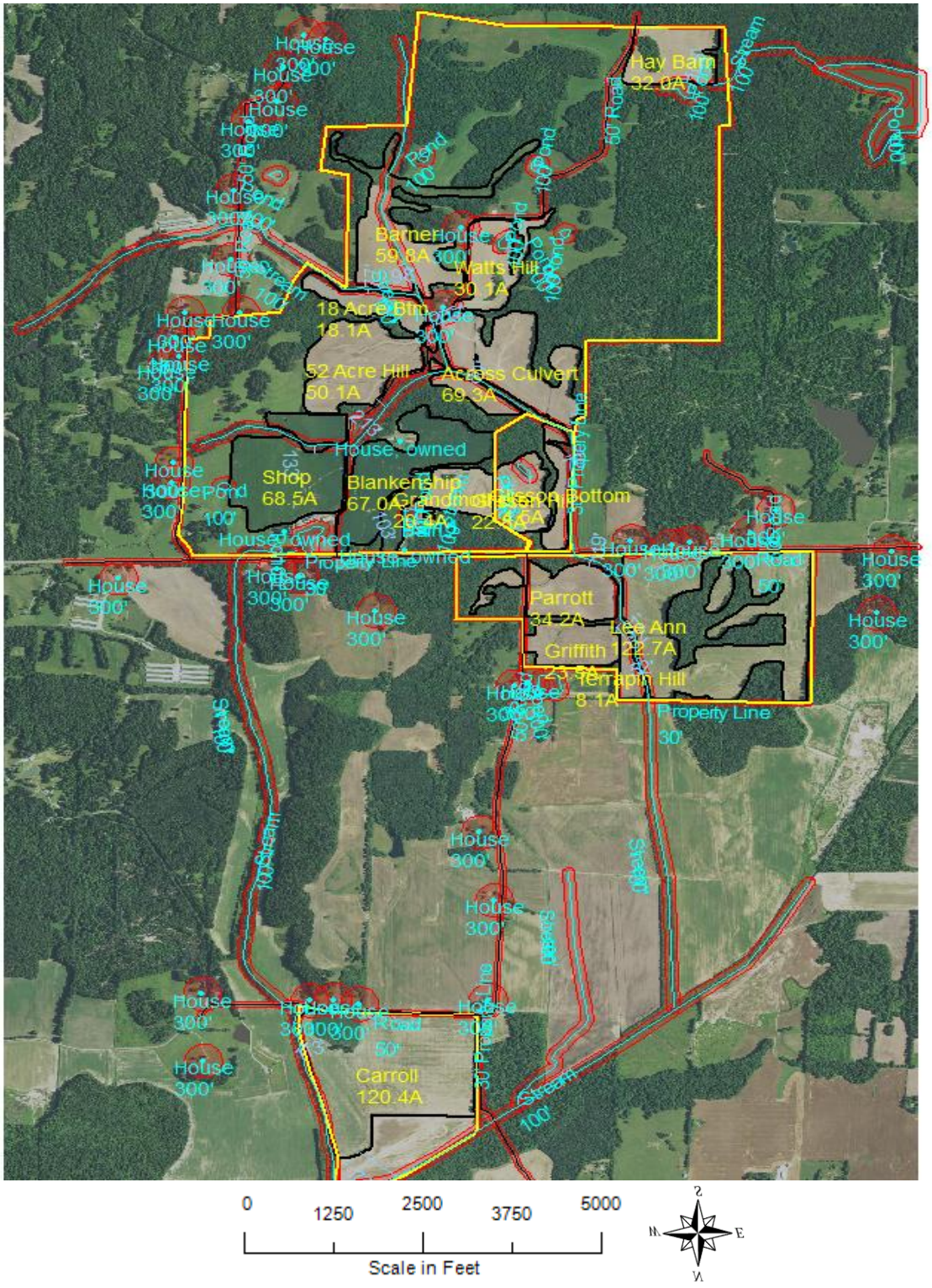
Component Percent Cutoff: None Specified

Tie-break Rule: Higher

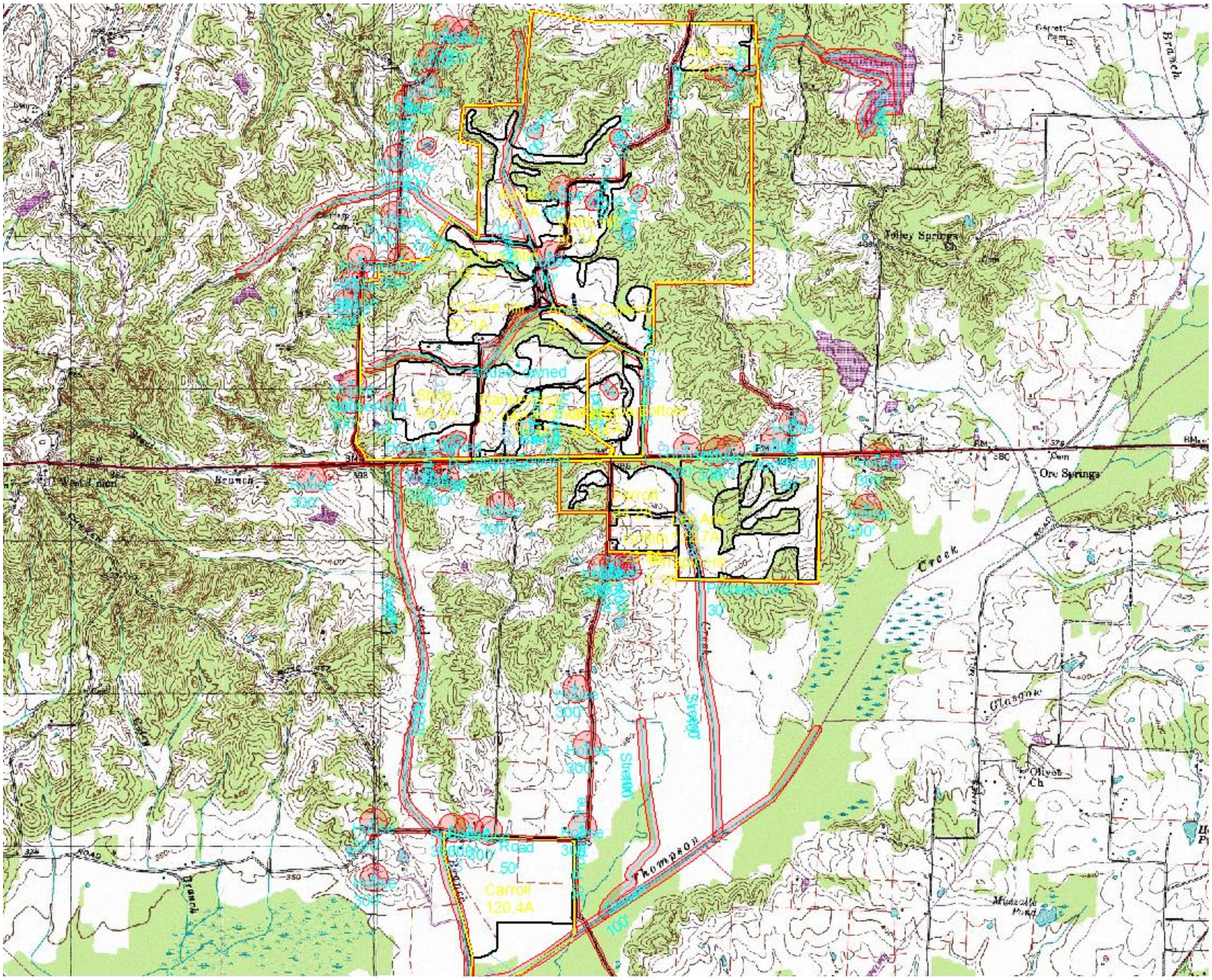
Section 2. Crop and Pasture (Land Treatment)

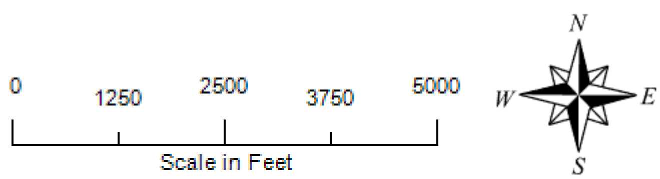
2.1. Maps of Fields, Soils, Application Setbacks, Existing and Planned Crop and Pasture Conservation Practices

Ariel Map

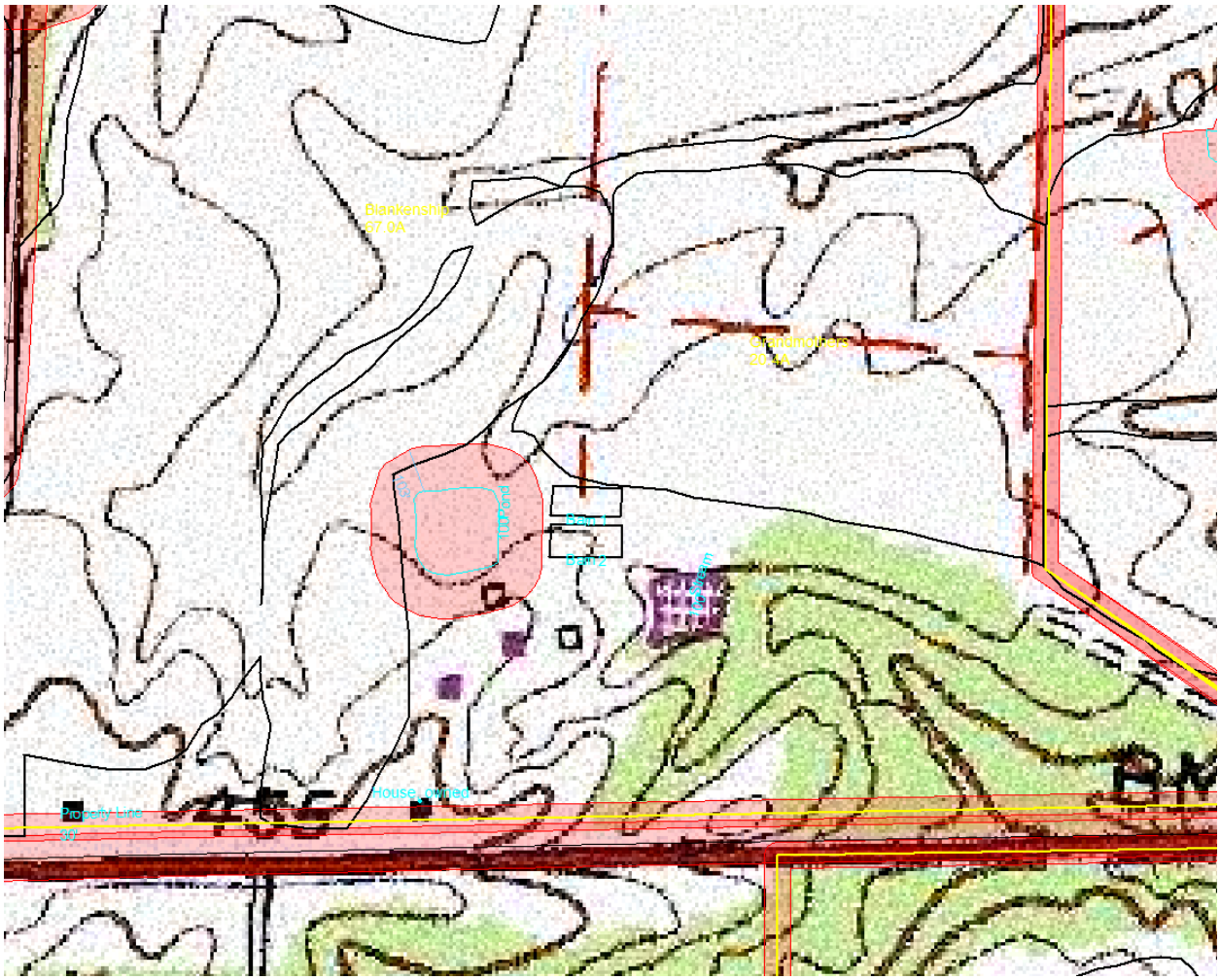


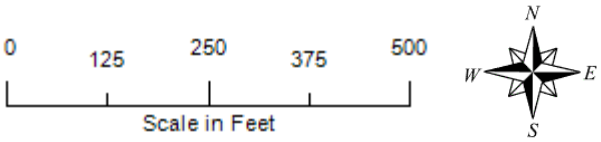
Topo Map


Valley Springs
Ore Springs
Carroll
120.4A


0
1250
2500
3750
5000
Scale in Feet
N
W
E
S

Production Area





Topo Map


Hay Barn
32.0A
Barner
59.8A
Walls Hill
30.1A
18 Acre Btm
18.1A
52 Acre Hill
50.1A
Across Culvert
69.3A
Shop
68.5A
Blankenship
67.0A
Grandpa Jesson Bottom
Parrotta
34.2A
Griffin
123.7A
Lee Arm
23.9A
Terrapin Hill
8.1A
Carroll
20.4A
Property Line
50' Road
Stream
100' Stream
House
300'
soils
Ca
Ce - Cn
Cn - Co
Co - Fa
Fa - Fb
Fb - GrB2
GrB2 - GrC3
GrC3 - LeB2
LeB2 - LeC3
LeC3 - LeD3
LeD3 - LeE3
LeE3 - LoB2
LoB2 - LoC3
LoC3 - LoD3
LoD3 - LoE3
LoE3 - MeB2
MeB2 - MeC2
MeC2 - Oc
Oc - Oh
Oh - RO
RO - Rt
Rt - SmF2
SmF2 - USF
USF - W
W - Wa
Wa - WR
0
1250
2500
3750
5000
Scale in Feet
N
W
E
S

2.2. Crop and Pasture Conservation Practices -- Record of Decisions

Conservation Crop Rotation (328)

Grow crops in a recurring sequence in the same field. Develop crop rotation program for Corn - Soybeans. See Practice Standard 328.

Field(s)	Planned amount (Ac)	Month	Year	Amount Applied	Date
All Fields in Plan	**714**	6	2017		
Total	**714**	**6**	**2017**		

Nutrient Management (590)

Soil amendments, animal waste, and lime will be applied according to soil test recommendations. When applying animal waste, recommended buffer widths shall be observed. Refer to Practice Standard 590.

Ongoing: Use of rotation, application of manure and commercial fertilizer/ lime according to soil test results from a Tn accredited lab.

Manure needs to be tested each time an application occurs if manure test varies from this document, make adjustments to application rate.

Field(s)	Planned amount (Ac)	Month	Year	Amount Applied	Date
All Fields in Plan	**714**	6	2017		
Total	**714**	**6**	**2017**		

All NRCS conservation practices shall be installed, operated and maintained according to NRCS conservation practice standards and associated technical specifications.

2.3. Crop and Pasture Conservation Practices – Implementation Requirements

Sampling Farm Fields

Divide fields to be sampled into production areas (of 10 acres or less) based on uniform soil type, fertilization and management history. Sandy or eroded areas, and problem areas of obviously different plant growth responses should also be sampled separately -- provided the area is sufficiently large enough to be treated differently with lime or fertilizer.

From your local county Extension office, obtain a soil sample box for **each** production area, and submit a Soil and Media Test Information Sheet,* for each **ten** production areas.

For each production area that you have identified:

1. Collect a composite soil sample by moving through the area in a zig-zag pattern; sampling at a minimum of 20 locations. This sampling procedure should be random with respect to any existing cropping row. In continuous no-till production fields, be sure to vary distance from the row for each sub-sample collected. In continuous no-till fields or where fertilizer has been banded, increasing the number of sub-samples to 30 or 40 will increase precision of the results.

2. Move surface litter aside. Each sub-sample should be obtained by using a soil tube, trowel or spade. For determination of plant nutrients, take soil samples to a depth of 6 inches. For organic matter determination, sample to the depth of 2 inches.

3. Combine each sub-sample in a clean bucket as you move through the production area. Do not use a galvanized bucket if Zn is to be determined. Thoroughly mix the sub-samples into one composite sample. If the soil is exceptionally wet, you may have to let it air dry on a paper plate before it can be properly mixed (wet soil can also dramatically increase shipping costs and weaken shipping containers). DO NOT use heat to dry a soil sample as heat may change your results.

4. From this composite sample remove enough soil (about a cup) to fill a soil sample box. Adequately mark the box to identify the selected production area location represented by that soil sample and keep this record in a safe place for later referral.

5. For the PSNT soil test, sample to a depth of 12 inches when corn is 6 to 12 inches tall. Height should be measured from the ground to bottom of the whorl (4-6 fully mature leaves present).

6. For container media analysis, medium should be sampled before posting by removing several portions from the mix and blending thoroughly. For established plantings, select 8 to 10 pots that are representative of the medium used. Scrape away the top one-fourth inch of each pot including slow-release fertilizer pellets and discard. Mix samples being careful not to crush any remaining fertilizer pellets. Completely fill **two** soil sample boxes for container media analysis.

Send soil sample(s), Soil and Media Information Sheet(s), and appropriate fees to the Soil, Plant and Pest Center (see address and fee information on the Soil and Media Information Sheet). Fees can also be paid by credit card using the secure UT Institute of Agriculture eMarketplace site. Click here to pay online.

THE UNIVERSITY of TENNESSEE Extension
WD93

Livestock Waste Management and Conservation

Procedures for Manure and Litter Sampling

(Class I & II – Large and Medium CAFOs)

Tennessee CAFO Factsheet #14

Kristy M. Hill, Extension Dairy Specialist
Animal Science Department

Nutrient composition of manure varies with a number of factors, including animal type, bedding, ration, storage and handling, environmental conditions, field application method, age of manure, timing of sampling and sampling technique. This variability makes book values (or averages) an unreliable source for determining application rates of nitrogen, phosphorus and potassium. Each livestock production operation and manure management system is unique, and an individual farm's manure analysis can vary from average values by 50 percent or more. Testing manure may better indicate how animal management and other factors actually affect nutrient contents and will allow for more accurate calculation of application rates.

The results of a manure analysis are only as reliable as the sample taken. A representative sample is needed to accurately reflect the nutrient content. However, obtaining a representative sample can be a challenge as manure nutrient content is not uniform within storage structures. Mixing and sampling strategies can insure that samples more accurately reflect the type of manure that will be applied.

When to Sample

The ideal time to sample manure is prior to application to ensure that results of the analysis are received in time to adjust nutrient application rates. However, do not allow long periods of time to pass before application begins, because there can be storage and handling losses over time. Sampling several days to a week prior to application is best. However, a complication of the timing of the sampling is that semi-solid (or slurry) manure should be well agitated before sampling, and in many situations, such as contracting waste application to a third party, agitators or other necessary equipment are not available until application begins. In cases such as this, "pre-sampling" (dipping samples off the top of the storage structure for N and K concentrations) can be used to estimate application rates (See page 4 for more info on pre-sampling).

Building a "bank" of manure analysis over time can be quite useful in the future as long as animal management practices, feed rations or manure storage and handling methods do not drastically change from present methods. If samples do not vary greatly from year to year or are consistent during spring or fall applications, the "bank" averages will help estimate application rates if an analysis cannot be performed prior to application.

Safety Precautions

It is more dangerous and more difficult to sample from liquid storage facilities than dry-manure systems. Proper precautions should be taken to prevent

accidents, such as falling into the storage facility or being overcome by manure gases.

1. Have two people present at all times;
2. Never enter confined manure-storage spaces without appropriate safety gear, such as a self-contained breathing apparatus;
3. When agitating a storage pit below a building, be sure to provide adequate ventilation for both humans and animals; and
4. When agitating outdoor pits, monitor activities closely to prevent erosion of berms or destruction of pit liners.

Sample Preparations

1. Check with the laboratory performing the analysis, as most of these labs have plastic bottles available for liquid sample collection or sealable plastic bags for dry samples (freezer bags work well). Additionally, they may have specific sample collection procedures, including holding times, refrigeration and shipping requirements.
2. Do not use glass containers, as expansion of the gases in the sample can cause the container to break.
3. Never use galvanized containers for collection or mixing due to the risk of contamination from metals like zinc in the container.
4. When taking liquid samples from facilities spreading both effluent and solids, the manure should be agitated for two to four hours before taking the sample.
5. Liquid samples can be taken during agitation (after two to four hours have passed) because most agitation equipment is effective 75 to 100 feet away from the equipment.
6. Take multiple samples from the storage facility and mix them together thoroughly in a larger bucket to obtain a representative sample. For liquid or semi-solid samples, use a stirring rod to get the solids spinning in suspension and collect the representative sample while the liquid is still spinning.
7. When taking liquid samples, fill the plastic bottle three-fourths full and leave at least 1 inch of air space to allow for gas expansion.
8. When taking dry samples, squeeze all of the excess air from the sealable plastic bag to allow for gas expansion and place the first bag into a second sealable plastic bag to prevent leaks.
9. Label the plastic bags or bottles prior to sampling with your name, date and sample identification number. Use a waterproof pen.
10. After sampling, place the container(s) in the refrigerator or freezer (preferred) until mailed to the lab. Cooling the samples will reduce microbial activity, chemical reactions and reduce odors.
11. Ship samples early in the week (Monday–Wednesday) using an overnight service. Avoid holidays and weekends.

Sampling Semi-Solid and Liquid Manure from Storage Facilities

Manure with 10 to 20 percent solids is classified as semi-solid manure and can usually be handled as a liquid. Semi-solid manure usually requires the use of chopper pumps to provide thorough agitation before pumping. Liquid manure is manure with less than 10 percent solids and is handled with pumps, pipes, tank wagons or irrigation equipment (if less than 5 percent solids).

If all contents of the entire semi-solid or liquid storage facility will be applied, complete agitation (2-4 hours minimum) is required to accurately sample the manure because in liquid and semi-solid systems, settled solids can contain more than 90 percent of the phosphorus. However, if solids will be purposefully left on the bottom when the storage structure is pumped out, as is sometimes the case with lagoons, then complete agitation during sampling will generate artificially high nutrient values. In this case, agitation of the solids or sludge at the bottom of the lagoon is not needed for nutrient analysis, and premixing the surface liquid in the lagoon is not needed.

Methods of Sampling:

Several different methods may be used to sample liquid or semi-solid manure from storage facilities:

1. Use a plastic sampling cup with a 10- to 12-foot handle to obtain surface water samples (see Figure 1). Collect about a pint of sample from several locations (six to eight) around the perimeter of the storage unit about 6 feet from the bank and 12 inches below the surface. Avoid floating debris or scum. Pour each of the samples into a clean plastic bucket and mix well. Pour representative sample in plastic container for shipping. *(Chastain, 2003)*
2. Throw a small plastic bucket tied to a long rope out towards the middle of the storage unit while holding onto the rope. Begin pulling the bucket back to the bank as soon as it strikes the surface. Make sure the bucket is raised above the surface before it strikes the bank. Pour each sample into a larger plastic bucket, and repeat this procedure at four to six locations evenly spaced around the perimeter of the storage unit. Mix all samples well and pour representative sample into a plastic container for shipping. *(Chastain, 2003)*
3. Samples may also be taken using a probe or a tube. They can be constructed out of a 1½-inch diameter PVC pipe. Cut the PVC pipe a foot longer than the depth of the pit. Run a ¼-inch rod or string through the length of the pipe and attach a plug such as a rubber stopper or rubber ball (see Figure 2). The rod or the string must be longer than the pipe. If using a rod, bend the top over to prevent it from falling out of the pipe. The probe should be slowly inserted into the pit or lagoon with the stopper open, to the full depth of the pit. Pull the string or rod to close the bottom of the pipe and pull the probe out of the pit, being careful not to tip the pipe and dump the sample. Release the sample into a large plastic bucket and repeat the process at least three times around the pit. Mix all samples well and pour a representative sample into a plastic container for shipping. *(Rieck-Hinz, 2003)*

Figure 1.

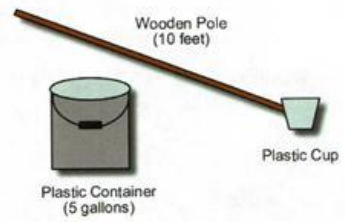
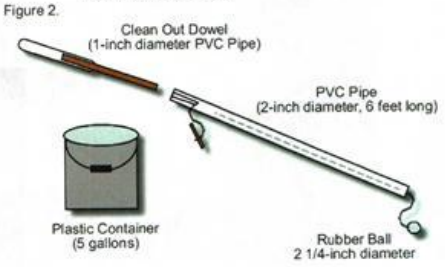


Figure 2.



Sampling Semi-Solid and Liquid Manure during Land Application with Tank Wagons

Settling begins as soon as agitation stops, so samples should be collected as soon as possible after the manure tank wagon is filled, unless the tanker has an agitator. Be sure the port or opening does not have a solids accumulation from prior loads. Collect samples in a plastic bucket from the loading or unloading port or the opening near the bottom of the tank. Stir the sample in the bucket to get the solids in suspension. Remove a ladle full while the liquid is still spinning and pour into the sample bottle. Repeat these steps until the sample bottle is three quarters full.

Sampling Liquid Manure during Land Application with Irrigation Systems

Place plastic buckets randomly at different distances from the sprinkler head in the field to collect the liquid manure that is being applied by an irrigation system. Immediately after manure has been applied, collect manure from the buckets and combine them into one container. Stir the collective sample, remove a ladle full while the liquid is still spinning and pour into the sample bottle.

Pre-Sampling Nitrogen and Potassium from Liquid Manure Systems

If liquid systems cannot be agitated prior to application and a sample is needed to estimate application rates, manure samples can be dipped off the top of the stored liquid manure to analyze for N and K concentrations. Research indicates that the top-dipped liquid represents approximately 90 percent of the N concentration measured in mixed, field-collected samples. Multiply the results of the N concentration from top-dipped samples by 1.1 for a better estimate of N. Dipping a sample from the surface of a liquid storage pit does NOT provide a good estimate of P concentrations in the pit, so use of the P analysis from top-dipped samples is not recommended. Therefore, if application is limited to a P-based application rate, pre-sampling is not recommended. Producers who take these types of samples should remember to take additional samples during application to calculate the actual amount of nutrients applied and use to adjust commercial fertilizer application. *(Rieck-Hinz, 2003)*

Sampling Dry or Solid Manure

Solid manure systems will include fecal matter, urine, bedding and feed. They can vary from one location to another within the same production operation and from season to season. Sampling of dry or solid manure is best done in the field during application, because it will take into account losses that occur during handling and application. Manure is better mixed during application than during storage. Results will not be available in time to adjust application rates; however, sampling will allow producers to adjust any future commercial fertilizer rates and manure application in subsequent years. If a sample must be taken prior to application to estimate application rates, be sure to take samples from various places in the manure pile, stack or litter to obtain a representative sample for analysis. It may even be beneficial to take samples several times during the year because of the variation in bedding content.

Methods of Sampling:

As with liquid or semi-solid systems, many different methods can be used to obtain a representative sample. The method chosen will depend on the type of solid system used on the farm. Sub-samples can be taken with a shovel, pitchfork or soil probe. Regardless of the method of sampling, a composite

sample will need to be taken from all of the samples to ensure it represents the entire manure used for application. To obtain a composite sample, place all sub-samples (the more sub-samples, the more accurate the results) in a pile and mix with a shovel by continuously scooping from the outside of the pile to the center of the pile until well mixed. Fill a one-gallon plastic Zip-lock® freezer bag (or the bag provided by the laboratory) one-half full with the composite sample by turning the bag inside out over one hand. With the covered hand, grab representative handfuls of manure and turn the freezer bag right side out over the sample with the free hand. Squeeze out the excess air, close, seal and store sample in another plastic sealable bag in the freezer until mailed. *(Rieck-Hinz, 2003)*

1. *Sampling poultry litter in-house:* Collect 10 to 15 sub-samples from throughout the house to the depth the litter will be removed. Cake litter samples should be taken at the depth of cake removal. The number of samples taken near feeders or waterers should be proportionate to their space occupied in the whole house. *(LPES)*
2. *Sampling stockpiled manure, litter or compost:* Ideally, stockpiled material should be stored under cover on an impervious surface. The exterior of uncovered waste may not accurately represent the majority of the material because rainfall moves water-soluble nutrients down into the pile. If an uncovered stockpile is used over an extended period of time, it should be sampled before each application. Take 10 sub-samples from different locations around the pile at least 18 inches below the surface. *(LPES)*
3. *Sampling from a bedded pack:* It is recommended that samples from a bedded pack be taken during loading. Take at least five sub-samples while loading several spreader loads. *(Peters, 2003)*
4. *Sampling daily hauls:* Place a five-gallon pail under the barn cleaner 4 to 5 times while loading a spreader. *(Peters, 2003)*
5. *Sampling scrape-and-haul feedlots:* Facilities where manure accumulates on paved feedlots and is scraped and hauled to the field daily or several times during the week are referred to as scrape-and-haul feedlots. Sub-samples can be collected by scraping a shovel across approximately 25 feet of the paved feedlot. This process should be repeated 10 or more times, taking care to sample in a direction that slices through the variations of moisture, bedding, depth, age, etc. Avoid excessively wet areas and areas with large amounts of hay or feed. Several composite samples may be needed for this type of facility. *(Rieck-Hinz, 2003)*
6. *Sampling during spreading or land application:* Spread a sheet of plastic or a tarp in the field and drive the tractor and spreader over the top of the plastic to catch the manure from one pass of the spreader. Samples should be collected to represent the first, middle and last part of the storage facility or loads applied and should be correlated as to which loads are applied on each field to track changes in nutrient content throughout the storage facility. *(Rieck-Hinz, 2003)*

References

Peters, John. (ed.) 2003. **Recommended Methods of Manure Analysis**. University of Wisconsin Extension. A3769.

Rieck-Hinz, A., J. Lorimor, T. Richard, and K. Kohl. 2003. **How to Sample Manure for Nutrient Analysis**. Iowa State University Extension. PM1558.

Chastain, J.P. 2003. **Manure Sampling Procedures.** South Carolina Confined Animal Manure Managers Certification Program. Clemson Extension.

Livestock and Poultry Environmental Stewardship (LPES) Curriculum. Manure Sampling. Module D, Land Application and Nutrient Management.

2.4. Predicted Soil Erosion

Average water, wind, irrigation, gully and ephemeral erosion estimates

Field	Predominant Soil Type	T Factor (t/ac/yr)	Slope (%)	Water (Sheet and Rill) (t/ac/yr)	Wind (t/ac/yr)	Irrigation Erosion Controlled (y/n)	Gully Erosion Controlled (y/n)	Ephemeral Erosion Controlled (y/n)
Watts Hill	LoB2 (Loring SIL)	4	3.5	1.7				
Terrapin Hill	Cn (Collins SIL)	5	1.0	0.5				
Shop	LoB2 (Loring SIL)	4	3.5	1.8				
Parrott	Cn (Collins SIL)	5	1.0	1.6				
Lee Ann	LoB2 (Loring SIL)	4	3.5	2.0				
Hay Barn	LoB2 (Loring SIL)	4	3.5	1.7				
Griffith	Cn (Collins SIL)	5	1.0	0.5				
Grandmothers	LoB2 (Loring SIL)	4	3.5	1.3				
Glisson Hill	LoB2 (Loring SIL)	4	3.5	1.3				
Glisson Bottom	Cn (Collins SIL)	5	1.0	1.6				
Carroll	Co (Collins SIL)	5	1.0	1.6				
Across Culvert	Co (Collins SIL)	5	1.0	1.6				
Blankenship	LoB2 (Loring SIL)	4	3.5	1.2				
Barner	Co (Collins SIL)	5	1.0	1.6				
52 Acre Hill	LoC3 (Loring SIL)	2	6.5	2.0				
18 Acre Btm	Co (Collins SIL)	5	1.0	1.1				

Crop period sheet and rill erosion estimates

Field	Crop Year	Primary Crop	Starting Date (mm/dd/yyyy)	Ending Date (mm/dd/yyyy)	Crop Period Soil Loss (t/ac)
Watts Hill	2018	Corn grain	10/16/2017	9/15/2018	2.0
	2019	Soybean	9/16/2018	10/15/2019	1.3
	2020	Corn grain	10/16/2019	9/15/2020	2.0
	2021	Soybean	9/16/2020	10/15/2021	1.3
	2022	Corn grain	10/16/2021	9/15/2022	2.0
Terrapin Hill	2018	Soybean	9/16/2017	10/15/2018	0.3

Field	Crop Year	Primary Crop	Starting Date (mm/dd/yyyy)	Ending Date (mm/dd/yyyy)	Crop Period Soil Loss (t/ac)
	2019	Corn grain	10/16/2018	9/15/2019	0.6
	2020	Soybean	9/16/2019	10/15/2020	0.5
	2021	Corn grain	10/16/2020	9/15/2021	0.7
	2022	Soybean	9/16/2021	10/15/2022	0.5
Shop	2018	Corn grain	10/16/2017	9/15/2018	2.1
	2019	Soybean	9/16/2018	10/15/2019	1.4
	2020	Corn grain	10/16/2019	9/15/2020	2.1
	2021	Soybean	9/16/2020	10/15/2021	1.4
	2022	Corn grain	10/16/2021	9/15/2022	2.1
Parrott	2018	Soybean	9/16/2017	10/15/2018	0.8
	2019	Corn grain	10/16/2018	9/15/2019	2.0
	2020	Soybean	9/16/2019	10/15/2020	1.2
	2021	Corn grain	10/16/2020	9/15/2021	2.3
	2022	Soybean	9/16/2021	10/15/2022	1.3
Lee Ann	2018	Soybean	9/16/2017	10/15/2018	1.3
	2019	Corn grain	10/16/2018	9/15/2019	2.9
	2020	Soybean	9/16/2019	10/15/2020	1.3
	2021	Corn grain	10/16/2020	9/15/2021	2.9
	2022	Soybean	9/16/2021	10/15/2022	1.3
Hay Barn	2018	Corn grain	10/16/2017	9/15/2018	2.0
	2019	Soybean	9/16/2018	10/15/2019	1.3
	2020	Corn grain	10/16/2019	9/15/2020	2.0
	2021	Soybean	9/16/2020	10/15/2021	1.3
	2022	Corn grain	10/16/2021	9/15/2022	2.0
Griffith	2018	Soybean	9/16/2017	10/15/2018	0.3
	2019	Corn grain	10/16/2018	9/15/2019	0.6
	2020	Soybean	9/16/2019	10/15/2020	0.5
	2021	Corn grain	10/16/2020	9/15/2021	0.7
	2022	Soybean	9/16/2021	10/15/2022	0.5
Grandmothers	2018	Soybean	9/16/2017	10/15/2018	0.6

Field	Crop Year	Primary Crop	Starting Date (mm/dd/yyyy)	Ending Date (mm/dd/yyyy)	Crop Period Soil Loss (t/ac)
	2019	Corn grain	10/16/2018	9/15/2019	1.5
	2020	Soybean	9/16/2019	10/15/2020	1.1
	2021	Corn grain	10/16/2020	9/15/2021	1.9
	2022	Soybean	9/16/2021	10/15/2022	1.3
Glisson Hill	2018	Soybean	9/16/2017	10/15/2018	0.6
	2019	Corn grain	10/16/2018	9/15/2019	1.5
	2020	Soybean	9/16/2019	10/15/2020	1.1
	2021	Corn grain	10/16/2020	9/15/2021	1.9
	2022	Soybean	9/16/2021	10/15/2022	1.3
Glisson Bottom	2018	Soybean	9/16/2017	10/15/2018	0.8
	2019	Corn grain	10/16/2018	9/15/2019	2.0
	2020	Soybean	9/16/2019	10/15/2020	1.2
	2021	Corn grain	10/16/2020	9/15/2021	2.3
	2022	Soybean	9/16/2021	10/15/2022	1.3
Carroll	2018	Corn grain	10/16/2017	9/15/2018	1.6
	2019	Soybean	9/16/2018	10/15/2019	0.8
	2020	Corn grain	10/16/2019	9/15/2020	2.0
	2021	Soybean	9/16/2020	10/15/2021	1.2
	2022	Corn grain	10/16/2021	9/15/2022	2.3
Across Culvert	2018	Soybean	9/16/2017	10/15/2018	0.8
	2019	Corn grain	10/16/2018	9/15/2019	2.0
	2020	Soybean	9/16/2019	10/15/2020	1.2
	2021	Corn grain	10/16/2020	9/15/2021	2.3
	2022	Soybean	9/16/2021	10/15/2022	1.3
Blankenship	2018	Corn grain	10/16/2017	9/15/2018	1.2
	2019	Soybean	9/16/2018	10/15/2019	0.6
	2020	Corn grain	10/16/2019	9/15/2020	1.4
	2021	Soybean	9/16/2020	10/15/2021	1.1
	2022	Corn grain	10/16/2021	9/15/2022	1.8
Barner	2018	Soybean	9/16/2017	10/15/2018	0.8

Field	Crop Year	Primary Crop	Starting Date (mm/dd/yyyy)	Ending Date (mm/dd/yyyy)	Crop Period Soil Loss (t/ac)
	2019	Corn grain	10/16/2018	9/15/2019	2.0
	2020	Soybean	9/16/2019	10/15/2020	1.2
	2021	Corn grain	10/16/2020	9/15/2021	2.3
	2022	Soybean	9/16/2021	10/15/2022	1.3
52 Acre Hill	2018	Soybean	9/16/2017	10/15/2018	0.9
	2019	Corn grain	10/16/2018	9/15/2019	2.3
	2020	Soybean	9/16/2019	10/15/2020	1.7
	2021	Corn grain	10/16/2020	9/15/2021	2.9
	2022	Soybean	9/16/2021	10/15/2022	1.9
18 Acre Btm	2018	Soybean	9/16/2017	10/15/2018	0.7
	2019	Corn grain	10/16/2018	9/15/2019	1.2
	2020	Soybean	9/16/2019	10/15/2020	0.6
	2021	Corn grain	10/16/2020	9/15/2021	1.9
	2022	Soybean	9/16/2021	10/15/2022	1.1

Section 3. Nutrient Management Plan (590)

3.1. Nitrogen and Phosphorus Risk Analyses

Tennessee Phosphorus Index

Field	Crop Year	Site Total	Management Total	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
Watts Hill	2018	12	20	12	240	Medium
Watts Hill	2019	12	3	12	36	Low
Watts Hill	2020	12	20	12	240	Medium
Watts Hill	2021	12	3	12	36	Low
Watts Hill	2022	12	20	12	240	Medium
Terrapin Hill	2018	12	3	12	36	Low
Terrapin Hill	2019	12	20	12	240	Medium
Terrapin Hill	2020	12	3	12	36	Low
Terrapin Hill	2021	12	20	12	240	Medium
Terrapin Hill	2022	12	3	12	36	Low
Shop	2018	12	18	12	216	Medium
Shop	2019	12	3	12	36	Low
Shop	2020	12	20	12	240	Medium
Shop	2021	12	3	12	36	Low
Shop	2022	12	20	12	240	Medium
Parrott	2018	11	3	11	33	Low
Parrott	2019	11	17	11	187	Medium
Parrott	2020	11	3	11	33	Low
Parrott	2021	11	17	11	187	Medium
Parrott	2022	11	3	11	33	Low
Lee Ann	2018	15	3	15	45	Low
Lee Ann	2019	15	17	15	255	Medium
Lee Ann	2020	15	3	15	45	Low
Lee Ann	2021	15	3	15	45	Low
Lee Ann	2022	15	3	15	45	Low
Hay Barn	2018	12	20	12	240	Medium

Field	Crop Year	Site Total	Management Total	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
Hay Barn	2019	12	3	12	36	Low
Hay Barn	2020	12	20	12	240	Medium
Hay Barn	2021	12	3	12	36	Low
Hay Barn	2022	12	20	12	240	Medium
Griffith	2018	11	3	11	33	Low
Griffith	2019	11	20	11	220	Medium
Griffith	2020	11	3	11	33	Low
Griffith	2021	11	20	11	220	Medium
Griffith	2022	11	3	11	33	Low
Grandmothers	2018	12	3	12	36	Low
Grandmothers	2019	12	20	12	240	Medium
Grandmothers	2020	12	3	12	36	Low
Grandmothers	2021	12	20	12	240	Medium
Grandmothers	2022	12	3	12	36	Low
Glisson Hill	2018	12	4	24	48	Low
Glisson Hill	2019	12	21	24	252	Medium
Glisson Hill	2020	12	4	24	48	Low
Glisson Hill	2021	12	21	24	252	Medium
Glisson Hill	2022	12	4	24	48	Low
Glisson Bottom	2018	12	3	12	36	Low
Glisson Bottom	2019	12	17	12	204	Medium
Glisson Bottom	2020	12	3	12	36	Low
Glisson Bottom	2021	12	17	12	204	Medium
Glisson Bottom	2022	12	3	12	36	Low
Carroll	2018	11	4	22	44	Low
Carroll	2019	11	4	22	44	Low
Carroll	2020	11	18	22	198	Medium
Carroll	2021	11	4	22	44	Low
Carroll	2022	11	18	22	198	Medium
Across Culvert	2018	12	3	12	36	Low
Across Culvert	2019	12	17	12	204	Medium

Field	Crop Year	Site Total	Management Total	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
Across Culvert	2020	12	3	12	36	Low
Across Culvert	2021	12	17	12	204	Medium
Across Culvert	2022	12	3	12	36	Low
Blankenship	2018	12	3	12	36	Low
Blankenship	2019	12	3	12	36	Low
Blankenship	2020	12	18	12	216	Medium
Blankenship	2021	12	3	12	36	Low
Blankenship	2022	12	18	12	216	Medium
Barner	2018	12	4	24	48	Low
Barner	2019	12	18	24	216	Medium
Barner	2020	12	4	24	48	Low
Barner	2021	12	18	24	216	Medium
Barner	2022	12	4	24	48	Low
52 Acre Hill	2018	12	3	12	36	Low
52 Acre Hill	2019	12	20	12	240	Medium
52 Acre Hill	2020	12	18	12	216	Medium
52 Acre Hill	2021	12	20	12	240	Medium
52 Acre Hill	2022	12	18	12	216	Medium
18 Acre Btm	2018	12	3	12	36	Low
18 Acre Btm	2019	12	3	12	36	Low
18 Acre Btm	2020	12	3	12	36	Low
18 Acre Btm	2021	12	17	12	204	Medium
18 Acre Btm	2022	12	3	12	36	Low

3.2. Manure Application Setback Distances

Setback Requirements: Class I CAFO

Feature	Setback Criteria	Setback Distance (Feet)
Streams	Applied upgradient, no permanent or insufficient vegetated setback	100
Streams	New operation, near high quality stream	60
Surface waters	Applied upgradient, no permanent or insufficient vegetated setback	100
Open tile line inlet structures	Applied upgradient, no permanent or insufficient vegetated setback	100
Sinkholes	Applied upgradient, no permanent or insufficient vegetated setback	100
Agricultural well heads	Applied upgradient, no permanent or insufficient vegetated setback	100
Other conduits to surface waters	Applied upgradient, no permanent or insufficient vegetated setback	100
Potable well, public or private	Application down-gradient of feature	150
Potable well, public or private	Application upgradient of feature	300

Source: TN DEQ Rule 1200-4-5-.14(17)(d) (http://www.state.tn.us/sos/rules/1200/1200-04/1200-04-05.pdf)

Setback Requirements: NRCS Standard

Feature	Setback Criteria	Setback Distance (Feet)
Well	Application upgradient of feature	300
Well	Application down-gradient of feature	150

Feature	Setback Criteria	Setback Distance (Feet)
Waterbody	Predominant slope <5% with good vegetation	30
Waterbody	Poor vegetation	100
Public road	All applications	50
Dwelling (other than producer)	All applications	300
Public use area	All applications	300
Property line	Application upgradient of feature	30

Source: Nutrient Management Standard 590 (http://efotg.nrcs.usda.gov/references/public/TN/Nutrient_Management_(590)_Standard.doc)

3.3. Soil Test Data

Field	Test Year	OM (%)	P Test Used	P	K	Mg	Ca	Units	Soil pH	Buffer pH	CEC (meq/ 100g)
Watts Hill	2015		Mehlich-3 ICP	16	71			ppm			
Terrapin Hill	2014		Mehlich-3 ICP	22	210			ppm			
Shop	2014		Mehlich-3 ICP	20	190			ppm			
Parrott	2016		Mehlich-3 ICP	14	53			ppm			
Lee Ann	2015		Mehlich-3 ICP	11	114			ppm			
Hay Barn	2015		Mehlich-3 ICP	16	79			ppm			
Griffith	2014		Mehlich-3 ICP	14	108			ppm			
Grandmothers	2014		Mehlich-3 ICP	16	125			ppm			
Glisson Hill	2015		Mehlich-3 ICP	26	165			ppm			
Glisson Bottom	2015		Mehlich-3 ICP	19	171			ppm			
Carroll	2014		Mehlich-3 ICP	32	114			ppm			
Across Culvert	2015		Mehlich-3 ICP	22	254			ppm			
Blankenship	2014		Mehlich-3 ICP	24	130			ppm			
Barner	2015		Mehlich-3 ICP	74	121			ppm			
52 Acre Hill	2015		Mehlich-3 ICP	19	151			ppm			
18 Acre Btm	2015		Mehlich-3 ICP	29	88			ppm			

3.4. Manure Nutrient Analyses

Manure Source	Dry Matter (%)	Total N	NH_4-N	Total P_2O_5	Total K_2O	Avail. P_2O_5	Avail. K_2O	Units	Analysis Source and Date	Alum Treatment Rate (lbs/1000 sq.ft.)
Barn 1		37.9	33.8	22.7	31.7	22.7	31.7	lbs/1000 gal	Analyses/Measured production from similar facility	
Barn 2		37.9	33.8	22.7	31.7	22.7	31.7	lbs/1000 gal	Analyses/Measured production from similar facility	

a. Entered analysis may be the average of several individual analyses.
b. Tennessee assumes that 100% of manure phosphorus and 100% of manure potassium is crop available. First-year per-acre nitrogen availability for individual manure applications is given in the Planned Nutrient Applications table. For more information about nitrogen availability in Tennessee, see "Manure Application Management," Tables 3 and 4, Tennessee Extension, PB1510, 2/94 (http://wastemgmt.ag.utk.edu/Pubs/PB1510.pdf).

3.5. Planned Crops and Fertilizer Recommendations

Field	Crop Year	Planned Crop	Yield Goal (per ac)	N Rec (lbs/ac)	P_2O_5 Rec (lbs/ac)	K_2O Rec (lbs/ac)	N Removed (lbs/ac)	P_2O_5 Removed (lbs/ac)	K_2O Removed (lbs/ac)	Custom Fert. Rec. Source
Watts Hill	2018	Corn grain	170.0 bu	160	70	70	128	75	49	
Watts Hill	2019	Small grain[a]	80.0 bu	90	40	20	104	40	28	
Watts Hill	2019	Soybean	45.0 bu	0	20	40	180	36	63	
Watts Hill	2020	Corn grain	170.0 bu	160	70	70	128	75	49	
Watts Hill	2021	Small grain[a]	80.0 bu	90	40	20	104	40	28	
Watts Hill	2021	Soybean	45.0 bu	0	20	40	180	36	63	
Watts Hill	2022	Corn grain	170.0 bu	160	70	70	128	75	49	
Terrapin Hill	2018	Small grain[a]	80.0 bu	75	40	0	104	40	28	
Terrapin Hill	2018	Soybean	45.0 bu	0	20	0	180	36	63	
Terrapin Hill	2019	Corn grain	170.0 bu	160	70	0	128	75	49	
Terrapin Hill	2020	Small grain[a]	80.0 bu	90	40	0	104	40	28	
Terrapin Hill	2020	Soybean	45.0 bu	0	20	0	180	36	63	
Terrapin Hill	2021	Corn grain	170.0 bu	160	70	0	128	75	49	
Terrapin Hill	2022	Small grain[a]	80.0 bu	90	40	0	104	40	28	
Terrapin Hill	2022	Soybean	45.0 bu	0	20	0	180	36	63	
Shop	2018	Corn grain	170.0 bu	160	70	0	128	75	49	
Shop	2019	Small grain[a]	80.0 bu	90	40	0	104	40	28	
Shop	2019	Soybean	45.0 bu	0	20	0	180	36	63	
Shop	2020	Corn grain	170.0 bu	160	70	0	128	75	49	
Shop	2021	Small grain[a]	80.0 bu	90	40	0	104	40	28	
Shop	2021	Soybean	45.0 bu	0	20	0	180	36	63	
Shop	2022	Corn grain	170.0 bu	160	70	0	128	75	49	
Parrott	2018	Soybean	45.0 bu	0	40	80	180	36	63	
Parrott	2019	Corn grain	170.0 bu	160	140	140	128	75	49	
Parrott	2020	Soybean	45.0 bu	0	40	80	180	36	63	
Parrott	2021	Corn grain	170.0 bu	160	140	140	128	75	49	
Parrott	2022	Soybean	45.0 bu	0	40	80	180	36	63	
Lee Ann	2018	Soybean	45.0 bu	0	40	0	180	36	63	
Lee Ann	2019	Corn grain	170.0 bu	160	140	0	128	75	49	

Field	Crop Year	Planned Crop	Yield Goal (per ac)	N Rec (lbs/ac)	P_2O_5 Rec (lbs/ac)	K_2O Rec (lbs/ac)	N Removed (lbs/ac)	P_2O_5 Removed (lbs/ac)	K_2O Removed (lbs/ac)	Custom Fert. Rec. Source
Lee Ann	2020	Soybean	45.0 bu	0	40	0	180	36	63	
Lee Ann	2021	Corn grain	170.0 bu	160	140	0	128	75	49	
Lee Ann	2022	Soybean	45.0 bu	0	40	0	180	36	63	
Hay Barn	2018	Corn grain	170.0 bu	160	70	70	128	75	49	
Hay Barn	2019	Small grain[a]	80.0 bu	90	40	20	104	40	28	
Hay Barn	2019	Soybean	45.0 bu	0	20	40	180	36	63	
Hay Barn	2020	Corn grain	170.0 bu	160	70	70	128	75	49	
Hay Barn	2021	Small grain[a]	80.0 bu	90	40	20	104	40	28	
Hay Barn	2021	Soybean	45.0 bu	0	20	40	180	36	63	
Hay Barn	2022	Corn grain	170.0 bu	160	70	70	128	75	49	
Griffith	2018	Small grain[a]	80.0 bu	75	80	0	104	40	28	
Griffith	2018	Soybean	45.0 bu	0	10	0	180	36	63	
Griffith	2019	Corn grain	170.0 bu	160	140	0	128	75	49	
Griffith	2020	Small grain[a]	80.0 bu	90	80	0	104	40	28	
Griffith	2020	Soybean	45.0 bu	0	10	0	180	36	63	
Griffith	2021	Corn grain	170.0 bu	160	140	0	128	75	49	
Griffith	2022	Small grain[a]	80.0 bu	90	80	0	104	40	28	
Griffith	2022	Soybean	45.0 bu	0	10	0	180	36	63	
Grandmothers	2018	Small grain[a]	80.0 bu	75	40	0	104	40	28	
Grandmothers	2018	Soybean	45.0 bu	0	20	0	180	36	63	
Grandmothers	2019	Corn grain	170.0 bu	160	70	0	128	75	49	
Grandmothers	2020	Small grain[a]	80.0 bu	90	40	0	104	40	28	
Grandmothers	2020	Soybean	45.0 bu	0	20	0	180	36	63	
Grandmothers	2021	Corn grain	170.0 bu	160	70	0	128	75	49	
Grandmothers	2022	Small grain[a]	80.0 bu	90	40	0	104	40	28	
Grandmothers	2022	Soybean	45.0 bu	0	20	0	180	36	63	
Glisson Hill	2018	Small grain[a]	80.0 bu	75	0	0	104	40	28	
Glisson Hill	2018	Soybean	45.0 bu	0	0	0	180	36	63	
Glisson Hill	2019	Corn grain	170.0 bu	160	0	0	128	75	49	
Glisson Hill	2020	Small grain[a]	80.0 bu	90	0	0	104	40	28	

Field	Crop Year	Planned Crop	Yield Goal (per ac)	N Rec (lbs/ac)	P_2O_5 Rec (lbs/ac)	K_2O Rec (lbs/ac)	N Removed (lbs/ac)	P_2O_5 Removed (lbs/ac)	K_2O Removed (lbs/ac)	Custom Fert. Rec. Source
Glisson Hill	2020	Soybean	45.0 bu	0	0	0	180	36	63	
Glisson Hill	2021	Corn grain	170.0 bu	160	0	0	128	75	49	
Glisson Hill	2022	Small grain[a]	80.0 bu	90	0	0	104	40	28	
Glisson Hill	2022	Soybean	45.0 bu	0	0	0	180	36	63	
Glisson Bottom	2018	Soybean	45.0 bu	0	20	0	180	36	63	
Glisson Bottom	2019	Corn grain	170.0 bu	160	70	0	128	75	49	
Glisson Bottom	2020	Soybean	45.0 bu	0	20	0	180	36	63	
Glisson Bottom	2021	Corn grain	170.0 bu	160	70	0	128	75	49	
Glisson Bottom	2022	Soybean	45.0 bu	0	20	0	180	36	63	
Carroll	2018	Corn grain	170.0 bu	160	0	0	128	75	49	
Carroll	2019	Soybean	45.0 bu	0	0	0	180	36	63	
Carroll	2020	Corn grain	170.0 bu	160	0	0	128	75	49	
Carroll	2021	Soybean	45.0 bu	0	0	0	180	36	63	
Carroll	2022	Corn grain	170.0 bu	160	0	0	128	75	49	
Across Culvert	2018	Soybean	45.0 bu	0	20	0	180	36	63	
Across Culvert	2019	Corn grain	170.0 bu	160	70	0	128	75	49	
Across Culvert	2020	Soybean	45.0 bu	0	20	0	180	36	63	
Across Culvert	2021	Corn grain	170.0 bu	160	70	0	128	75	49	
Across Culvert	2022	Soybean	45.0 bu	0	20	0	180	36	63	
Blankenship	2018	Corn grain	170.0 bu	160	70	0	128	75	49	
Blankenship	2019	Small grain[a]	80.0 bu	90	40	0	104	40	28	
Blankenship	2019	Soybean	45.0 bu	0	20	0	180	36	63	
Blankenship	2020	Corn grain	170.0 bu	160	70	0	128	75	49	
Blankenship	2021	Small grain[a]	80.0 bu	90	40	0	104	40	28	
Blankenship	2021	Soybean	45.0 bu	0	20	0	180	36	63	
Blankenship	2022	Corn grain	170.0 bu	160	70	0	128	75	49	
Barner	2018	Soybean	45.0 bu	0	0	0	180	36	63	
Barner	2019	Corn grain	170.0 bu	160	0	0	128	75	49	
Barner	2020	Soybean	45.0 bu	0	0	0	180	36	63	
Barner	2021	Corn grain	170.0 bu	160	0	0	128	75	49	

Field	Crop Year	Planned Crop	Yield Goal (per ac)	N Rec (lbs/ac)	P_2O_5 Rec (lbs/ac)	K_2O Rec (lbs/ac)	N Removed (lbs/ac)	P_2O_5 Removed (lbs/ac)	K_2O Removed (lbs/ac)	Custom Fert. Rec. Source
Barner	2022	Soybean	45.0 bu	0	0	0	180	36	63	
52 Acre Hill	2018	Small grain[a]	80.0 bu	75	40	0	104	40	28	
52 Acre Hill	2018	Soybean	45.0 bu	0	20	0	180	36	63	
52 Acre Hill	2019	Corn grain	170.0 bu	160	70	0	128	75	49	
52 Acre Hill	2020	Small grain[a]	80.0 bu	90	40	0	104	40	28	
52 Acre Hill	2020	Soybean	45.0 bu	0	20	0	180	36	63	
52 Acre Hill	2021	Corn grain	170.0 bu	160	70	0	128	75	49	
52 Acre Hill	2022	Small grain[a]	80.0 bu	90	40	0	104	40	28	
52 Acre Hill	2022	Soybean	45.0 bu	0	20	0	180	36	63	
18 Acre Btm	2018	Soybean	45.0 bu	0	20	40	180	36	63	
18 Acre Btm	2019	Corn grain	170.0 bu	160	70	70	128	75	49	
18 Acre Btm	2020	Soybean	45.0 bu	0	20	40	180	36	63	
18 Acre Btm	2021	Corn grain	170.0 bu	160	70	70	128	75	49	
18 Acre Btm	2022	Soybean	45.0 bu	0	20	40	180	36	63	

a. Unharvested cover crop or first crop in double-crop system.
b. Custom fertilizer recommendation.

3.6. Planned Nutrient Applications (Manure-spreadable Area)

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (lbs/ac)	Avail P_2O_5 (lbs/ac)	Avail K_2O (lbs/ac)
Watts Hill	Feb 2018	Corn grain	Barn 1	Drag Line	2-yr P	6,100 gal	3.2 mph	153,720 gal	25.2	162	138	193
Watts Hill	Feb 2020	Corn grain	Barn 1	Drag Line	2-yr P	6,000 gal	3.3 mph	151,200 gal	25.2	159	136	190
Watts Hill	Feb 2021	Small grain	32-0-0	Surface broadcast	Custom	24 gal		605 gal	25.2	85	0	0
Watts Hill	Feb 2022	Corn grain	Barn 1	Drag Line	2-yr P	6,000 gal	3.3 mph	151,200 gal	25.2	159	136	190
Terrapin Hill	Feb 2019	Corn grain	Barn 1	Drag Line	2-yr P	6,100 gal	3.2 mph	34,770 gal	5.7	162	138	193
Terrapin Hill	Feb 2020	Small grain	32-0-0	Surface broadcast	Custom	24 gal		137 gal	5.7	85	0	0
Terrapin Hill	Feb 2021	Corn grain	Barn 1	Drag Line	2-yr P	6,000 gal	3.3 mph	34,200 gal	5.7	159	136	190
Shop	Feb 2018	Corn grain	Barn 2	Drag Line	2-yr P	6,100 gal	3.2 mph	151,720 gal	24.9	162	138	193
Shop	Feb 2018	Corn grain	Barn 1	Drag Line	2-yr P	6,100 gal	3.2 mph	179,780 gal	29.5	162	138	193
Shop	Feb 2020	Corn grain	Barn 1	Drag Line	2-yr P	6,000 gal	3.3 mph	384,600 gal	64.1	159	136	190
Shop	Feb 2021	Small grain	32-0-0	Surface broadcast	Custom	24 gal		1,538 gal	64.1	85	0	0
Shop	Feb 2022	Corn grain	Barn 1	Drag Line	2-yr P	6,000 gal	3.3 mph	384,600 gal	64.1	159	136	190
Parrott	Feb 2019	Corn grain	Barn 1	Drag Line	2-yr P	4,700 gal	4.2 mph	156,980 gal	33.4	125	107	149
Parrott	Feb 2021	Corn grain	Barn 1	Drag Line	2-yr P	4,700 gal	4.2 mph	156,980 gal	33.4	125	107	149
Lee Ann	Apr 2019	Corn grain	32-0-0	Shallow subsurface band (<4")	Custom	37 gal		4,277 gal	115.6	131	0	0
Lee Ann	Apr 2019	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs		8,786 lbs	115.6	0	0	46
Lee Ann	Apr 2019	Corn grain	18-46-0	Surface broadcast	Custom	150 lbs		17,340 lbs	115.6	27	69	0
Hay Barn	Feb 2018	Corn grain	Barn 2	Drag Line	2-yr P	6,100 gal	3.2 mph	181,780 gal	29.8	162	138	193
Hay Barn	Feb 2020	Corn grain	Barn 1	Drag Line	2-yr P	6,000 gal	3.3 mph	178,800 gal	29.8	159	136	190
Hay Barn	Feb 2021	Small grain	32-0-0	Surface broadcast	Custom	24 gal		715 gal	29.8	85	0	0
Hay Barn	Feb 2022	Corn grain	Barn 1	Drag Line	2-yr P	6,000 gal	3.3 mph	178,800 gal	29.8	159	136	190
Griffith	Feb 2019	Corn grain	Barn 2	Drag Line	2-yr P	6,100 gal	3.2 mph	142,130 gal	23.3	162	138	193
Griffith	Feb 2020	Small grain	32-0-0	Surface broadcast	Custom	24 gal		559 gal	23.3	85	0	0
Griffith	Feb 2021	Corn grain	Barn 1	Drag Line	2-yr P	6,000 gal	3.3 mph	65,900 gal	11.0	159	136	190
Griffith	Feb 2021	Corn grain	Barn 2	Drag Line	2-yr P	6,000 gal	3.3 mph	73,800 gal	12.3	159	136	190
Griffith	Feb 2022	Small grain	32-0-0	Surface broadcast	Custom	24 gal		559 gal	23.3	85	0	0
Grandmothers	Feb 2019	Corn grain	Barn 2	Drag Line	2-yr P	6,100 gal	3.2 mph	120,170 gal	19.7	162	138	193
Grandmothers	Feb 2020	Small grain	32-0-0	Surface broadcast	Custom	24 gal		473 gal	19.7	85	0	0
Grandmothers	Feb 2021	Corn grain	Barn 2	Drag Line	2-yr P	6,000 gal	3.3 mph	118,200 gal	19.7	159	136	190

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (lbs/ac)	Avail P_2O_5 (lbs/ac)	Avail K_2O (lbs/ac)
Grandmothers	Feb 2022	Small grain	32-0-0	Surface broadcast	Custom	24 gal		473 gal	19.7	85	0	0
Glisson Hill	Feb 2019	Corn grain	Barn 2	Drag Line	2-yr P	6,100 gal	3.2 mph	118,340 gal	19.4	162	138	193
Glisson Hill	Feb 2020	Small grain	32-0-0	Surface broadcast	Custom	24 gal		466 gal	19.4	85	0	0
Glisson Hill	Feb 2021	Corn grain	Barn 2	Drag Line	2-yr P	6,000 gal	3.3 mph	116,400 gal	19.4	159	136	190
Glisson Hill	Feb 2022	Small grain	32-0-0	Surface broadcast	Custom	24 gal		466 gal	19.4	85	0	0
Glisson Bottom	Feb 2019	Corn grain	Barn 2	Drag Line	2-yr P	4,700 gal	4.2 mph	50,760 gal	10.8	125	107	149
Glisson Bottom	Feb 2021	Corn grain	Barn 2	Drag Line	2-yr P	4,700 gal	4.2 mph	50,760 gal	10.8	125	107	149
Carroll	Feb 2018	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	195 lbs		22,289 lbs	114.3	160	0	0
Carroll	Feb 2018	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs		8,687 lbs	114.3	0	0	46
Carroll	May 2019	Soybean	0-0-60	Surface broadcast	Custom	105 lbs		12,002 lbs	114.3	0	0	63
Carroll	Feb 2020	Corn grain	Barn 1	Drag Line	2-yr P	4,700 gal	4.2 mph	79,390 gal	16.9	125	107	149
Carroll	Feb 2020	Corn grain	Barn 2	Drag Line	2-yr P	4,700 gal	4.2 mph	457,780 gal	97.4	125	107	149
Carroll	Feb 2022	Corn grain	Barn 2	Drag Line	2-yr P	4,700 gal	4.2 mph	537,210 gal	114.3	125	107	149
Across Culvert	Feb 2019	Corn grain	Barn 2	Drag Line	2-yr P	4,700 gal	4.2 mph	289,050 gal	61.5	125	107	149
Across Culvert	Feb 2021	Corn grain	Barn 2	Drag Line	2-yr P	4,700 gal	4.2 mph	289,050 gal	61.5	125	107	149
Blankenship	Feb 2018	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	195 lbs		12,656 lbs	64.9	160	0	0
Blankenship	Feb 2018	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs		4,932 lbs	64.9	0	0	46
Blankenship	Feb 2020	Corn grain	Barn 2	Drag Line	2-yr P	6,100 gal	3.2 mph	342,620 gal	56.2	162	138	193
Blankenship	Feb 2021	Small grain	32-0-0	Surface broadcast	Custom	24 gal		1,558 gal	64.9	85	0	0
Blankenship	Feb 2022	Corn grain	Barn 1	Drag Line	2-yr P	6,000 gal	3.3 mph	85,800 gal	14.3	159	136	190
Blankenship	Feb 2022	Corn grain	Barn 2	Drag Line	2-yr P	6,000 gal	3.3 mph	263,190 gal	43.9	159	136	190
Barner	Feb 2019	Corn grain	Barn 1	Drag Line	2-yr P	4,900 gal	4 mph	228,340 gal	46.6	130	111	155
Barner	Feb 2021	Corn grain	Barn 1	Drag Line	2-yr P	4,900 gal	4 mph	228,340 gal	46.6	130	111	155
Barner	Apr 2021	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	87 lbs		4,054 lbs	46.6	71	0	0
52 Acre Hill	Feb 2019	Corn grain	Barn 1	Drag Line	2-yr P	6,100 gal	3.2 mph	300,730 gal	49.3	162	138	193
52 Acre Hill	Feb 2020	Small grain	18-46-0	Surface broadcast	Custom	162 lbs		7,987 lbs	49.3	29	75	0
52 Acre Hill	Feb 2020	Small grain	0-0-60	Surface broadcast	Custom	151 lbs		7,444 lbs	49.3	0	0	91
52 Acre Hill	Feb 2021	Corn grain	Barn 1	Drag Line	2-yr P	6,000 gal	3.3 mph	295,800 gal	49.3	159	136	190
52 Acre Hill	Apr 2021	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs		3,747 lbs	49.3	0	0	46
52 Acre Hill	Apr 2021	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs		7,987 lbs	49.3	133	0	0

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Loads, Speed or Time	Total Amount Applied	Acres Cov.	Avail N (lbs/ac)	Avail P_2O_5 (lbs/ac)	Avail K_2O (lbs/ac)
52 Acre Hill	Feb 2022	Small grain	0-0-60	Surface broadcast	Custom	151 lbs		7,444 lbs	49.3	0	0	91
52 Acre Hill	Feb 2022	Small grain	18-46-0	Surface broadcast	Custom	165 lbs		8,134 lbs	49.3	30	76	0
52 Acre Hill	Feb 2022	Small grain	32-0-0	Surface broadcast	Custom	17 gal		838 gal	49.3	60	0	0
18 Acre Btm	Feb 2021	Corn grain	Barn 2	Drag Line	2-yr P	4,900 gal	4 mph	77,420 gal	15.8	130	111	155
18 Acre Btm	Apr 2021	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs		1,201 lbs	15.8	0	0	46
18 Acre Btm	Apr 2021	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs		2,560 lbs	15.8	133	0	0

Planned Nutrient Applications (Non-manure-spreadable Area)

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (lbs/ac)	Avail P_2O_5 (lbs/ac)	Avail K_2O (lbs/ac)
Watts Hill	Feb 2018	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	794 lbs	4.9	133	0	0
Watts Hill	Feb 2018	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	372 lbs	4.9	0	0	46
Watts Hill	Apr 2020	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	372 lbs	4.9	0	0	46
Watts Hill	Feb 2021	Small grain	32-0-0	Surface broadcast	Custom	24 gal	118 gal	4.9	85	0	0
Terrapin Hill	Apr 2019	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	182 lbs	2.4	0	0	46
Terrapin Hill	Apr 2019	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	389 lbs	2.4	133	0	0
Terrapin Hill	Feb 2020	Small grain	32-0-0	Surface broadcast	Custom	24 gal	58 gal	2.4	85	0	0
Terrapin Hill	Apr 2021	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	182 lbs	2.4	0	0	46
Terrapin Hill	Apr 2021	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	389 lbs	2.4	133	0	0
Shop	Feb 2018	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	334 lbs	4.4	0	0	46
Shop	Feb 2018	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	713 lbs	4.4	133	0	0
Shop	Apr 2020	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	334 lbs	4.4	0	0	46
Shop	Apr 2020	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	713 lbs	4.4	133	0	0
Shop	Feb 2021	Small grain	32-0-0	Surface broadcast	Custom	24 gal	106 gal	4.4	85	0	0
Shop	Apr 2022	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	334 lbs	4.4	0	0	46
Shop	Apr 2022	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	713 lbs	4.4	133	0	0
Parrott	Apr 2019	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	61 lbs	0.8	0	0	46
Parrott	Apr 2019	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	130 lbs	0.8	133	0	0
Parrott	May 2020	Soybean	0-0-60	Surface broadcast	Custom	105 lbs	84 lbs	0.8	0	0	63
Parrott	Apr 2021	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	130 lbs	0.8	133	0	0

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (lbs/ac)	Avail P_2O_5 (lbs/ac)	Avail K_2O (lbs/ac)
Parrott	Apr 2021	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	61 lbs	0.8	0	0	46
Parrott	May 2022	Soybean	0-0-60	Surface broadcast	Custom	105 lbs	84 lbs	0.8	0	0	63
Lee Ann	Apr 2019	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	540 lbs	7.1	0	0	46
Lee Ann	Apr 2019	Corn grain	32-0-0	Shallow subsurface band (<4")	Custom	37 gal	263 gal	7.1	131	0	0
Lee Ann	Apr 2019	Corn grain	18-46-0	Surface broadcast	Custom	150 lbs	1,065 lbs	7.1	27	69	0
Lee Ann	May 2020	Soybean	0-0-60	Surface broadcast	Custom	105 lbs	745 lbs	7.1	0	0	63
Lee Ann	Apr 2021	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	1,150 lbs	7.1	133	0	0
Lee Ann	Apr 2021	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	540 lbs	7.1	0	0	46
Lee Ann	May 2022	Soybean	0-0-60	Surface broadcast	Custom	105 lbs	745 lbs	7.1	0	0	63
Hay Barn	Feb 2018	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	167 lbs	2.2	0	0	46
Hay Barn	Feb 2018	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	356 lbs	2.2	133	0	0
Hay Barn	Apr 2020	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	356 lbs	2.2	133	0	0
Hay Barn	Apr 2020	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	167 lbs	2.2	0	0	46
Hay Barn	Feb 2021	Small grain	32-0-0	Surface broadcast	Custom	24 gal	53 gal	2.2	85	0	0
Hay Barn	Apr 2022	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	356 lbs	2.2	133	0	0
Hay Barn	Apr 2022	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	167 lbs	2.2	0	0	46
Griffith	Apr 2019	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	15 lbs	0.2	0	0	46
Griffith	Apr 2019	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	32 lbs	0.2	133	0	0
Griffith	Feb 2020	Small grain	32-0-0	Surface broadcast	Custom	24 gal	5 gal	0.2	85	0	0
Griffith	Apr 2021	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	32 lbs	0.2	133	0	0
Griffith	Apr 2021	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	15 lbs	0.2	0	0	46
Griffith	Feb 2022	Small grain	32-0-0	Surface broadcast	Custom	24 gal	5 gal	0.2	85	0	0
Grandmothers	Apr 2019	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	53 lbs	0.7	0	0	46
Grandmothers	Apr 2019	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	113 lbs	0.7	133	0	0
Grandmothers	Feb 2020	Small grain	32-0-0	Surface broadcast	Custom	24 gal	17 gal	0.7	85	0	0
Grandmothers	Apr 2021	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	53 lbs	0.7	0	0	46
Grandmothers	Apr 2021	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	113 lbs	0.7	133	0	0
Grandmothers	Feb 2022	Small grain	32-0-0	Surface broadcast	Custom	24 gal	17 gal	0.7	85	0	0
Glisson Hill	Apr 2019	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	258 lbs	3.4	0	0	46
Glisson Hill	Apr 2019	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	551 lbs	3.4	133	0	0

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (lbs/ac)	Avail P_2O_5 (lbs/ac)	Avail K_2O (lbs/ac)
Glisson Hill	Feb 2020	Small grain	32-0-0	Surface broadcast	Custom	24 gal	82 gal	3.4	85	0	0
Glisson Hill	Apr 2021	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	551 lbs	3.4	133	0	0
Glisson Hill	Apr 2021	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	258 lbs	3.4	0	0	46
Glisson Hill	Feb 2022	Small grain	32-0-0	Surface broadcast	Custom	24 gal	82 gal	3.4	85	0	0
Glisson Bottom	Apr 2019	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	281 lbs	3.7	0	0	46
Glisson Bottom	Apr 2019	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	599 lbs	3.7	133	0	0
Glisson Bottom	May 2020	Soybean	0-0-60	Surface broadcast	Custom	105 lbs	388 lbs	3.7	0	0	63
Glisson Bottom	Apr 2021	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	599 lbs	3.7	133	0	0
Glisson Bottom	Apr 2021	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	281 lbs	3.7	0	0	46
Glisson Bottom	May 2022	Soybean	0-0-60	Surface broadcast	Custom	105 lbs	388 lbs	3.7	0	0	63
Carroll	Feb 2018	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	195 lbs	1,189 lbs	6.1	160	0	0
Carroll	Feb 2018	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	464 lbs	6.1	0	0	46
Carroll	May 2019	Soybean	0-0-60	Surface broadcast	Custom	105 lbs	640 lbs	6.1	0	0	63
Carroll	Apr 2020	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	988 lbs	6.1	133	0	0
Carroll	Apr 2020	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	464 lbs	6.1	0	0	46
Carroll	May 2021	Soybean	0-0-60	Surface broadcast	Custom	105 lbs	640 lbs	6.1	0	0	63
Carroll	Apr 2022	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	464 lbs	6.1	0	0	46
Carroll	Apr 2022	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	988 lbs	6.1	133	0	0
Across Culvert	Apr 2019	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	593 lbs	7.8	0	0	46
Across Culvert	Apr 2019	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	1,264 lbs	7.8	133	0	0
Across Culvert	May 2020	Soybean	0-0-60	Surface broadcast	Custom	105 lbs	819 lbs	7.8	0	0	63
Across Culvert	Apr 2021	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	1,264 lbs	7.8	133	0	0
Across Culvert	Apr 2021	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	593 lbs	7.8	0	0	46
Across Culvert	May 2022	Soybean	0-0-60	Surface broadcast	Custom	105 lbs	819 lbs	7.8	0	0	63
Blankenship	Feb 2018	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	195 lbs	409 lbs	2.1	160	0	0
Blankenship	Feb 2018	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	160 lbs	2.1	0	0	46
Blankenship	Apr 2020	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	340 lbs	2.1	133	0	0
Blankenship	Apr 2020	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	160 lbs	2.1	0	0	46
Blankenship	Feb 2021	Small grain	32-0-0	Surface broadcast	Custom	24 gal	50 gal	2.1	85	0	0
Blankenship	Apr 2022	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	160 lbs	2.1	0	0	46

Field	App. Month	Target Crop	Nutrient Source	Application Method	Rate Basis	Rate/Acre	Total Amount Applied	Acres Cov.	Avail N (lbs/ac)	Avail P_2O_5 (lbs/ac)	Avail K_2O (lbs/ac)
Blankenship	Apr 2022	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	340 lbs	2.1	133	0	0
Barner	Apr 2019	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	1,003 lbs	13.2	0	0	46
Barner	Apr 2019	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	2,138 lbs	13.2	133	0	0
Barner	May 2020	Soybean	0-0-60	Surface broadcast	Custom	105 lbs	1,386 lbs	13.2	0	0	63
Barner	Apr 2021	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	2,138 lbs	13.2	133	0	0
Barner	Apr 2021	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	1,003 lbs	13.2	0	0	46
Barner	May 2022	Soybean	0-0-60	Surface broadcast	Custom	105 lbs	1,386 lbs	13.2	0	0	63
52 Acre Hill	Apr 2019	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	130 lbs	0.8	133	0	0
52 Acre Hill	Apr 2019	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	61 lbs	0.8	0	0	46
52 Acre Hill	Feb 2020	Small grain	18-46-0	Surface broadcast	Custom	162 lbs	130 lbs	0.8	29	75	0
52 Acre Hill	Feb 2020	Small grain	0-0-60	Surface broadcast	Custom	151 lbs	121 lbs	0.8	0	0	91
52 Acre Hill	Apr 2021	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	130 lbs	0.8	133	0	0
52 Acre Hill	Apr 2021	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	61 lbs	0.8	0	0	46
52 Acre Hill	Feb 2022	Small grain	32-0-0	Surface broadcast	Custom	17 gal	14 gal	0.8	60	0	0
52 Acre Hill	Feb 2022	Small grain	0-0-60	Surface broadcast	Custom	151 lbs	121 lbs	0.8	0	0	91
52 Acre Hill	Feb 2022	Small grain	18-46-0	Surface broadcast	Custom	165 lbs	132 lbs	0.8	30	76	0
18 Acre Btm	Apr 2019	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	175 lbs	2.3	0	0	46
18 Acre Btm	Apr 2019	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	373 lbs	2.3	133	0	0
18 Acre Btm	May 2020	Soybean	0-0-60	Surface broadcast	Custom	105 lbs	242 lbs	2.3	0	0	63
18 Acre Btm	Apr 2021	Corn grain	82-0-0	Shallow subsurface band (<4")	Custom	162 lbs	373 lbs	2.3	133	0	0
18 Acre Btm	Apr 2021	Corn grain	0-0-60	Surface broadcast	Custom	76 lbs	175 lbs	2.3	0	0	46
18 Acre Btm	May 2022	Soybean	0-0-60	Surface broadcast	Custom	105 lbs	242 lbs	2.3	0	0	63

3.7. Field Nutrient Balance (Manure-spreadable Area)

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2018	Watts Hill	25.2	Corn grain	170	160	70	70	162	138	193	2	68	123	63	144
2019	Watts Hill	25.2	Small grain	80	90	40	20								
2019	Watts Hill	25.2	Soybean	45	0	20	40	0	0	0	-87[g]	8	63	-13	53
2020	Watts Hill	25.2	Corn grain	170	160	70	70	159	136	190	0[g]	74	183	61	194
2021	Watts Hill	25.2	Small grain	80	90	40	20								
2021	Watts Hill	25.2	Soybean	45	0	20	40	85	0	0	-2[g]	14	123	-15	103
2022	Watts Hill	25.2	Corn grain	170	160	70	70	159	136	190	0[g]	80	243	61	244
Total	**Watts Hill**				**660**	**330**	**330**	**565**	**410**	**573**					
2018	Terrapin Hill	5.7	Small grain	80	75	40	0								
2018	Terrapin Hill	5.7	Soybean	45	0	20	0	0	0	0	-75	-60	0	-76	-91
2019	Terrapin Hill	5.7	Corn grain	170	160	70	0	162	138	193	2	68	193	63	144
2020	Terrapin Hill	5.7	Small grain	80	90	40	0								
2020	Terrapin Hill	5.7	Soybean	45	0	20	0	85	0	0	-2[g]	8	193	-13	53
2021	Terrapin Hill	5.7	Corn grain	170	160	70	0	159	136	190	0[g]	74	383	61	194
2022	Terrapin Hill	5.7	Small grain	80	90	40	0								
2022	Terrapin Hill	5.7	Soybean	45	0	20	0	0	0	0	-87[g]	14	383	-15	103
Total	**Terrapin Hill**				**575**	**320**	**0**	**406**	**274**	**383**					
2018	Shop	64.1	Corn grain	170	160	70	0	137	117	164	-23	47	164	42	115
2019	Shop	64.1	Small grain	80	90	40	0								
2019	Shop	64.1	Soybean	45	0	20	0	0	0	0	-87[g]	-13	164	-34	24
2020	Shop	64.1	Corn grain	170	160	70	0	159	136	190	0[g]	66	354	61	165
2021	Shop	64.1	Small grain	80	90	40	0								
2021	Shop	64.1	Soybean	45	0	20	0	85	0	0	-2[g]	6	354	-15	74
2022	Shop	64.1	Corn grain	170	160	70	0	159	136	190	0[g]	72	544	61	215
Total	**Shop**				**660**	**330**	**0**	**540**	**389**	**544**					
2018	Parrott	33.4	Soybean	45	0	40	80	0	0	0	0	-40	-80	-36	-63
2019	Parrott	33.4	Corn grain	170	160	140	140	125	107	149	-35	-33	9	32	100
2020	Parrott	33.4	Soybean	45	0	40	80	0	0	0	0	-40	-71	-4	37

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2021	Parrott	33.4	Corn grain	170	160	140	140	125	107	149	-34[g]	-33	9	32	137
2022	Parrott	33.4	Soybean	45	0	40	80	0	0	0	0	-40	-71	-4	74
Total	**Parrott**				**320**	**400**	**520**	**250**	**214**	**298**					
2018	Lee Ann	115.6	Soybean	45	0	40	0	0	0	0	0	-40	0	-36	-63
2019	Lee Ann	115.6	Corn grain	170	160	140	0	158	69	46	-2	-71	46	-6	-3
2020	Lee Ann	115.6	Soybean	45	0	40	0	0	0	0	0	-40	46	-36	-63
2021	Lee Ann	115.6	Corn grain	170	160	140	0	0	0	0	-160	-140	46	-75	-49
2022	Lee Ann	115.6	Soybean	45	0	40	0	0	0	0	0	-40	46	-36	-63
Total	**Lee Ann**				**320**	**400**	**0**	**158**	**69**	**46**					
2018	Hay Barn	29.8	Corn grain	170	160	70	70	162	138	193	2	68	123	63	144
2019	Hay Barn	29.8	Small grain	80	90	40	20								
2019	Hay Barn	29.8	Soybean	45	0	20	40	0	0	0	-87[g]	8	63	-13	53
2020	Hay Barn	29.8	Corn grain	170	160	70	70	159	136	190	0[g]	74	183	61	194
2021	Hay Barn	29.8	Small grain	80	90	40	20								
2021	Hay Barn	29.8	Soybean	45	0	20	40	85	0	0	-2[g]	14	123	-15	103
2022	Hay Barn	29.8	Corn grain	170	160	70	70	159	136	190	0[g]	80	243	61	244
Total	**Hay Barn**				**660**	**330**	**330**	**565**	**410**	**573**					
2018	Griffith	23.3	Small grain	80	75	80	0								
2018	Griffith	23.3	Soybean	45	0	10	0	0	0	0	-75	-90	0	-76	-91
2019	Griffith	23.3	Corn grain	170	160	140	0	162	138	193	2	-2	193	63	144
2020	Griffith	23.3	Small grain	80	90	80	0								
2020	Griffith	23.3	Soybean	45	0	10	0	85	0	0	-2[g]	-90	193	-13	53
2021	Griffith	23.3	Corn grain	170	160	140	0	159	136	190	0[g]	-4	383	61	194
2022	Griffith	23.3	Small grain	80	90	80	0								
2022	Griffith	23.3	Soybean	45	0	10	0	85	0	0	-2[g]	-90	383	-15	103
Total	**Griffith**				**575**	**550**	**0**	**491**	**274**	**383**					
2018	Grandmothers	19.7	Small grain	80	75	40	0								
2018	Grandmothers	19.7	Soybean	45	0	20	0	0	0	0	-75	-60	0	-76	-91
2019	Grandmothers	19.7	Corn grain	170	160	70	0	162	138	193	2	68	193	63	144

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2020	Grandmothers	19.7	Small grain	80	90	40	0								
2020	Grandmothers	19.7	Soybean	45	0	20	0	85	0	0	-2[g]	8	193	-13	53
2021	Grandmothers	19.7	Corn grain	170	160	70	0	159	136	190	0[g]	74	383	61	194
2022	Grandmothers	19.7	Small grain	80	90	40	0								
2022	Grandmothers	19.7	Soybean	45	0	20	0	85	0	0	-2[g]	14	383	-15	103
Total	**Grandmothers**				**575**	**320**	**0**	**491**	**274**	**383**					
2018	Glisson Hill	19.4	Small grain	80	75	0	0								
2018	Glisson Hill	19.4	Soybean	45	0	0	0	0	0	0	-75	0	0	-76	-91
2019	Glisson Hill	19.4	Corn grain	170	160	0	0	162	138	193	2	138	193	63	144
2020	Glisson Hill	19.4	Small grain	80	90	0	0								
2020	Glisson Hill	19.4	Soybean	45	0	0	0	85	0	0	-2[g]	138	193	-13	53
2021	Glisson Hill	19.4	Corn grain	170	160	0	0	159	136	190	0[g]	274	383	61	194
2022	Glisson Hill	19.4	Small grain	80	90	0	0								
2022	Glisson Hill	19.4	Soybean	45	0	0	0	85	0	0	-2[g]	274	383	-15	103
Total	**Glisson Hill**				**575**	**0**	**0**	**491**	**274**	**383**					
2018	Glisson Bottom	10.8	Soybean	45	0	20	0	0	0	0	0	-20	0	-36	-63
2019	Glisson Bottom	10.8	Corn grain	170	160	70	0	125	107	149	-35	37	149	32	100
2020	Glisson Bottom	10.8	Soybean	45	0	20	0	0	0	0	0	17	149	-4	37
2021	Glisson Bottom	10.8	Corn grain	170	160	70	0	125	107	149	-34[g]	54	298	32	137
2022	Glisson Bottom	10.8	Soybean	45	0	20	0	0	0	0	0	34	298	-4	74
Total	**Glisson Bottom**				**320**	**200**	**0**	**250**	**214**	**298**					
2018	Carroll	114.3	Corn grain	170	160	0	0	160	0	46	0	0	46	-75	-3
2019	Carroll	114.3	Soybean	45	0	0	0	0	0	63	0	0	109	-36	0
2020	Carroll	114.3	Corn grain	170	160	0	0	125	107	149	-35	107	258	32	100
2021	Carroll	114.3	Soybean	45	0	0	0	0	0	0	0	107	258	-4	37
2022	Carroll	114.3	Corn grain	170	160	0	0	125	107	149	-34[g]	214	407	32	137
Total	**Carroll**				**480**	**0**	**0**	**410**	**214**	**407**					
2018	Across Culvert	61.5	Soybean	45	0	20	0	0	0	0	0	-20	0	-36	-63
2019	Across Culvert	61.5	Corn grain	170	160	70	0	125	107	149	-35	37	149	32	100

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2020	Across Culvert	61.5	Soybean	45	0	20	0	0	0	0	0	17	149	-4	37
2021	Across Culvert	61.5	Corn grain	170	160	70	0	125	107	149	-34[g]	54	298	32	137
2022	Across Culvert	61.5	Soybean	45	0	20	0	0	0	0	0	34	298	-4	74
Total	**Across Culvert**				**320**	**200**	**0**	**250**	**214**	**298**					
2018	Blankenship	64.9	Corn grain	170	160	70	0	160	0	46	0	-70	46	-75	-3
2019	Blankenship	64.9	Small grain	80	90	40	0								
2019	Blankenship	64.9	Soybean	45	0	20	0	0	0	0	-90	-60	46	-76	-91
2020	Blankenship	64.9	Corn grain	170	160	70	0	140	120	167	-20	50	213	45	118
2021	Blankenship	64.9	Small grain	80	90	40	0								
2021	Blankenship	64.9	Soybean	45	0	20	0	85	0	0	-2[g]	-10	213	-31	27
2022	Blankenship	64.9	Corn grain	170	160	70	0	143	122	170	-16[g]	52	383	47	148
Total	**Blankenship**				**660**	**330**	**0**	**528**	**242**	**383**					
2018	Barner	46.6	Soybean	45	0	0	0	0	0	0	0	0	0	-36	-63
2019	Barner	46.6	Corn grain	170	160	0	0	130	111	155	-30	111	155	36	106
2020	Barner	46.6	Soybean	45	0	0	0	0	0	0	0	111	155	0	43
2021	Barner	46.6	Corn grain	170	160	0	0	201	111	155	42[g]	222	310	36	149
2022	Barner	46.6	Soybean	45	0	0	0	0	0	0	0	222	310	0	86
Total	**Barner**				**320**	**0**	**0**	**331**	**222**	**310**					
2018	52 Acre Hill	49.3	Small grain	80	75	40	0								
2018	52 Acre Hill	49.3	Soybean	45	0	20	0	0	0	0	-75	-60	0	-76	-91
2019	52 Acre Hill	49.3	Corn grain	170	160	70	0	162	138	193	2	68	193	63	144
2020	52 Acre Hill	49.3	Small grain	80	90	40	0								
2020	52 Acre Hill	49.3	Soybean	45	0	20	0	29	75	91	-58[g]	83	284	62	144
2021	52 Acre Hill	49.3	Corn grain	170	160	70	0	292	136	236	133[g]	149	520	123	331
2022	52 Acre Hill	49.3	Small grain	80	90	40	0								
2022	52 Acre Hill	49.3	Soybean	45	0	20	0	90	76	91	3[g]	165	611	123	331
Total	**52 Acre Hill**				**575**	**320**	**0**	**573**	**425**	**611**					
2018	18 Acre Btm	15.8	Soybean	45	0	20	40	0	0	0	0	-20	-40	-36	-63
2019	18 Acre Btm	15.8	Corn grain	170	160	70	70	0	0	0	-160	-70	-70	-75	-49

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2020	18 Acre Btm	15.8	Soybean	45	0	20	40	0	0	0	0	-20	-40	-36	-63
2021	18 Acre Btm	15.8	Corn grain	170	160	70	70	263	111	201	103	41	131	36	152
2022	18 Acre Btm	15.8	Soybean	45	0	20	40	0	0	0	0	21	91	0	89
Total	**18 Acre Btm**				**320**	**200**	**260**	**263**	**111**	**201**					

Field Nutrient Balance (Non-manure-spreadable Area)

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2018	Watts Hill	4.9	Corn grain	170	160	70	70	133	0	46	-27	-70	-24	-75	-3
2019	Watts Hill	4.9	Small grain	80	90	40	20								
2019	Watts Hill	4.9	Soybean	45	0	20	40	0	0	0	-90	-60	-60	-76	-91
2020	Watts Hill	4.9	Corn grain	170	160	70	70	0	0	46	-160	-70	-24	-75	-3
2021	Watts Hill	4.9	Small grain	80	90	40	20								
2021	Watts Hill	4.9	Soybean	45	0	20	40	85	0	0	-5	-60	-60	-76	-91
2022	Watts Hill	4.9	Corn grain	170	160	70	70	0	0	0	-160	-70	-70	-75	-49
Total	**Watts Hill**				**660**	**330**	**330**	**218**	**0**	**92**					
2018	Terrapin Hill	2.4	Small grain	80	75	40	0								
2018	Terrapin Hill	2.4	Soybean	45	0	20	0	0	0	0	-75	-60	0	-76	-91
2019	Terrapin Hill	2.4	Corn grain	170	160	70	0	133	0	46	-27	-70	46	-75	-3
2020	Terrapin Hill	2.4	Small grain	80	90	40	0								
2020	Terrapin Hill	2.4	Soybean	45	0	20	0	85	0	0	-5	-60	46	-76	-91
2021	Terrapin Hill	2.4	Corn grain	170	160	70	0	133	0	46	-27	-70	92	-75	-3
2022	Terrapin Hill	2.4	Small grain	80	90	40	0								
2022	Terrapin Hill	2.4	Soybean	45	0	20	0	0	0	0	-90	-60	92	-76	-91
Total	**Terrapin Hill**				**575**	**320**	**0**	**351**	**0**	**92**					
2018	Shop	4.4	Corn grain	170	160	70	0	133	0	46	-27	-70	46	-75	-3
2019	Shop	4.4	Small grain	80	90	40	0								
2019	Shop	4.4	Soybean	45	0	20	0	0	0	0	-90	-60	46	-76	-91
2020	Shop	4.4	Corn grain	170	160	70	0	133	0	46	-27	-70	92	-75	-3

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2021	Shop	4.4	Small grain	80	90	40	0								
2021	Shop	4.4	Soybean	45	0	20	0	85	0	0	-5	-60	92	-76	-91
2022	Shop	4.4	Corn grain	170	160	70	0	133	0	46	-27	-70	138	-75	-3
Total	**Shop**				**660**	**330**	**0**	**484**	**0**	**138**					
2018	Parrott	0.8	Soybean	45	0	40	80	0	0	0	0	-40	-80	-36	-63
2019	Parrott	0.8	Corn grain	170	160	140	140	133	0	46	-27	-140	-94	-75	-3
2020	Parrott	0.8	Soybean	45	0	40	80	0	0	63	0	-40	-17	-36	0
2021	Parrott	0.8	Corn grain	170	160	140	140	133	0	46	-27	-140	-94	-75	-3
2022	Parrott	0.8	Soybean	45	0	40	80	0	0	63	0	-40	-17	-36	0
Total	**Parrott**				**320**	**400**	**520**	**266**	**0**	**218**					
2018	Lee Ann	7.1	Soybean	45	0	40	0	0	0	0	0	-40	0	-36	-63
2019	Lee Ann	7.1	Corn grain	170	160	140	0	158	69	46	-2	-71	46	-6	-3
2020	Lee Ann	7.1	Soybean	45	0	40	0	0	0	63	0	-40	109	-36	0
2021	Lee Ann	7.1	Corn grain	170	160	140	0	133	0	46	-27	-140	155	-75	-3
2022	Lee Ann	7.1	Soybean	45	0	40	0	0	0	63	0	-40	218	-36	0
Total	**Lee Ann**				**320**	**400**	**0**	**291**	**69**	**218**					
2018	Hay Barn	2.2	Corn grain	170	160	70	70	133	0	46	-27	-70	-24	-75	-3
2019	Hay Barn	2.2	Small grain	80	90	40	20								
2019	Hay Barn	2.2	Soybean	45	0	20	40	0	0	0	-90	-60	-60	-76	-91
2020	Hay Barn	2.2	Corn grain	170	160	70	70	133	0	46	-27	-70	-24	-75	-3
2021	Hay Barn	2.2	Small grain	80	90	40	20								
2021	Hay Barn	2.2	Soybean	45	0	20	40	85	0	0	-5	-60	-60	-76	-91
2022	Hay Barn	2.2	Corn grain	170	160	70	70	133	0	46	-27	-70	-24	-75	-3
Total	**Hay Barn**				**660**	**330**	**330**	**484**	**0**	**138**					
2018	Griffith	0.2	Small grain	80	75	80	0								
2018	Griffith	0.2	Soybean	45	0	10	0	0	0	0	-75	-90	0	-76	-91
2019	Griffith	0.2	Corn grain	170	160	140	0	133	0	46	-27	-140	46	-75	-3
2020	Griffith	0.2	Small grain	80	90	80	0								
2020	Griffith	0.2	Soybean	45	0	10	0	85	0	0	-5	-90	46	-76	-91

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2021	Griffith	0.2	Corn grain	170	160	140	0	133	0	46	-27	-140	92	-75	-3
2022	Griffith	0.2	Small grain	80	90	80	0								
2022	Griffith	0.2	Soybean	45	0	10	0	85	0	0	-5	-90	92	-76	-91
Total	**Griffith**				**575**	**550**	**0**	**436**	**0**	**92**					
2018	Grandmothers	0.7	Small grain	80	75	40	0								
2018	Grandmothers	0.7	Soybean	45	0	20	0	0	0	0	-75	-60	0	-76	-91
2019	Grandmothers	0.7	Corn grain	170	160	70	0	133	0	46	-27	-70	46	-75	-3
2020	Grandmothers	0.7	Small grain	80	90	40	0								
2020	Grandmothers	0.7	Soybean	45	0	20	0	85	0	0	-5	-60	46	-76	-91
2021	Grandmothers	0.7	Corn grain	170	160	70	0	133	0	46	-27	-70	92	-75	-3
2022	Grandmothers	0.7	Small grain	80	90	40	0								
2022	Grandmothers	0.7	Soybean	45	0	20	0	85	0	0	-5	-60	92	-76	-91
Total	**Grandmothers**				**575**	**320**	**0**	**436**	**0**	**92**					
2018	Glisson Hill	3.4	Small grain	80	75	0	0								
2018	Glisson Hill	3.4	Soybean	45	0	0	0	0	0	0	-75	0	0	-76	-91
2019	Glisson Hill	3.4	Corn grain	170	160	0	0	133	0	46	-27	0	46	-75	-3
2020	Glisson Hill	3.4	Small grain	80	90	0	0								
2020	Glisson Hill	3.4	Soybean	45	0	0	0	85	0	0	-5	0	46	-76	-91
2021	Glisson Hill	3.4	Corn grain	170	160	0	0	133	0	46	-27	0	92	-75	-3
2022	Glisson Hill	3.4	Small grain	80	90	0	0								
2022	Glisson Hill	3.4	Soybean	45	0	0	0	85	0	0	-5	0	92	-76	-91
Total	**Glisson Hill**				**575**	**0**	**0**	**436**	**0**	**92**					
2018	Glisson Bottom	3.7	Soybean	45	0	20	0	0	0	0	0	-20	0	-36	-63
2019	Glisson Bottom	3.7	Corn grain	170	160	70	0	133	0	46	-27	-70	46	-75	-3
2020	Glisson Bottom	3.7	Soybean	45	0	20	0	0	0	63	0	-20	109	-36	0
2021	Glisson Bottom	3.7	Corn grain	170	160	70	0	133	0	46	-27	-70	155	-75	-3
2022	Glisson Bottom	3.7	Soybean	45	0	20	0	0	0	63	0	-20	218	-36	0
Total	**Glisson Bottom**				**320**	**200**	**0**	**266**	**0**	**218**					
2018	Carroll	6.1	Corn grain	170	160	0	0	160	0	46	0	0	46	-75	-3

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2019	Carroll	6.1	Soybean	45	0	0	0	0	0	63	0	0	109	-36	0
2020	Carroll	6.1	Corn grain	170	160	0	0	133	0	46	-27	0	155	-75	-3
2021	Carroll	6.1	Soybean	45	0	0	0	0	0	63	0	0	218	-36	0
2022	Carroll	6.1	Corn grain	170	160	0	0	133	0	46	-27	0	264	-75	-3
Total	**Carroll**				**480**	**0**	**0**	**426**	**0**	**264**					
2018	Across Culvert	7.8	Soybean	45	0	20	0	0	0	0	0	-20	0	-36	-63
2019	Across Culvert	7.8	Corn grain	170	160	70	0	133	0	46	-27	-70	46	-75	-3
2020	Across Culvert	7.8	Soybean	45	0	20	0	0	0	63	0	-20	109	-36	0
2021	Across Culvert	7.8	Corn grain	170	160	70	0	133	0	46	-27	-70	155	-75	-3
2022	Across Culvert	7.8	Soybean	45	0	20	0	0	0	63	0	-20	218	-36	0
Total	**Across Culvert**				**320**	**200**	**0**	**266**	**0**	**218**					
2018	Blankenship	2.1	Corn grain	170	160	70	0	160	0	46	0	-70	46	-75	-3
2019	Blankenship	2.1	Small grain	80	90	40	0								
2019	Blankenship	2.1	Soybean	45	0	20	0	0	0	0	-90	-60	46	-76	-91
2020	Blankenship	2.1	Corn grain	170	160	70	0	133	0	46	-27	-70	92	-75	-3
2021	Blankenship	2.1	Small grain	80	90	40	0								
2021	Blankenship	2.1	Soybean	45	0	20	0	85	0	0	-5	-60	92	-76	-91
2022	Blankenship	2.1	Corn grain	170	160	70	0	133	0	46	-27	-70	138	-75	-3
Total	**Blankenship**				**660**	**330**	**0**	**511**	**0**	**138**					
2018	Barner	13.2	Soybean	45	0	0	0	0	0	0	0	0	0	-36	-63
2019	Barner	13.2	Corn grain	170	160	0	0	133	0	46	-27	0	46	-75	-3
2020	Barner	13.2	Soybean	45	0	0	0	0	0	63	0	0	109	-36	0
2021	Barner	13.2	Corn grain	170	160	0	0	133	0	46	-27	0	155	-75	-3
2022	Barner	13.2	Soybean	45	0	0	0	0	0	63	0	0	218	-36	0
Total	**Barner**				**320**	**0**	**0**	**266**	**0**	**218**					
2018	52 Acre Hill	0.8	Small grain	80	75	40	0								
2018	52 Acre Hill	0.8	Soybean	45	0	20	0	0	0	0	-75	-60	0	-76	-91
2019	52 Acre Hill	0.8	Corn grain	170	160	70	0	133	0	46	-27	-70	46	-75	-3
2020	52 Acre Hill	0.8	Small grain	80	90	40	0								

Year	Field	Size	Crop	Yield Goal	Fertilizer Recs[a]			Nutrients Applied[b]			Balance After Recs[c]			Balance After Removal[d]	
		ac		per ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	N lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac	P_2O_5 lbs/ac	K_2O lbs/ac
2020	52 Acre Hill	0.8	Soybean	45	0	20	0	29	75	91	-61	15	137	-1	0
2021	52 Acre Hill	0.8	Corn grain	170	160	70	0	133	0	46	-27	-55	183	-75	-3
2022	52 Acre Hill	0.8	Small grain	80	90	40	0								
2022	52 Acre Hill	0.8	Soybean	45	0	20	0	90	76	91	0	16	274	0	0
Total	**52 Acre Hill**				**575**	**320**	**0**	**385**	**151**	**274**					
2018	18 Acre Btm	2.3	Soybean	45	0	20	40	0	0	0	0	-20	-40	-36	-63
2019	18 Acre Btm	2.3	Corn grain	170	160	70	70	133	0	46	-27	-70	-24	-75	-3
2020	18 Acre Btm	2.3	Soybean	45	0	20	40	0	0	63	0	-20	23	-36	0
2021	18 Acre Btm	2.3	Corn grain	170	160	70	70	133	0	46	-27	-70	-1	-75	-3
2022	18 Acre Btm	2.3	Soybean	45	0	20	40	0	0	63	0	-20	23	-36	0
Total	**18 Acre Btm**				**320**	**200**	**260**	**266**	**0**	**218**					

[a] Fertilizer Recs are the crop fertilizer recommendations. The N rec accounts for any N credit from previous legume crop.

[b] Nutrients Applied are the nutrients expected to be available to the crop from that year's manure applications plus nutrients from that year's commercial fertilizer applications and nitrates from irrigation water. With a double-crop year, the total nutrients applied for both crops and the year's balances are listed on the second crop's line.

[c] For N, Nutrients Applied minus Fertilizer Recs for indicated crop year. Also includes amount of residual N expected to become available that year from prior years' manure applications. For P_2O_5 and K_2O, Nutrients Applied minus Fertilizer Recs *through* the indicated crop year, with positive balances carried forward to subsequent years. Negative values indicate a potential need to apply additional nutrients.

[d] Nutrients Applied minus amount removed by harvested portion of crop through the indicated year. Positive balances are carried forward to subsequent years.

[e] Custom fertilizer recommendation.

[f] Legume crop is assumed to utilize some or all of the supplied N.

[g] Includes residual N expected to become available that year from prior years' manure applications.

3.8. Manure Inventory Annual Summary (Optional)

Manure Source	Plan Period	On Hand at Start of Period	Total Generated	Total Imported	Total Trans-ferred In	Total Applied	Total Exported	Total Trans-ferred Out	On Hand at End of Period	Units
Barn 1	Oct '17 - Sep '18	0	800,000	0	0	333,500	0	0	466,500	gal
Barn 2	Oct '17 - Sep '18	0	800,000	0	0	333,500	0	0	466,500	gal
All Sources	**Oct '17 - Sep '18**	**0**	**1,600,000**	**0**	**0**	**667,000**	**0**	**0**	**933,000**	**gal**
Barn 1	Oct '18 - Sep '19	466,500	800,000	0	0	720,820	0	0	545,680	gal
Barn 2	Oct '18 - Sep '19	466,500	800,000	0	0	720,450	0	0	546,050	gal
All Sources	**Oct '18 - Sep '19**	**933,000**	**1,600,000**	**0**	**0**	**1,441,270**	**0**	**0**	**1,091,730**	**gal**
Barn 1	Oct '19 - Sep '20	545,680	800,000	0	0	793,990	0	0	551,690	gal
Barn 2	Oct '19 - Sep '20	546,050	800,000	0	0	800,400	0	0	545,650	gal
All Sources	**Oct '19 - Sep '20**	**1,091,730**	**1,600,000**	**0**	**0**	**1,594,390**	**0**	**0**	**1,097,340**	**gal**
Barn 1	Oct '20 - Sep '21	551,690	800,000	0	0	781,220	0	0	570,470	gal
Barn 2	Oct '20 - Sep '21	545,650	800,000	0	0	725,630	0	0	620,020	gal
All Sources	**Oct '20 - Sep '21**	**1,097,340**	**1,600,000**	**0**	**0**	**1,506,850**	**0**	**0**	**1,190,490**	**gal**
Barn 1	Oct '21 - Sep '22	570,470	800,000	0	0	800,400	0	0	570,070	gal
Barn 2	Oct '21 - Sep '22	620,020	800,000	0	0	800,400	0	0	619,620	gal
All Sources	**Oct '21 - Sep '22**	**1,190,490**	**1,600,000**	**0**	**0**	**1,600,800**	**0**	**0**	**1,189,690**	**gal**

3.9. Fertilizer Material Annual Summary (Optional)

Product Analysis	Plan Period	Product Needed Oct - Dec	Product Needed Jan - Sep	Total Product Needed	Units
0-0-60	Oct '17 - Sep '18	0	15,115	15,115	lbs
82-0-0	Oct '17 - Sep '18	0	38,406	38,406	lbs
0-0-60	Oct '18 - Sep '19	0	24,649	24,649	lbs
82-0-0	Oct '18 - Sep '19	0	5,719	5,719	lbs
18-46-0	Oct '18 - Sep '19	0	18,405	18,405	lbs
32-0-0	Oct '18 - Sep '19	0	4,540	4,540	gal
32-0-0	Oct '19 - Sep '20	0	1,795	1,795	gal
18-46-0	Oct '19 - Sep '20	0	8,116	8,116	lbs
0-0-60	Oct '19 - Sep '20	0	12,726	12,726	lbs
82-0-0	Oct '19 - Sep '20	0	2,397	2,397	lbs
32-0-0	Oct '20 - Sep '21	0	4,742	4,742	gal
0-0-60	Oct '20 - Sep '21	0	8,810	8,810	lbs
82-0-0	Oct '20 - Sep '21	0	21,468	21,468	lbs
32-0-0	Oct '21 - Sep '22	0	2,453	2,453	gal
18-46-0	Oct '21 - Sep '22	0	8,266	8,266	lbs
0-0-60	Oct '21 - Sep '22	0	12,354	12,354	lbs
82-0-0	Oct '21 - Sep '22	0	2,397	2,397	lbs

3.10. Plan Nutrient Balance (Manure-spreadable Area)

	N (lbs)	P_2O_5 (lbs)	K_2O (lbs)
Total Manure Nutrients on Hand at Start of Plan[a]	0	0	0
Total Manure Nutrients Collected[b]	303,200	181,600	253,600
Total Manure Nutrients Imported[c]	0	0	0
Total Manure Nutrients Exported[d]	0	0	0
Total Manure Nutrients Gained/Lost in Transfer[e]	0	0	0
Total Manure Nutrients on Hand at End of Plan[f]	45,089	27,006	37,713
Total Manure Nutrients Applied[g]	257,900	154,510	215,696
Available Manure Nutrients Applied (Utilized by plan's crops)[h]	183,907	140,037	180,422
Available Manure Nutrients Applied (Not utilized by plan's crops)[i]	1,337	14,473	35,274
Commercial Fertilizer Nutrients Applied (Utilized by plan's crops)[j]	91,503	15,421	32,729
Commercial Fertilizer Nutrients Applied (Not utilized by plan's crops)[k]	0	0	0
Available Nutrients Applied (Manure and fertilizer; utilized by plan's crops)[l]	275,410	155,458	213,151
Nutrient Utilization Potential[m]	658,575	247,870	228,628
Nutrient Balance of Spreadable Acres[n p]	-383,165	-92,412	-15,477
Average Nutrient Balance per Spreadable Acre per Year[o p]	-110	-26	-4

a. Total manure nutrients present in storage at the beginning of the plan.
b. Total manure nutrients collected on the farm.
c. Total manure nutrients imported onto the farm.
d. Total manure nutrients exported from the farm to an external operation.
e. Net change in total manure nutrients due to transfers between storage units with differing analyses.
f. Total manure nutrients present in storage at the end of plan.
g. Total nutrients present in land-applied manure. These values do not account for losses due to rate, timing, and method of application.
h. Manure nutrients applied and available to crops in the plan. These values are based on the total manure nutrients applied after accounting for nutrient losses due to rate, timing, and method of application. Nutrients which will not be utilized by crops in the plan are excluded from these values.
i. Manure nutrients applied that will be utilized by crops outside the plan. This usually results from Fall nutrient applications at the end of the plan intended for crops in subsequent years.
j. Nutrients applied as commercial fertilizers and nitrates contained in irrigation water. Nutrients that will not be utilized by crops in the plan are excluded from these values.
k. Nutrients applied as commercial fertilizer which will be utilized by crops outside the plan.
l. Sum of available manure nutrients applied and commercial fertilizer nutrients applied.
m. Nutrient utilization potential of crops grown. For N the value is based on the N recommendation for non-legume crops and N uptake or other state-imposed limit for N application rates for legumes. P_2O_5 and K_2O values are based on fertilizer recommendations or crop removal (whichever is greater).
n. Available nutrients applied minus crop nutrient utilization potential. Negative values indicate additional nutrient utilization potential and positive values indicate over-application.
o. Average per acre-year nutrient balance. Values are calculated by dividing nutrient balance of spreadable acres by the number of spreadable acres in the plan and by the length of the plan in years. Negative values indicate additional nutrient utilization potential and positive values indicate over-application.

p. Non-trivial, positive values for N indicate that the plan was not properly developed. Negative values for N indicate additional nutrient utilization potential which may or may not be intentional. For example, plans that include legume crops often will not utilize the full N utilization potential for legume crops if manure can be applied to non-legume crops that require N for optimum yield. Positive values for P_2O_5 and/or K_2O do not necessarily indicate that the plan was developed improperly. For example, producers may be allowed to apply N-based application rates of manure to fields with low soil test P values or fields with a low potential P-loss risk based on the risk assessment tool used by the state. Negative values for P_2O_5 and K_2O indicate that planned applications to some fields are less than crop removal rates or fertilizer recommendations.

Plan Nutrient Balance (Non-manure-spreadable Area)

	N (lbs)	P_2O_5 (lbs)	K_2O (lbs)

	N (lbs)	P_2O_5 (lbs)	K_2O (lbs)
Commercial Fertilizer Nutrients Applied[a]	20,420	611	11,706
Nutrient Utilization Potential[b]	27,384	11,766	3,357
Nutrient Balance of Non-spreadable Acres[c e]	-6,964	-11,155	8,349
Average Nutrient Balance per Non-spreadable Acre per Year[d e]	-22	-36	27

a. Nutrients applied as commercial fertilizers and nitrates contained in irrigation water.
b. Nutrient utilization potential of crops grown based on crop fertilizer recommendations.
c. Commercial fertilizer nutrients applied minus crop nutrient utilization potential. Negative values indicate additional nutrient utilization potential and positive values indicate over-application.
d. Average per acre-year nutrient balance. Values are calculated by dividing nutrient balance of non-spreadable acres by number of non-spreadable acres in plan and by the length of the plan in years. Negative values indicate additional nutrient utilization potential and positive values indicate over-application.

e. Non-trivial, positive values for N indicate that the plan was not properly developed. Negative values for N indicate additional nutrient utilization potential which may or may not be intentional. Positive values for P_2O_5 and/or K_2O do not necessarily indicate that the plan was developed improperly. For example, multiple year applications may have been planned during the final plan year(s) and these nutrients will not be utilized by crops in the current plan. Negative values for P_2O_5 and K_2O indicate that applications to some fields may have been delayed to allow the producer to apply the nutrients in accordance with their fertilization schedule.

Closure Plan

In the event that Swine production at this location ceases, the following will be done within 360 days:

- All manure in all animal use areas will be removed and spread on the farm or spread elsewhere according to my current Nutrient Management Plan.
- The most current manure analysis will be provided to anyone removing manure from the farm.
- Any dead pigs on the farm will be disposed of at the time of closure according to methods outlined in my current Nutrient Management Plan and or allowable by Tennessee Law.
- Any manure which is land applied will be done so according to the rates discussed in my most recent Nutrient Management Plan.

The following will be completed within a reasonable period as allowable by law using Tennessee Natural Resources Conservation Service (NRCS) Standard Code 360- Closure of Waste Impoundments:

- Any manure storage facility (lagoon) located on the swine farm will be properly decommissioned.
- Any manure currently in storage at the time of closure will be removed and spread on the farm or spread elsewhere according to my current Nutrient Management Plan.
- The lagoon will be breached and backfilled and or converted to freshwater storage according to NRCS standards.

Ken Moore

Date: 9-11-17

Record Keeping

This section includes a list of key records that Ben Moore will keep in order to document and verify implementation of the procedures in this CNMP. Records shall be kept for a minimum of 5 years, or for the length of the contract, rotation, or permit, whichever is longer, for each field where manure is applied.

These general records include but are not limited to:

1. Soil Test Results
2. Weather and soil conditions 24 hours prior to, during and 24 hours application of manure, chemicals and pesticides.
3. Type, quantities, and sources of all nutrients generated and collected
4. Type, quantities, and sources of all nutrients applied to each field
5. Dates of manure applications
6. Inspection Reports
7. Operation and Maintenance records of conservation practices and equipment
8. Restricted pesticides used to meet label requirements
9. Equipment Calibration records
10. Crops planted, tillage method and dates planted
11. Crop harvest dates and yield
12. Adjustments to nutrient management plan based on records and changes in farming operations as appropriate
13. Weekly check of volume in pit
14. Annual visual inspection of retention structure (pits), animal holding areas, if applicable and land application areas
15. Records of mortalities and how managed

Declarations to Nutrient Management Plan:

By my signature below, I affirm that I have read, understand, and will comply with the following stipulations from Tennessee's CAFO regulations that apply to my CAFO operation:

1) All animals in confinement are prevented from coming in direct contact with waters of the state.
2) All chemicals and other contaminants handled on-site are not disposed of in any manure, litter, process wastewater, or storm water storage or treatment system unless specifically designed to treat such chemicals and other contaminants.
3) Pesticide-contaminated waters will be prevented from discharging into waste retention structures. Waste from pest control and from facilities used to manage potentially hazardous or toxic chemicals shall be handled and disposed of in a manner that will prevent pollutants from entering waste retention structures or waters of the state.
4) Chemicals, manure/litter, and process wastewater will be managed to prevent spills. Spill clean-up plans will be developed and any equipment needed for spill clean-up will be available to facility personnel.
5) All sampling of soil and manure/litter is conducted according to protocols developed by UT Extension.
6) All records outlined in the permit that I am applying for will be maintained and available on-site.
7) Any confinement buildings, waste/wastewater handling or treatment systems, lagoons, holding ponds, and any other agricultural waste containment/treatment structures constructed or modified after April 13, 2006, are or will be located in accordance with NRCS Conservation Practice Standard 313.
8) A copy of the most recent Nutrient Management Plan will be kept as part of the farm records and will be maintained and implemented as written.
9) If applicable, all waste directed to under floor pits shall be composed entirely of wastewater (i.e. washwater and animal waste).
10) The Tennessee Department of Environment and Conservation Division of Water Resources will be notified of any significant wildlife mortalities near retention ponds or following any land application of animal wastes to fields.
11) All employees involved in work activities that relate to permit compliance will receive regular training on proper operation and maintenance (O&M) of the facility and waste disposal. Training shall include appropriate topics, such as land application of wastes, good housekeeping and material management practices, proper O&M of the facility, record keeping, and spill response and clean up. The periodic scheduled dates for such training shall be identified in the current Nutrient Management Plan.
12) There shall be no land application of nutrients within 24 hours of a precipitation event that may cause runoff. The operator shall not land apply nutrients to frozen, flooded, or saturated soils.

Ben Moore — 9-11-17

Signature of CAFO Owner/Operator — Date

KB Farms.nat-cnmp 3. Nutrient Management Page 72 of 80

Operation and Maintenance

Ben Moore is responsible for safe operation and maintenance of the nutrient management plan including all equipment. Operation and maintenance includes the following items:

1. periodic plan review to determine if adjustments or modifications to the plan are needed. As minimum, plans will be reviewed/revised with each soil test cycle.
2. weekly there will be a visual inspection of pits
3. calibration of application equipment to ensure uniform distribution of material at planned rates.
4. documentation of the actual rate at which nutrients were applied. When the actual rates used differ from or exceed the recommended and planned rates, records will indicate the reasons for the differences.
5. Maintaining records to document plan implementation. As applicable, records include
    a. Soil test results and recommendations for nutrient application
    b. Quantities, analysis and sources of nutrients applied
    c. Dates and method of nutrient applications
    d. Crops planted, planting and harvest dates, yields, and residues removed
    e. Results of water, plant and organic byproduct analysis
    f. Dates of review and person performing the review and recommendations
    g. Conservation practices being applied.

Records will be maintained for five years or for a period longer than five years if required by other Federal, state, or local ordinances or program or contract requirements.

The disposal of material generated by the cleaning nutrient application equipment accomplished properly. Excess material should be collected and stored or field applied in an appropriate manner. Excess material should not be applied on areas of high potential risk for runoff and leaching.

The disposal/recycling of nutrient containers should be according to state and local guidelines or regulations.

Pesticides, toxic chemicals, and petroleum products will not be used in areas where leakage could enter the manure storage facility.

Conservation Practices Operation & Maintenance

Heavy Use Area Protection

The Operation and Maintenance (O&M) plan shall specify that the treatment areas and associated practices will be inspected annually and after significant storm events to identify repair and maintenance needs. The O&M plan shall contain the operational requirements for managing the heavy use area. Planned scraping intervals, replacement of fine material, storage, treatment, and/or utilization methods will also be described. Provisions for re-establishment of vegetated areas will be included. The O&M plan shall detail the level of repairs needed to maintain the effectiveness and useful life of the practice. If using a front-end loader, recommend back dragging the manure/hay to conserve removal of gravel from the surface. Consider using fabricated large equipment tire for scraping surface. The O&M plan shall be provided to, and discussed with, the operator. The O&M plan must complement the Comprehensive Nutrient Management Plan, as necessary.

Composting Facility

An operation and maintenance (O&M) plan shall be developed consistent with the purposes of this standard, its intended life, safety requirements, and the criteria for its design. The O&M plan shall include recipe ingredients and sequence that they are layered and mixed, maximum and minimum temperature for operation, land application rates, moisture level, management of odors, testing, etc. Make adjustments throughout the composting period to ensure proper composting processes. The compost facility should be inspected regularly when the facility is empty. Replace deteriorated wooden materials or hardware. Patch concrete floors and curbs as necessary to assure water tightness. Roof structures should be examined for structural integrity and repaired as needed. Exposed metal components should be inspected for corrosion. Corroded metal should be wire brushed and painted as necessary. Closely monitor temperatures above 165^{o}F. Take action immediately to cool piles that have reached temperatures above 185^{o}F. The operation and maintenance plan shall state that composting is a biological process. It requires a combination of art and science for success. Hence, the operation may need to undergo some trial and error in the start-up of a new composting facility.

Nutrient Management (590)

The owner/client is responsible for safe operation and maintenance of the nutrient management plan including all equipment. Operation and maintenance addresses the following:

1. periodic plan review to determine if adjustments or modifications to the plan are needed. As a minimum, plans will be reviewed/revised with each soil test cycle.
2. protection of fertilizer and organic byproduct storage facilities from weather and accidental leakage or spillage.
3. calibration of application equipment to ensure uniform distribution of material at planned rates.
4. documentation of the actual rate at which nutrients were applied. When the actual rates used differ from or exceed the recommended and planned rates, records will indicate the reasons for the differences.
5. Maintaining records to document plan implementation. As applicable, records include:

soil test results and recommendations for nutrient application,

quantities, analyses and sources of nutrients applied,

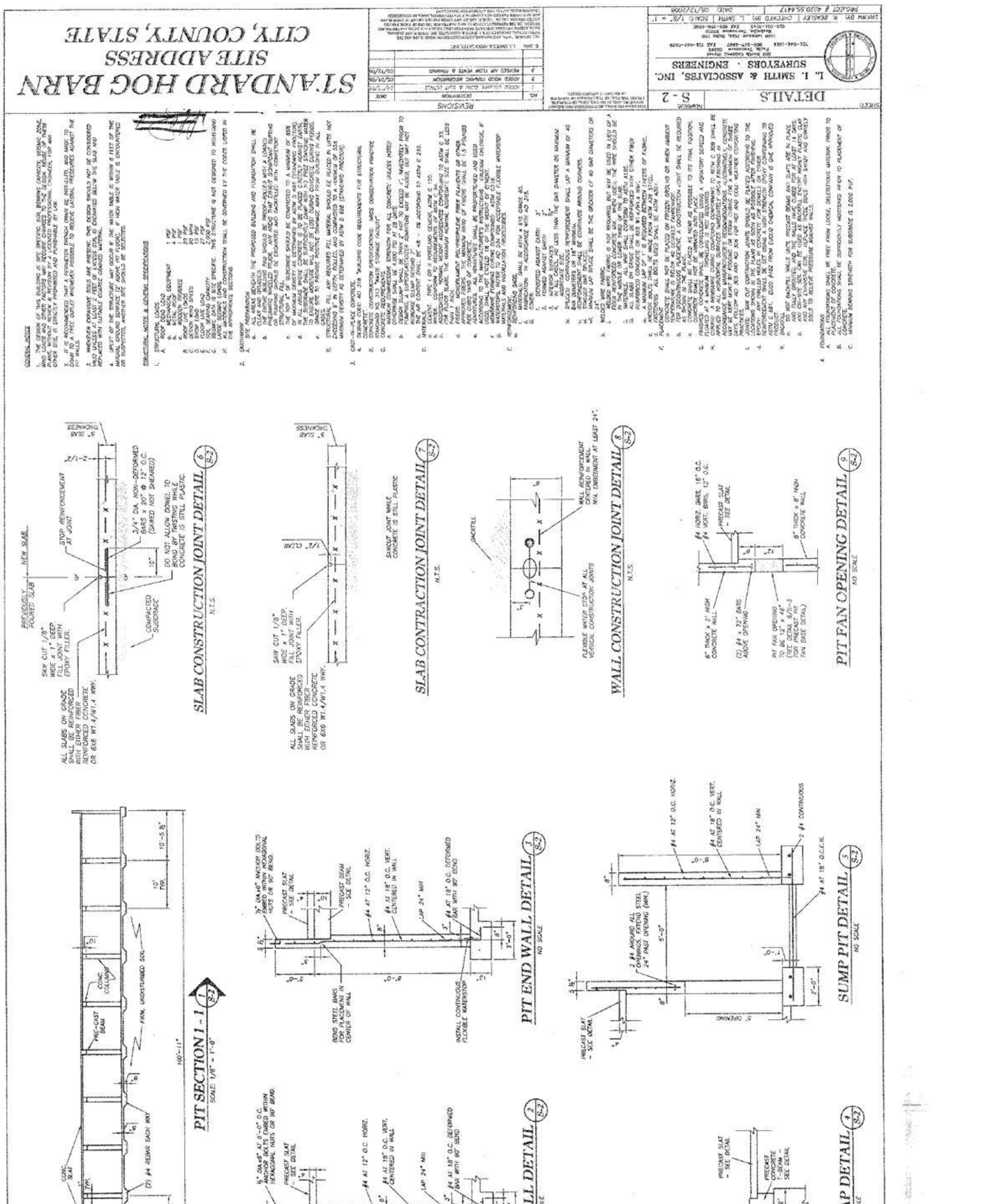
dates and method of nutrient applications,

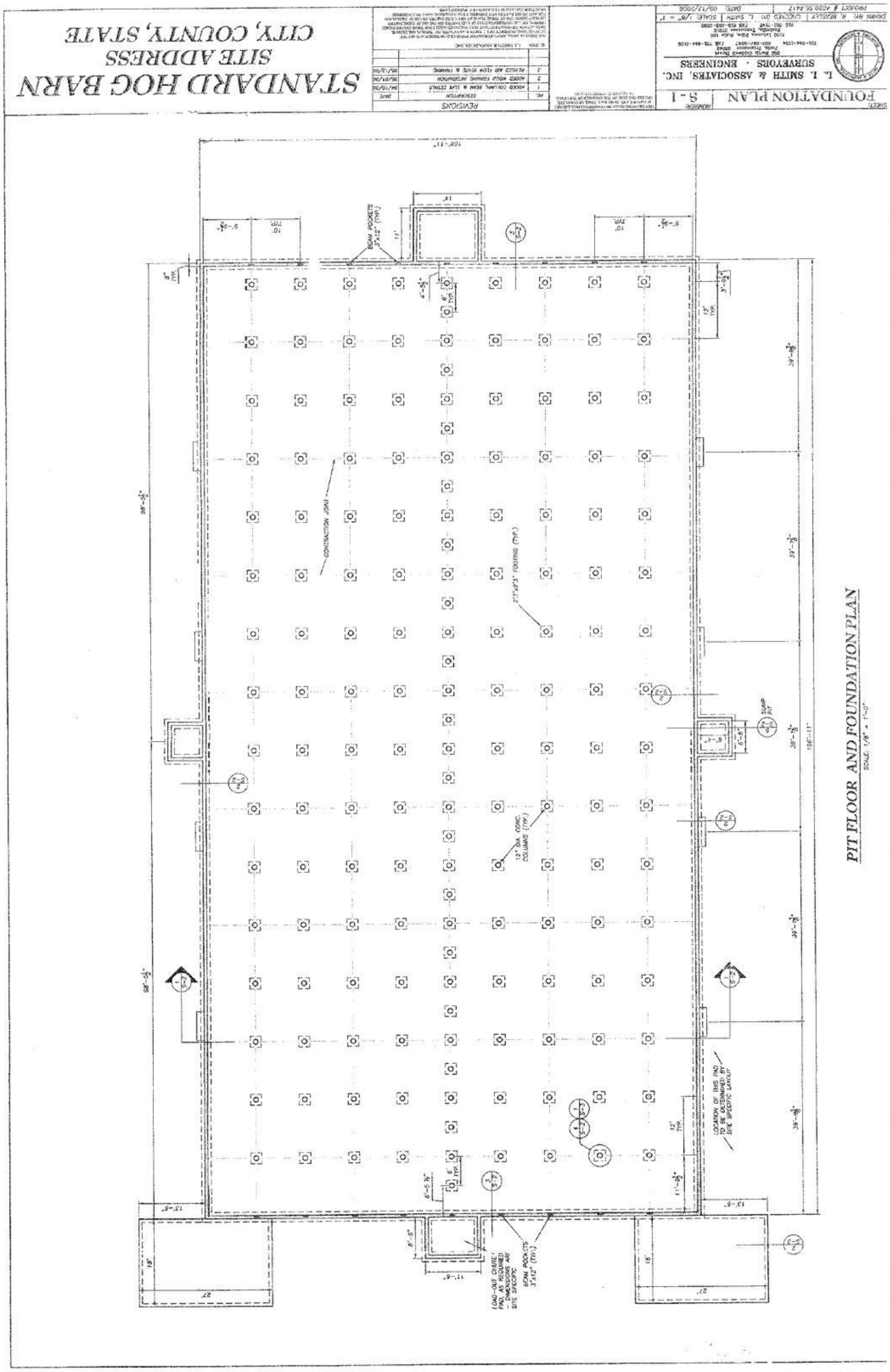
crops planted, planting and harvest dates, yields, and residues removed,

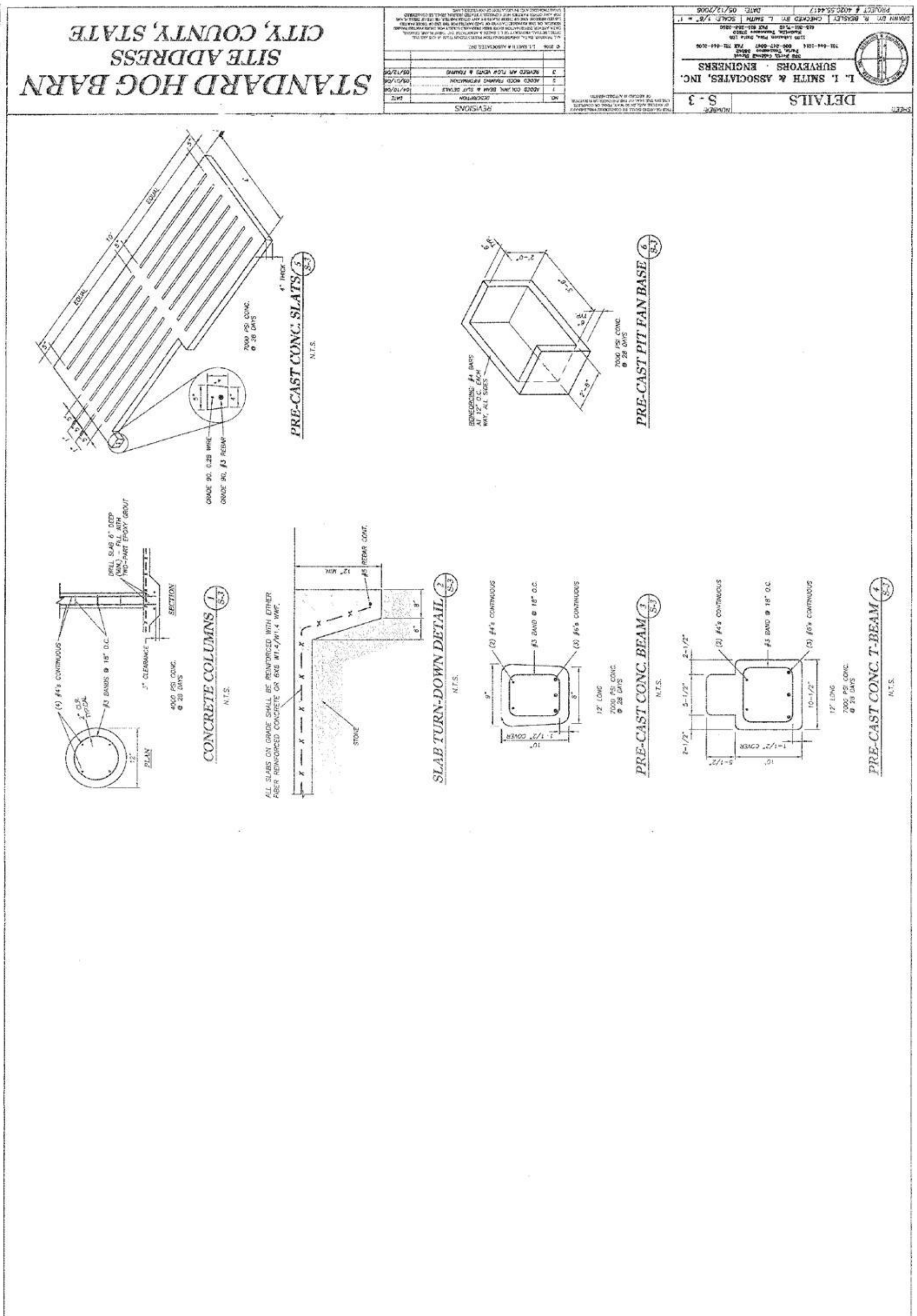
results of water, plant, and organic byproduct analyses, and

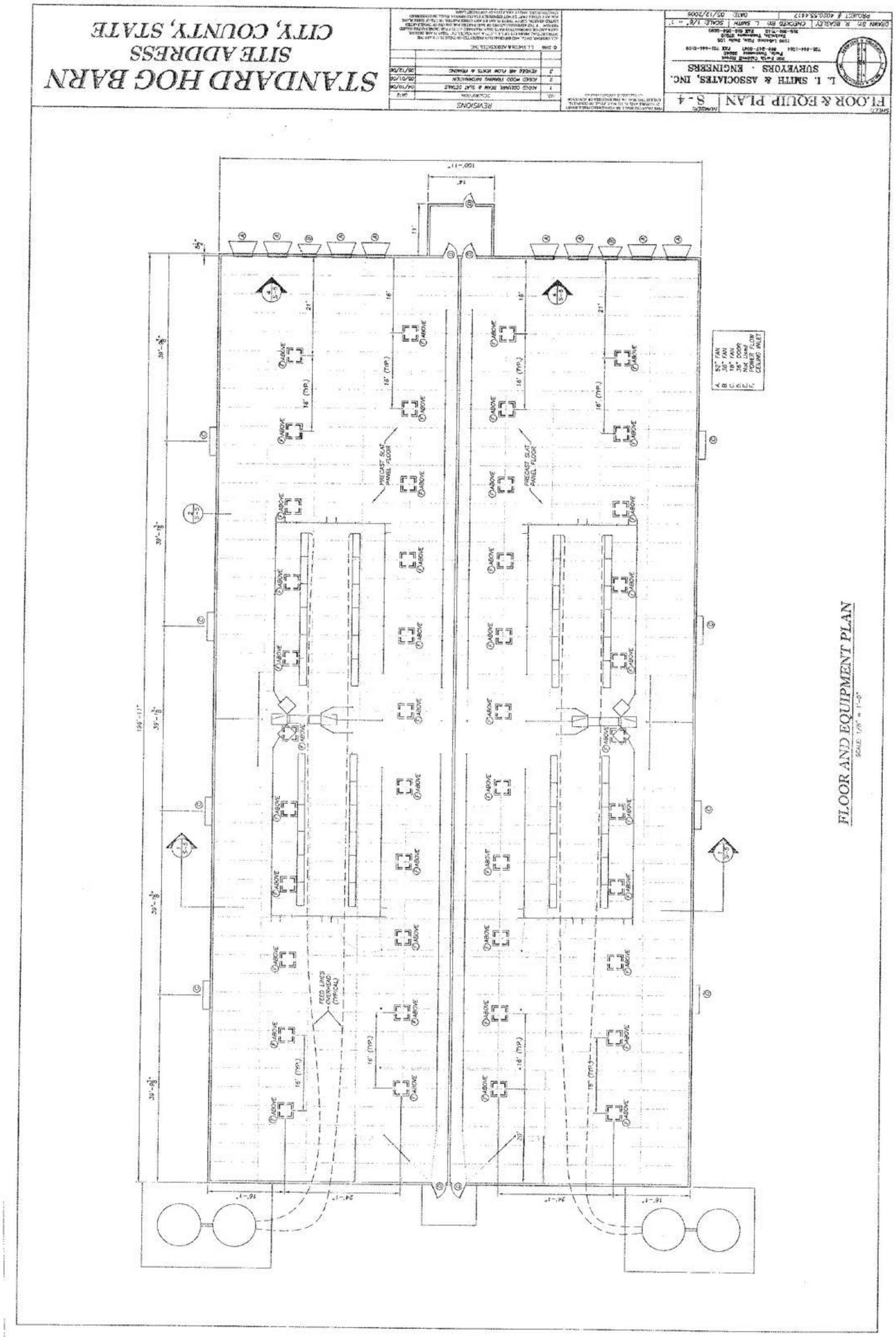
dates of review and person performing the review, and recommendations.

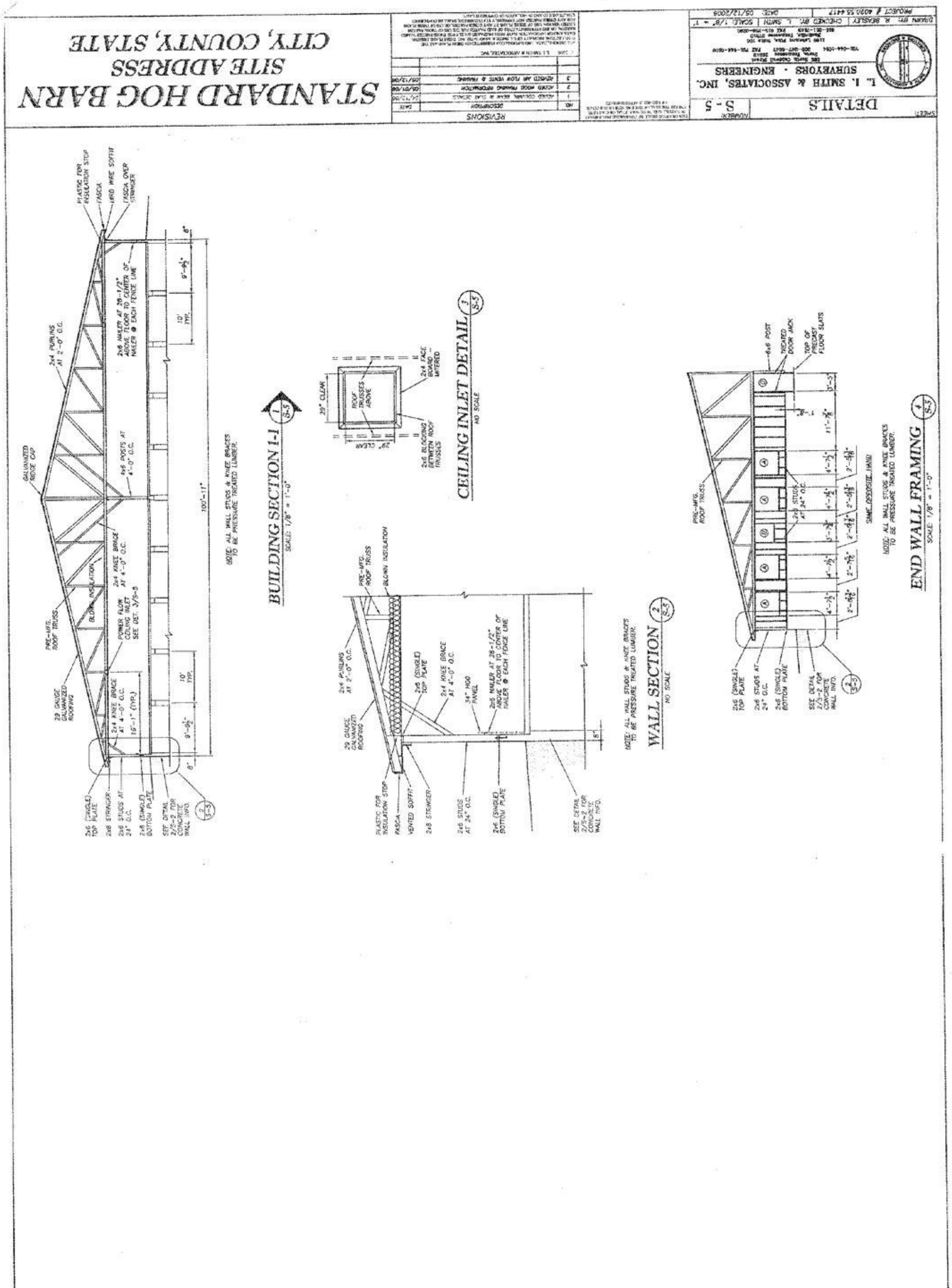
Records should be maintained for five years or for a period longer than five years if required by other Federal, state, or local ordinances, or program or contract requirements. Workers shall be protected from and avoid unnecessary contact with chemical fertilizers and organic by-products. Protection should include the use of protective clothing when working with plant nutrients. Extra caution must be taken when handling ammonia sources of nutrients, or when dealing with organic wastes stored in unventilated enclosures. The disposal of material generated by the cleaning nutrient application equipment should be accomplished properly. Excess material should be collected and stored or field applied in an appropriate manner. Excess material should not be applied on areas of high potential risk for runoff and leaching. The disposal/recycling of nutrient containers should be according to state and local guidelines or regulations.


STANDARD HOG BARN
SITE ADDRESS
CITY, COUNTY, STATE
DETAILS
S-2
L. I. SMITH & ASSOCIATES, INC.
ENGINEERS · SURVEYORS
PIT SECTION 1-1
PIT SIDE WALL DETAIL
PIT END WALL DETAIL
COLUMN CAP DETAIL
SUMP PIT DETAIL
SLAB CONSTRUCTION JOINT DETAIL
SLAB CONTRACTION JOINT DETAIL
WALL CONSTRUCTION JOINT DETAIL
PIT FAN OPENING DETAIL


STANDARD HOG BARN
SITE ADDRESS
CITY, COUNTY, STATE
FOUNDATION PLAN
S-1
L. I. SMITH & ASSOCIATES, INC.
SURVEYORS · ENGINEERS
PIT FLOOR AND FOUNDATION PLAN


STANDARD HOG BARN
SITE ADDRESS
CITY, COUNTY, STATE
DETAILS
S-3
L. I. SMITH & ASSOCIATES, INC.
SURVEYORS · ENGINEERS
REVISIONS
PRE-CAST CONC. SLATS
PRE-CAST PIT FAN BASE
CONCRETE COLUMNS
SLAB TURN-DOWN DETAIL
PRE-CAST CONC. BEAM
PRE-CAST CONC. T-BEAM


STANDARD HOG BARN
SITE ADDRESS
CITY, COUNTY, STATE
REVISIONS
L. L. SMITH & ASSOCIATES, INC.
SURVEYORS · ENGINEERS
FLOOR & EQUIP PLAN
S-4
FLOOR AND EQUIPMENT PLAN
PRECAST SLAT PANEL FLOOR
FEED LINES OVERHEAD (TYPICAL)


STANDARD HOG BARN
SITE ADDRESS
CITY, COUNTY, STATE
L. I. SMITH & ASSOCIATES, INC.
ENGINEERS · SURVEYORS
DETAILS
S-5
REVISIONS
BUILDING SECTION 1-1
CEILING INLET DETAIL
WALL SECTION
END WALL FRAMING

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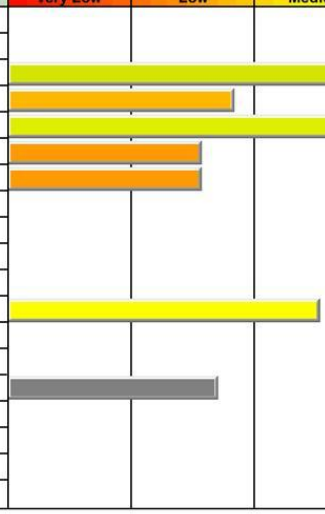
SOIL ANALYSIS

Client :	Grower :	
Wheat Tech, Inc. Josh Johnson 2375 Purdy Road Huntingdon TN 38344	Ben Moore Farm ID: Bishop	Report No: 15-022-0812 Cust No: 02929 Date Printed: 02/05/2015 Date Received : 01/22/2015 PO: Page : 6 of 16

Lab Number : 64044 **Field Id :** Bishop 18ac **Sample Id :** 6

Test	Method	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	1:1	5.9	
Buffer pH	BPH	7.82	
Phosphorus (P)	M3	29 ppm	
Potassium (K)	M3	88 ppm	
Calcium (Ca)	M3	726 ppm	
Magnesium (Mg)	M3	46 ppm	
Sulfur (S)	M3	8 ppm	
Boron (B)			
Copper (Cu)			
Iron (Fe)			
Manganese (Mn)			
Zinc (Zn)	M3	2.3 ppm	
Sodium (Na)			
Soluble Salts			
Organic Matter	LOI	2.7 % ENR 98	
Nitrate Nitrogen			



Calculated Cation Exchange Capacity: **5.4** meq/100g

%Saturation

	%sat	meq
K	4.2	0.2
Ca	67.2	3.6
Mg	7.1	0.4
H	20.8	1.1

K/Mg Ratio: 0.50

Ca/Mg Ratio: 9.46

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
Crop :							**Rec Units:**			

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH

Analysis prepared by: A&L Analytical Laboratories, Inc.

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SOIL ANALYSIS

Client : Wheat Tech, Inc. Josh Johnson 2375 Purdy Road Huntingdon TN 38344	Grower : Ben Moore Farm ID: Bishop	Report No: 15-022-0928 Cust No: 02929 Date Printed: 02/05/2015 Date Received : 01/22/2015 PO: Page : 17 of 20

Lab Number : 64858 **Field Id :** Bishop 52ac **Sample Id :** 17

Test	Method	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	1:1	6.6	
Buffer pH			
Phosphorus (P)	M3	19 ppm	
Potassium (K)	M3	151 ppm	
Calcium (Ca)	M3	1392 ppm	
Magnesium (Mg)	M3	117 ppm	
Sulfur (S)	M3	6 ppm	
Boron (B)			
Copper (Cu)			
Iron (Fe)			
Manganese (Mn)			
Zinc (Zn)	M3	2.2 ppm	
Sodium (Na)			
Soluble Salts			
Organic Matter	LOI	2.9 % ENR 102	
Nitrate Nitrogen			

Calculated Cation Exchange Capacity: **8.9 meq/100g**

%Saturation

	%sat	meq
K	4.4	0.4
Ca	78.2	7.0
Mg	11.0	1.0
H	6.0	0.5

K/Mg Ratio: 0.40

Ca/Mg Ratio: 7.11

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH

Analysis prepared by: A&L Analytical Laboratories, Inc.

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SOIL ANALYSIS

Client : Wheat Tech, Inc. Josh Johnson 2375 Purdy Road Huntingdon TN 38344	Grower : Ben Moore Farm ID: Jim Moore	Report No: 15-028-0668 Cust No: 02929 Date Printed: 02/05/2015 Date Received : 01/28/2015 PO: Page : 17 of 23

Lab Number : 01598 **Field Id :** JM Barner **Sample Id :** 17

Test	Method	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	1:1	6.2	
Buffer pH	BPH	7.85	
Phosphorus (P)	M3	21 ppm	
Potassium (K)	M3	84 ppm	
Calcium (Ca)	M3	955 ppm	
Magnesium (Mg)	M3	63 ppm	
Sulfur (S)	M3	8 ppm	
Boron (B)			
Copper (Cu)			
Iron (Fe)			
Manganese (Mn)			
Zinc (Zn)	M3	3.0 ppm	
Sodium (Na)			
Soluble Salts			
Organic Matter	LOI	2.1 % ENR 86	
Nitrate Nitrogen			

Calculated Cation Exchange Capacity: **6.3 meq/100g**

%Saturation

	%sat	meq
K	3.4	0.2
Ca	75.8	4.8
Mg	8.3	0.5
H	11.9	0.8

K/Mg Ratio: 0.40

Ca/Mg Ratio: 9.13

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH

Analysis prepared by: A&L Analytical Laboratories, Inc.

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SOIL ANALYSIS

Client :	Grower :	Report No: 14-035-0512
Wheat Tech, Inc.	Ben Moore	Cust No: 02929
Josh Johnson		Date Printed: 02/05/2014
2100 Purdy Road		Date Received : 02/04/2014
Huntingdon TN 38344		PO:
	Farm ID: Kenneth Moore	Page : 3 of 29

Lab Number : 04540 **Field Id :** Blankenship **Sample Id :** 3

Test	Method	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	1:1	6.2	
Buffer pH	BPH	7.85	
Phosphorus (P)	M3	24 LB/ACRE	
Potassium (K)	M3	130 LB/ACRE	
Calcium (Ca)	M3	2046 LB/ACRE	
Magnesium (Mg)	M3	156 LB/ACRE	
Sulfur (S)	M3	10 LB/ACRE	
Boron (B)			
Copper (Cu)			
Iron (Fe)			
Manganese (Mn)			
Zinc (Zn)	M3	3.0 LB/ACRE	
Sodium (Na)			
Soluble Salts			
Organic Matter	LOI	1.9 % ENR 82	
Nitrate Nitrogen			

Calculated Cation Exchange Capacity: **6.7** meq/100g

Calculated Cation Saturation

%K	2.0
%Ca	76.0
%Mg	10.0
%H	12.0
Hmeq	0.8

K : Mg Ratio: 0.26

Ca : Mg Ratio: 7.60

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH
Analysis prepared by: A&L Analytical Laboratories, Inc.

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SOIL ANALYSIS

Client :	Grower :	Report No: 14-035-0896
Wheat Tech, Inc.	Ben Moore	Cust No: 02929
Josh Johnson		Date Printed: 02/05/2014
2100 Purdy Road		Date Received : 02/04/2014
Huntingdon TN 38344		PO:
	Farm ID: Jim Moore	Page : 5 of 50

Lab Number : 07515 **Field Id :** Carroll **Sample Id :** 5

Test	Method	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	1:1	6.0	
Buffer pH	BPH	7.84	
Phosphorus (P)	M3	32 LB/ACRE	
Potassium (K)	M3	114 LB/ACRE	
Calcium (Ca)	M3	1660 LB/ACRE	
Magnesium (Mg)	M3	136 LB/ACRE	
Sulfur (S)	M3	16 LB/ACRE	
Boron (B)			
Copper (Cu)			
Iron (Fe)			
Manganese (Mn)			
Zinc (Zn)	M3	4.4 LB/ACRE	
Sodium (Na)			
Soluble Salts			
Organic Matter	LOI	2.1 % ENR 86	
Nitrate Nitrogen			

Calculated Cation Exchange Capacity: **5.7** meq/100g

Calculated Cation Saturation

%K	3.0
%Ca	73.0
%Mg	10.0
%H	15.0
Hmeq	0.9

K : Mg Ratio: 0.26

Ca : Mg Ratio: 7.30

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH
Analysis prepared by: A&L Analytical Laboratories, Inc.

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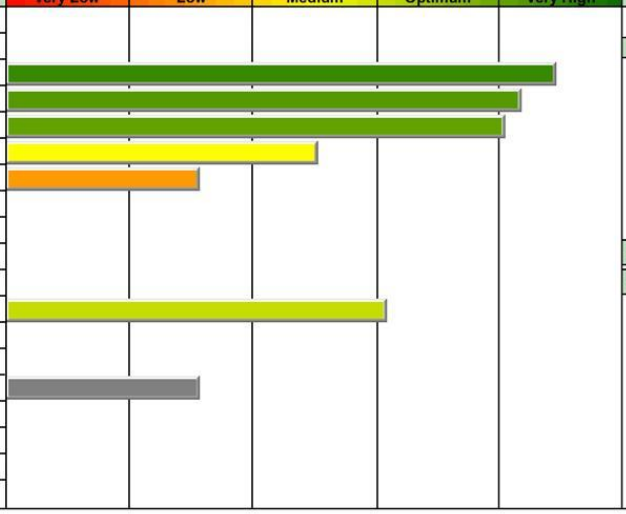
SOIL ANALYSIS

Client : Wheat Tech, Inc. Josh Johnson 2375 Purdy Road Huntingdon TN 38344	Grower : Ben Moore Farm ID: Bishop	Report No: 15-022-0654 Cust No: 02929 Date Printed: 02/05/2015 Date Received : 01/22/2015 PO: Page : 5 of 16

Lab Number : 63127 **Field Id :** Bishop GB **Sample Id :** 5

Test	Method	Results
Soil pH	1:1	6.9
Buffer pH		
Phosphorus (P)	M3	79 ppm
Potassium (K)	M3	181 ppm
Calcium (Ca)	M3	1382 ppm
Magnesium (Mg)	M3	109 ppm
Sulfur (S)	M3	8 ppm
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)	M3	3.8 ppm
Sodium (Na)		
Soluble Salts		
Organic Matter	LOI	2.6 % ENR 96
Nitrate Nitrogen		



Calculated Cation Exchange Capacity: **8.4 meq/100g**

%Saturation

	%sat	meq
K	5.5	0.5
Ca	82.3	6.9
Mg	10.8	0.9
H	1.5	0.1

K/Mg Ratio: 0.56

Ca/Mg Ratio: 7.62

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH

Analysis prepared by: A&L Analytical Laboratories, Inc.

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SOIL ANALYSIS

Client :	Grower :	
Wheat Tech, Inc. Josh Johnson 2375 Purdy Road Huntingdon TN 38344	Ben Moore Farm ID: Kenneth Moore	Report No: 15-022-0653 Cust No: 02929 Date Printed: 02/05/2015 Date Received : 01/22/2015 PO: Page : 7 of 8

Lab Number : 63120 **Field Id :** Grandma **Sample Id :** 7

Test	Method	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	1:1	6.6	
Buffer pH			
Phosphorus (P)	M3	16 ppm	
Potassium (K)	M3	125 ppm	
Calcium (Ca)	M3	1490 ppm	
Magnesium (Mg)	M3	183 ppm	
Sulfur (S)	M3	9 ppm	
Boron (B)			
Copper (Cu)			
Iron (Fe)			
Manganese (Mn)			
Zinc (Zn)	M3	1.4 ppm	
Sodium (Na)			
Soluble Salts			
Organic Matter	LOI	3.3 % ENR 110	
Nitrate Nitrogen			

Calculated Cation Exchange Capacity: **9.9** meq/100g

%Saturation

	%sat	meq
K	3.2	0.3
Ca	75.3	7.5
Mg	15.4	1.5
H	6.0	0.6

K/Mg Ratio: 0.20

Ca/Mg Ratio: 4.89

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH

Analysis prepared by: A&L Analytical Laboratories, Inc.

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SOIL ANALYSIS

Client :	Grower :	Report No: 14-035-0620
Wheat Tech, Inc.	Ben Moore	Cust No: 02929
Josh Johnson		Date Printed: 02/05/2014
2100 Purdy Road		Date Received : 02/04/2014
Huntingdon TN 38344		PO:
	Farm ID: Griffith	Page : 8 of 9

Lab Number : 06033 **Field Id :** Griffith **Sample Id :** 8

Test	Method	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	1:1	6.4	
Buffer pH	BPH	7.86	
Phosphorus (P)	M3	14 LB/ACRE	Low
Potassium (K)	M3	108 LB/ACRE	Low
Calcium (Ca)	M3	2408 LB/ACRE	Optimum
Magnesium (Mg)	M3	330 LB/ACRE	Optimum
Sulfur (S)	M3	12 LB/ACRE	Low
Boron (B)			
Copper (Cu)			
Iron (Fe)			
Manganese (Mn)			
Zinc (Zn)	M3	1.8 LB/ACRE	Low
Sodium (Na)			
Soluble Salts			
Organic Matter	LOI	2.8 % ENR 100	
Nitrate Nitrogen			

Calculated Cation Exchange Capacity: **8.3** meq/100g

Calculated Cation Saturation

%K	2.0
%Ca	73.0
%Mg	17.0
%H	9.0
Hmeq	0.7

K : Mg Ratio: 0.10

Ca : Mg Ratio: 4.29

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH
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SOIL ANALYSIS

Client : Wheat Tech, Inc. Josh Johnson 2375 Purdy Road Huntingdon TN 38344	Grower : Ben Moore Farm ID: Jim Moore	Report No: 15-022-0930 Cust No: 02929 Date Printed: 02/05/2015 Date Received : 01/22/2015 PO: Page : 2 of 15

Lab Number : 64875 **Field Id :** Hay Barn **Sample Id :** 2

Test	Method	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	1:1	5.7	
Buffer pH	BPH	7.77	
Phosphorus (P)	M3	16 ppm	
Potassium (K)	M3	79 ppm	
Calcium (Ca)	M3	948 ppm	
Magnesium (Mg)	M3	143 ppm	
Sulfur (S)	M3	8 ppm	
Boron (B)			
Copper (Cu)			
Iron (Fe)			
Manganese (Mn)			
Zinc (Zn)	M3	2.0 ppm	
Sodium (Na)			
Soluble Salts			
Organic Matter	LOI	3.9 % ENR 122	
Nitrate Nitrogen			

Calculated Cation Exchange Capacity: **7.8 meq/100g**

%Saturation

	%sat	meq
K	2.6	0.2
Ca	60.8	4.7
Mg	15.3	1.2
H	20.9	1.6

K/Mg Ratio: 0.17

Ca/Mg Ratio: 3.97

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH

Analysis prepared by: A&L Analytical Laboratories, Inc.

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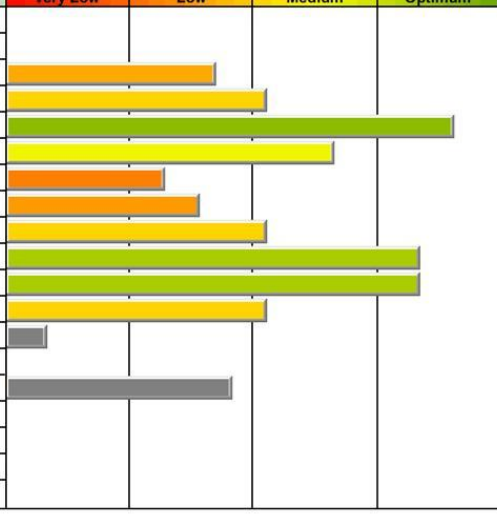
SOIL ANALYSIS

Client :	Grower :	
Wheat Tech, Inc. Josh Johnson 2375 Purdy Road Huntingdon TN 38344	Ben Moore Farm ID: Lee Ann	Report No: 15-028-0526 Cust No: 02929 Date Printed: 02/05/2015 Date Received : 01/28/2015 PO: Page : 2 of 19

Lab Number : 00165 **Field Id :** Lee Ann **Sample Id :** 2

Test	Method	Results
Soil pH	1:1	6.6
Buffer pH		
Phosphorus (P)	M3	11 ppm
Potassium (K)	M3	114 ppm
Calcium (Ca)	M3	1584 ppm
Magnesium (Mg)	M3	154 ppm
Sulfur (S)	M3	6 ppm
Boron (B)	M3	0.3 ppm
Copper (Cu)	M3	1.1 ppm
Iron (Fe)	M3	134 ppm
Manganese (Mn)	M3	181 ppm
Zinc (Zn)	M3	1.8 ppm
Sodium (Na)	M3	13 ppm
Soluble Salts		
Organic Matter	LOI	2.9 % ENR 102
Nitrate Nitrogen		



Calculated Cation Exchange Capacity

10.2 meq/100g

%Saturation	%sat	meq
K	2.9	0.3
Ca	77.6	7.9
Mg	12.6	1.3
H	6.0	0.6
Na	0.6	0.1

K/Mg Ratio: 0.23

Ca/Mg Ratio: 6.16

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH

Analysis prepared by: A&L Analytical Laboratories, Inc.

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SOIL ANALYSIS

Client :	Grower :	Report No: 14-035-0609
Wheat Tech, Inc.	Ben Moore	Cust No: 02929
Josh Johnson		Date Printed: 02/05/2014
2100 Purdy Road		Date Received : 02/04/2014
Huntingdon TN 38344		PO:
	Farm ID: Junior Moore	Page : 20 of 20

Lab Number : 05898 **Field Id :** Terrapin Hill **Sample Id :** 3

Test	Method	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	1:1	5.7	
Buffer pH	BPH	7.83	
Phosphorus (P)	M3	22 LB/ACRE	
Potassium (K)	M3	210 LB/ACRE	
Calcium (Ca)	M3	1278 LB/ACRE	
Magnesium (Mg)	M3	116 LB/ACRE	
Sulfur (S)	M3	28 LB/ACRE	
Boron (B)			
Copper (Cu)			
Iron (Fe)			
Manganese (Mn)			
Zinc (Zn)	M3	3.2 LB/ACRE	
Sodium (Na)			
Soluble Salts			
Organic Matter	LOI	3.3 % ENR 110	
Nitrate Nitrogen			

Calculated Cation Exchange Capacity: **5.0** meq/100g

Calculated Cation Saturation

%K	5.0
%Ca	64.0
%Mg	10.0
%H	21.0
Hmeq	1.0

K : Mg Ratio: 0.56

Ca : Mg Ratio: 6.40

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH
Analysis prepared by: A&L Analytical Laboratories, Inc.

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SOIL ANALYSIS

Client :
Wheat Tech, Inc.
Josh Johnson
6026 Creekside Drive
Milan TN 38358

Grower :
Ben Moore

Farm ID: Bishop

Report No: 16-354-0848
Cust No: 02929
Date Printed: 12/20/2016
Date Received : 12/19/2016
PO:
Page : 6 of 14

Lab Number : 44627 **Field Id :** Parrott **Sample Id :** A6

Test	Method	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	1:1	6.1	
Buffer pH	BPH	7.86	
Phosphorus (P)	M3	14 ppm	
Potassium (K)	M3	53 ppm	
Calcium (Ca)	M3	708 ppm	
Magnesium (Mg)	M3	51 ppm	
Sulfur (S)	M3	13 ppm	
Boron (B)			
Copper (Cu)			
Iron (Fe)			
Manganese (Mn)			
Zinc (Zn)	M3	1.7 ppm	
Sodium (Na)			
Soluble Salts			
Organic Matter	LOI	2.1 % ENR 86	
Nitrate Nitrogen			

Calculated Cation Exchange Capacity: **4.8 meq/100g**

%Saturation

	%sat	meq
K	2.8	0.1
Ca	73.8	3.5
Mg	8.9	0.4
H	14.6	0.7

K/Mg Ratio: 0.25
Ca/Mg Ratio: 8.29

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH

Analysis prepared by: Waypoint Analytical Tennessee, Inc.

A&L Analytical Laboratories, Inc.

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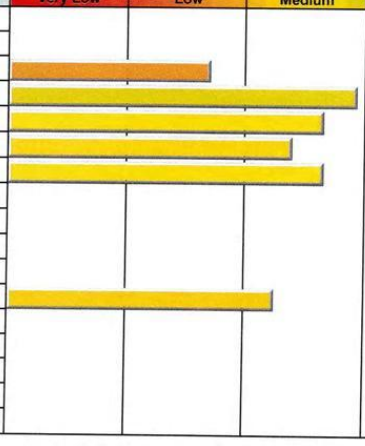
SOIL ANALYSIS

Client :	Grower :	
Wheat Tech, Inc. Josh Johnson 2100 Purdy Road Huntingdon TN 38344	Ben Moore Farm ID: Junior Moore	Report No: 14-035-0609 Cust No: 02929 Date Printed: 02/05/2014 Date Received : 02/04/2014 PO: Page : 4 of 20

Lab Number : 05880 **Field Id** [redacted] Across Culvert **Sample Id :** 4

Test	Method	Results
Soil pH	1:1	5.9
Buffer pH	BPH	7.78
Phosphorus (P)	M3	22 LB/ACRE
Potassium (K)	M3	254 LB/ACRE
Calcium (Ca)	M3	1830 LB/ACRE
Magnesium (Mg)	M3	182 LB/ACRE
Sulfur (S)	M3	34 LB/ACRE
Boron (B)		
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)	M3	4.0 LB/ACRE
Sodium (Na)		
Soluble Salts		
Organic Matter	LOI	2.3 % ENR 90
Nitrate Nitrogen		

SOIL TEST RATINGS



Calculated Cation Exchange Capacity	
7.2 meq/100g	
Calculated Cation Saturation	
%K	5.0
%Ca	64.0
%Mg	11.0
%H	21.0
Hmeq	1.5
K : Mg Ratio	
0.43	
Ca : Mg Ratio	
5.82	

SOIL FERTILITY GUIDELINES

Crop :

Rec Units:

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop :

Rec Units:

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH
Analysis prepared by: A&L Analytical Laboratories, Inc.

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SOIL ANALYSIS

Client :	Grower :	
Wheat Tech, Inc. Josh Johnson 2100 Purdy Road Huntingdon TN 38344	Ben Moore Farm ID: kenneth Moore	Report No: 14-035-0608 Cust No: 02929 Date Printed: 02/05/2014 Date Received : 02/04/2014 PO: Page : 4 of 11

Lab Number : 05868 **Field Id :** Shop **Sample Id :** 4

Test	Method	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	1:1	6.5	
Buffer pH			
Phosphorus (P)	M3	20 LB/ACRE	
Potassium (K)	M3	190 LB/ACRE	
Calcium (Ca)	M3	2644 LB/ACRE	
Magnesium (Mg)	M3	242 LB/ACRE	
Sulfur (S)	M3	20 LB/ACRE	
Boron (B)			
Copper (Cu)			
Iron (Fe)			
Manganese (Mn)			
Zinc (Zn)	M3	3.8 LB/ACRE	
Sodium (Na)			
Soluble Salts			
Organic Matter	LOI	2.9 % ENR 102	
Nitrate Nitrogen			

Calculated Cation Exchange Capacity	
8.5 meq/100g	
Calculated Cation Saturation	
%K	3.0
%Ca	78.0
%Mg	12.0
%H	8.0
Hmeq	0.6
K : Mg Ratio	
0.24	
Ca : Mg Ratio	
6.50	

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
Crop :							**Rec Units:**			

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH
Analysis prepared by: A&L Analytical Laboratories, Inc.

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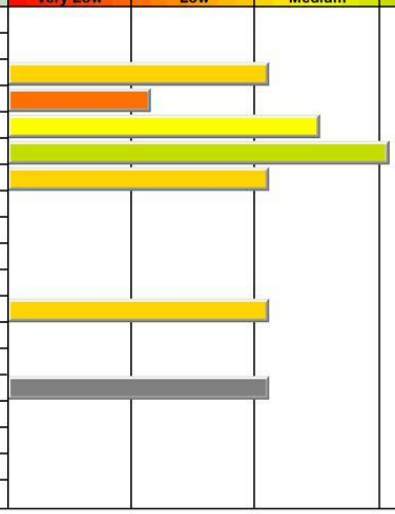
SOIL ANALYSIS

Client : Wheat Tech, Inc. Josh Johnson 2375 Purdy Road Huntingdon TN 38344	Grower : Ben Moore Farm ID: Watts Hill	Report No: 15-028-0727 Cust No: 02929 Date Printed: 02/05/2015 Date Received : 01/28/2015 PO: Page : 11 of 12

Lab Number : 01933 **Field Id :** WHill **Sample Id :** 11

Test	Method	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	1:1	5.6	
Buffer pH	BPH	7.66	
Phosphorus (P)	M3	16 ppm	
Potassium (K)	M3	71 ppm	
Calcium (Ca)	M3	1416 ppm	
Magnesium (Mg)	M3	191 ppm	
Sulfur (S)	M3	11 ppm	
Boron (B)			
Copper (Cu)			
Iron (Fe)			
Manganese (Mn)			
Zinc (Zn)	M3	1.7 ppm	
Sodium (Na)			
Soluble Salts			
Organic Matter	LOI	3.1 % ENR 106	
Nitrate Nitrogen			



Calculated Cation Exchange Capacity: **11.6 meq/100g**

%Saturation

	%sat	meq
K	1.6	0.2
Ca	61.0	7.1
Mg	13.7	1.6
H	23.4	2.7

K/Mg Ratio: 0.13

Ca/Mg Ratio: 4.45

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe

Crop : **Rec Units:**

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH

Analysis prepared by: A&L Analytical Laboratories, Inc.

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SOIL ANALYSIS

Client :	Grower :	
Wheat Tech, Inc. Josh Johnson 2375 Purdy Road Huntingdon TN 38344	Ben Moore Farm ID: Bishop	Report No: 15-022-0654 Cust No: 02929 Date Printed: 02/05/2015 Date Received : 01/22/2015 PO: Page : 12 of 16

Lab Number : 63135 **Field Id :** Bishop GH **Sample Id :** 6

Test	Method	Results	SOIL TEST RATINGS (Very Low / Low / Medium / Optimum / Very High)
Soil pH	1:1	6.6	
Buffer pH			
Phosphorus (P)	M3	26 ppm	
Potassium (K)	M3	165 ppm	
Calcium (Ca)	M3	1375 ppm	
Magnesium (Mg)	M3	94 ppm	
Sulfur (S)	M3	8 ppm	
Boron (B)			
Copper (Cu)			
Iron (Fe)			
Manganese (Mn)			
Zinc (Zn)	M3	2.5 ppm	
Sodium (Na)			
Soluble Salts			
Organic Matter	LOI	2.8 % ENR 100	
Nitrate Nitrogen			

Calculated Cation Exchange Capacity: **8.6** meq/100g

%Saturation

	%sat	meq
K	4.9	0.4
Ca	79.9	6.9
Mg	9.1	0.8
H	6.0	0.5

K/Mg Ratio: 0.50

Ca/Mg Ratio: 8.78

SOIL FERTILITY GUIDELINES

Crop : **Rec Units:**

(lbs) LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
Crop :							**Rec Units:**			

Comments :

M3 - Mehlich 3 BPH - Lime Index LOI - Loss On Ignition 1:1 - Water pH

Analysis prepared by: A&L Analytical Laboratories, Inc.

Tennessee Phosphorus Index

Operation: Moore Farms ***County:*** Weakley ***Plan Saved:*** 9/13/2017
Plan File: KB Farms.mmp ***State:*** Tennessee ***Init. File Rev:*** 4/6/2015
Plan Folder: \\Jt\i\CNMP NMP\MMP\Hog Barn Export\Ben Moore ***Soils File Rev:*** 1/11/2016

Field	Crop Year	Site Total	Management Total	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
Watts Hill	2018	12	20	12	240	Medium
Watts Hill	2019	12	3	12	36	Low
Watts Hill	2020	12	20	12	240	Medium
Watts Hill	2021	12	3	12	36	Low
Watts Hill	2022	12	20	12	240	Medium
Terrapin Hill	2018	12	3	12	36	Low
Terrapin Hill	2019	12	20	12	240	Medium
Terrapin Hill	2020	12	3	12	36	Low
Terrapin Hill	2021	12	20	12	240	Medium
Terrapin Hill	2022	12	3	12	36	Low
Shop	2018	12	18	12	216	Medium
Shop	2019	12	3	12	36	Low
Shop	2020	12	20	12	240	Medium
Shop	2021	12	3	12	36	Low
Shop	2022	12	20	12	240	Medium
Parrott	2018	11	3	11	33	Low
Parrott	2019	11	17	11	187	Medium
Parrott	2020	11	3	11	33	Low
Parrott	2021	11	17	11	187	Medium
Parrott	2022	11	3	11	33	Low
Lee Ann	2018	15	3	15	45	Low
Lee Ann	2019	15	17	15	255	Medium
Lee Ann	2020	15	3	15	45	Low
Lee Ann	2021	15	3	15	45	Low
Lee Ann	2022	15	3	15	45	Low
Hay Barn	2018	12	20	12	240	Medium
Hay Barn	2019	12	3	12	36	Low
Hay Barn	2020	12	20	12	240	Medium
Hay Barn	2021	12	3	12	36	Low
Hay Barn	2022	12	20	12	240	Medium
Griffith	2018	11	3	11	33	Low
Griffith	2019	11	20	11	220	Medium
Griffith	2020	11	3	11	33	Low
Griffith	2021	11	20	11	220	Medium
Griffith	2022	11	3	11	33	Low
Grandmothers	2018	12	3	12	36	Low
Grandmothers	2019	12	20	12	240	Medium
Grandmothers	2020	12	3	12	36	Low

Tennessee Phosphorus Index

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Field	Crop Year	Site Total	Management Total	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
Grandmothers	2021	12	20	12	240	Medium
Grandmothers	2022	12	3	12	36	Low
Glisson Hill	2018	12	3	12	36	Low
Glisson Hill	2019	12	20	12	240	Medium
Glisson Hill	2020	12	3	12	36	Low
Glisson Hill	2021	12	20	12	240	Medium
Glisson Hill	2022	12	3	12	36	Low
Glisson Bottom	2018	12	3	12	36	Low
Glisson Bottom	2019	12	17	12	204	Medium
Glisson Bottom	2020	12	3	12	36	Low
Glisson Bottom	2021	12	17	12	204	Medium
Glisson Bottom	2022	12	3	12	36	Low
Carroll	2018	11	4	22	44	Low
Carroll	2019	11	4	22	44	Low
Carroll	2020	11	18	22	198	Medium
Carroll	2021	11	4	22	44	Low
Carroll	2022	11	18	22	198	Medium
Across Culvert	2018	12	3	12	36	Low
Across Culvert	2019	12	17	12	204	Medium
Across Culvert	2020	12	3	12	36	Low
Across Culvert	2021	12	17	12	204	Medium
Across Culvert	2022	12	3	12	36	Low
Blankenship	2018	12	3	12	36	Low
Blankenship	2019	12	3	12	36	Low
Blankenship	2020	12	18	12	216	Medium
Blankenship	2021	12	3	12	36	Low
Blankenship	2022	12	18	12	216	Medium
Barner	2018	12	4	24	48	Low
Barner	2019	12	18	24	216	Medium
Barner	2020	12	4	24	48	Low
Barner	2021	12	18	24	216	Medium
Barner	2022	12	4	24	48	Low
52 Acre Hill	2018	12	3	12	36	Low
52 Acre Hill	2019	12	20	12	240	Medium
52 Acre Hill	2020	12	18	12	216	Medium
52 Acre Hill	2021	12	20	12	240	Medium
52 Acre Hill	2022	12	18	12	216	Medium
18 Acre Btm	2018	12	3	12	36	Low
18 Acre Btm	2019	12	3	12	36	Low

Tennessee Phosphorus Index

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Field	Crop Year	Site Total	Management Total	P Index w/o P Apps	P Index w/ P Apps	P Loss Risk
18 Acre Btm	2020	12	3	12	36	Low
18 Acre Btm	2021	12	17	12	204	Medium
18 Acre Btm	2022	12	3	12	36	Low