

Septage Nutrient Management Plan
2014 update for
Toi Toi of North Carolina, Inc.
SLAS 67-10 Richlands Hwy. site
Onslow County, NC



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Purpose: The purpose of this document is to update the septage nutrient management plan of SLAS #67-10 and to provide updated compliance with state regulations.

Existing Site Conditions: The relevant property lines, approved site limits, natural geographic conditions and known site improvements are incorporated from the prior plan.

A. General Information:

1. Septage will be sampled at least three (3) times per year for waste analysis. These samples will be used to monitor nutrient loadings. The recommended procedure for collecting the samples is as follows:
 - a) Make sure the septage has been stabilized at a pH of 12 with hydrated lime for 30 minutes (domestic septage) or for 2 hours (grease trap septage).
 - b) Set out some pans in the path where the truck will be disposing the septage. Plastic pans are recommended. Do not use zinc plated or galvanized metal pans; the metals content will be distorted.
 - c) Mix contents of 3-4 pans and fill a 16-20 ounce plastic bottle $\frac{3}{4}$ full. Squeeze out some of the excess air and label the bottle with your name and septage sample identification.
 - d) Complete the NCDA&CS Septage Sample Cover Sheet and bring it with the sample to the Cooperative Extension office.

If samples are collected over a couple of days or from different truckloads, it makes for a more representative sample; however, samples should be kept cool. Only one sample is needed, as long as it is mixed from several different sub-samples.

Bring the samples to the Extension Office for forwarding to the NCDA&CS lab.

Please use a check made out to NCDA&CS (\$8.00 per sample). Bottles need to be clearly labeled as a household -lime stabilized- septage sample (waste code MLS). For extra security, place the bottle in a plastic freezer bag. The form and check can be put in an envelope and placed in the bag with the bottle.

2. An annual soil sampling of each numbered field will be conducted and the results maintained on file. Pay particular attention to: soil pH and manganese index.

3. Total available area for septage application on this site is 9.0 acres. This is divided into two smaller fields: (sizes confirmed per Chester Cobb, 06/09/14)
 - a) Field #1 contains approximately 4.7 acres
 - b) Field #2 contains approximately 4.3 acres

The dominant soil series at this site is mainly Baymeade fine sand (BaB) with a small portion of Norfolk loamy fine sand (NoB), and a very small corner of Marvyn loamy fine sand (MaC). These are according to the Onslow Co. Soil Survey (sheets 13 and 18), and the web soil survey. A map is attached.

4. Septage will not be applied when and where the site is untrafficable. Untrafficable is defined as soil that will allow a loaded truck to leave a depression in sod greater than 3 inches in depth. It also will not be applied when the field is flooded, frozen, or snow covered.
5. Grease septage is to be diluted at least 1:1 from its original concentration when pumped with domestic septage or water. Grease septage applications shall not exceed 25,000 gallons/acre/yr.
6. Septage storage shall be provided to account for the average volume of septage pumped per week, or an alternative plan, such as disposal at a waste treatment plant, should be in place. Storage tanks are currently located at the site.
7. If the forage is to be grazed, the nitrogen recommendations are to be reduced by 25% for each applicable field.

B. Crops to be grown and approximate planting and harvest times:

1. The operator desires to change the summer crop to pearl millet in both Field #1 & #2, and grow cereal rye during the winter. Prior to planting the pearl millet, kill any residual rye, Bermuda grass, and weeds with glyphosate. Pearl millet establishes best at a pH of 6.0 to 6.5 (may start yellowing at pH above 6.2). Use the soil test report to determine if lime, phosphorus and potassium additions are needed. Manganese sulfate may also be needed.

The November 2013 soil samples for the site indicate a pH of 7.3-7.4, and the \$ and &pH are indicated under manganese. From the NCDA notes ([http://www.ncagr.gov/agronomi/pdffiles/st\\$note.pdf](http://www.ncagr.gov/agronomi/pdffiles/st$note.pdf)), lowering the soil pH through sulfur application would be beneficial. The use of magnesium sulfate will also help (<http://www.soil.ncsu.edu/publications/Soilfacts/AG-439-18/AG-439-18.pdf>).

The following seeding rates are recommended to meet the realistic yield expectation (RYE) and appropriate stand densities. Under adverse conditions, a much lower percentage of the seeds will establish successfully. For that reason, many seeds are needed to obtain a satisfactory stand. During drought and other adverse conditions, reseeding may be necessary:

Cereal rye: 2.5-3 bu/acre (160 lbs per acre broadcast, 140 lbs per acre drilled). Drilled is preferred. If seed is broadcast, cultipacking is recommended to improve seed/soil contact and increase survival rate, especially during dry weather.

Pearl millet: 20-25 lbs/acre if broadcast, or 15-20 lbs/acre if drilled (preferred method)

In Onslow, the prime planting dates for pearl millet are May 1-15, although it can extend into June (see *Planting Guide for Forage Crops in NC*:

<http://edgecombe.ces.ncsu.edu/files/library/33/A.%20Planting%20Guide%20for%20Forage%20Crops%20in%20NC.pdf>). Thirty pounds of nitrogen per acre can be applied at planting. Make cuttings when the stand reaches 15-inches tall, but do not cut the plants shorter than 6-inches or significant die-off may occur. The first cutting of pearl millet is usually a good yield; however, yield and stand may decline during the summer.

Replanting can be done in mid-summer to improve stand density (maintain the required 80% coverage) and maintain application window. Contact Tim Hall, NCDA&CS Regional Agronomist, for stand health questions (324-9924).

Overseeding with cereal rye will occur near mid-October of each year, at a rate of approximately 2.5 bu/acre to 3 bu/acre. The cereal rye will be harvested as hay, preferably by late April to early-May.

2. Crop rotation table:

<i>Field</i>	Crop	Season
1	Cereal rye	mid-October--April
	Pearl millet	May--September
2	Cereal rye	mid-October--April
	Pearl millet	May--September

3. Weed control

If weeds become a problem, contact your technical specialist for assistance and/or the most recent *North Carolina Agricultural Chemicals Manual* for herbicides to control specific weeds. Weed control for the various crops is very weed specific. Please consult one of your local advisors for proper identification and control recommendations.

C. Nitrogen needs for crops grown:

RYE = Realistic Yield Expectation for soil type (majority of each field is Baymeade)

N App. Rate = Suggested nitrogen application rate

<i>Field</i>	<i>Crop (as hay)</i>	<i>RYE tons/acre</i>	<i>N App. Rate lbs/dry ton</i>	<i>Total lbs N/ac</i>	<i>*Gal/ac/yr</i>	<i>Adjusted Gal/ac/yr</i>	<i>Actual lbs N/ac</i>
1 & 2	Cereal rye	1.0	49	49	18,846	18,000	47
	Pearl millet	4.4	54	237	91,154	32,000	83

* This column represents the number of gallons needed to meet the total nitrogen needs of the crops. The maximum permitted application is 50,000 gal/acre/yr, with a maximum winter monthly application of 5,000 gal/acre.

Crops will be harvested as hay and removed from site for feed, bedding, or other approved uses. The **Adjusted gal/acre/year** column represents what can be applied so as not to exceed the maximum permitted application rate of 50,000 gal/acre/yr.

Because the nitrogen needs will not be met, commercial nitrogen fertilizer can be used IF NEEDED. A Plant Tissue Analysis sample can be collected to determine if the plants are deficient. If fertilizer is used, it is important that the crop N requirements not be exceeded! The pearl millet can have up to 154 lbs of commercial N. All such additions are to be documented.

D. Monthly/yearly application rate estimates in gallons:

<i>Crop</i>	<i>Maximum Uptake Period</i>
Pearl millet (hay)	May-August
Cereal rye (hay)	February-April

As shown in the above table, the cereal rye has its maximum nutrient uptake during February through April. There is some uptake, however, as the crop first grows and becomes established. It is generally recommended that 1/3 of the nutrients be applied during the lower growth months (November-January) and the remaining 2/3 be applied during February-April.

It is understood that homeowner pumping requests are greatest during the winter months. The application recommendations in the table below, therefore, are given as the permissible amount WEATHER, CROP, AND FIELD CONDITIONS PERMITTING. In order to get more customers to request summer pumping, you may want to offer a "price incentive" (i.e., have a summer price that is less than the winter price). This would reduce your risk of either an application or crop cover violation. Again, this is just a recommendation.

<i>Month</i>	<i>Field 1 & 2</i>
	<i>application per acre</i>
	<i>Pearl Millet & Rye</i>
January*	low
February*	low
March*	medium
April	medium
May	medium
June	high
July	high
August**	low/medium
September**	low/medium
October	medium
November*	low
December*	low

Low = up to 5,000 gallons; medium = up to 10,000 gallons; high = up to 15,000 gallons

* These months can have wetter soil conditions than during the other months. It is exceedingly important that the applications be applied to the largest surface area practicable, so as not to have any ponding or runoff, and to minimize untrafficable areas.

**** Application volume will depend on health and growth stage of crop.**

Note: Application dates are approximate and subject to adjustments due to harvesting (30 day rest periods) and weather. They are given as an application guide.

It is understood that weather conditions can cause the winter crop to mature earlier or later than the specified field harvest date. Regulations mandate that a crop be planted or break dormancy within 30 days of any application of septage. No crop can be harvested until at least 30 days after the last septage application to that crop if it is to be used as forage or bedding. Harvests should, therefore, be staggered at intervals among the fields such that at least one is available for application while the others go through the 30 day rest period.

E. Application method:

The preceding information is based on septage being **evenly applied** over the entire permitted site. For this facility, septage will be applied using a pumper truck with a splash plate, when the crops are of suitable height and the field is trafficable. If the entire field is not covered each time, markers or some form of consistent rotation are needed to ensure that one portion of the field is not more heavily loaded than other portions of the field. This can be done by dividing each field into sub-fields (ex.: 1a, 1b, 1c, etc.).

An application record for each sub-field is highly recommended. Waste record forms SLUR-1 and SLUR-2 can be used for record keeping. These and additional forms are available from the local Cooperative Extension office or from the DENR Wilmington Regional Office.

F. Additional fertility requirements:

Optimum nitrogen uptake will not occur if the concentrations of other nutrients limit the crop growth. Septage does not provide adequate supplies of all necessary nutrients over a prolonged period of time; so periodic supplements may be required. These maintenance applications should be based on annual soil test analyses. Soil samples should be taken at a consistent time each year, preferably in the Fall. **DO NOT FOLLOW THE NITROGEN RECOMMENDATION FROM THE SOIL TEST REPORT!** You are to use the nitrogen amounts given in this waste application plan.

A separate soil sample should be collected for the buffer areas. Commercial fertilizer applications to the buffers are to be based on the soil sample results. If you have questions, feel free to ask a Certified Waste Management Plan person in the local Cooperative Extension or Soil & Water Conservation offices.

G. Harvest of the crops and their use:

1. The pearl millet will be cut and baled as hay. Allow the millet to grow to roughly 15-inches tall between cuttings. Do not cut shorter than 6-inches tall.
2. The rye will be cut and baled as hay during April to early May. Kill any residual rye and weeds with glyphosate prior to planting the millet.
3. The baled crops will be transported off site and used as livestock feed or other approved uses.
4. A 30-day waiting period must be observed between the last application of septage and harvest if the material is to be used as livestock feed or bedding; therefore, an application

rotation will need to be established among the fields. Record keeping will be an important factor in documenting proper application. This cycle will continue until your next plan update or other instructions from either DENR or a Certified Waste Management Plan person. Any changes are to be put into writing, placed in your plan file, and copies given to the appropriate agencies.

H. Records required to be kept for five years:

1. Soil tests are to be done annually and the reports kept. Although nitrogen and phosphorus are the main nutrients of interest, some micronutrients are also of concern. Check your soil test results and compare them to the follow table:

<i>Pollutant</i>	<i>Maximum Cumulative Loading Rate (kilograms per hectare)</i>	<i>Equivalent Soil Test Report Value (parts per million)</i>
Zinc	2800	1400
Copper	1500	750
Cadmium	39	19.5
Nickel	420	210
Lead	300	150
Selenium	100	50
Arsenic	41	20.5
Mercury	17	8.5

2. Septage pumping log
3. Septage land application log
4. Septage land application log cover sheet with signed certification

The NC Septage Management Rules (15A NCAC 13B .0822(e)) and the Federal Rules (40 CRF 503.17(b)) require that specific information be recorded and maintained for septage land application sites. Incomplete record keeping may result in penalties. If you do not include the required records your site may not be re-permitted. If you have more than one site and each site has a separate permit number, the records for each must be maintained separately.

One **Septage Land Application Log Cover Sheet** is to be attached to each set of log forms submitted to DENR. The **Septage Pumping Log** (modified SLUR-1) is used to record septage pumped by the firm. The **Septage Land Application Log** (modified SLUR-2) is used to record how the septage is treated and land applied. All blocks are to be completed. One Septage Land Application Log is to be kept for each field and crop. Your site would have a minimum of four log forms for each year:

- Field #1 Rye,
- Field #1 Pearl Millet,
- Field #2 Rye,
- Field #2 Pearl Millet.

If the fields are sub-divided for applications, additional forms may be used. Although not

required, crop harvest records are strongly recommended.

Questions regarding the regulations? Contact Chester Cobb (Composting and Land Application Branch) at 919-707-8285.

Soil Erosion and Runoff Control Plan

Natural Resource Conservation Service best management practices (BMPs) are readily available and directly applicable to septage application sites. Some recommended BMPs for this site include:

1. Maintain a vegetative cover. At any time of the year, crops or their residue should be present on the site.
2. Manage soil surface for maximum infiltration. Minimize soil disturbance by drill planting the winter small grain crop. The Onslow Extension Center has a grain drill available for rent. If soil compaction should become evident (ponding of applied septage), use a subsoiler to loosen the soil and improve infiltration. Field traffic should be kept to a minimum.
3. Maintain vegetation on swales, ditch channels, and all other field exits for stormwater runoff. Bermudagrass buffers at least 50 feet wide should be maintained around the site. A 200-ft buffer is to be maintained in areas adjacent to streams. If additional control or screening is needed, contact the Soil & Water Conservation office to see if the site qualifies for Cost Share assistance. They may be able to help you get trees or shrubs.
4. Extra care and control may be needed on those areas with increased slope. If possible, field edges should be shaped to detain runoff.

Nutrient management and erosion control plans are not static instruments; they are blueprints for planning and optimizing the defined crop use goals. As crop use goals or site conditions change, the management plan may need to be amended. Information sources, such as Cooperative Extension or Soil & Water Conservation, should be used on an ongoing basis.

Submitted by:  Date: 06/20/14

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Attachments: This is an update of the 2007 plan. Any aerial photos, maps, booklets, and forms from the prior plan should be kept and attached to this plan. A site map, NCDA&CS septage sample certification form, and a septage land application log cover sheet are included with this plan.

Please sign both copies and send one copy to:

*Chester Cobb, Soil Scientist
Division of Waste Management
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