

**CRAVEN LCID**  
**(A Land Clearing and Inert Debris Landfill)**  
**PERMIT NUMBER 2513-LCID-2013**

**Permit Application Data and Operation Plan**

356 Sanders Lane  
Number 8 Township  
Craven County  
New Bern, N.C.

For

Craven LCID, LLC  
Mr. Terry D. Morris, Agent  
109 Swift Creek Road  
Vanceboro, NC 28586  
(252) 670-6749

Prepared By



Michael L. Rice, P.E.  
**ROBERT M. CHILES, P.E.**  
P.O. Box 3496  
New Bern, N.C.  
(252) 637 - 4702  
May 31, 2013  
Revised August 6, 2013

**APPROVED**  
**DIVISION OF WASTE MANAGEMENT**  
**SOLID WASTE SECTION**  
DATE September 04 BY [Signature]  
2013

DOC ID 19624

Permit No.	Date	Document ID No.
<b>P1263</b>	<b>August 29, 2013</b>	<b>19614</b>

**From:** [Mike Rice](#)  
**To:** [Chao, Ming-tai](#)  
**Subject:** Re: Permit Application for Craven LCIDLF  
**Date:** Thursday, August 29, 2013 8:33:14 AM  
**Attachments:** [2013030 ESC Approval.pdf](#)

Received by an e-mail  
**Date: August 29, 2013**  
**Solid Waste Section**  
**Raleigh Central Office**

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Dear Mr. Chao:

Attached is a copy of the ESC approval for Craven LCID.  
A printed copy of the erosion control plan and this approval will follow via postal service.  
You already have an electronic copy of the plan and its attachments.

If you have any questions or have any problems with the attached file, contact us at your convenience.

Michael L. Rice, P.E., P.L.S.

ROBERT M. CHILES, P.E.  
PO Box 3496  
New Bern, NC 28564  
(252) 637-4702 (ofc)  
(252) 637-3100 (fax)



North Carolina Department of Environment and Natural Resources  
**Division of Energy, Mineral, and Land Resources**  
**Land Quality Section**

Tracy E. Davis, PE, CPM  
Director

Pat McCrory, Governor  
John E. Skvarla, III, Secretary

August 23, 2013

**LETTER OF APPROVAL WITH MODIFICATIONS**

Craven LCID, LLC  
ATTN: Mr. Terry D. Morris, Agent  
109 Swift Creek Road  
Vanceboro, North Carolina 28586

RE: Erosion and Sedimentation Control Plan No. Crave-2013-019  
Project Name: Craven LCID  
Location: NCSR 1243 County: Craven  
River Basin: Neuse  
Date Received by LQS: August 13, 2013  
Project Acreage: 4.5 Project Type: Revised  
Project Description: The disturbance is to increase the height of an existing Land Clearing and Inert Debris disposal area.

Dear Sir:

This office has reviewed the subject erosion and sedimentation control plan. We find the plan to be acceptable and hereby issue this Letter of Approval with Modifications. The modifications required for approval are listed on the attached page. This plan approval shall expire three (3) years following the date of approval, if no land-disturbing activity has been undertaken, as required by 15A NCAC 4B.0129, unless modified by other legislation.

Please be advised that 15A NCAC 4B.0118(a) requires that a copy of the approved erosion and sedimentation control plan be on file at the job site. Also, you should consider this letter as giving the Notice required by G.S. 113A-61.1(a) of our right of periodic inspection to ensure compliance with the approved plan.

North Carolina's Sedimentation Pollution Control Program is performance oriented, requiring protection of existing natural resources and adjoining properties. If, following the commencement of this project, it is determined that the erosion and sedimentation control plan is inadequate to meet the requirements of the Sedimentation Pollution Control Act of 1973 (G.S. 113A-51 through 66), this office may require revisions to the plan and implementation of the revisions to ensure compliance with the Act.

Acceptance and approval of this plan is conditioned upon your compliance with Federal and State water quality laws, regulations and rules. In addition, local city or county ordinances or rules may also apply to this land-disturbing activity. This approval does not supersede any other permit or approval.

Washington Regional Office

943 Washington Square Mall, Washington, North Carolina 27889 • Phone: 252-946-6481 / FAX: 252-975-3716

Internet: <http://www.portal.ncdenr.org/web/lr/land-quality>

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Craven LCID, LLC  
ATTN: Mr. Terry D. Morris, Agent  
August 23, 2013  
Page 2

Please note that this approval is based in part on the accuracy of the information provided in the Financial Responsibility/Ownership Form, which you have submitted. You are required to file an amended form if there is any change in the information included on the form. NOTE: Neither this approval nor the financial responsibility/liability cited in it automatically transfer with a change in project ownership. In addition, 15A NCAC 4B.0127(c) requires that you notify this office of the proposed starting date for this project (using the enclosed Project Information Sheet). Please notify us if you plan to have a preconstruction conference.

Please be advised that a rule to protect and maintain existing buffers along watercourses in the Neuse River Basin became effective on July 22, 1997. The Neuse River Riparian Area Protection and Maintenance Rule (15A NCAC 2B.0233) applies to the 50-foot wide zone directly adjacent to surface waters (Intermittent streams, perennial streams, lakes, ponds and estuaries) in the Neuse River Basin. For more information about the riparian area rule, please contact the Division of Water Quality's Wetland/401 Unit at 919-807-6300, or DWQ in our regional office at 252-946-6481.

Please be aware that your project will be covered by the enclosed NPDES General Stormwater Permit NCG010000 (Construction Activities). You should first become familiar with all of the requirements for compliance with the enclosed permit.

Sincerely,



Patrick H. McClain, PE  
Regional Engineer

Enclosures

cc w/o enc: Michael L. Rice, PE, Robert M. Chiles, PE  
Amy Adams, Regional Supervisor, Division of Water Resources

**MODIFICATIONS**

1. **AS THE DECLARED RESPONSIBLE PARTY, YOUR LEGAL RESPONSIBILITY** is to understand the Act and comply with the following minimum requirements of the Act:
  - A. In the event of a conflict between the requirements of the Sedimentation Pollution Control Act, the submitted plan and/or the contract specifications, the more restrictive requirement shall prevail;
  - B. The land disturbing activity shall be conducted in accordance with the approved erosion and sedimentation control plan;
  - C. The **LATEST APPROVED** erosion and sediment control plan will be used during periodic unannounced inspections to determine compliance and a copy of the plan must be on file at the job site. If it is determined that the implemented plan is inadequate, this office may require the installation of additional measures and/or that the plan be revised to comply with state law.
  - D. All site revisions, including those required by other local, state or federal agencies, which affect site layout, drainage patterns, limits of disturbance and/or disturbed acreage must be submitted to this office for approval a minimum of 15 day prior implementing the revision;
  - E. Revisions exceeding the approved scope of this project without this office's prior approval of the plan showing the changes can be considered a violation. Failure to comply with any part of the approved plan or with any requirements of this program could result in appropriate legal action (civil or criminal) against the financially responsible party. Legal actions could include Stop Work Orders, the assessing of a civil penalty of up to \$5000 for the initial violation and/or a civil penalty of up to \$5000 per day for each day the site is out of compliance.
  - F. The **CERTIFICATE OF PLAN APPROVAL** must be posted at the primary entrance to the job site and remain until the site is permanently stabilized
  - G. In cases of natural disaster related changes to the proposed land disturbing activity, all appropriate actions and adequate measure installations may be performed to prevent sediment damage, prior to submitting and receiving approval of the revised plan. A revised plan must be submitted for approval as soon as possible, but no later than 15 days after all emergency actions have been performed;

**MODIFICATIONS**

- H. Erosion and sediment control measures or devices are to be constructed and/or installed to safely withstand the runoff resulting from a 10 year storm event (25 year storm event in High Quality Zones). The 10 year storm event is generally equivalent to a storm producing 6.5 - 7 inches in 24 hours or at the rate of 6.5 - 7 inches in 1 hour, depending on the location of the project within the region;
- I. No earthen material is to be brought on or removed from the project site, until the off-site borrow and/or disposal sites are identified as part of the erosion control plan. If an off-site borrow and/or disposal site is to be utilized, submit the name and identification number (E&SCP# or Mine Permit #), prior to use.
- J. A buffer zone, sufficient to restrain visible sedimentation within the 25% of the width closest to the land disturbance, must be provided and maintained between the land-disturbing activity and any adjacent property or watercourse.
- K. In order to comply with the intent of the Act, the scheduling of the land-disturbing activities is to be such that both the area of exposure and the time between the land disturbance and the providing of a ground cover is minimized.
- L. Unless a temporary, manufactured, lining material has been specified, a clean straw mulch must be applied, at the minimum rate of 2 tons/acre, to all seeded areas. The mulch must cover at least 75% of the seeded area after it is either tacked, with an acceptable tacking material, or crimped in place.
- M. New or affected cut or filled slopes must be at an angle that can be retained by vegetative cover or other adequate erosion-control devices or structures appropriate, **AND must be provided with a ground cover sufficient to restrain erosion within 21 calendar days of completion of any phase (rough or final) of grading (ANNUAL RYE GRASS IS NOT in the APPROVED seeding specifications NOR is it an ACCEPTABLE substitute for the providing of a temporary ground cover).**
- N. A **permanent ground cover**, sufficient restrain erosion, **must be provided** within the shorter of 15 working or 90 calendar days (if in a High Quality Zone, the shorter of 15 working or 60 calendar days) after completion of construction or development on any portion of the tract (**ANNUAL RYE GRASS IS NOT in the APPROVED seeding specifications NOR is it an ACCEPTABLE substitute for the providing of a nurse cover for the permanent grass cover).**

Erosion and Sedimentation Control Plan No. Crave-2013-019

Project Name: Craven LCID

August 23, 2013

**MODIFICATIONS**

Page C

- O. All sediment and erosion control details for this project must conform to the standards as shown in the current Erosion & Sediment Control Planning and Design Manual; These details must be utilized for construction and incorporated in the plan. The Design Manual may be found on-line at: <http://portal.ncdenr.org/web/lr/publications>
  
2. Adequate and appropriate measures must be properly installed downstream, within the limits of disturbance, of any land disturbing activity to prevent sediment from leaving the limits of disturbance, entering existing drainage systems, impacting an on-site natural watercourse or adjoining property.

Permit No.	Date	Document ID No.
<b>P1263</b>	<b>August 23, 2013</b>	<b>19591</b>

**From:** [Mike Rice](#)  
**To:** [Chao, Ming-tai](#)  
**Subject:** Re: Permit Application for Craven LCIDLF  
**Date:** Friday, August 23, 2013 10:39:15 AM  
**Attachments:** [2013030 LCID App Data and Op Plan Rev 8-23-13.pdf](#)

Sent by an e-mail  
Date: **August 21, 2013**  
Solid Waste Section  
Raleigh Central Office

Dear Mr. Chao:

Apparently I overlooked the remaining capacity when revising the "volume of waste" section during the August 6 revisions. I have corrected the remaining capacity volume to read 55,000 cubic yards.

As suggested, I have added a paragraph to the "volumes of waste" section which discusses the possible locations for stockpiles, and generically limit the size(s) of stockpiles. If the buffers that you indicate are applied, there are locations outside of the disposal area footprint that will accommodate stockpiles. In order to address stockpile duration, I included a requirement that remaining stockpiles shall be incorporated into the disposal area prior to final site closure. Given the solid nature of the material that might be stockpiled, it is not likely that a stockpile will "spoil." If located according to the operation plan, stockpiles will not pose an environmental threat, so any time limit to their duration other than to the working life of the landfill appears to be arbitrary.

By making a few format changes, I was able to limit to two, the number of pages of the operation plan effected by the revisions and added information. The changes occur only on pages 5 and 6 of the document. As the changes are noted with today's date, this effectively changes the revision date on the cover page to August 23, 2013.

I have created and attached a revised pdf of the application data and operation plan for your use. Please print pages 5 and 6, and use them to replace the corresponding pages in the latest hard copies that we submitted to you. As for the revision date on the signed cover, please line through August 6, 2012 and write August 23, 2013.

On a related note, we do not provide copies to the client until after permit approval. Therefore, documents issued to the client will display the correct revision date and include all revisions that are prompted by the regulatory review process.

With respect to your comment about the compliance offer (officer?) - is that something internal to your office, or are you still waiting for information from the project owner or my office?

I spoke with Mr. McClain this morning regarding approval of the erosion control plan. He advised that he has not yet reviewed the revisions submitted to him, but assured me that he would do so and call me later today. Again, we will forward copies of the approved plan and issued approval from the Land Quality Section as soon as we receive it.

Michael

Michael L. Rice, P.E., P.L.S.

ROBERT M. CHILES, P.E.  
PO Box 3496  
New Bern, NC 28564  
(252) 637-4702 (ofc)  
(252) 637-3100 (fax)

----- Original Message -----

**From:** [Chao, Ming-tai](#)

**To:** [mikerice@robertmchilespe.com](mailto:mikerice@robertmchilespe.com)

**Sent:** Wednesday, August 21, 2013 3:04 PM

**Subject:** FW: Permit Application for Craven LCIDLF

Dear Mr. Rice:

I am sorry to hit the wrong key and sent out the previously e-mail message without my signature.

I am still waiting the Compliance Offer to approve the compliance history review for the site, and after that I can work on the permit. The permit can't be issued until the Erosion and Sediment Control Plan is approved by the NC LQS. Please contact me if you have any questions of the permitting processes.

Best regards,

Ming-Tai Chao, P.E.

Environmental Engineer

Permitting Branch, Solid Waste Section

Division of Waste Management

**(Mailing Address)**

**1646 Mail Service Center**

**Raleigh, NC 27699-1646**

(Street Address)

Green Square, 217 West Jones Street

Raleigh, NC 27603

**Tel. 919-707-8251**

[ming.chao@ncdenr.gov](mailto:ming.chao@ncdenr.gov)

<http://portal.ncdenr.org/web/wm/sw>

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**From:** Chao, Ming-tai

**Sent:** Wednesday, August 21, 2013 2:57 PM

**To:** 'Mike Rice'

**Subject:** RE: Permit Application for Craven LCIDLF

Dear Mr. Rice:

I have found a discrepancy of the "Volume of Waste" (on Page 5 of the Permit Application). The total capacity of the LCIDLF is 107,500 cubic yards (cy) which including the in-place waste volume of 52,500 cy [consistent with the original submittal) and the remaining capacity of the proposed Craven LCIDLF – **54,500** cy. I think this remaining volume is likely 55,000 cy. Please confirm the

remaining volume of the landfill.

After reviewing your responses dated 08/19/2013 I would like point out my purposes for my pervious comments/concerns:

Comment 1.

The recyclables can be stockpiled in the working faces as long as the duration is not violate the cover requirements stated in Rules .0566(4) & (5). I agreed with your approach that the stockpiles can be seated in the location within the permitted waste footprints (about 3.6 acres) but not inside the working faces, and relocate as necessary when the waste fill in progress.

The record of recyclable is optional; your client may use the record to ask for tax or grant if they are available. The record will be the official document for grant or tax deduction applications (However, I can't guaranty anything).

According to previously court ruling, the permit conditions can't be enforceable if the permit conditions don't incorporate the written statements, descriptions, methods, approaches, or measurements in the approved operations plan or if the permit conditions are not required by State, Federal, or local Rules, Laws, or Regulations. If you provide the maximum stockpile amount and duration in the operations plan, as long as it is reasonable, the Solid Waste Section will approved them which will be incorporated into the permit conditions and become a legal-bounding document. So, any responses you think is necessary for the waste operation please put them in the written operations plan.

I have no further comments on your responses 2 & 3.

After you receiving the approval of the Erosion and Sediment Control Plan & permit issued by the NC Land Quality Section, please provide me a copy of the approve letter and permit and any revised portions of the Permit Application.

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Permit No.	Date	Document ID No.
<b>P1263</b>	<b>August 20, 2013</b>	<b>19563</b>

**From:** [Mike Rice](#)  
**To:** [Chao, Ming-tai](#)  
**Cc:** [Shackelford, Dennis](#); [Williams, Ray](#)  
**Subject:** Re: Permit Application for Craven LCIDLF  
**Date:** Monday, August 19, 2013 11:38:47 AM

**Received by an e-mail**  
**Date: August 19, 2013**  
**Solid Waste Section**  
**Raleigh Central Office**

Dear Mr. Chao:

With all due respect, the drawing attached to my August 15, 2013 email will not be added to the permit. Referring to that drawing, please note the following: the date in the titleblock that indicates **May 5, 2005**; and the text immediately above "Sheet 1 of 4" that reads "revised per NCDENR **August 3, 2005**," emphasis added. That drawing was revised in response to comments contained in a letter dated July 20, 2005, written by Mr. Jim Barber of your office. The drawing represented the existing conditions at the project site in 2005 and was submitted to your office as part of a revised LCID application package, attached to our August 9, **2005** cover letter to Mr. Mussler, on behalf of the previous landowner, Mr. Robert Jones, of RJ Bushhogging, Inc. According to the US Postal Service return receipt, that submission was received by the mail service center on August 10, 2005 by a Mr. H. Lee Holt, and should already be among the archives of your office under the name RJ Bushhogging, Inc. or Sanders Lane LCID. The conditions indicated in that drawing have not represented the existing site conditions since 2006 according to aerial photographs available through Google Earth. In one way or another, Mr. Jones filled what was then an existing ditch in order to expand his LCID operation to what was eventually issued the closure notice.

With regard to your concerns/comments about the revised Operation Plan:

1

The last paragraph of Section 3, Volume of Waste on Page 5 merely contains a few suggestions to the operator that, if employed, can extend the operating life of the LCID. The introductory paragraph of 15A NCAC 13B.0563 states that disposal in a landfill is the least desirable method of disposing of land clearing and inert debris waste. In light of that sentiment, we included the suggestions contained in the last paragraph of our section 3 to offer a few methods for the operator to reduce the volume of material ultimately landfilled in the disposal area.

1(i)

If any of the suggested methods are utilized, recyclable stockpiles will be located within the footprint of the approved disposal area. This is the only way to comply with the setbacks required for the LCID, and to remain within the disturbed area boundary of the proposed erosion control plan (still awaiting approval).

1(ii)

If your office would like to add this stockpile retention time limit as a condition of the approved permit, please do. Doing so will provide additional guidance that will apply in the event that recycling woody debris for reuse as mulch or as fuel is performed as a method of reducing landfilled quantities.

1(iii)

Given the requirements for cover placement, it is almost necessary to have 800 to 1,600 cubic yards of soil stockpiled onsite. This is easily accomplished with an average of 10 feet of material covering one-tenth of an acre. It is just as easy to stockpile a like quantity of mulch in a similar footprint. Given the ease of transporting material to the nearby energy plant, the operator may choose to stockpile no more than one truckload before removing it to the plant, but that is a matter for the operator to decide, provided the operation complies with the issued permit.

On a practical note, if we consider that the active portion of the LCID is held to a single acre, it is realistic to assume that stockpiled material will be limited to quantities that can be maintained within a quarter-acre, thereby allowing for ingress/egress of haul trucks, handling and placement of material. With soil and recycled wood presumably in separate piles and with working room between them, stockpiles much larger than one-tenth of an acre each (per acre of active disposal area) are unlikely.

1(iv)

We understand if your office would like the operator to document the type and amount of recyclable material sold, if any. If your office would like to add this as another condition of the approved permit, please do.

2

The existing disposal area depicted in the drawings prepared for Craven LCID, LLC is most definitely not consistent with the existing waste limit depicted in the copy of our August 2005 drawing that we provided for your information on August 15, 2013. The area depicted in our drawings for Craven LCID, LLC reflect many years of activity performed by RJ Bushhogging, and closely approximate the currently existing LCID footprint.

3

We see no reason to revise the drawings for Craven LCID, LLC to match the depiction contained in the drawings prepared for RJ Bushhogging, Inc, as the current conditions do not match those depicted in the 2005 drawing.

We hope this addresses your concerns satisfactorily. Again, if you have additional questions or require more information, please contact me at your convenience.

Thank you for your continued review of this application.

Michael

Michael L. Rice, P.E., P.L.S.

ROBERT M. CHILES, P.E.  
PO Box 3496  
New Bern, NC 28564  
(252) 637-4702 (ofc)  
(252) 637-3100 (fax)

----- Original Message -----

**From:** [Chao, Ming-tai](#)

**To:** [Mike Rice](#)

**Cc:** [Shackelford, Dennis](#) ; [Williams, Ray](#)

**Sent:** Friday, August 16, 2013 9:10 AM

**Subject:** RE: Permit Application for Craven LCIDLF

Dear Mr. Rice:

Thank you for the prompt response to my question on the buffer. The drawing that is attached to the e-mail message dated August 15, 2013 shows the existing site conditions; I think this drawing

should be added to the permit. Apparently, the segment of the on-site ditch traversing the site will be located underneath the proposed landfill waste footprints. The Permit Application must provide a plan to use clayey earthen material to backfill this ditch section and properly compact the backfill so that the buried ditch will not become a passage to discharge any leachate from the landfill cell into the nearby surface water body and/or drainage features. After completing a review of the revised application (Doc ID 19525) dated August 6, 2013, I also have several concerns/ comments on the revised Operation Plan which stated below:

1. (Section 3, Volume of Waste on Page 5, the last paragraph) The Operation Plan proposes to conduct screening and recycling cleaning soil for cover material and woody material for mulch and fuel sources at the facility. Please address the following concerns:
  - i. Please provide the locations of the recyclable stockpiles on the site-wide drawing which must be 50-feet away from property boundaries, 50-feet away from surface water body, and 25-feet away any drainage features including the intermittent drainage ditches.
  - ii. If the recyclable woody material is intended to sell and not used for facility operation, the stockpiled material shall not be stored at the facility more than one year after they are been processed and treated. The 25-feet fire isle must always maintain between woody stockpiles for firefighting.
  - iii. Please provide the estimated maximum quantities of the on-site recyclable stockpiles at any given day or annually.
  - iv. The operating record must document the type and the amount of recyclable sold or used on site which will be recorded to the facility annual report.
  
2. (Section 7, Drawing titled Section and Isometric Views) The existing disposal area limits (“Approximate Existing Disposal Area Surface”) shown on the Section E-W is likely not consistent with the existing waste limits on the drawing that provide in the August 15, 2013 e-mail message.
  
3. (Section 7) Please submit the revised site-wide drawing as indicated in the August 14, 2013 e-mail message.

Please provide me a copy of the revised portions of the permit application and contact me if you have any questions of the comments or require any further clarification. Thank you and have a wonderful weekend.

Ming-Tai Chao, P.E.  
Environmental Engineer  
Permitting Branch, Solid Waste Section  
Division of Waste Management  
**(Mailing Address)**

**1646 Mail Service Center  
Raleigh, NC 27699-1646**

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**Tel. 919-707-8251**

[ming.chao@ncdenr.gov](mailto:ming.chao@ncdenr.gov)

<http://portal.ncdenr.org/web/wm/sw>

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Permit No.	Date	Document ID No.
<b>P1263</b>	<b>August 20, 2013</b>	<b>19562</b>

**From:** Chao, Ming-tai  
**To:** ["Mike Rice"](#)  
**Cc:** [Shackelford, Dennis](#); [Williams, Ray](#)  
**Subject:** RE: Permit Application for Craven LCIDLF  
**Date:** Friday, August 16, 2013 9:10:00 AM

**Correspondences - e-mail**  
**Date: Au 14 – Aug 16, 2013**  
**Solid Waste Section**  
**Raleigh Central Office**

---

Dear Mr. Rice:

Thank you for the prompt response to my question on the buffer. The drawing that is attached to the e-mail message dated August 15, 2013 shows the existing site conditions; I think this drawing should be added to the permit. Apparently, the segment of the on-site ditch traversing the site will be located underneath the proposed landfill waste footprints. The Permit Application must provide a plan to use clayey earthen material to backfill this ditch section and properly compact the backfill so that the buried ditch will not become a passage to discharge any leachate from the landfill cell into the nearby surface water body and/or drainage features. After completing a review of the revised application (Doc ID 19525) dated August 6, 2013, I also have several concerns/ comments on the revised Operation Plan which stated below:

1. (Section 3, Volume of Waste on Page 5, the last paragraph) The Operation Plan proposes to conduct screening and recycling cleaning soil for cover material and woody material for mulch and fuel sources at the facility. Please address the following concerns:
  - i. Please provide the locations of the recyclable stockpiles on the site-wide drawing which must be 50-feet away from property boundaries, 50-feet away from surface water body, and 25-feet away any drainage features including the intermittent drainage ditches.
  - ii. If the recyclable woody material is intended to sell and not used for facility operation, the stockpiled material shall not be stored at the facility more than one year after they are been processed and treated. The 25-foot fire isle must always maintain between woody stockpiles for firefighting.
  - iii. Please provide the estimated maximum quantities of the on-site recyclable stockpiles at any given day or annually.
  - iv. The operating record must document the type and the amount of recyclable sold or used on site which will be recorded to the facility annual report.
2. (Section 7, Drawing titled Section and Isometric Views) The existing disposal area limits ("Approximate Existing Disposal Area Surface") shown on the Section E-W is likely not consistent with the existing waste limits on the drawing that provide in the August 15, 2013 e-mail message.
3. (Section 7) Please submit the revised site-wide drawing as indicated in the August 14, 2013 e-mail message.

Please provide me a copy of the revised portions of the permit application and contact me if you have any questions of the comments or require any further clarification. Thank you and have a wonderful weekend.

Ming-Tai Chao, P.E.  
Environmental Engineer  
Permitting Branch, Solid Waste Section  
Division of Waste Management  
**(Mailing Address)**

**1646 Mail Service Center  
Raleigh, NC 27699-1646**

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[ming.chao@ncdenr.gov](mailto:ming.chao@ncdenr.gov)  
<http://portal.ncdenr.org/web/wm/sw>

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---

**From:** Mike Rice [mailto:mikerice@robertmchilespe.com]  
**Sent:** Thursday, August 15, 2013 9:04 AM  
**To:** Chao, Ming-tai  
**Subject:** Re: Permit Application for Craven LCIDLF

Dear Mr. Chao:

In answer to your question, the exiting ditch located at the site entrance is ephemeral, carrying only stormwater runoff during and immediately after rainfall. This is the case for all of the ditches within the property containing the LCID.

In the application package, Section 3, Groundwater Data, we indicate that the south property line ditch invert is approximately six feet below the original ground surface, and that during site visits performed in April and May of 2005, the ditch invert was dry. We also indicate that the water in Bachelor Creek is approximately 15 feet below the LCID site. Bachelor Creek is probably 20 feet lower, but not having physically surveyed the difference, we chose to report the more conservative estimation.

To provide additional information, I offer the following: That ditch was shown as a proposed ditch on the previous drawing between the labels "existing cable gate" and "existing paved entrance." The ditch was copied directly from a similar drawing that was prepared by us for Mr. Robert Jones, of R.J. Bushhogging, Inc. in 2005. The portion of ditch that is labeled "existing" in our revised drawings is actually a remaining portion of a ditch that existed prior to Mr. Jones' expansion of his notification site (see attached drawing). Information gathered while making the revisions prompted by your review comments revealed that our depiction of that ditch was drawn in the wrong location. The current drawing depicts the ditch closer to its actual location (based upon aerial photography). We removed the remainder of the proposed ditch to eliminate concerns about its proximity to the disposal area.

If you have additional questions or require more information, please contact me at your convenience. To expedite receipt of any such information, feel free to contact me via telephone at the number indicated below.

Thank you for your continued review of this application.

Michael

Michael L. Rice, P.E., P.L.S.

ROBERT M. CHILES, P.E.  
PO Box 3496  
New Bern, NC 28564  
(252) 637-4702 (ofc)  
(252) 637-3100 (fax)

----- Original Message -----

**From:** [Chao, Ming-tai](#)

**To:** [Mike Rice](#)

**Sent:** Wednesday, August 14, 2013 3:26 PM

**Subject:** RE: Permit Application for Craven LCIDLF

Dear Mr. Rice:

Thank you to provide me the pdf file of the revised permit application. I am currently working on the revised permit application and one thing need your input:

The buffer requirement. On the site wide drawing, an existing ditch is located at the site entrance area and less than 50-feet away from the proposed LCID waste footprints (I circled the area of concern on the attached drawing). This ditch was not shown on the previous submittal. I need you to confirm if this drainage ditch is an intermittent one or perennial one. If it is a ditch carrying flow year-round, you need to revise the waste foot prints for the new LCIDLF to meet the requirement stated in Rule .0546(9)(a). Have a wonderful day.

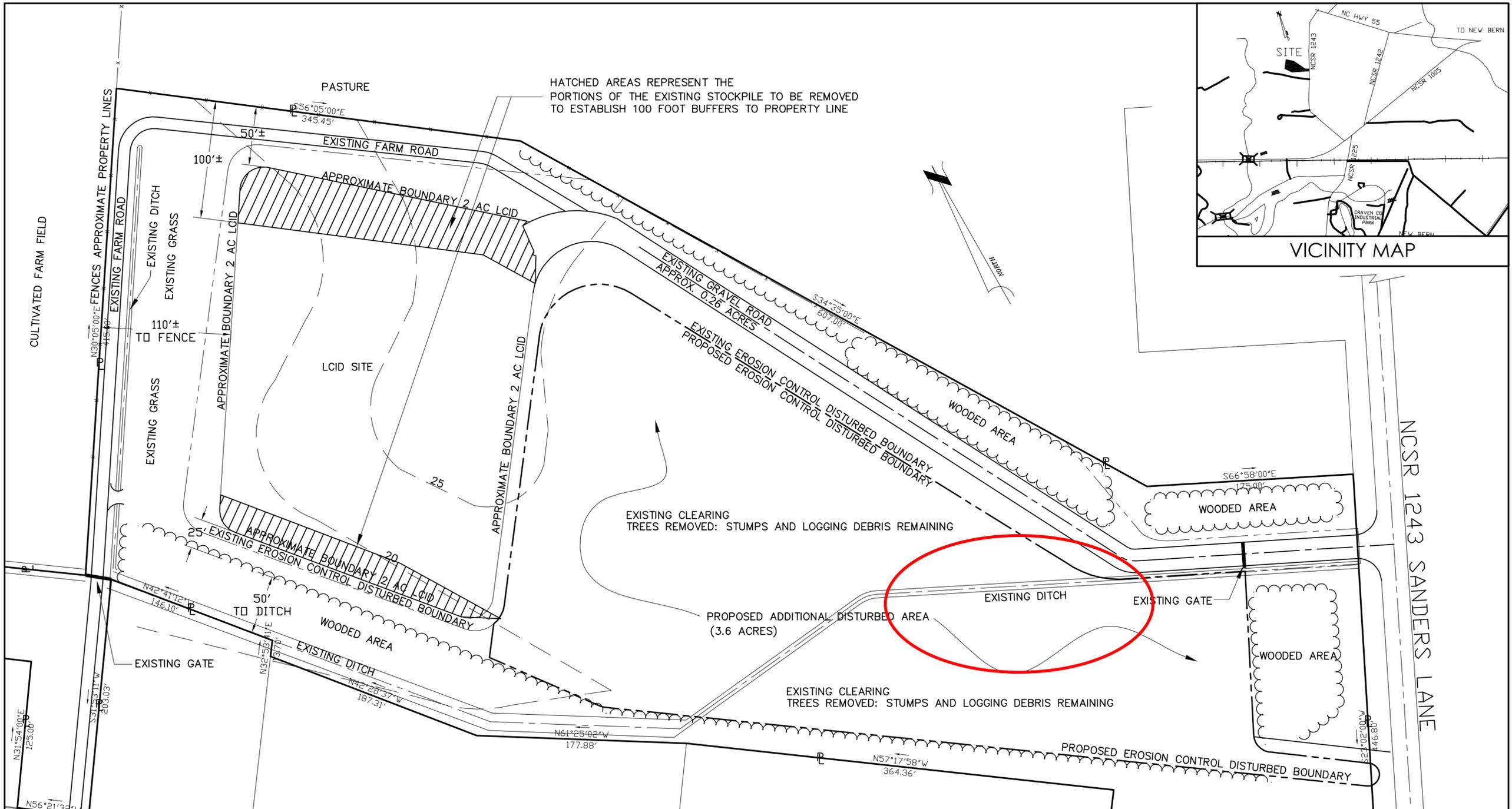
Ming-Tai Chao, P.E.  
Environmental Engineer  
Permitting Branch, Solid Waste Section  
Division of Waste Management  
**(Mailing Address)**  
**1646 Mail Service Center**  
**Raleigh, NC 27699-1646**  
(Street Address)  
Green Square, 217 West Jones Street  
Raleigh, NC 27603  
**Tel. 919-707-8251**

[ming.chao@ncdenr.gov](mailto:ming.chao@ncdenr.gov)

<http://portal.ncdenr.org/web/wm/sw>

*E-mail correspondence to and from this address may be subject to the North Carolina Public Records Law and may be disclosed to third parties.*

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**NOTES**

CONTOUR LINES ARE SHOWN IN APPROXIMATE POSITIONS AND ARE BASED UPON USGS QUADRANGLE JASPER AND FIELD OBSERVATIONS.

CONTOURS INDICATE TOPOGRAPHY FOR ORIGINAL GROUND ELEVATIONS

LCID SITE IS CONTAINED IN A PORTION OF THE PROPERTY DESCRIBED IN CRAVEN COUNTY REGISTER OF DEEDS BOOK 2134 AT PAGE 80.

THE PROJECT SITE IS LOCATED IN ZONE X ACCORDING TO FEMA FIRM MAP NUMBER 3720554000J, EFFECTIVE JULY 2, 2004.

THERE ARE NO WETLANDS WITHIN THE PORTION OF THE PROPERTY CONTAINING THE PROJECT SITE.

**LEGEND**

- x—x— FENCE
- wavy— TREES
- dashed— CONTOUR LINES
- long dashed— PROJECT BOUNDARY
- solid— PROPERTY LINE

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THIS DOCUMENT ORIGINALLY ISSUED AND SEALED BY MICHAEL L. RICE, P.E., LICENSE NUMBER 28925, ON 8/3/2005.  
THIS PDF CREATED 3/15/2013.

REVISED PER NCDENR AUGUST 3, 2005

SHEET 1 OF 4

**ENGINEER/SURVEYOR**

ROBERT M. CHILES, P.E.  
ENGINEERS & CONSULTANTS  
P.O. BOX 3496  
NEW BERN, NORTH CAROLINA 28564-3496  
(252) 637-4702

**OWNER/OPERATOR**

R.J. BUSHHOGGING, INC.  
MR. ROBERT JONES, OWNER  
175 HIGH SCHOOL ROAD  
VANCEBORO, NORTH CAROLINA 28586  
(252) 244-2805



**APPROXIMATE BOUNDARY**  
FOR THE  
LESS THAN 2 ACRE LCID LANDFILL SITE  
FOR  
**R.J. BUSHHOGGING, INC.**

TOWNSHIP NO. 8      CRAVEN COUNTY      NORTH CAROLINA

DATE: MAY 5, 2005      **ROBERT M. CHILES, P.E.**

JOB NO: 2004146      ENGINEERS AND CONSULTANTS

SCALE: 1" = 60'      NEW BERN, NORTH CAROLINA

MLR 2004146 ps 080305

Permit No.	Date	Document ID No.
P1263	August 20, 2013	19561

**From:** [Williams, Ray](#)  
**To:** [Chao, Ming-tai](#)  
**Subject:** RE: Buffer issue at the proposed Craven LCIDLF  
**Date:** Friday, August 16, 2013 10:38:42 AM

Correspondences - e-mail  
Date: **Au 14 – Aug 16, 2013**  
Solid Waste Section  
Raleigh Central Office

Ming,  
To my recollection, the ditch is there for drainage during weather events and does not convey water at other times.  
Ray

Sent from my Verizon Wireless 4G LTE Tablet

----- Original message -----

From: "Chao, Ming-tai" <ming.chao@ncdenr.gov>  
Date: 08/14/2013 1:12 PM (GMT-05:00)  
To: "Williams, Ray" <ray.williams@ncdenr.gov>, "Shackelford, Dennis" <dennis.shackelford@ncdenr.gov>  
Cc: "Mussler, Ed" <ed.mussler@ncdenr.gov>  
Subject: Buffer issue at the proposed Craven LCIDLF

Gentlemen:

I need your help on the buffer issue at the proposed Craven LCIDLF which will be located on the top of the closed Sanders Lane LCIDLF (a notification site). According to the property survey map, it is evidently that the closed notification site had major violations for its waste footprints over 2 acres but w/o permit for operation and buffer violation. However, the past is the past. I made the new owner to meet the 100-ft buffer requirement [.0564(9)(b)] except for the existing ditch right next to the access road & the site entrance area (I circled the area of concerns in red in the attached drawing). The Rule .0564(9)(a) requires 50-ft buffer distance to the new waste boundaries. I think if the existing ditch is an intermittent one and it may not be considered "Water" as defined in NCGS 143-212 [http://www.ncleg.net/EnactedLegislation/Statutes/PDF/BySection/Chapter\\_143/GS\\_143-212.pdf](http://www.ncleg.net/EnactedLegislation/Statutes/PDF/BySection/Chapter_143/GS_143-212.pdf). So the buffer requirement is not applicable. Ray visited the site in 2011, I hope he can confirm if the ditch is perennial or intermittent one. I would like to get your input and consensus on this matter. Thanks for the help.

Ming

**From:** [Shackelford, Dennis](#)  
**To:** [Mussler, Ed](#); [Chao, Ming-tai](#); [Williams, Ray](#)  
**Subject:** RE: Buffer issue at the proposed Craven LCIDLF  
**Date:** Thursday, August 15, 2013 8:39:50 AM

---

I agree with Ed. I don't see a problem with it.

And yes I would like to hear what Mr. Williams input will be.

Dennis E. Shackelford  
Eastern District Supervisor  
Department Of Environment & Natural Resources  
Division of Waste Management  
Solid Waste Section  
225 Green Street, Suite 714  
Fayetteville, North Carolina 28301

[dennis.shackelford@ncdenr.gov](mailto:dennis.shackelford@ncdenr.gov)

.....  
Dept. Tel: (910)-433-3300  
Office Tel: (910)-433-3349  
Fax: (910)-486-0707  
.....

<http://portal.ncdenr.org/web/wm/sw>

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 Go Green! Print this email only when necessary. Thank you for helping NCDENR be environmentally responsible.

---

**From:** Mussler, Ed  
**Sent:** Wednesday, August 14, 2013 1:34 PM  
**To:** Chao, Ming-tai; Williams, Ray; Shackelford, Dennis  
**Subject:** RE: Buffer issue at the proposed Craven LCIDLF

Ming, I think you made a common sense interpretation, . Lets hear what Ray observes.

Thanks

Ed

---

**From:** Chao, Ming-tai  
**Sent:** Wednesday, August 14, 2013 1:12 PM  
**To:** Williams, Ray; Shackelford, Dennis  
**Cc:** Mussler, Ed  
**Subject:** Buffer issue at the proposed Craven LCIDLF

Gentlemen:

I need your help on the buffer issue at the proposed Craven LCIDLF which will be located

on the top of the closed Sanders Lane LCIDLF (a notification site). According to the property survey map, it is evidently that the closed notification site had major violations for its waste footprints over 2 acres but w/o permit for operation and buffer violation. However, the past is the past. I made the new owner to meet the 100-ft buffer requirement [.0564(9)(b)] except for the existing ditch right next to the access road & the site entrance area (I circled the area of concerns in red in the attached drawing). The Rule .0564(9)(a) requires 50-ft buffer distance to the new waste boundaries. I think if the existing ditch is an intermittent one and it may not be considered "Water" as defined in NCGS 143-212 [http://www.ncleg.net/EnactedLegislation/Statutes/PDF/BySection/Chapter\\_143/GS\\_143-212.pdf](http://www.ncleg.net/EnactedLegislation/Statutes/PDF/BySection/Chapter_143/GS_143-212.pdf). So the buffer requirement is not applicable. Ray visited the site in 2011, I hope he can confirm if the ditch is perennial or intermittent one. I would like to get your input and consensus on this matter. Thanks for the help.

Ming

**From:** Chao, Ming-tai  
**To:** [Williams, Ray](#); [Shackelford, Dennis](#)  
**Cc:** [Mussler, Ed](#)  
**Subject:** Buffer issue at the proposed Craven LCIDLF  
**Date:** Wednesday, August 14, 2013 1:12:00 PM  
**Attachments:** [Pages from DIN 19525\\_08132013\\_permit\\_app.pdf](#)

---

Gentlemen:

I need your help on the buffer issue at the proposed Craven LCIDLF which will be located on the top of the closed Sanders Lane LCIDLF (a notification site). According to the property survey map, it is evidently that the closed notification site had major violations for its waste footprints over 2 acres but w/o permit for operation and buffer violation. However, the past is the past. I made the new owner to meet the 100-ft buffer requirement [.0564(9)(b)] except for the existing ditch right next to the access road & the site entrance area (I circled the area of concerns in red in the attached drawing). The Rule .0564(9)(a) requires 50-ft buffer distance to the new waste boundaries. I think if the existing ditch is an intermittent one and it may not be considered "Water" as defined in NCGS 143-212 [http://www.ncleg.net/EnactedLegislation/Statutes/PDF/BySection/Chapter\\_143/GS\\_143-212.pdf](http://www.ncleg.net/EnactedLegislation/Statutes/PDF/BySection/Chapter_143/GS_143-212.pdf). So the buffer requirement is not applicable. Ray visited the site in 2011, I hope he can confirm if the ditch is perennial or intermittent one. I would like to get your input and consensus on this matter. Thanks for the help.

Ming

N/F/ DAVID KOONCE  
DB 1159 PG 0445

N/F/ MARY ALICE KOONCE  
DB 1159 PG 0445

N/F/ KENNETH MOUTON  
DB 2293 PG 1025

N/F/ AND WEGANDT  
DB 1565 PG 0771

N/F/ DONNIE DIANNE KOONCE  
DB 2014 PG 0128

N/F/ DAVID & DONNIE D KOONCE  
DB 3033 PG 0396

N/F/ DAVID KOONCE  
DB 1159 PG 0445

N/F/ EWA HAYNES  
DB 1258 PG 0423

N/F/ VELMA NEWTON  
DB 1482 PG 0781

N/F/ VALERIE RAYNOR & MILTON JONES  
DB 1922 PG 0143

N/F/ JEAN K. DAIL  
DB 1159 PG 0445

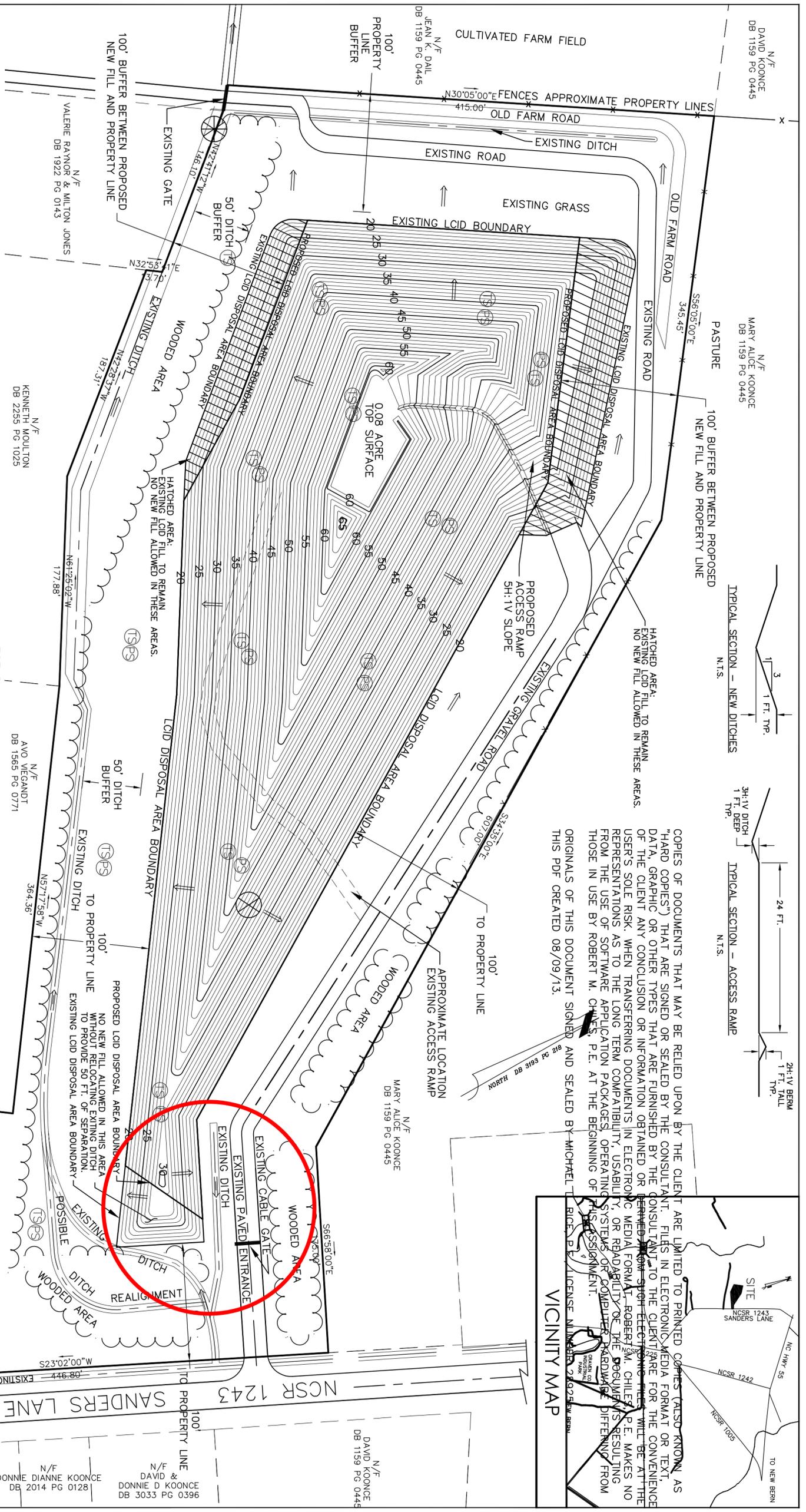
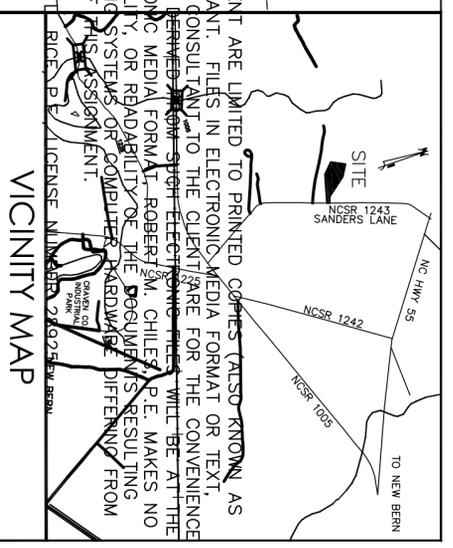
TYPICAL SECTION - NEW DITCHES  
N.T.S.

TYPICAL SECTION - ACCESS RAMP  
N.T.S.

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ORIGINALS OF THIS DOCUMENT SIGNED AND SEALED BY MICHAEL L. RICE, P.E. LICENSE NUMBER 280256, NEW BERN, NC.

THIS PDF CREATED 08/09/13.



**NOTES**

CONTOUR LINES REPRESENT ONE POSSIBLE CONFIGURATION OF THE LCID DISPOSAL AREA BASED UPON 3:1 SIDE SLOPES AND 5:1 RAMP SLOPE (20% GRADE) WITH A 50 FT. RADIUS TURN AROUND AREA ON THE TOP PLATEAU.

CONTOUR LABELS REPRESENT APPROXIMATE NAVD88 ELEVATIONS.

LCID SITE IS CONTAINED ON PROPERTY LOCATED AT 356 SANDERS LANE AND RECORDED IN CRAVEN COUNTY REGISTER OF DEEDS BOOK 3193 BEGINNING AT PAGE 118.

THE PROJECT SITE IS LOCATED IN ZONE X ACCORDING TO FEMA FIRM MAP NUMBER 3720554000, EFFECTIVE JULY 2, 2004.

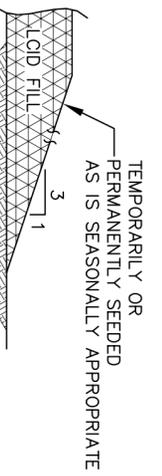
THERE ARE NO WETLANDS WITHIN THE PROPERTY.

**ENGINEER/SURVEYOR**

ROBERT M. CHILES, P.E.  
ENGINEERS & CONSULTANTS  
P.O. BOX 3496  
NEW BERN, NORTH CAROLINA 28564-3496  
(252) 657-4702

**OWNER/OPERATOR**

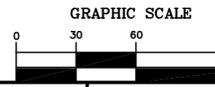
CRAVEN LCID, LLC  
MR. TERRY MORRIS, AGENT  
109 SWIFT CREEK ROAD  
VANCEBORO, NORTH CAROLINA 28586  
(252) 670-6749



**LEGEND**

- X — FENCE
- (TS) TEMPORARY SEEDING (PER EROSION CONTROL PLAN APPROVAL)
- (PS) PERMANENT SEEDING (PER EROSION CONTROL PLAN APPROVAL)
- (T) TREES
- DISPOSAL AREA PROPOSED CONTOUR LINES
- APPROXIMATE LOCATION OF 2005 TEST PIT USED TO DETERMINE GROUNDWATER SURFACE DEPTH.
- PROPOSED LOCATION OF SAMPLING POINT FOR LEACHATE AND STORMWATER RUNOFF TESTING, IF REQUIRED.
- X — SURFACE WATER FLOW DIRECTION
- PROPOSED LOCATION OF SAMPLING POINT FOR LEACHATE AND STORMWATER RUNOFF TESTING, IF REQUIRED.

CATEGORY	AFFECTED ACREAGE
Total Tract	10.01±
Existing LCID Boundary	4.05±
Proposed LCID Boundary	3.60±
Existing Roads	0.70±
Boundary/Wooded Areas	5.26±



A PROPOSED LAND CLEARING AND INERT DEBRIS LANDFILL LOCATED AT

**CRAVEN LCID**  
FOR  
**356 SANDERS LANE**  
CRAVEN COUNTY, NORTH CAROLINA

**ROBERT M. CHILES, P.E.**  
ENGINEERS AND CONSULTANTS  
NEW BERN, NORTH CAROLINA

TOWNSHIP NO. 8  
DATE: MAY 30, 2013  
JOB NO.: 20130306c  
SCALE: 1" = 60'

MLR 2013030 ps 080613

REV. 11ADD/REVISE EXISTING LCID DATA, FLOW DIRECTIONS, ROADSIDE DITCHES, RAMP SECTION, REVISE DISPOSAL AREA BOUNDARY AND CONTOURS, PER NCDENR MLR 108-06-13



August 7, 2013

Certified Mail Receipt No. 7009 2820 0001 4222 9246

Mr. Ming-Tai Chao, P.E.  
NCDENR, DWM, Solid Waste Section  
1646 Mail Service Center  
Raleigh, NC 27699-1646



Re: Craven LCID, 356 Sanders Lane, Document ID No. 19172

- Enclosures: (1) Copy, Exhibit A, description of LCID property, with errors marked.  
(2) 2 Paper Copies and 1 electronic Copy, Craven LCID (A Land Clearing and Inert Debris Landfill), Permit Application Data and Operation Plan, 356 Sanders Lane, Number 8 Township, Craven County, New Bern, NC, for Craven LCID, LLC, prepared by Robert M. Chiles, PE, Revised, August 6, 2013.

Dear Mr. Chao:

On behalf of our client, Craven LCID, LLC and its agent, Mr. Terry Morris, we submit the enclosures in response to your letter of July 12, for your review and approval. To simplify your review, the responses in this letter are presented in the same order as the comments are presented in your letter.

The property description contained in exhibit A of deed book 3193, page 221 contains a number of errors, all of which have been brought to Mr. Morris's attention. The property depicted in the site-wide drawing is copied from drawings created for the previous LCID operator, and is based upon deed descriptions and actual survey data that were current at that time. It is the deed description, and not the depiction of the property that contains the error. For your information, a copy of that exhibit with the errors marked and presented to Mr. Morris, is provided as enclosure 1.

In the interim since receiving your letter, we received a response from the NC Wildlife Resources Commission. We also submitted a request to the office of the NC Heritage Program and have received their response. To summarize their comments, neither agency anticipates any negative effects from the proposed LCID. Both of their responses are included in the appendix of the revised LCID permit application data and operation plan.

We have received two responses from the Division of Water Quality regarding stormwater management for the LCID. In response to that agency's review of a copy of our erosion and sedimentation control submittal, they determined that the project will not pose surface water quality threats from stormwater runoff, and issued an exemption from stormwater management permit regulations. Concurrently, they reviewed our ownership change request for the general permit issued to the previous LCID owner, and re-issued the general permit with the new owner information. The exemption letter and general permit are included in the appendix of the revised LCID permit application data and operation plan.

Your item 5 addresses 15A NCAC 13B.0564 (4) and (5). These codes relate to the LCID's possible effect on archeological or historic sites, state parks, state nature and historic preserves, etc. In addition to the response from the NC Natural Heritage Program, we added a paragraph to Section 2 of the permit application to address the issue.

In order to satisfy the required buffer distances from the property line, we have revised the site-wide drawing to indicate that the existing fill material is present within, but will not be removed from the buffer, and have also relocated the proposed disposal area boundary to honor the buffer requirement.

We have revised Section 3, Type of Waste Accepted/Prohibited to indicate that the owner's agent, or in his absence, the facility operator is responsible for screening all received waste. We also added the language of 15A NCAC 13B.0566(8) to this section. To clarify language contained in the operation plan, the proposed LCID is primarily for the private use of its owner. It is unlikely that the site will ever be operated on an "open to the general public" basis. However, the owner wants to preserve the ability to accept waste from other generators on a case-by-case basis, therefore, the "public use" aspects are included in the plan.

Owing to changes made to the proposed disposal area boundary, the possible fill configuration depicted in the drawings and the volumes associated with that configuration are changed. We have revised Section 2, paragraph 4, and Section 3, Volume of Waste, and the acreage table on the LCID site-wide drawing to reflect those changes.

The Surface Water Control/Wet Weather Operation portion of Section 3 is revised, and surface water control is presented separately from wet weather operation. The surface water control portion is revised to provide additional discussion related to potential discharge sources (stormwater runoff and leachate) and information about the way those sources are treated. References are made to 15A NCAC 13B.0101 (24), 15A NCAC 13B.0103 (i), and 15A NCAC 13B.0566 (14), and how they relate to operation of the proposed LCID. A paragraph addressing the issue of stormwater run-on is added. In short, stormwater will not run onto the disposal area because the entire operation is above the original ground surface. Arrows indicating surface water flow direction are added to the LCID site-wide drawing. The directions indicated apply for both the existing and proposed conditions, as the proposed construction does not change the existing flow patterns of the site. The onsite ditches are connected to, and discharge into other ditches that flow westward, eventually discharging approximately 1,400 feet west of the LCID property, toward Bachelor Creek. A proposed sampling location is indicated on the LCID drawing at the point where onsite ditches exit the property. If sampling is required as part of the issued permit(s), this location is where it will be performed. The location of existing Sanders Lane roadside ditches are added, and the existing ditches near the entrance road are corrected on the site-wide drawing. Notes are added to change the proposed ditch realignment to a possible ditch realignment. The realignment will only be necessary if the owner wants to make use of the easternmost portion of the existing disposal area. Since that area affords very little disposal area increase, it is unlikely that the ditch will be relocated. The wet weather operation paragraph is unchanged; if it is raining, the site will, most likely, be closed.

We have revised Section 3, Fire Prevention/Management to include your earthen material suggestion, and have corrected the typographical error contained in the NCAC reference to .0566(13).

Section 3, Site Closure is revised to address post-closure use and inspections of the proposed LCID disposal site. It also addresses care and maintenance of the portions of the existing LCID disposal area that cannot be used due to their location within the required property line buffers.

Section 4, Sedimentation and erosion control plan is revised to include more information. We are still working toward approval of the sedimentation and erosion control plan, and will provide a copy of the plan and approval upon issuance.

The site-wide and isometric drawings are revised to separately label the existing and proposed LCID disposal area boundaries where they are now different; to indicate surface water flow directions; and to include a proposed stormwater discharge sampling location, as requested in your item 15. The proposed construction will not alter flow directions on the property, so the arrows indicate both existing and proposed flow directions. The proposed sampling location is only applicable if sampling is a requirement of the NPDES or LCID operation permits, as the state stormwater permit does not require sampling. The drawings contain a number of other corrections and additions that result from the revisions made and additional information gathered during that process.

Owing to the number of changes affected by your comments, we felt it would be better to provide two printed copies of the entire permit application data and operation plan revised pursuant to your comments, as opposed to providing only revised pages and instructions regarding their placement. To reiterate, we have not yet received approval from LQS for the erosion control plan. We will provide a copy of that approval upon issuance, along with a copy of the approved plan.

Should you require additional information, or have any questions or additional comments about the revised documents and drawings, please contact us your earliest convenience.

Very truly yours,  
ROBERT M. CHILES, P.E.



Michael L. Rice, P.E.

cc: Mr. Terry Morris, agent, Craven LCID, LLC



North Carolina Department of Environment and Natural Resources

Division of Waste Management

Pat McCrory  
Governor

Dexter R. Matthews  
Director

John E. Skvarla, III  
Secretary

**SOLID WASTE SECTION**

July 12, 2013

Mr. Terry D. Morris, Agent  
Craven LCID, LLC  
109 Swift Creek Road  
Vanceboro, North Carolina 28586

Subject: Comments on the Permit Application  
Craven Land Clearing and Inert Debris Landfill (LCIDLF)  
Craven County, North Carolina  
P1263, Document ID No. (Doc ID) 19178

Dear Mr. Morris:

On June 12, 2013, the Division of Waste Management (DWM), Solid Waste Section (SWS) received the following documents (two hard copies and one electronic copy) which are prepared on your behalf by Robert M. Chiles, P.E. in New Bern, North Carolina:

- A cover letter dated June 11, 2013 and signed by Michael L. Rice, P.E.
- "Craven LCID (A Land Clearing and Inert Debris Landfill), Permit Application Data and Operation Plan" dated May 31, 2013.

For document tracking purposes, the above-mentioned documents were combined into a single document (Permit Application), with a Document ID No. 19172, for the proposed new landfill facility – Craven Land Clearing and Inert Debris Landfill (LCIDLF). The electronic format of the Permit Application and this comment letter can be reviewed and downloaded from the DWM's web site at <https://edm.nc.gov/DENR-Portal/>. Type in the Doc ID Number (only numeric number) in the boxed area next to the "**Description**" in the "**Property Criteria**" area. Then click "**Search**" box. The document in "pdf" format will appear on the lower section of the screen called "**Content**" area.

On June 27, 2013, the SWS received the statutorily required permit fee in the amount of one thousand dollars (\$1,000.00).

After completing the review of the Permit Application, the SWS has several comments stated below. Your timely responses to the comments will expedite the permitting processes.

1646 Mail Service Center, Raleigh, North Carolina 27699-1646  
Phone: 919-707-8200\ Internet: <http://portal.ncdenr.org/web/wm/sw>

1. Exhibit A of the Deed describes, specifically, the property info on the west and southwest sides of the property as "...; thence down and with the fence 475.00 feet to a point; thence South 43 degree 21 minutes 55 seconds East 170.00 feet to a point...." The information stated in the Exhibit A, Property Deed (Book 3193/Page 221) is not consistent with that on the survey map attached to the Permit Application. Please make necessary correction on the drawing and provide the final acreage of the tract, if necessary. Should the final acreage be changed, please make sure the revision is completed throughout the entire Permit Application.
2. Please provide a copy of the response letter from NC Wildlife Resources Commission to the April 22, 2013 letter sent by Mr. Robert M. Chiles, P.E. regarding the determination if there is potential damage or threat to endangered species due to the proposed landfill development and operation.
3. The response letter dated May 4, 2005 from the North Carolina Natural Heritage Program (NCNHP) was issued approximately 8 years ago. Because there are likely regulation changes or new findings at or adjacent to the proposed landfill site for the past 8 years, please send a written request to the office of the NCNHP determining if there is potential damage or threat to endangered species, significant natural communities, or priority natural areas in or adjacent to the proposed landfill site.
4. Please provide a copy of the new Stormwater Management Permit (Permit No. SW7050818) issued to the proposed landfill applicant and facility.
5. In Section 2 of the Permit Application, please describe and demonstrate that the proposed landfill development, construction, and operation will not violate the Solid Waste Management Rules (Rule) 15A NCAC 13B .0564(4) & (5).
6. According to the site-wide drawing attached to the Permit Application, the buffer distances from the proposed landfill waste footprints to the north / northwest sides of property lines likely do not satisfy the minimum buffer requirement - 100 feet set forth in the Rule 15A NCAC 13B .0564 (9)(b). The SWS will not request you to relocate or remove the existing waste footprints of the closed Sanders Lane LCIDLF to meet the rule-required buffer requirement; however, the waste footprints for the new landfill must meet the buffer requirement. Please revise the waste footprints of the new LCIDLF to satisfy the above-referenced rule requirement.
7. (Section 3, Type of Waste Accepted/Prohibited) Please provide the info of the person who will conduct the waste screening processes described in this sub-section. Please add the requirement stated in Rule 15A NCAC 13B .0566(8) to this sub-section, when the landfill is opening to for public use which is consistent with the intention described in the Operation Plan.

8. (Section 3, Volume of Waste) Since the proposed waste footprints may be subject to change to meet the buffer requirements (referring to Comment No. 6), the waste volume must be revised accordingly. Additionally, the final acreage of the waste limits (may not be 4.05 acres) must be revised throughout the entire permit application document.
9. (Section 3, Surface Water Control / Wet Weather Operation) Please describe the on-site drainage features including flow directions, the proposal of relocating/realigning the existing ditch and of constructing new ditch, the off-site drainage features to receive flow drained the on-site ditches, and the discharge points to be monitored required by the stormwater permit and/or NPDES permit.
10. (Section 3, Surface Water Control / Wet Weather Operation) The SWS has strong concerns of the proposed leachate treatment/disposal approach described in the first paragraph of this subsection, which stated “Stormwater runoff generated by the waste material stockpile will flow overland, across vegetated side slopes and buffers before reaching existing/proposed ditches.” The stormwater runoff generated by the waste material stockpile is leachate which is defined in Rule 15A NCAC 13B .0101(24). Pursuant to Rule 15A NCAC 13B .0566(14), any leachate generated from this proposed landfill must be properly retained on-site and then be treated/disposed by on-site or off-site wastewater treatment facilities, except that the facility holds the valid and current General or Individual National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permit. If you plan to disposal of leachate as the manner described in the subsection, please provide a copy of the NPDES discharge permit for this landfill facility. Otherwise, please describe stormwater run-on prevention [Rule 15A NCAC 13B .0566(10)] and acceptable approaches/BMPs [Rule 15A NCAC 13B .0566(14)] to manage potential leachate outbreaks during the life time of the new and closed landfills.
11. (Section 3, Surface Water Control / Wet Weather Operation) The site-wide drawing shows the locations of the proposed on-site drainage ditches and the existing ditch realignment/replacement. Since the portions of ditches, next to the site main entrance area didn’t show on the drawing, please describe the relationship between the roadside ditches along the west side of Sanders Lane/NCSR 1243 and the on-site drainage ditches.
12. (Section 3, Fire Prevention/Management) Please address the following concerns:
  - i. Since there is no on-site borrow pits and water impoundments, it is recommended that piles of earthen material stored nearby the working face during the landfill operation. The piles of earthen material can be used for cover material and firefighting resources. If you agree with this approach please add this firefighting approach to the Section 3.
  - ii. The rule referring the limits of explosive gas concentration is 15A NCAC 13B .0566(13), not .0566(12). Please correct this typo.

13. (Section 3, Site Closure) Please address the following concerns:
  - i. Pursuant to Rule 15A NCAC 13B .0565(4)(b), please describe the plan for future land use after the LCIDLF is closed.
  - ii. The Permit Application must address the post-closure cares of the portion of the closed LCIDLF which can't be used for future disposal unit due to the insufficient buffer distance to the property lines during the courses of operating the new landfill facility. The post-closure cares include, but not limited to, the repair of soil cover, leachate outbreaks, vegetation maintenance, etc.
  
14. (Section 4) Because the soil disturbance extents including the waste disposal areas are greater than one (1) acre [Rule 15A NCAC 13B .0565(3)(m)] and the SWS coincides with concerns addressed in the US Fish and Wildlife Services letter dated May 23, 2013, please provide a copy of the approved documents including approval letter and the approved Erosion and Sediment Control Plan, including BMP drawings issued by the NC Land Quality Section. The approved documents shall be appended to the permit application document.
  
15. (Section 7, Drawings) Please address the following concerns:
  - i. Referring the Comment No. 6, on the site-wide drawing and section & isometric views drawing, please show the wastes limits for both the proposed LCIDLF and the closed Sanders Lane LCIDLF, a notification site under the Identification No. N 0634.
  - ii. Please add the flow directions of the on-site ditch (existing and proposed ones) to the site-wide drawing.
  - iii. Add the approved stormwater discharge sampling and monitoring point on the drawing.

Please submit the SWS completed written responses and the hard copy of the portions of the Permit Application which are subjected to change and one completed electronic copy of the submittal (the responses letter and the completed new permit application). The Solid Waste Section appreciates your efforts and cooperation in this matter. If you have any questions or a request for clarification of the comments, please contact me at (919) 707-8251 or [ming.chao@ncdenr.gov](mailto:ming.chao@ncdenr.gov).

Sincerely,



Ming-Tai Chao, P.E.  
Environmental Engineer  
Solid Waste Section

Cc:

Michael L. Rice, P.E.  
Christine Ritter, DWM  
Ray Williams, DWM

Ed Mussler, Permitting Branch Supervisor  
Dennis Shackelford, DWM  
Central Files



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June 11, 2013

Certified Mail Receipt No. 7009 2820 0001 4222 9215

Mr. Ed Mussler, P.E.  
NCDENR, DWM, Solid Waste Section  
1646 Mail Service Center  
Raleigh, NC 27699-1646



Re: Craven LCID, 356 Sanders Lane

Enclosures: (1) 2 Paper Copies and 1 electronic Copy, Craven LCID (A Land Clearing and Inert Debris Landfill), Permit Application Data and Operation Plan, 356 Sanders Lane, Number 8 Township, Craven County, New Bern, NC, for Craven LCID, LLC, prepared by Robert M. Chiles, PE, May 31, 2013.

Dear Mr. Mussler:

On behalf of our client, Craven LCID, LLC and its agent, Mr. Terry Morris, we submit the enclosed LCID application package for your review and approval.

Craven LCID, LLC recently purchased property from Robert Jones Bushhogging located on Sanders Lane, west of New Bern, in township number 8. Mr. Jones operated a land clearing and inert debris landfill (LCID) on part of the property. In January of 2011, Mr. Ray Williams of the Washington Regional Office issued a closure letter to Mr. Jones for the LCID, and it was recorded in Craven County Register of Deeds book 2989 at page 507.

As we discussed via several emails and telephone calls during March and April of this year, Craven LCID, LLC seeks permission to re-activate the LCID. The proposed operation will remain within the footprint of the existing disposal area, and is describe in more detail in the enclosed application data and operation plan.

We prepared the enclosure using the comments provided by your Mr. Ming Chao, and also using a copy of the Solid Waste Section document titled *Application Guidance Land Clearing and Inert Debris (LCID) Landfill Permit* dated February 27, 2012 for guidance. Both documents indicate a \$1,000 new permit fee, but following the suggestion in the guidance document, we have not submitted the permitting fee. We have informed Mr. Morris to anticipate receiving an invoice for the permitting fee from your office.

Should you require additional information or have any questions, please contact us your convenience.

Very truly yours,  
ROBERT M. CHILES, P.E.

Michael L. Rice, P.E.

cc: Mr. Terry Morris, agent, Craven LCID, LLC

# INDEX

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Permit No.	Date	Document ID No.
<b>P1263</b>	<b>August 23, 2013</b>	<b>19592</b>

Received by an e-mail  
Date: August 23, 2013  
**Solid Waste Section**  
**Raleigh Central Office**

- Section 4 - Sedimentation and Erosion Control Plan
- Section 5 - Application for 5-Year Permit
- Section 6 - Signature Page
- Appendix
- Section 7 - Drawings
  - Proposed Expansion to a 4.1 Acre LCID Landfill Site for Craven LCID, LLC, prepared by Robert M. Chiles, PE.
  - Section and Isometric Views of the Proposed LCID Topographic Contours for Craven LCID, LLC, prepared by Robert M. Chiles, PE.
  - Area Within 1/4 Mile of the 4.1 Acre LCID Landfill Site for Craven LCID, LLC, prepared by Robert M. Chiles, PE.

## **Section 1 - General Information**

Craven LCID is the name of this proposed land clearing and inert debris (LCID) landfill.

R.J. Bushhogging, Inc. previously operated a notification LCID on site. On January 11, 2011, the NCDENR, DWM, Solid Waste Section issued a closure letter bearing notification number N0634 for the RJ Bushhogging LCID. The closure was recorded in Craven County Register of Deeds book 2989 at page 507.

Landowner / LCID Owner / LCID Operator:

Craven LCID, LLC.  
109 Swift Creek Road  
Vanceboro, NC 28586  
Mr. Terry D. Morris, Agent

Mr. Terry D. Morris is the individual in responsible charge of the LCID daily operations. Mr. Morris will receive permit fee and annual fee invoices at the LLC address, and can be reached via telephone at (252) 670-6749

Applicant's Consulting Engineer:

Robert M. Chiles, PE  
Engineers and Consultants  
P.O. Box 3496  
New Bern, NC 28564-3496  
(252)637-4702

## **Section 2 - Property Information**

The property containing the LCID is located on NCSR 1243 and the physical address is 356 Sanders Lane. The property is between 340 and 370 Sanders Lane and directly across the street from 355, 365, and 379 Sanders Lane. The Craven Co GIS website indicates that the current tax parcel number is 8-225-15000.

Sanders Lane extends from NCSR 1005 to NC HWY 55, west of New Bern and north of the Craven County Industrial Park. Sanders Road intersects with NC HWY 55 approximately 3.2 miles west of the intersection of NC HWY 55 and NC HWY 43 Connector, at Washington Post Road. The property driveway is approximately seven-tenths of a mile north along Sanders Lane from the intersection at NCSR 1005.

As mentioned in section one, a notification LCID was previously operated onsite by R.J. Bushhogging, Inc. On January 11, 2011, the NCDENR, DWM, Solid Waste Section issued a closure letter bearing notification number N0634 for the RJ Bushhogging LCID. The closure was recorded in Craven County Register of Deeds book 2989 at page 507.

The property contains a total of 10.01 acres, the existing boundary of the LCID fill material covers approximately 4.05 acres and the proposed boundary of the LCID fill material covers approximately 3.60 acres. There are approximately 0.70 acres of existing roads within the property. The road surface materials include asphalt and gravel. (paragraph revised, 8/6/13 revision)

As there are no archaeological or historic sites, state parks, recreation or scenic areas, or any other lands in the state nature and historic preserve located on the project site, or within one-quarter mile of the project site, it is presumed that the proposed facility shall not damage or destroy any such site, and that it complies with 15A NCAC 13B.0564 (4) and (5). (paragraph added, 8/6/13 revision)

The following enclosures are provided in the Appendix for additional information:

- Craven County Deed Book 3193, Pages 218-221.
- Road Map with Approximate Location Indicated.
- Portion of USGS Quadsheet "JASPER" with Approximate Location indicated.
- Copy, Zoning Consistency Letter from Craven County Office of Planning and Community Development.
- Portion of FEMA FIRM Community Panel Number 372 554000J with approximate location indicated.
- Copy, USFWS Internet generated National Wetlands Inventory Map for site.
- Copy, Cover letter to US Fish and Wildlife Service regarding endangered species.
- Copy, Response from US Fish and Wildlife Service .
- Copy, Cover letter to NC Wildlife Resources Commission regarding endangered species.
- Copy, Response from NC Wildlife Resources Commission
- Copy, 2005 Response from NCDENR Natural Heritage Program regarding endangered species, natural and historic sites.
- Copy, Cover letter to NCDENR Natural Heritage Program regarding endangered species, natural and historic sites.
- Copy, 2013 Response from NCDENR Natural Heritage Program regarding endangered species, natural and historic sites

(paragraph added, 8/6/13 revision)

## Section 3 -Operation Plan

### General

The proposed landfill will incorporate and reactivate an existing land clearing and inert debris landfill that is located on the site. The landfill will be operated entirely above the original ground surface. The facility will operate in accordance with 15A NCAC 13B.0564 and 15A NCAC 13B.0566. (paragraph revised, 8/6/13 revision)

If existing material is removed for screening, consolidation, and replacement in order to regain storage capacity, excavation will be limited to a depth approximately equal to that of the original ground surface. In the event that deeper excavation is necessary, then only uncontaminated soil will be used to restore the excavation to the original grade.

### Groundwater Data

On August 8, 2005 the ground water table elevation was measured directly in a test pit excavated to a depth of 8 feet below the original grade. At 9AM the top of the ground water was located 7.4 feet below the original ground surface elevation of the proposed site. At 12PM the top of the ground water was located 7 feet below the original ground surface elevation of the proposed site. The top layer of wet soil was observed in the test pit at a depth of 5 feet below the existing grade.

The original ground at the project site is approximately at elevation 20 NAVD88. Bachelor Creek is located approximately 1400 feet away from the proposed LCID boundary, and a number of ditches are located between the site and the creek.

Observations were made during April and May, 2005 site visits to identify the possible elevation of the ground water table. During all site visits, the property line ditch adjacent to the site and those between the site and creek were dry. The invert of the property line ditch is approximately 6 feet below the existing ground elevation of the site. The water surface elevation in Bachelor Creek is estimated to be 15 feet below the existing ground elevation of the site.

Electronic data retrieved from the NCDENR Division of Water Resources identifies two surficial aquifer wells near the project site. Wells Q 21T1 - Vanceboro and S 22J4 - Clarks are located 8.8 and 1.5 miles from the site, respectively. These wells are located at similar ground elevations as the LCID site and both indicate mean depths to the surficial aquifer of 8 to 10 feet below existing ground.

The currently existing site (2013) contains approximately 10 feet of fill above the original ground elevation. Given that operations are proposed to remain entirely above the original ground elevation, the provided separation distance

between the bottom of landfilled material and the seasonal high groundwater table elevation will exceed the required four feet minimum.

### Types of Waste Accepted/Prohibited

Craven LCID will only accept land clearing waste, yard trash, yard waste, untreated and unpainted wood, and inert debris.

The following definitions contained within North Carolina General Statutes and the North Carolina Administrative Code are provided for reference:

- |                        |  |
|------------------------|--|
| Land clearing waste    | means solid waste which is generated solely from land clearing activities such as stumps, trees, limbs, brush, grass, and other naturally occurring vegetative material.   |
| Yard trash, yard waste | means solid waste resulting from landscaping and yard maintenance such as brush, grass, tree limbs, and similar vegetative material.   |
| Inert debris           | means solid waste which consists solely of material that is virtually inert and that is likely to retain its physical and chemical structure under expected conditions of disposal, such as concrete, brick, concrete block, uncontaminated soil, rock and gravel. |

Prohibited waste includes, but is not limited to tires, appliances, petroleum products, automobiles, household garbage, treated lumber, insulation, and medical waste. Prohibited items that are discovered among otherwise acceptable incoming waste material shall be removed from the site by the transporter attempting delivery. Prohibited items discovered onsite shall be separated from surrounding acceptable material, removed from the disposal area of the LCID upon discovery, and transported to an appropriate waste facility during the next convenient operating hours of the receiving facility.

The owner's agent, or in his absence, the facility's assigned operator, is responsible for screening all received waste. In accordance with 15A NCAC 13B.0566 (8):

The facility shall be adequately secured by means of gates, chains, berms, fences, etc., to prevent unauthorized access except when an operator is on duty. An attendant shall be on duty at all times while the landfill is open for public use to assure compliance with operational requirements and to prevent acceptance of unauthorized wastes. (paragraph added, 8/6/13 revision)

## Sources of Waste

The primary source for waste received at the site is a general contracting company with which Mr. Morris is affiliated. There are no plans to operate the LCID as an "open to the public" facility, however, waste material from sources other than Mr. Morris's company will be considered on a case-by-case basis.

Waste material received by the site is likely to originate in Craven, Carteret, Pamlico, Beaufort, Pitt, Lenoir, and/or Jones Counties.

## Volume of Waste

The proposed LCID has an approximate total capacity of 107,500 cubic yards. The volume of material contained in the existing LCID is approximately 52,500 cubic yards, or one-half of the available capacity. Without further consolidation, the remaining capacity of the proposed LCID is approximately 55,000 cubic yards. (paragraph revised, 8/23/13 revision)

The average over-the-road dump truck is estimated to contain 10 cubic yards of material. Based upon 10 cubic yards per truck, the remaining 55,000 cubic-yard capacity will serve an additional 5,500 truckloads. (paragraph revised, 8/23/13 revision)

If no activity is performed to extend the useful capacity of the site, the remaining capacity will be depleted in 5 years assuming an average of twenty-one 10 cubic yard truckloads per work week are transported to the proposed LCID. (paragraph revised, 8/6/13 revision)

The usable capacity of the LCID can effectively be increased by employing the use of a screening device to remove soil from and further consolidate the solid wastes already deposited in the LCID. Screening incoming debris to provide clean soil for reuse as topsoil or cover material, and chipping woody debris for reuse as mulch or fuel for the local wood-energy plant can also help reduce the volume of material eventually stored in the disposal area. (paragraph revised, 8/6/13 revision)

Stockpiles of material prepared for reuse shall not be located on finalized exterior slopes, but can be located within the active portion of the proposed disposal area, and/or outside of the disposal area when located 50-feet away from property boundaries and surface waters, and 25-feet away from any drainage features including ditches. Stockpiles are limited to a size(s) that will not interfere with facility ingress/egress, handling and placement of landfill material. Remaining stockpiles shall be transferred to the disposal area prior to final site closure. (paragraph added 8/23/13)

## Equipment

At a minimum, it is anticipated that an excavator and/or bull-dozer will be used onsite to place, shape, and cover solid waste deposited onsite.

The use of mechanical screening, crushing, chipping, and drying equipment, based upon the receipt of any necessary additional permits, can be employed onsite to prepare materials such as topsoil, concrete, for re-purposed use by landscaping or paving companies, thereby reducing the volume of material ultimately landfilled onsite.

### Site Security and Access Control

The LCID property has one road-front entrance accessible by the general public, and a private rear entrance. Both entrances are gated and locked.

(paragraph revised, 8/6/13 revision)

### Hours of Operation

As this LCID is not proposed to be operated as an "open to the public" facility, generally speaking, there are no "normal" hours of operation. Mr. Morris will typically require access to the LCID during standard daytime business hours. For other waste generators, the LCID will probably operate on a "by appointment" method to accommodate waste disposal on a case-by-case basis.

(paragraph revised, 8/23/13 revision)

### Signs

Signs will be posted at the facility entrances to indicate the facility name, address, permit number, emergency contact phone number and to prohibit trespassing. If public operation is considered, signs indicating the types of waste accepted, types of waste prohibited, hours of operation, and necessary instructions will also be posted.

### Road Maintenance

The entrance road is paved with asphalt. Other roads within the LCID site are paved with gravel, while others still are compacted dirt. Maintenance will be performed on all roads as needed to provide safe passage into, through, and away from the site.

### Surface Water Control

(section revised, 8/6/13 revision)

The original ground surface of the property containing the LCID was relatively flat, at approximately elevation 20. The property and surrounding area sloped downward from east to west, with Sanders Lane immediately to the east and Bachelors Creek approximately 1,400 feet to the west.

The existing and proposed LCID disposal areas are located entirely above ground and constructed in that manner, stormwater run-on will not be an issue.

The LCID disposal area has the potential to discharge two forms of water; stormwater runoff and leachate.

Stormwater runoff will occur whenever rainfall volumes exceed the infiltration capacity of the LCID property. Deposition of waste material is proposed to occur above ground and in a method that prevents standing water. Given the requirements for cover placement, stormwater runoff generated by the waste material stockpile will typically occur after the vegetatively stabilized cover material is saturated. Stormwater runoff generated in this circumstance will flow overland, across the vegetated side slopes and buffers before reaching existing/proposed ditches. Fifty feet-wide vegetated buffers are provided between the proposed disposal area and onsite ditches to provide additional opportunity for infiltration and for sediment removal before runoff reaches the ditches. The existing system of ditches discharges in the southwest corner of the project site and continues westward approximately 1,400 feet before reaching Bachelor Creek.

Leachate, is defined in 15A NCAC 13B.0101 (24) as any liquid, including any suspended components in liquid, that has percolated through or drained from solid waste. By regulatory definition, and as expanded upon in the "types of waste accepted" section of this operation plan, the material allowed to be received by this LCID is divided into two categories; land clearing debris, and inert debris, neither of which pose a threat of contamination to stormwater beyond that of sedimentation. This is supported by 15A NCAC 13B.0103 (i) which reads "after January 1, 1998, all active sanitary landfills (except land clearing and inert debris landfills) shall be equipped with liners, leachate collection systems and final cover systems as required in Sections .0500 and .1600 of this Subchapter," emphasis added. Accordingly, no leachate collection system is proposed at this LCID.

15A NCAC 13B.0566 (14) states that leachate shall be properly managed on site through the use of current best management practices. Because the disposal area is above the original ground surface, stormwater that infiltrates the disposal area can potentially collect above the original ground surface and travel horizontally until it discharges through the surface of the fill slopes. This "leachate" can erode the vegetated earthen material used to cover the disposal area, creating an increased possibility of sediment being transported away from the disposal area within the leachate and stormwater runoff. In order to manage and reduce the effects of this possibility, the operator will inspect the perimeter slopes of the disposal area weekly during active LCID operations (monthly during inactive periods), and after any significant runoff producing rainfall for slope face erosion. Slope failures shall be repaired using uncontaminated earthen material (soil) placed in six to eight inch-thick lifts, compacted, and seeded in accordance with the erosion and sediment control plan. Any sedimentation that has occurred beyond the perimeter of the disposal area shall be removed and returned to the disposal area. Repaired areas shall be inspected weekly until vegetation stabilization is fully developed.

General stormwater permit number SW7050818 was issued to RJ Bushhogging in October 2005 for operation of the LCID. By letter dated July 22, 2013, the Washington Regional Office of NCDENR DWQ transferred that permit to Craven LCID, LLC. A copy of the name/ownership change form and issued permit is provided in the Appendix for additional information.

### Wet Weather Operation

(section isolated, 8/6/13 revision)

Under normal conditions, LCID operation is dependant upon the operation of the other companies with which the owner/operator is affiliated. As those companies typically cease operations during inclement weather, it is likely that the LCID will not operate during inclement weather.

### Fire Prevention

In accordance with 15A NCAC 13B.0566 (12), open burning of solid waste is prohibited at the LCID.

In accordance with 15A NCAC 13B.0566 (13), the concentration of explosive gases generated by the facility shall not exceed:

- a. Twenty-five percent of the lower explosive limit for the gases in facility structures.
- b. The lower explosive limit for the gases at the property boundary.

The primary explosive gas produced by an LCID landfill is methane. Methane production occurs as a result of anaerobic decomposition of organic waste. The lower explosive limit of methane is a concentration of five (5) percent by volume in the atmosphere.

Monitoring frequency does not appear to be specifically addressed in the NCAC. The introduction of the NCDENR, DWM, Solid Waste Section, Landfill Gas Monitoring Guidance document, dated November 2010, indicates that 15A NCAC 13B requires "quarterly monitoring of methane and other explosive landfill gases at C&D and other landfills." In accordance with the guidance document, quarterly testing will be performed at the property boundary and within any facility structures (if proposed and constructed in the future) for the presence and level of landfill gases. A record of the date, time and result of the tests shall be maintained with the LCID documents for the life of the facility or the time mandated by permit conditions, if different. A copy of the landfill gas monitoring guidance document is provided in the appendix for reference.

Wet and/or green vegetation should be placed in a manner that promotes drying before landfilling to reduce the possibility of auto-ignition from the heat of decomposition as is common with large mulch stockpiles. A copy of the NCDENR,

DWM, Solid Waste Section issued spontaneous combustion guidance document for disaster debris management is provided in the appendix for reference.

The facility is located in a community that is served by volunteer fire, rescue, EMS, and the County Sheriff's Department all of which can be contacted as needed.

In the event of a fire that exceeds the extinguishing capabilities of the equipment or staff onsite, evacuate the site and call 911 to report the fire.

Earthen material received by the facility that is suitable for future use as cover material should be stockpiled within the footprint of the landfill waste area (see following section "cover material"). Earthen material stockpiled onsite also provides a readily accessible smothering agent for use during firefighting.

(paragraph added, 8/6/13 revision)

### File Management

Originals of LCID related permits, inspection reports, correspondence, and operation plans will be maintained at a location chosen by the agent of Craven LCID, LLC.

A copy of all current permits and plans applicable to the LCID operation will be kept onsite for reference.

### Cover Material

In accordance with 15A NCAC 13B.0566 (4), adequate soil cover shall be applied monthly, or when the active area reaches one acre in size, whichever occurs first.

Periodic cover placed in compliance with the 0566(4) at an average lift thickness of six (6) inches will require approximately 800 cubic yards of material for every acre being covered.

In accordance with 15A NCAC 13B.0566 (5), 120 calendar days after completion of any phase of disposal operations, or upon revocation of a permit, the disposal area shall be covered with a minimum of one foot of suitable soil cover sloped to allow surface runoff in a controlled manner. The Division may require further action in order to correct any condition which is or may become injurious to the public health, or nuisance to the community.

Final cover placed in compliance with the 0566(5) at an average lift thickness of one (1) foot will require approximately 1,600 cubic yards of material for every acre being covered.

In accordance with 15A NCAC 13B.0566 (7), provisions for a ground cover sufficient to restrain erosion must be accomplished within 30 working days or 120 calendar days upon completion of any phase of landfill development. If requirements contained in the erosion and sediment control or National Pollution Discharge Elimination System (NPDES) permits differ, the permit indicating the shortest time governs. (paragraph revised, 8/6/13 revision)

To avoid the undesired loss of storage capacity within the LCID disposal area, it is recommended to maintain an active area that is less than one acre, with exterior side slopes adjacent to the active area covered and stabilized as completed.

Craven LCID, LLC is affiliated with another company that performs land clearing, grading, excavation, and other site preparation work, and operates surface mines that produce topsoil, sand, and gravel. If insufficient quantities of suitable cover material are generated by the land clearing, grading, and site preparation work, then sufficient cover soils for the LCID can be provided by the mining operations.

Site Closure (section revised, 8/6/13 revision)

Portions of the previously closed notification LCID are located within the 100 feet of the property line. These areas are hatched and labeled on the proposed LCID plan drawing. These areas cannot be part of the new waste disposal area. Vegetatively stabilized soil cover, at the approved slopes, must be maintained on these areas throughout the life of the permitted LCID. Damage and/or erosion of cover material or vegetative stabilization within these areas shall be repaired upon discovery in accordance with the provisions of the issued erosion control plan.

When it is desired to terminate all operations of the LCID, cover material will be installed on all remaining exposed surfaces of the disposal site, with surfaces and slopes graded to promote overland runoff of stormwater. Vegetative ground cover sufficient to restrain erosion will be installed, and allowed to establish. Contact will be made with representatives of the Division of Waste Management, Solid Waste Section to schedule a final inspection and arrange for issuance of a notice of closure.

After a notice of closure is received and the appropriate form (if any) is filed with the Register of Deeds, operation of the LCID is terminated. No additional waste shall be received after closure without applying for and receipt of a permit renewal and/or a new permit. Following closure, the property containing the LCID will be allowed to establish woody and other naturally occurring vegetation.

Unless less stringent requirements are allowed by the issued LCID operation permit or closure notice, post-closure inspections shall be performed of the LCID disposal area for damage and/or erosion of cover material and vegetative stabilization, formation of sinkholes, and slope failures upon the following schedule:

- For the first calendar year following closure, the facility shall be inspected monthly. Beginning the second calendar year following closure, or after two consecutive monthly inspections yield no damages/erosion, whichever occurs last.
- After two consecutive quarterly inspections yield no damages/erosion, the facility shall be inspected semi-annually.
- After two consecutive semi-annual inspections yield no damages/erosion, the facility shall be inspected annually for the remainder of the first five years following closure.

Note: replace missing cover material and/or vegetation, fill sinkholes using uncontaminated earthen fill material, repair slope failures, and remove any sediment deposited downslope resulting from slope failures, upon discovery. Following discovery of sinkholes or slope failures, resume monthly inspections of repaired areas until two consecutive monthly inspections indicate the repairs are stabilized.

#### **Section 4 - Sedimentation and Erosion Control Plan**

(section revised, 8/6/13 revision)

The primary sedimentation and erosion control measure proposed for use at the LCID site is fill slopes that change one foot or less vertically for every three feet of horizontal distance (1V:3H, or flatter), stabilized vegetatively with temporary and permanent seeding. As perimeter fill slopes are constructed within the LCID, cover soils will be placed and vegetation planted/seeded to stabilize those slopes.

Check dams are proposed for use in the access ramp ditch. These will be installed as the access ramp is constructed.

An existing paved entrance road will serve to reduce/eliminate any offsite transportation of sediment on vehicle wheels. Any dirt/debris carried onto and deposited on the public roads from the LCID site will be swept and removed from the road as discovered. If necessary, a gravel construction entrance will be constructed on the gravel portion of the entrance road to supplement the tire cleaning capacity of the paved entrance road.

A copy of the financial responsibility/ownership, sedimentation pollution control act form is provided in the Appendix. A copy of the erosion and sedimentation control plan and letter of approval will be provided upon issuance.

## **Section 5 -Application for 5-Year Permit**

Each five-year period of operation requires an application for permit amendment. The following information must be submitted to the Solid Waste Section no less than six (6) months prior to the expiration date of the previous permit to operate to maintain continuous operation of the LCID landfill.

- The general information indicated at the beginning of this document.
- A minimum of two cross sections along each major axis per operational area that shows the current elevations, the proposed excavation, the proposed elevation at the end of the five-year phase of operation and the proposed final elevations. The excavation drawing must show the separation to groundwater and bedrock is at least 4 feet.
- Any updates to the operation plan.
- Letter from local government stating that the LCID complies with local land use and zoning ordinances.

Section 6 - Applicant Signature Page

Name of Facility: CRAVEN LCID

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision and that the information provided in this application is true, accurate, and complete to the best of my knowledge.

I understand that North Carolina General Statute 130A-22 provides for administrative penalties of up to fifteen thousand dollars (\$15,000.00) per day per each violation of the Solid Waste Management Rules. I further understand that the Solid Waste Management Rules may be revised or amended in the future and that the facility siting and operations of this solid waste management facility will be required to comply with all such revisions or amendments.

  
\_\_\_\_\_  
Signature

Terry D. Morris                      6.6.13  
Print Name                                      Date

\_\_\_\_\_  
Agent  
Title

Craven LCID, LLC  
Business or organization name

## **Appendix**

(revised, 8/6/13)

- Copy, 15A NCAC 13B.0564 and 13B.0566.
- Copy, NC Department of the Secretary of State website corporation information cover page for Craven LCID, LLC.
- Craven County Deed Book 3193, Pages 218-221.
- Road Map with Approximate Location Indicated.
- Portion of USGS Quadsheet "JASPER" with Approximate Location indicated.
- Copy, Zoning Consistency Letter from Craven County Office of Planning and Community Development.
- Portion of FEMA FIRM Community Panel Number 372 554000J with approximate location indicated.
- Copy, USFWS Internet generated National Wetlands Inventory Map for site.
- Copy, Cover letter to US Fish and Wildlife Service regarding endangered species.
- Copy, Response from US Fish and Wildlife Service .
- Copy, Cover letter to NC Wildlife Resources Commission regarding endangered species.
- Copy, Response from NC Wildlife Resources Commission
- Copy, 2005 Response from NCDENR Natural Heritage Program regarding endangered species, natural and historic sites.
- Copy, Cover letter to NCDENR Natural Heritage Program regarding endangered species, natural and historic sites.
- Copy, 2013 Response from NCDENR Natural Heritage Program regarding endangered species, natural and historic sites.
- Copy, State Stormwater Permit Name/Ownership Change Form for stormwater management permit number SW7050818
- Copy, DWQ Exemption letter, dated July 8, 2013
- Copy, State Stormwater Permit number SW7050818
- Copy, NCDENR, DWM, Solid Waste Section, Landfill Gas Monitoring Guidance, November 2010
- Copy, NCDENR, DWM, Solid Waste Section, Emergency Site/Disaster Management Spontaneous Combustion Guidance Document
- Copy, Financial Responsibility/Ownership Form from erosion and sedimentation control approval submission
- Copy, Erosion and sedimentation control plan and approval (provided after approval is received)

**15A NCAC 13B .0564 SITING CRITERIA FOR LAND CLEARING AND INERT DEBRIS (LCID) LANDFILLS**

The following siting criteria shall apply for Land Clearing and Inert Debris (LCID) landfills:

- (1) Facilities or practices, shall not be located in the 100-year floodplain.
- (2) Facilities or practices shall not cause or contribute to the taking of any endangered or threatened species of plants, fish, or wildlife.
- (3) Facilities or practices shall not result in the destruction or adverse modification of the critical habitat of endangered or threatened species as identified in 50 CFR Part 17 which is hereby incorporated by reference including any subsequent amendments and editions. This material is available for inspection at the Department of Environment, Health, and Natural Resources, Division of Solid Waste Management, 401 Oberlin Road, Raleigh, North Carolina 27605 where copies can be obtained at no cost.
- (4) Facilities or practices shall not damage or destroy an archaeological or historical site.
- (5) Facilities or practices shall not cause an adverse impact on a state park, recreation or scenic area, or any other lands included in the state nature and historic preserve.
- (6) Facilities shall not be located in any wetland as defined in the Clean Water Act, Section 404(b).
- (7) It must be shown that adequate suitable soils are available for cover, either from on or off site.
- (8) Land Clearing and Inert Debris landfills shall meet the following surface and ground water requirements:
  - (a) Facilities or practices shall not cause a discharge of pollutants into waters of the state that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES), under Section 402 of the Clean Water Act, as amended.
  - (b) Facilities or practices shall not cause a discharge of dredged materials or fill material into waters of the state that is in violation of the requirements under Section 404 of the Clean Water Act, as amended.
  - (c) Facilities or practices shall not cause non-point source pollution of waters of the state that violates assigned water quality standards.
  - (d) Waste in landfills with a disposal area greater than two acres shall be placed a minimum of four feet above the seasonal high water table, except where an alternative separation is approved by the Division.
  - (e) Waste in landfills with a disposal area less than two acres shall be placed above the seasonal high water table.
- (9) The facility shall meet the following minimum buffer requirements:
  - (a) 50 feet from the waste boundary to all surface waters of the state as defined in G.S. 143-212.
  - (b) 100 feet from the disposal area to property lines, residential dwellings, commercial or public buildings, and wells.
  - (c) Buffer requirements may be adjusted as necessary to insure adequate protection of public health and the environment.
- (10) The facility shall meet all requirements of any applicable zoning ordinance.

*History Note: Authority G.S. 130A-294;  
Eff. January 4, 1993.*

**15A NCAC 13B .0566 OPERATIONAL REQ. FOR LAND CLEARING/INERT DEBRIS (LCID)  
LANDFILLS**

Land Clearing and Inert Debris (LCID) landfills shall meet the following operational requirements:

- (1) Operational plans shall be approved and followed as specified for the facility.
- (2) The facility shall only accept those solid wastes which it is permitted to receive.
- (3) Solid waste shall be restricted to the smallest area feasible and compacted as densely as practical into cells.
- (4) Adequate soil cover shall be applied monthly, or when the active area reaches one acre in size, whichever occurs first.
- (5) 120 calendar days after completion of any phase of disposal operations, or upon revocation of a permit, the disposal area shall be covered with a minimum of one foot of suitable soil cover sloped to allow surface water runoff in a controlled manner. The Division may require further action in order to correct any condition which is or may become injurious to the public health, or a nuisance to the community.
- (6) Adequate erosion control measures, structures, or devices shall be utilized to prevent silt from leaving the site and to prevent excessive on site erosion.
- (7) Provisions for a ground cover sufficient to restrain erosion must be accomplished within 30 working days or 120 calendar days upon completion of any phase of landfill development.
- (8) The facility shall be adequately secured by means of gates, chains, berms, fences, etc. to prevent unauthorized access except when an operator is on duty. An attendant shall be on duty at all times while the landfill is open for public use to assure compliance with operational requirements and to prevent acceptance of unauthorized wastes.
- (9) Access roads shall be of all-weather construction and properly maintained.
- (10) Surface water shall be diverted from the working face and shall not be impounded over waste.
- (11) Solid waste shall not be disposed of in water.
- (12) Open burning of solid waste is prohibited.
- (13) The concentration of explosive gases generated by the facility shall not exceed:
  - (a) Twenty-five percent of the lower explosive limit for the gases in facility structures.
  - (b) The lower explosive limit for the gases at the property boundary.
- (14) Leachate shall be properly managed on site through the use of current best management practices.
- (15) Should the Division deem it necessary, ground water or surface water monitoring, or both, may be required as provided for under Rules .0601 and .0602 of this Subchapter.
- (16) A sign shall be posted at the facility entrance showing the contact name and number in case of an emergency and the permit number. The permit number requirement is not applicable for facilities not requiring an individual permit.

*History Note: Authority G.S. 130A-294;  
Eff. January 4, 1993.*



*Elaine F. Marshall*  
Secretary

North Carolina

DEPARTMENT OF THE  
SECRETARY OF STATE

PO Box 29622 Raleigh, NC 27626-0622 (919)807-2000

[Account Login](#)   [Register](#)

**Date: 6/4/2013**

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## Corporation Names

Name	Name Type
<b>NC</b> CRAVEN LCID, LLC	LEGAL

## Limited Liability Company Information

<b>SOSID:</b>	1311013
<b>Status:</b>	Current-Active
<b>Effective Date:</b>	4/5/2013
<b>Citizenship:</b>	DOMESTIC
<b>Duration:</b>	PERPETUAL
<b>Annual Report Status:</b>	CURRENT

## Registered Agent

<b>Agent Name:</b>	MORRIS, TERRY D.
<b>Office Address:</b>	109 SWIFT CREEK ROAD VANCEBORO NC 28586
<b>Mailing Address:</b>	109 SWIFT CREEK ROAD VANCEBORO NC 28586

## Principal Office

<b>Office Address:</b>	109 SWIFT CREEK ROAD VANCEBORO NC 28586
<b>Mailing Address:</b>	109 SWIFT CREEK ROAD VANCEBORO NC 28586

## Officers

This website is provided to the public as a part of the Secretary of State Knowledge Base (SOSKB) system. Version: 687

ARTICLES OF ORGANIZATION  
OF  
CRAVEN LCID, LLC

Pursuant to § 57C-2-20 of the General Statutes of North Carolina, the undersigned hereby does submit these Articles of Organization for the purpose of forming a limited liability company.

1. The name of the limited liability company is "Craven LCID, LLC."
2. The period of duration of the limited liability company shall be perpetual.
3. The name and address of the organizer executing these Articles are:

Name

Address

Lee C. Hodge

1001 College Court  
New Bern, NC 28562

4. The street and mailing address of the initial registered office of the limited liability company is 109 Swift Creek Road, Vanceboro, Craven County, NC 28586; and the name of the initial registered agent of the limited liability company at such address is Terry D. Morris.

5. The street and mailing address of the principal office of the limited liability company is 109 Swift Creek Road, Vanceboro, Craven County, NC 28586.

6. Except as provided in N.C.G.S. § 57C-3-20(a), members of the limited liability company shall not be managers of the limited liability company by virtue of their status as members.

7. These Articles of Organization shall be effective upon the filing of same by the North Carolina Secretary of State.

IN TESTIMONY WHEREOF, the undersigned has executed this instrument, this  
the 3rd day of April, 2013.



---

Lee C. Hodge, Organizer

Prepared by and return to:

Lee C. Hodge  
For the firm of  
Ward and Smith, P.A.  
1001 College Court  
PO Box 867  
New Bern, NC 28563-0867  
Telephone: (252) 672-5400  
Facsimile: (252) 672-5477

ND: 4842-6723-3811, v. 1

  
 Image ID: 00002229463 Type: CRP  
 Recorded: 05/08/2013 at 03:37:07 PM  
 Fee Amt: \$156.00 Page 1 of 4  
 Revenue Tax: \$130.00  
 Workflow# 000092748-0002  
 Craven, NC  
 Sherri B. Richard Register of Deeds  
 BK **3193** PG **218**

DEED

Parcel: 8-225-15000

Revenue Stamps: \$130.00

If checked, the property includes the primary residence of the party depicted as party of the first part. (N.C. Gen. Stat. § 105-317.2)

STATE OF NORTH CAROLINA

COUNTY OF CRAVEN

THIS DEED, made and entered into this the 8th day of May, 2013 by and between R. J'S BUSHHOGGING, INC., party of the first part (the address of the party of the first part is: 1185 Winn Circle, Vanceboro, NC 28586); and CRAVEN LCID, LLC, party of the second part (the address of the party of the second part is: 109 Swift Creek Road, Vanceboro, NC 28586).

WITNESSETH:

That the party of the first part in consideration of the sum of Ten and No/100 Dollars (\$10.00) and other good and valuable considerations to said party paid by the party of the second part, the receipt of which hereby is acknowledged, has bargained and sold and by these presents does bargain, sell and convey unto the party of the second part, said party's successors and assigns, the following described property, to wit:

Prepared by Ward and Smith, P.A., 1001 College Court (28562), Post Office Box 867, New Bern, NC 28563-0867  
Please return to Ward and Smith, P.A., 1001 College Court (28562), Post Office Box 867, New Bern, NC 28563-0867  
Attention: C. H. Pope, Jr.

No opinion on title is rendered by Ward and Smith, P.A., without a separate written opinion on title from Ward and Smith, P.A.

*Handwritten initials*



Image ID: 00002229464 Type: CRP  
Page 2 of 4

BK 3193 PG 219

All that certain tract or parcel of land lying and being situate in Number Eight (8) Township, Craven County, North Carolina, and being more particularly described on Exhibit A attached hereto and incorporated herein by reference.

This conveyance is made subject to utility easements and unviolated restrictive covenants that do not materially affect the value of the property and ad valorem taxes for the current year, which taxes the party of the second part, by acceptance of this deed, assumes and agrees to pay.

TO HAVE AND TO HOLD said property and all privileges and appurtenances thereunto belonging to the party of the second part, said party's successors and assigns forever.

And the party of the first part covenants that said party is seized of said property in fee and has the right to convey same in fee simple; that the same is free from encumbrances except any encumbrances or restrictions mentioned above and that said party will warrant and defend the title to the same against the lawful claims of all persons whomsoever.

IN TESTIMONY WHEREOF, the party of the first part has caused this instrument to be executed under seal and in such form as to be binding, this the day and year first above written.

R. J.'S BUSHHOGGING, INC.

By: Robert E. Jones  
Robert E. Jones, President

Image ID: 000002229465 Type: CRP  
Page 3 of 4  
BK 3193 PG 220

STATE OF NORTH CAROLINA  
COUNTY OF CRAVEN

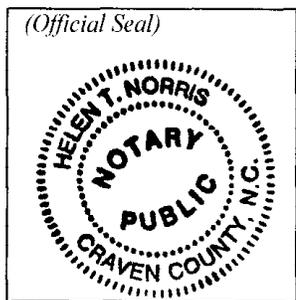
I certify that the following person personally appeared before me this day, acknowledging to me that he signed the foregoing document for the purpose(s) stated therein, in the capacity indicated therein: Robert E. Jones.

Date: 5/8/13

Helen T. Norris  
Signature of Notary Public

Helen T. Norris  
Notary's printed or typed name

My commission expires: 5-11-14



Notary seal or stamp must appear within this box.

ND: 4820-9323-0867, v. 1



Image ID: 00002229466 Type: CRP  
Page 4 of 4

BK 3193 PG 221

EXHIBIT A

All that certain tract or parcel of land lying and situate in Number Eight Township, Craven County, North Carolina and being more particularly described as follows:

Beginning at a point in the western right of way line of NCSR 1243 (Sanders Lane), which point marks the southeasternmost corner of the Alice Koonce property described in Book 1115 at Page 445 the office of the Register of Deeds of Craven County, and the northeasternmost corner of the lands conveyed to Robert Jones by Deed recorded in Book 2134 at Page 80 in the office of the Register of Deeds of Craven County. Running thence from this point of beginning North 66 degrees 58 minutes West 175.00 feet; thence North 34 degrees 35 minutes West 607.00 feet; thence North 56 degrees 05 minutes West 345.50 feet to a fence line; thence down and with the fence 475.00 feet to a point; thence South 43 degrees 21 minutes 55 seconds East 170.00 feet to a point; thence South 42 degrees 28 minutes 37 seconds East 187.31 feet to a point; thence South 61 degrees 24 minutes 59 seconds East 177.89 feet to a point; thence South 57 degrees 18 minutes 00 seconds East 364.34 feet to a point; thence South 32 degrees 55 minutes 00 seconds West 120.55 feet more or less to the northern line of the 30' Access Easement depicted on a map recorded in Plat Cabinet G, Slide 31-B; thence South 57 degrees 05 minutes 00 seconds West 126.00 feet along the western line of said 30' Access Easement to a point; thence North 23 degrees 02 minutes East 80.00 feet to a point; thence South 57 degrees 05 minutes East 120.00 feet to a western right of way line of NCSR 1243; thence along the western right of way of NCSR 1243 North 23 degrees 02 minutes East to the point of beginning.

This conveyance is made together with a non-exclusive, perpetual easement for the purposes of ingress, egress, regress, access, the installation and maintenance of utilities and further subdivision, to and from N.C.S.R. 1243, said 30' access easement being more particularly described by map recorded in Plat Cabinet G, Slide 31-B in the office of the Register of Deeds of Craven County.

There is saved and excepted from this conveyance the property described as a 80 foot by 120 foot lot on a map entitled "Survey for David M. & Mitchell Koonce", said map being attached to a deed recorded in Book 1159, Page 448 in the office of the Register of Deeds of Craven County.



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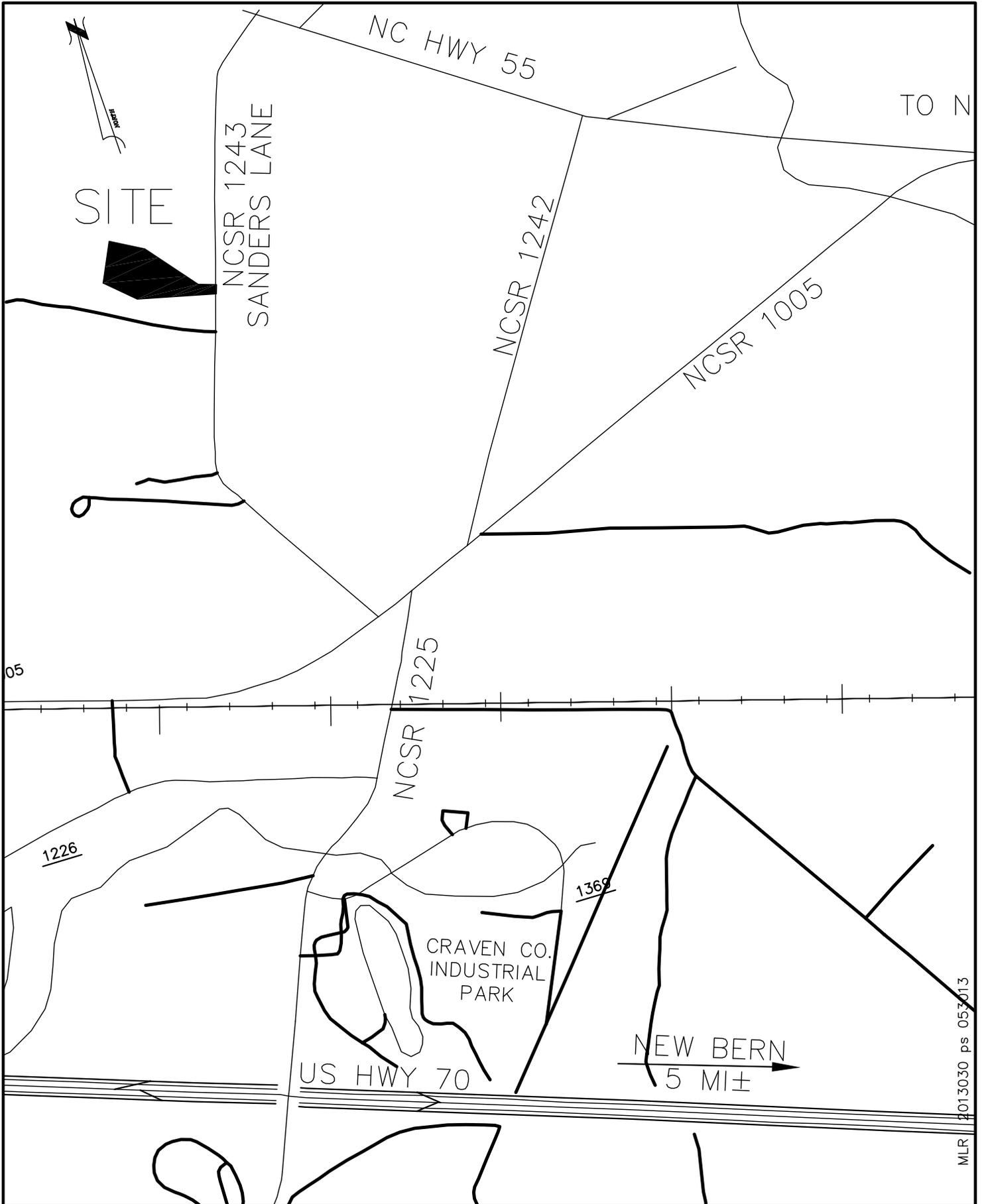
wrong bearing & distance due to missed call to follow. SHOULD BE EAST

omitted direction, & wrong distance missed a call here S 32°53'41" W 13.70 ft

This conveyance is made together with a non-exclusive, perpetual easement for the purposes of ingress, egress, regress, access, the installation and maintenance of utilities and further subdivision, to and from N.C.S.R. 1243, said 30' access easement being more particularly described by map recorded in Plat Cabinet G, Slide 31-B in the office of the Register of Deeds of Craven County.

There is saved and excepted from this conveyance the property described as a 80 foot by 120 foot lot on a map entitled "Survey for David M. & Mitchell Koonce", said map being attached to a deed recorded in Book 1159, Page 448 in the office of the Register of Deeds of Craven County.

Not Applicable: the description above (after correction) goes around & does not include the 80x120 lot

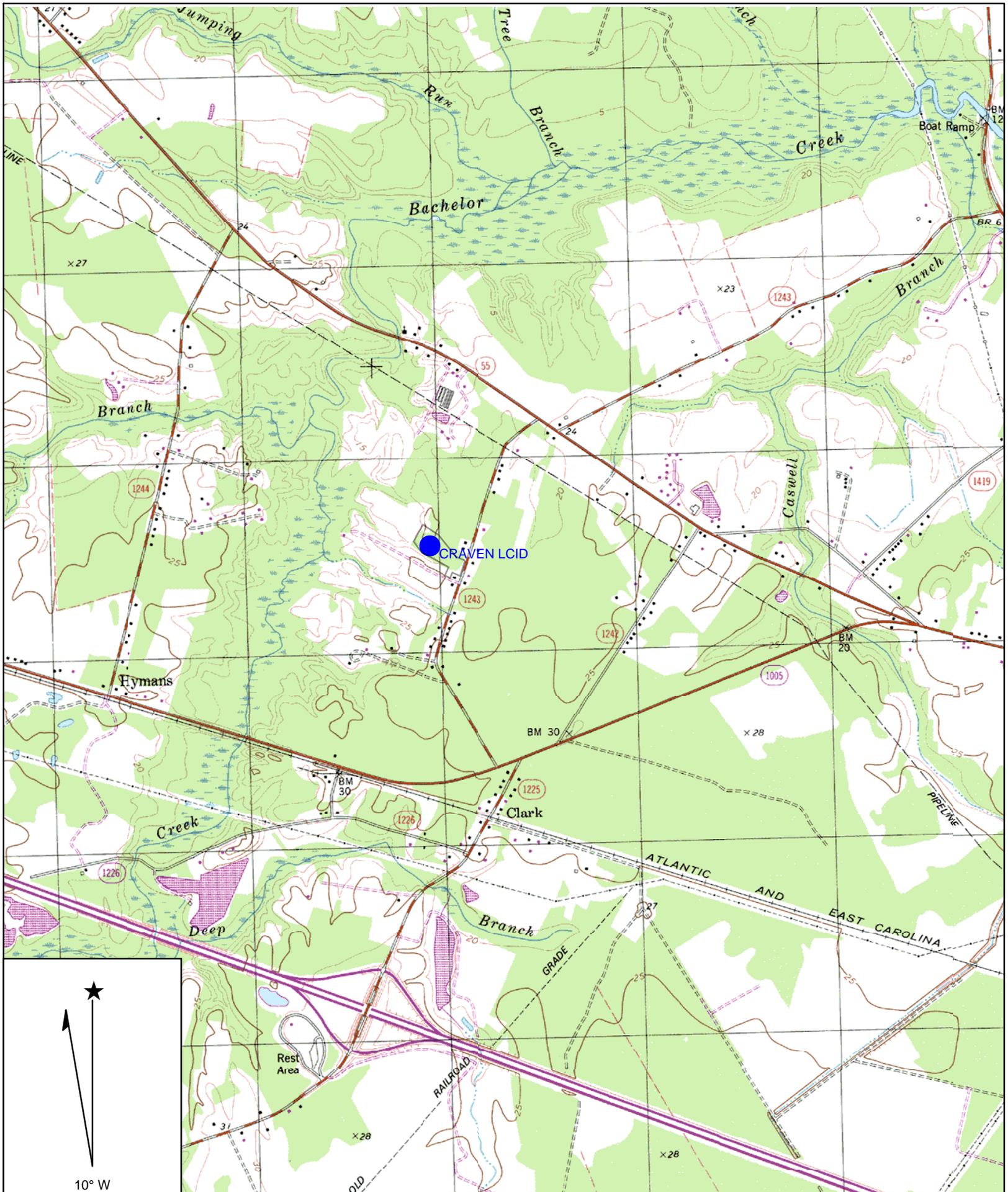


MLR 2013030 ps 053013

CRAVEN LCID  
VICINITY MAP  
FOR  
CRAVEN LCID, LLC

DATE: MAY 30, 2013  
JOB NO. 2013030  
SCALE: 1" = 1200'

**ROBERT M. CHILES, P.E.**  
ENGINEERS AND CONSULTANTS  
NEW BERN, NORTH CAROLINA



Name: JASPER  
 Date: 5/31/2013  
 Scale: 1 inch equals 2000 feet

Location: 035° 09' 30.0" N 077° 09' 48.0" W  
 Caption: Craven LCID  
 356 Sanders Lane

**Office of Planning,  
Inspections and  
Community Development**

Donald R. Baumgardner, Director  
R. Chad Strawn, Assistant Director  
Shelton P. Toler, Chief Building  
Inspector

**Craven County**



**Human Services Annex  
2828 Neuse Boulevard  
New Bern, North Carolina 28562**

Planning (252) 636-6618  
Fax (252) 636-5190  
Inspections (252) 636-4987  
Fax (252) 636-4984

April, 18 2013

RE: Sanders Lane  
Parcel ID 8-225-15000

To Whom It May Concern:

The above property located in Craven County, North Carolina does not fall within any municipality and, therefore, is regulated by the county. Craven County does not have a typical zoning ordinance within its jurisdiction. Thus this property can be used for residential or commercial development.

If you have any further questions or comments regarding this property or county policies, please do not hesitate to contact me.

Thank you,

A handwritten signature in black ink, appearing to read "Don LaVelle Jr", with a long horizontal line extending to the right.

Don LaVelle Jr  
Planner I  
Craven County Planning Department



# Craven LCID



- |                                    |                                  |                                 |
|------------------------------------|----------------------------------|---------------------------------|
| ★ Major Cities                     | — Roads                          | 100yr Flooding - Floodway (AE)  |
| + Benchmarks                       | — NC Highway                     | 100yr Flooding - Has BFE's (AE) |
| DFIRM Grid                         | — US Highway                     | 100yr Flooding - No BFE's (A)   |
| — Rivers and Streams               | — Interstate Highway             | 100yr Flooding - Velocity Zone  |
| — Transects (Coastal)              | — Political Areas                | 500yr Flooding (Shaded X)       |
| — County Boundaries                | — Extraterritorial Jurisdictions | — Base Flood Elevation (Symbol) |
| — Coastal Barrier Resource Systems | — Coastal Sounds                 | — Cross Sections                |



North Carolina  
Floodplain Mapping Program

Portion of FIRM Panel 5540, Map Number 3720554000J, July 2, 2004

77° 10' 00"

JOINS PANEL 5542

77° 09' 00"  
304 000 M

2 555 000 FEET

000 M





# U.S. Fish and Wildlife Service National Wetlands Inventory

Craven LCID

May 8, 2013



## Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

**User Remarks:**  
National Wetlands Inventory Map



417-A BROAD ST.  
P.O. BOX 3496  
NEW BERN, NORTH CAROLINA 28564-3496

**ROBERT M. CHILES, P.E.**  
ENGINEERS, CONSULTANTS  
&  
MARINE SURVEYORS



BUSINESS : 252-637-4702  
FAX: 252-637-3100  
[office@robertmchilespe.com](mailto:office@robertmchilespe.com)  
[mikerice@robertmchilespe.com](mailto:mikerice@robertmchilespe.com)

April 22, 2013

Mr. Pete Benjamin, Field Supervisor  
US Fish and Wildlife Service  
PO Box 33726  
Raleigh, NC 27636

Re: Sanders Lane Land Clearing and Inert Debris Landfill

- Enclosures:
- (1) 15A NCAC 13B.0101 (portion), 15A NCAC 13B.0562.
  - (2) Portion of USGS Topographic Quadrangle Jasper, with project site indicated.
  - (3) Portion NFIP FIRM Panel 370072 0225 B, effective May 4, 1987, with project site indicated.
  - (4) Portion NFIP FIRM Panel 370072 5540000J, effective July 2, 2004, with project site indicated.
  - (5) USFWS Endangered Species Act species list for the project site.

Dear Mr. Benjamin:

Our office is preparing a land clearing and inert debris landfill (LCID) permit application package for submission to the North Carolina Department of Environment and Natural Resources, Division of Waste Management, Solid Waste Section. One of the enclosures we must include is a letter from the USFWS indicating that based upon a survey results there is no potential damage or threat to endangered species due to the site development and operation.

If you are unfamiliar with LCID landfills, they provide a location for depositing brick, concrete, concrete block, uncontaminated soil, rock, gravel, brush, grass, tree limbs, stumps, trees, etc. Enclosure one provides copies of the applicable definitions contained within North Carolina Administrative Code (NCAC) Chapter 15A, sub-chapter 13B, section .0101, and section .0562 for your reference.

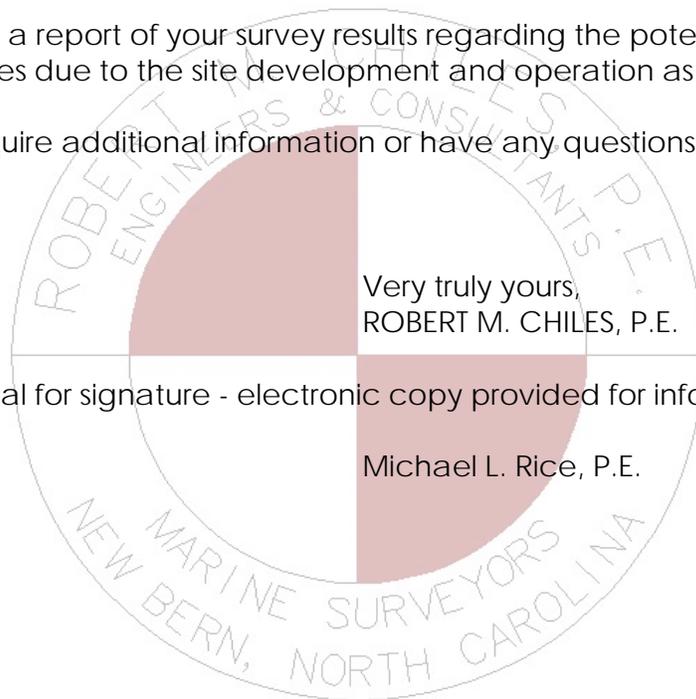
The project site is located between 340 and 370 Sanders Lane and the current Craven Co GIS website indicates that the parcel number is 8-225-15000. Enclosures 2, 3 and 4 provide copies of the Jasper quadrangle and FIRM maps with the site location indicated.

The site contains an existing LCID that was closed by the previous owner. We are preparing the permit application for a new owner who seeks to reactivate the site. We performed a search on the USFWS website and enclosure 5 provides a copy of the resulting report for your information. The polygon shown in the project location map was drawn to enclose the entire property using the available aerial photograph background as a guide. The species indicated by the report are essentially all of those indicated for Craven County.

With respect to the species on the list generated by the USFWS website we offer the following discussion: There are no water bodies in or near the LCID property, so there is no habitat for manatee, sea turtle, and sturgeon on site. One-half acre of trees at the road frontage of the property and those along the south property line are the only trees onsite. The LCID site proper has no trees remaining, greatly reducing the potential habitat for woodpeckers to be present on site. According to USFWS, the primary habitat for sensitive joint vetch is the intertidal zone of coastal marsh, where subject to twice-daily flooding. There are no marshes or surface waters on site, so that habitat does not exist on the site. According to USFWS, the primary habitat for rough-leaf loosestrife is the edges between longleaf pine uplands and pond pine pocosins, on moist to seasonally saturated sands and shallow organic soils overlaying sand. Investigations onsite made during 2005 indicated a ground water surface elevation seven to eight feet below the existing natural ground surface. In the years since, the ground surface was raised with the placement of fill material and covering soil. The surrounding properties are developed for residential and agricultural uses. Accordingly, neither the seasonal saturation nor the pine boundary habitat for rough-leaf loosestrife exist on the site.

Please provide a report of your survey results regarding the potential damage or threat to endangered species due to the site development and operation as an LCID.

Should you require additional information or have any questions, please contact us your convenience.



Very truly yours,  
ROBERT M. CHILES, P.E.

Michael L. Rice, P.E.

See original for signature - electronic copy provided for information only



## United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Raleigh Field Office  
Post Office Box 33726  
Raleigh, North Carolina 27636-3726

May 23, 2013

Robert Chiles, P.E.  
Engineers, Consultants & Marine Surveyors  
417-A Broad St.  
New Bern, NC 28564

Re: Sanders Lane Land Clearing & Inert Debris Landfill- Craven County, NC

Dear Mr. Chiles:

This letter is to inform you that a list of all federally-protected endangered and threatened species with known occurrences in North Carolina is now available on the U.S. Fish and Wildlife Service's (Service) web page at <http://www.fws.gov/raleigh>. Therefore, if you have projects that occur within the Raleigh Field Office's area of responsibility (see attached county list), you no longer need to contact the Raleigh Field Office for a list of federally-protected species.

Our web page contains a complete and frequently updated list of all endangered and threatened species protected by the provisions of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)(Act), and a list of federal species of concern<sup>1</sup> that are known to occur in each county in North Carolina.

Section 7 of the Act requires that all federal agencies (or their designated non-federal representative), in consultation with the Service, insure that any action federally authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any federally-listed endangered or threatened species. A biological assessment or evaluation may be prepared to fulfill that requirement and in determining whether additional consultation with the Service is necessary. In addition to the federally-protected species list, information on the species' life histories and habitats and information on completing a biological assessment or evaluation and can be found on our web page at <http://www.fws.gov/raleigh>. Please check the web site often for updated information or changes.

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<sup>1</sup> The term "federal species of concern" refers to those species which the Service believes might be in need of concentrated conservation actions. Federal species of concern receive no legal protection and their designation does not necessarily imply that the species will eventually be proposed for listing as a federally endangered or threatened species. However, we recommend that all practicable measures be taken to avoid or minimize adverse impacts to federal species of concern.

If your project contains suitable habitat for any of the federally-listed species known to be present within the county where your project occurs, the proposed action has the potential to adversely affect those species. As such, we recommend that surveys be conducted to determine the species' presence or absence within the project area. The use of North Carolina Natural Heritage program data should not be substituted for actual field surveys.

If you determine that the proposed action may affect (i.e., likely to adversely affect or not likely to adversely affect) a federally-protected species, you should notify this office with your determination, the results of your surveys, survey methodologies, and an analysis of the effects of the action on listed species, including consideration of direct, indirect, and cumulative effects, before conducting any activities that might affect the species. If you determine that the proposed action will have no effect (i.e., no beneficial or adverse, direct or indirect effect) on federally listed species, then you are not required to contact our office for concurrence (unless an Environmental Impact Statement is prepared). However, you should maintain a complete record of the assessment, including steps leading to your determination of effect, the qualified personnel conducting the assessment, habitat conditions, site photographs, and any other related articles.

With regard to the above-referenced project, we offer the following remarks. Our comments are submitted pursuant to, and in accordance with, provisions of the Endangered Species Act.

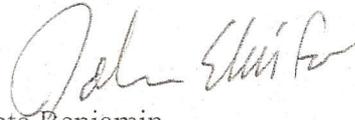
Based on the information provided and other information available, it appears that the proposed action is not likely to adversely affect any federally-listed endangered or threatened species, their formally designated critical habitat, or species currently proposed for listing under the Act at these sites. We believe that the requirements of section 7(a)(2) of the Act have been satisfied for your project. Please remember that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

However, the Service is concerned about the potential impacts the proposed action might have on aquatic species. Aquatic resources are highly susceptible to sedimentation. Therefore, we recommend that all practicable measures be taken to avoid adverse impacts to aquatic species, including implementing directional boring methods and stringent sediment and erosion control measures. An erosion and sedimentation control plan should be submitted to and approved by the North Carolina Division of Land Resources, Land Quality Section prior to construction. Erosion and sedimentation controls should be installed and maintained between the construction site and any nearby down-gradient surface waters. In addition, we recommend maintaining natural, vegetated buffers on all streams and creeks adjacent to the project site.

The North Carolina Wildlife Resources Commission has developed a Guidance Memorandum (a copy can be found on our website at (<http://www.fws.gov/raleigh>) to address and mitigate secondary and cumulative impacts to aquatic and terrestrial wildlife resources and water quality. We recommend that you consider this document in the development of your projects and in completing an initiation package for consultation (if necessary).

We hope you find our web page useful and informative and that following the process described above will reduce the time required, and eliminate the need, for general correspondence for species' lists. If you have any questions or comments, please contact John Ellis of this office at (919) 856-4520 ext. 26.

Sincerely,

A handwritten signature in cursive script that reads "John Ellis".

Pete Benjamin  
Field Supervisor

List of Counties in the Service's Raleigh Field Office Area of Responsibility

Alamance	Perquimans
Beaufort	Person
Bertie	Pitt
Bladen	Randolph
Brunswick	Richmond
Camden	Robeson
Carteret	Rockingham
Caswell	Sampson
Chatham	Scotland
Chowan	Tyrrell
Columbus	Vance
Craven	Wake
Cumberland	Warren
Currituck	Washington
Dare	Wayne
Duplin	Wilson
Durham	
Edgecombe	
Franklin	
Gates	
Granville	
Greene	
Guilford	
Halifax	
Harnett	
Hertford	
Hoke	
Hyde	
Johnston	
Jones	
Lee	
Lenoir	
Martin	
Montgomery	
Moore	
Nash	
New Hanover	
Northampton	
Onslow	
Orange	
Pamlico	
Pasquotank	
Pender	



417-A BROAD ST.  
P.O. BOX 3496  
NEW BERN, NORTH CAROLINA 28564-3496

**ROBERT M. CHILES, P.E.**  
ENGINEERS, CONSULTANTS  
&  
MARINE SURVEYORS



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[office@robertmchilespe.com](mailto:office@robertmchilespe.com)  
[mikerice@robertmchilespe.com](mailto:mikerice@robertmchilespe.com)

April 22, 2013

Mrs. Maria Dunn  
NC Wildlife Resources Commission  
943 Washington Square Mall  
Washington, NC 27889

Re: Sanders Lane Land Clearing and Inert Debris Landfill

- Enclosures:
- (1) 15A NCAC 13B.0101 (portion), 15A NCAC 13B.0562.
  - (2) Portion of USGS Topographic Quadrangle Jasper, with project site indicated.
  - (3) Portion NFIP FIRM Panel 370072 0225 B, effective May 4, 1987, with project site indicated.
  - (4) Portion NFIP FIRM Panel 370072 5540000J, effective July 2, 2004, with project site indicated.
  - (5) USFWS Endangered Species Act species list for the project site.

Dear Mrs. Dunn:

Our office is preparing a land clearing and inert debris landfill (LCID) permit application package for submission to the North Carolina Department of Environment and Natural Resources, Division of Waste Management, Solid Waste Section. One of the enclosures we must include is a letter from the NC Wildlife Resources Commission indicating that based upon a survey results there is no potential damage or threat to endangered species due to the site development and operation.

If you are unfamiliar with LCID landfills, they provide a location for depositing brick, concrete, concrete block, uncontaminated soil, rock, gravel, brush, grass, tree limbs, stumps, trees, etc. Enclosure one provides copies of the applicable definitions contained within North Carolina Administrative Code (NCAC) Chapter 15A, sub-chapter 13B, section .0101, and section .0562 for your reference.

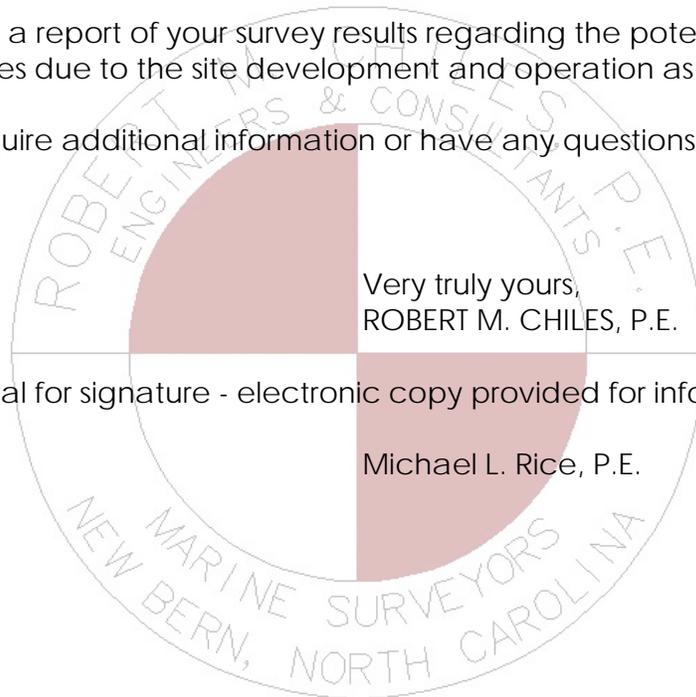
The project site is located between 340 and 370 Sanders Lane and the current Craven Co GIS website indicates that the parcel number is 8-225-15000. Enclosures 2, 3 and 4 provide copies of the Jasper quadrangle and FIRM maps with the site location indicated.

The site contains an existing LCID that was closed by the previous owner. We are preparing the permit application for a new owner who seeks to reactivate the site. We performed a search on the USFWS website and enclosure 5 provides a copy of the resulting report for your information. The polygon shown in the project location map was drawn to enclose the entire property using the available aerial photograph background as a guide. The species indicated by the report are essentially all of those indicated for Craven County.

With respect to the species on the list generated by the USFWS website we offer the following discussion: There are no water bodies in or near the LCID property, so there is no habitat for manatee, sea turtle, and sturgeon on site. One-half acre of trees at the road frontage of the property and those along the south property line are the only trees onsite. The LCID site proper has no trees remaining, greatly reducing the potential habitat for woodpeckers to be present on site. According to USFWS, the primary habitat for sensitive joint vetch is the intertidal zone of coastal marsh, where subject to twice-daily flooding. There are no marshes or surface waters on site, so that habitat does not exist on the site. According to USFWS, the primary habitat for rough-leaf loosestrife is the edges between longleaf pine uplands and pond pine pocosins, on moist to seasonally saturated sands and shallow organic soils overlaying sand. Investigations onsite made during 2005 indicated a ground water surface elevation seven to eight feet below the existing natural ground surface. In the years since, the ground surface was raised with the placement of fill material and covering soil. The surrounding properties are developed for residential and agricultural uses. Accordingly, neither the seasonal saturation nor the pine boundary habitat for rough-leaf loosestrife exist on the site.

Please provide a report of your survey results regarding the potential damage or threat to endangered species due to the site development and operation as an LCID.

Should you require additional information or have any questions, please contact us your convenience.



Very truly yours,  
ROBERT M. CHILES, P.E.

Michael L. Rice, P.E.

See original for signature - electronic copy provided for information only



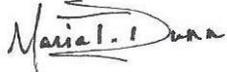
## ◊ North Carolina Wildlife Resources Commission ◊

---

Gordon S. Myers, Executive Director

### MEMORANDUM

**TO:** Michael L. Rice, P.E., P.L.S.  
Robert M. Chiles, P.E.  
Engineers, Consultants & Marine Surveyors

**FROM:** Maria T. Dunn, Northeast Coastal Region Coordinator  
Habitat Conservation Program 

**DATE:** August 2, 2013

**SUBJECT:** Sanders Lane Land Clearing and Inert Debris Landfill, Craven County, North Carolina.

Biologists with the North Carolina Wildlife Resources Commission (NCWRC) have reviewed the request for threatened and endangered species information for the above project area located between 340 and 370 Sanders Lane in Craven County. Our comments are provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667e).

The proposed project is to reinstate an inert debris landfill (LCID) that was closed by a previous owner. LCID facilities provide a disposal location for construction materials such as brick, concrete, rock, gravel, brush, stumps and other materials as defined in NCAC 15A 13B.0101 and NCAC 15A 13B.0562.

The NCWRC has looked at the available information and does not foresee the project as proposed will cause significant adverse impacts to threatened or endangered wildlife resources due to the location of the property and disturbed nature from the previously active LCID facility. This area does not appear to have records of any threatened or endangered wildlife species on file nor is located near any primary nursery areas or anadromous fish spawning areas.

Thank you for your concern pertaining to wildlife resources. If I can be of further assistance, please contact me at (252) 948-3916.



North Carolina Department of Environment and Natural Resources

Michael F. Easley, Governor

William G. Ross Jr., Secretary

May 4, 2005

Mr. Michael L. Rice  
Robert M. Chiles, P.E.  
417-A Broad St.  
P.O. Box 3496  
New Bern, NC 28564-3496

Subject: Expansion of Land Clearing and Inert Debris (LCID) Landfill; NCSR 1243 (Sanders Lane), Craven County

Dear Mr. Rice:

The Natural Heritage Program has no record of rare species, significant natural communities, or priority natural areas at the site nor within 0.7 mile of the project area. Although our maps do not show records of such natural heritage elements in the project area, it does not necessarily mean that they are not present. It may simply mean that the area has not been surveyed. The use of Natural Heritage Program data should not be substituted for actual field surveys, particularly if the project area contains suitable habitat for rare species, significant natural communities, or priority natural areas.

You may wish to check the Natural Heritage Program database website at [www.ncnhp.org](http://www.ncnhp.org) for a listing of rare plants and animals and significant natural communities in the county and on the topographic quad map. Please do not hesitate to contact me at 919-715-8697 if you have questions or need further information.

Sincerely,

Harry E. LeGrand, Jr., Zoologist  
Natural Heritage Program

HEL/hel



417-A BROAD ST.  
P.O. BOX 3496  
NEW BERN, NORTH CAROLINA 28564-3496

**ROBERT M. CHILES, P.E.**  
ENGINEERS, CONSULTANTS  
&  
MARINE SURVEYORS



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[mikerice@robertmchilespe.com](mailto:mikerice@robertmchilespe.com)

July 29, 2013

Henry LeGrand, Zoologist  
NC Natural Heritage Program  
1601 Mail Service Center  
Raleigh, NC 27699-1601

Re: Sanders Lane Land Clearing and Inert Debris Landfill

- Enclosures:
- (1) 15A NCAC 13B.0101 (portion), 15A NCAC 13B.0562.
  - (2) Portion of USGS Topographic Quadrangle Jasper, with project site indicated.
  - (3) Portion NFIP FIRM Panel 370072 0225 B, effective May 4, 1987, with project site indicated.
  - (4) Portion NFIP FIRM Panel 370072 5540000J, effective July 2, 2004, with project site indicated.
  - (5) USFWS Endangered Species Act species list for the project site.

Dear Mr. LeGrand:

Based upon our brief telephone conversation last Friday, I present this letter and enclosures for your review and response. With the exception of the recipient, this is the same letter I sent to the US Fish and Wildlife Service and NC Wildlife Resources Commission.

Our office is preparing a land clearing and inert debris landfill (LCID) permit application package for submission to the North Carolina Department of Environment and Natural Resources, Division of Waste Management, Solid Waste Section. One of the enclosures we must include is a letter from the NC Wildlife Resources Commission indicating that based upon a survey results there is no potential damage or threat to endangered species due to the site development and operation.

If you are unfamiliar with LCID landfills, they provide a location for depositing brick, concrete, concrete block, uncontaminated soil, rock, gravel, brush, grass, tree limbs, stumps, trees, etc. Enclosure one provides copies of the applicable definitions contained within North Carolina Administrative Code (NCAC) Chapter 15A, sub-chapter 13B, section .0101, and section .0562 for your reference.

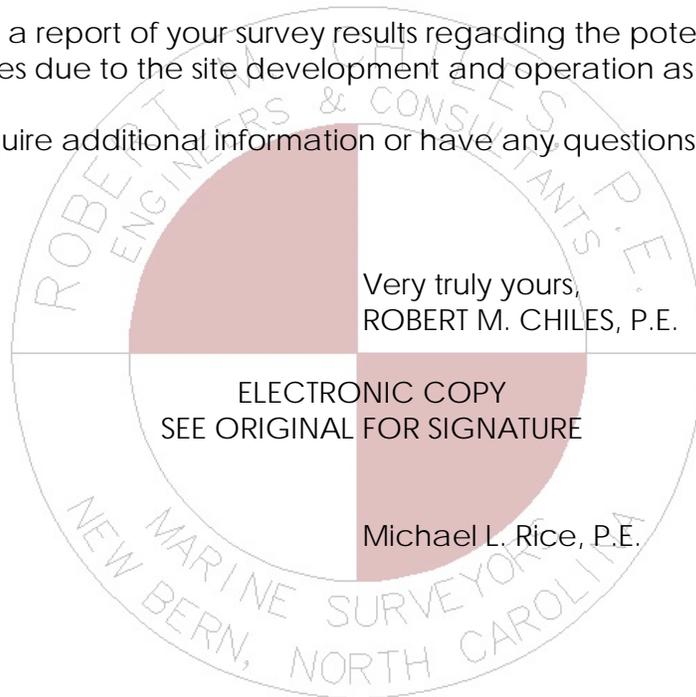
The project site is located between 340 and 370 Sanders Lane and the current Craven Co GIS website indicates that the parcel number is 8-225-15000. Enclosures 2, 3 and 4 provide copies of the Jasper quadrangle and FIRM maps with the site location indicated.

The site contains an existing LCID that was closed by the previous owner. We are preparing the permit application for a new owner who seeks to reactivate the site. We performed a search on the USFWS website and enclosure 5 provides a copy of the resulting report for your information. The polygon shown in the project location map was drawn to enclose the entire property using the available aerial photograph background as a guide. The species indicated by the report are essentially all of those indicated for Craven County.

With respect to the species on the list generated by the USFWS website we offer the following discussion: There are no water bodies in or near the LCID property, so there is no habitat for manatee, sea turtle, and sturgeon on site. One-half acre of trees at the road frontage of the property and those along the south property line are the only trees onsite. The LCID site proper has no trees remaining, greatly reducing the potential habitat for woodpeckers to be present on site. According to USFWS, the primary habitat for sensitive joint vetch is the intertidal zone of coastal marsh, where subject to twice-daily flooding. There are no marshes or surface waters on site, so that habitat does not exist on the site. According to USFWS, the primary habitat for rough-leaf loosestrife is the edges between longleaf pine uplands and pond pine pocosins, on moist to seasonally saturated sands and shallow organic soils overlaying sand. Investigations onsite made during 2005 indicated a ground water surface elevation seven to eight feet below the existing natural ground surface. In the years since, the ground surface was raised with the placement of fill material and covering soil. The surrounding properties are developed for residential and agricultural uses. Accordingly, neither the seasonal saturation nor the pine boundary habitat for rough-leaf loosestrife exist on the site.

Please provide a report of your survey results regarding the potential damage or threat to endangered species due to the site development and operation as an LCID.

Should you require additional information or have any questions, please contact us your convenience.



Very truly yours,  
ROBERT M. CHILES, P.E.

ELECTRONIC COPY  
SEE ORIGINAL FOR SIGNATURE

Michael L. Rice, P.E.



North Carolina Department of Environment and Natural Resources  
Office of Conservation, Planning, and Community Affairs

Pat McCrory  
Governor

Linda Pearsall  
Director

John E. Skvarla, III  
Secretary

August 6, 2013

Mr. Michael L. Rice  
Robert M. Chiles, P.E.  
417-A Broad St.  
P.O. Box 3496  
New Bern, NC 28564-3496

Subject: Sanders Lane Land Clearing and Inert Debris Landfill; Craven County

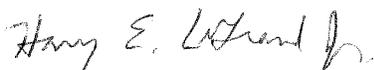
Dear Mr. Rice:

The Natural Heritage Program has no record of rare species, significant natural communities, significant natural heritage areas, or conservation/managed areas at the site nor within 0.45-mile of the project area. Roughly 0.45-mile to the northwest is Bachelor Creek, and within the creek are locations of two rare animals within a mile of the site – the Neuse River Waterdog (*Necturus lewisi*), which is State Special Concern, and the State Significantly Rare Banded Sunfish (*Enneacanthus obesus*). Locations of the creek and these rare species appear to be far enough from the proposed project site that no impacts to them are anticipated.

You may wish to check the Natural Heritage Program database website at <http://www.ncnhp.org>. Use the NHP “Map Viewer” tab to search for records of rare species, natural communities, significant natural areas, and managed areas within various distances (1 mile to 5 mile radius choices) of your project area; or use the “Database Search” tool for listings of rare species and natural communities by county and USGS 7.5-minute topo map. You can also download GIS shapefiles of our data; click on “Download Natural Heritage Program shapefiles” for more information. To view the site ratings of significant natural areas, plus the scoring methodology, click on “Publications”, then “NHP Publications”, then enter “2013” in the Search box, then click on the Download for the “NC NHP Biennial Protection Plan.”

Please do not hesitate to contact me at 919-707-8603 if you have questions or need further information.

Sincerely,

  
Harry E. LeGrand, Jr., Zoologist  
Natural Heritage Program



417-A BROAD ST.  
P.O. BOX 3496  
NEW BERN, NORTH CAROLINA 28564-3496

**ROBERT M. CHILES, P.E.**  
ENGINEERS, CONSULTANTS  
&  
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[office@robertmchilespe.com](mailto:office@robertmchilespe.com)  
[mikerice@robertmchilespe.com](mailto:mikerice@robertmchilespe.com)

June 11, 2013

Certified Mail Receipt No. 7009 2820 0001 4222 9192

Mrs. Amy Adams, Regional Supervisor  
NCDENR, Division of Water Quality  
943 Washington Square Mall  
Washington, N. C. 27889

Re: Craven LCID, 356 Sanders Lane

Enclosures: (1) State Stormwater Permit Name/Ownership Change Form  
(2) Copy, Craven County Register of Deeds Book 3193, Pages 218-221

Dear Mrs. Adams:

On behalf of our client, Craven LCID, LLC and its agent, Mr. Terry Morris, we submit the enclosed form for your review and approval.

Craven LCID, LLC recently purchased property from Robert Jones Bushhogging located on Sanders Lane, west of New Bern, in township number 8. Mr. Jones operated a land clearing and inert debris landfill (LCID) on part of the property, and Craven LCID, LLC is applying for the several permits required to re-activate the LCID.

In August 2005, DWQ issued stormwater permit number SW7050818 to Mr. Jones for operation of the land clearing and inert debris landfill on Sanders Lane. The permit is contained in the May 6 revision of the active state stormwater permits spreadsheet that is linked to the stormwater permitting unit website. During a telephone conversation with Mr. Thorpe 2 weeks ago, we discussed how the new owner wishes to resume operations at the LCID, that the proposed operation is essentially the same as the previously permitted operation, and inquired if a name/ownership change applied in this case. Based upon that conversation, we have presented Craven LCID with a copy of the RJ Bushhogging stormwater permit and approved plans, and have prepared the enclosed name/ownership change form for your approval.

Should you require additional information or have any questions, please contact us your convenience.

Very truly yours,  
ROBERT M. CHILES, P.E.

See original for signature - electronic copy provided for information only

Michael L. Rice, P.E.

cc: Mr. Terry Morris, agent, Craven LCID, LLC



III. REQUIRED ITEMS

A request to transfer a permit will not be approved by the Division of Water Quality (DWQ) unless all of the applicable required items listed below are included with the submittal. Failure to provide the listed items may result in processing delays or denial of the transfer.

- 1. This completed and signed form. This certification must be completed and signed by both the current permit holder and the new applicant if this is a change of ownership.
2. Legal documentation of the property transfer to a new owner.
3. A copy of any recorded deed restrictions, covenants, or easements, if required by the permit.
4. The designer's certification (DWQ Engineer and Designer Certification Forms are available from each DWQ Regional office), if required by the permit and if not already submitted to DWQ.
5. If the proposed permittee is a firm, partnership, association, institution, corporation, limited liability company, or other corporate entity, provide documentation showing the authority of the named representative to act on behalf of the proposed permittee.
6. The \$40.00 processing fee. If this is an initial transfer from the original permittee the processing fee is not required. Subsequent ownership transfers will require the \$40.00 processing fee.

IV. CURRENT PERMITTEE'S CERTIFICATION

Please check one of the following statements and fill out the certification below that statement:

[ ] Check here if the current permittee is only changing his/her/its name, the project name, or mailing address, but will retain the permit. I, \_\_\_\_\_, the current permittee, hereby notify the DWQ that I am changing my name and/or I am changing my mailing address and/or I am changing the name of the permitted project. I further attest that this application for a name/ownership change is accurate and complete to the best of my knowledge. I understand that if all required parts of this application are not completed or if all required supporting information and attachments listed above are not included, this application package will be returned as incomplete.

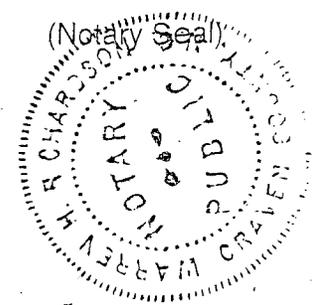
[X] Check here if current permittee is transferring the property to a new owner and will not retain ownership of the permit.

I, Robert Jones, the current permittee, am submitting this application for a transfer of ownership for permit # SW7050818. I hereby notify DWQ of the sale or other legal transfer of the stormwater system associated with this permit. I have provided a copy of the most recent permit, the designer's certification for each BMP, any recorded deed restrictions, covenants, or easements, the DWQ approved plans and/or approved as-built plans, the approved operation and maintenance agreement, past maintenance records, and the most recent DWQ stormwater inspection report to the proposed permittee named in Sections II and V of this form. I further attest that this application for a name/ownership change is accurate and complete to the best of my knowledge. I understand that if all required parts of this application are not completed or if all required supporting information and attachments listed above are not included, this application package will be returned as incomplete. I assign all rights and obligations as permittee to the proposed permittee named in Sections II and V of this form. I understand that this transfer of ownership cannot be approved by the DWQ unless and until the facility is in compliance with the permit.

Signature: Robert Jones Date: 6-6-13

I, Warren H. Richardson, a Notary Public for the State of North Carolina, County of Craven, do hereby certify that Robert Jones personally appeared before me this the 6 day of June, 2013, and acknowledge the due execution of the

forgoing instrument. Witness my hand and official seal, Warren H. Richardson, Notary Signature July 13, 2013



V. **PROPOSED PERMITTEE CERTIFICATION:** (This section must be completed by the Proposed Permittee for all transfers of ownership)

I, Terry D. Morris, hereby notify the DWQ that I have acquired through sale, lease or legal transfer, the responsibility for operating and maintaining the permitted stormwater management system, and, if applicable, constructing the permitted system. I acknowledge and attest that I have received a copy of: (check all that apply to this permit)

- the most recent permit
- the designer's certification for each BMP
- any recorded deed restrictions, covenants, or easements
- the DWQ approved plans and/or approved as-built plans
- the approved operation and maintenance agreement
- past maintenance records from the previous permittee (where required)
- DWQ stormwater inspection report showing compliance within 90 days prior to this transfer

I have reviewed the permit, approved plans and other documents listed above, and I will comply with the terms and conditions of the permit and approved plans. I acknowledge and agree that I will operate and maintain the system pursuant to the requirements listed in the permit and in the operation and maintenance agreement. I further attest that this application for a name/ownership change is accurate and complete to the best of my knowledge. I understand that if all required parts of this application are not completed or if all required supporting information and attachments listed above are not included, this application package will be returned as incomplete.

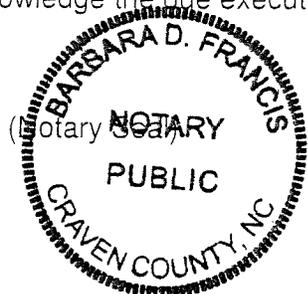
Signature: *Terry D. Morris* Date: 6-6-13

I, Barbara D. Francis, a Notary Public for the State of North Carolina, County of Craven, do hereby certify that

Terry D. Morris personally appeared before me this the 6<sup>th</sup> day of JUNE, 2013, and acknowledge the due execution of the forgoing instrument. Witness my hand and official seal,

*Barbara D. Francis*  
Notary Signature

MY COMMISSION EXPIRES : JUNE 24, 2017



Additional copies of the original permit and the approved Operation and Maintenance agreement can be obtained from the appropriate Regional Office of the Division of Water Quality.

This completed form, including all supporting documents and processing fee (if required), should be sent to the appropriate Regional Office of the North Carolina Department of Environment and Natural Resources, Division of Water Quality, as shown on the attached map.

Please note that if the Proposed Permittee listed above is not the property owner, the property owner must complete and sign page 4 of this document. Both the lessee / developer and the property owner will appear on the permit as permittees.



**III. REQUIRED ITEMS**

A request to transfer a permit will not be approved by the Division of Water Quality (DWQ) unless all of the applicable required items listed below are included with the submittal. Failure to provide the listed items may result in processing delays or denial of the transfer.

1. This completed and signed form. **This certification must be completed and signed by both the current permit holder and the new applicant if this is a change of ownership.**
2. Legal documentation of the property transfer to a new owner.
3. A copy of any recorded deed restrictions, covenants, or easements, if required by the permit.
4. The designer's certification (DWQ Engineer and Designer Certification Forms are available from each DWQ Regional office), if required by the permit and if not already submitted to DWQ.
5. If the proposed permittee is a firm, partnership, association, institution, corporation, limited liability company, or other corporate entity, provide documentation showing the authority of the named representative to act on behalf of the proposed permittee.
6. The \$40.00 processing fee. If this is an initial transfer from the original permittee the processing fee is not required. Subsequent ownership transfers will require the \$40.00 processing fee.

**IV. CURRENT PERMITTEE'S CERTIFICATION**

*Please check one of the following statements and fill out the certification below that statement:*

*Check here if the current permittee is only changing his/her/its name, the project name, or mailing address, but will retain the permit. I, \_\_\_\_\_, the current permittee, hereby notify the DWQ that I am changing my name and/or I am changing my mailing address and/or I am changing the name of the permitted project. I further attest that this application for a name/ownership change is accurate and complete to the best of my knowledge. I understand that if all required parts of this application are not completed or if all required supporting information and attachments listed above are not included, this application package will be returned as incomplete.*

*Check here if current permittee is transferring the property to a new owner and will not retain ownership of the permit. I, Robert Jones, the current permittee, am submitting this application for a transfer of ownership for permit # SW7050818. I hereby notify DWQ of the sale or other legal transfer of the stormwater system associated with this permit. I have provided a copy of the most recent permit, the designer's certification for each BMP, any recorded deed restrictions, covenants, or easements, the DWQ approved plans and/or approved as-built plans, the approved operation and maintenance agreement, past maintenance records, and the most recent DWQ stormwater inspection report to the proposed permittee named in Sections II and V of this form. I further attest that this application for a name/ownership change is accurate and complete to the best of my knowledge. I understand that if all required parts of this application are not completed or if all required supporting information and attachments listed above are not included, this application package will be returned as incomplete. I assign all rights and obligations as permittee to the proposed permittee named in Sections II and V of this form. I understand that this transfer of ownership cannot be approved by the DWQ unless and until the facility is in compliance with the permit.*

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

I, \_\_\_\_\_, a Notary Public for the State of \_\_\_\_\_, County of \_\_\_\_\_, do hereby certify that \_\_\_\_\_ personally appeared before me this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, and acknowledge the due execution of the forgoing instrument. Witness my hand and official seal, (Notary Seal)

\_\_\_\_\_  
Notary Signature

**V. PROPOSED PERMITTEE CERTIFICATION:** *(This section must be completed by the Proposed Permittee for all transfers of ownership)*

I, Terry D. Morris, hereby notify the DWQ that I have acquired through sale, lease or legal transfer, the responsibility for operating and maintaining the permitted stormwater management system, and, if applicable, constructing the permitted system. I acknowledge and attest that I have received a copy of: (check all that apply to this permit)

- the most recent permit
- the designer's certification for each BMP
- any recorded deed restrictions, covenants, or easements
- the DWQ approved plans and/or approved as-built plans
- the approved operation and maintenance agreement
- past maintenance records from the previous permittee (where required)
- DWQ stormwater inspection report showing compliance within 90 days prior to this transfer

I have reviewed the permit, approved plans and other documents listed above, and I will comply with the terms and conditions of the permit and approved plans. I acknowledge and agree that I will operate and maintain the system pursuant to the requirements listed in the permit and in the operation and maintenance agreement. I further attest that this application for a name/ownership change is accurate and complete to the best of my knowledge. I understand that if all required parts of this application are not completed or if all required supporting information and attachments listed above are not included, this application package will be returned as incomplete.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

I, Barbara D. Francis, a Notary Public for the State of North Carolina, County of Craven, do hereby certify that Terry D. Morris personally appeared before me this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, and acknowledge the due execution of the forgoing instrument. Witness my hand and official seal,

\_\_\_\_\_  
Notary Signature

(Notary Seal)

*Additional copies of the original permit and the approved Operation and Maintenance agreement can be obtained from the appropriate Regional Office of the Division of Water Quality.*

*This completed form, including all supporting documents and processing fee (if required), should be sent to the appropriate Regional Office of the North Carolina Department of Environment and Natural Resources, Division of Water Quality, as shown on the attached map.*

*Please note that if the Proposed Permittee listed above is not the property owner, the property owner must complete and sign page 4 of this document. Both the lessee / developer and the property owner will appear on the permit as permittees.*

**VI. PROPERTY OWNER CONTACT INFORMATION AND CERTIFICATION**

*If the Proposed Permittee listed in Sections II and V of this form is not the Property Owner, the Property Owner must provide his/her Contact Information below and sign this form:*

Printed Name: \_\_\_\_\_

Organization: \_\_\_\_\_

Title within the Organization: \_\_\_\_\_

Street Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Mailing Address: \_\_\_\_\_  
(if different from street address)

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

Email: \_\_\_\_\_

I certify that I own the property identified in this permit transfer document and have given permission to the Proposed Permittee listed in Sections II and V to develop and/or, lease the property. A copy of the lease agreement or other contract, which indicates the party responsible for the construction and/or operation and maintenance of the stormwater system, has been provided with the submittal.

As the legal property owner I acknowledge, understand, and agree by my signature below, that I will appear as a permittee along with the lessee/developer and I will therefore share responsibility for compliance with the DWQ Stormwater permit. As the property owner, it is my responsibility to notify DWQ by submitting a completed Name/Ownership Change Form within 30 days of procuring a developer, lessee or purchaser for the property. I understand that failure to operate and maintain the stormwater treatment facility in accordance with the permit is a violation of NC General Statute (NCGS) 143-215.1, and may result in appropriate enforcement action including the assessment of civil penalties of up to \$25,000 per day, pursuant to NCGS 143-215.6.

Signature of the property owner \_\_\_\_\_ Date: \_\_\_\_\_

I, \_\_\_\_\_, a Notary Public for the State of \_\_\_\_\_, County of \_\_\_\_\_, do hereby certify that \_\_\_\_\_ personally appeared before me this the \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, and acknowledge the due execution of the forgoing instrument. Witness my hand and official seal,

\_\_\_\_\_  
Notary Signature

(Notary Seal)



North Carolina Department of Environment and Natural Resources

Division of Water Quality

Pat McCrory  
Governor

Thomas A. Reeder  
Acting Director

John E. Skvarla, III  
Secretary

July 8, 2013

Mr. Terry Morris  
Craven LCID, LLC  
109 Swift Creek Road  
Vanceboro, NC 28586

Subject: **EXEMPTION** from Stormwater Management Permit Regulations  
SEC Plan Approval  
Craven LCID  
Stormwater Project No.: SW7130612  
Craven County

Dear Mr. Morris:

The Washington Regional Office received a copy of your SEC Plan application for the proposed Craven LCID project in Craven County, North Carolina on June 17, 2013. Staff review of the plans and specifications has determined that the project, as proposed, consists of activities that will not pose surface water quality threats from stormwater runoff since no significant new impervious area is proposed.

The Director has determined that projects that are reviewed and approved by the Division as not posing water quality threats from stormwater runoff should not be subject to the State stormwater management permitting requirements of 15A NCAC 2H.1000 and SL 2008-211. For this reason, we are informing you by way of this letter that your project will not require a State Stormwater management permit at this time. Please understand that you will automatically receive coverage under the separate Federal NPDES NCG010000 Construction Stormwater Permit that goes along with the Erosion & Sediment Control Plan approval.

The State stormwater rules require the Division to permit the common plan of development, therefore, any future development on the property, regardless of whether a SEC plan or CAMA Major permit is also required, will require a Stormwater Management Permit review from the Division of Water Quality prior to any construction. Any non-agricultural development or construction on the subject site, prior to receipt of the required permit, will constitute a violation of 15A NCAC 2H.1000 and SL 2008-211 and may result in appropriate enforcement actions by this Office.

Please keep in mind that this determination does not affect your legal requirements to obtain other permits which may be required by the Division of Water Quality, the Division of Land Resources, Coastal Area Management Act or any other Federal, State or Local Government.

Please reference the Stormwater Project Number above on all correspondence. If you have any questions or need additional information concerning this matter, please contact Samir Dumpor at (252) 946-6481.

Sincerely,

Amy Adams  
Regional Supervisor  
Washington Regional Office

AA/ sd: K:\SD\STORMWATER\EXEMPT\SW7130612  
cc: Washington Regional Office



North Carolina Department of Environment and Natural Resources

Division of Water Quality

Pat McCrory  
Governor

Thomas A. Reeder  
Acting Director

John E. Skvarla, III  
Secretary

July 22, 2013

Mr. Terry Morris  
Craven LCID, LLC  
109 Swift Creek Road  
Vanceboro, NC 28586

Subject: Stormwater Permit No. SW7050818 Ownership Change  
Debris Landfill Site  
General Stormwater Permit  
Craven County

Dear Mr. Morris:

The Washington Regional Office received your Stormwater Application and supporting information on June 13, 2013. Staff review of the plans and specifications has determined that the project, as proposed, will comply with the Stormwater Regulations set forth in Title 15A NCAC 2H.1000. We are forwarding Permit No. SW7050818 dated July 22, 2013 to Craven LCID, LLC.

This permit shall be effective from the date of issuance until rescinded and shall be subject to the conditions and limitations as specified therein. Any future development at this site will require an additional Stormwater review and a permit for any Stormwater control measures deemed appropriate.

If any parts, requirements, or limitations contained in this permit are unacceptable, you have the right to request an adjudicatory hearing upon written request within thirty (30) days following receipt of this permit. This request must be in the form of a written petition, conforming to Chapter 150B of the North Carolina General Statutes, and filed with the office of Administrative Hearings, 6714 Mail Service Center, Raleigh, NC 2799-6714. Unless such demands are made this permit shall be final and binding.

If you have any questions, or need additional information concerning this matter, please contact Mr. Roger Thorpe at (252) 948-3923.

Sincerely,

*Amy Adams*  
for Thomas A. Reeder

Cc R. J. Bushhogging, Inc.  
Robert M. Chiles, P.E.

State Stormwater Management Systems  
Permit No. SW7050818

**STATE OF NORTH CAROLINA  
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES  
DIVISION OF WATER QUALITY**

**STATE STORMWATER MANAGEMENT PERMIT**

**GENERAL PERMIT**

In accordance with the provisions of Article 21 of Chapter 143, General Statutes of North Carolina as amended, and other applicable Laws, Rules and Regulations

PERMISSION IS HEREBY GRANTED TO

Craven LCID, LLC  
Craven County  
FOR THE

construction, operation and maintenance of stormwater management systems in compliance with the provisions of 15A NCAC 2H.1000 (hereafter referred to as the "stormwater rules") and the approved stormwater management plans and specifications, and other supporting data as attached and on file with and approved by the Division of Water Quality and considered a part of this permit for grass swales and vegetated buffers to serve an Inert Debris Landfill located off SR1243 near New Bern, NC. The Permit shall be effective from the date of issuance until rescinded and shall be subject to the following specific conditions and limitations.

**I. DESIGN STANDARDS**

1. This project involves the construction of grass swales and vegetated buffers to serve an inert debris landfill and gravel access road located off SR1243.
2. Approved plans and specifications for projects covered by this permit are incorporated by reference and are enforceable parts of the permit.
3. No stormwater piping in addition to the existing piping shall be allowed except:
  - a. That minimum amount necessary to direct runoff beneath an impervious surface such as a road.
  - b. That minimum amount needed under driveways to provide access to lots.

## II. SCHEDULE OF COMPLIANCE

1. Grasslined swales, vegetated buffers and other Best Management Practices used for stormwater runoff control shall be adequately maintained throughout the life of the project.
2. The permittee shall at all times provide adequate erosion control measures in conformance with the approved Erosion Control Plan.
3. The permittee shall submit all information requested by the Director or his representative within the time frame specified in the written information request.

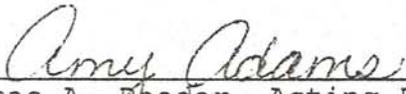
## III. GENERAL CONDITIONS

1. Failure to abide by the conditions and limitations contained in this permit may subject the Permittee to an enforcement action by the Division of Water Quality, in accordance with North Carolina General Statutes 143-215.6A to 143.215.6C.
2. The permit may be modified, revoked or terminated for cause. The filing of a request for a permit modification, or termination does not void any permit condition.
3. The issuance of this permit does not prohibit the Director from reopening and modifying laws, rules, and regulations contained in Title 15A of the North Carolina Administrative Code, Subchapter 2H.1000; and North Carolina General Statute 143-215.1 et.al.
4. The following items will require a modification to the permit:
  - a. Any revision to the approved plans, regardless of size
  - b. Project name change
  - c. Change of ownership
  - d. Redesign or addition to the approved amount of built-upon area.
  - e. Further subdivision of the project area
  - f. In addition, the Director may determine that other revisions to the project should require a modification to the permit.
5. For any additions or modifications of the previously permitted built-upon area, the permittee shall submit to the Director revised plans and specifications and shall receive approval prior to construction.

6. The Director may notify the permittee when the permitted site does not meet one or more of the minimum requirements of the permit. Within the time frame specified in the notice, the permittee shall submit a written time schedule to the Director for modifying the site to meet minimum requirements. The permittee shall provide copies of revised plans and certification in writing to the Director that the changes have been made.
7. The permit is not transferable to any person except after notice to and approval by the Director. The Director may require modification or revocation and reissuance of the permit to change the name and incorporate such other requirements as may be necessary. A formal permit request must be submitted to the Division of Water Quality accompanied by the appropriate fee, documentation from both parties involved, and other supporting materials as may be appropriate. The approval of this request will be considered on its merits, and may or may not be approved.
8. The issuance of this permit does not preclude the Permittee from complying with any and all statutes, rules, regulations, or ordinances which may be imposed by other government agencies (local, state and federal) which have jurisdiction.

Permit issued this the 22 nd day of July, 2013.

**NORTE CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION**



Thomas A. Reeder, Acting Director  
Division of Water Quality

By Authority of the Environmental Management Commission

Permit Number SW7050818

NORTH CAROLINA DEPARTMENT OF  
ENVIRONMENT AND NATURAL RESOURCES

DIVISION OF WASTE MANAGEMENT

SOLID WASTE SECTION

LANDFILL GAS MONITORING GUIDANCE

NOVEMBER 2010

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## **SECTION 1 - Introduction**

North Carolina Solid Waste Management Rules 15A NCAC 13B require quarterly monitoring of methane gas (at MSW landfills) and quarterly monitoring of methane and other explosive landfill gases (LFG) (at C&D and other landfills) to ensure that landfill gas does not exceed the lower explosive limit (LEL) at the facility property boundary or 25 percent of the lower explosive limit in facility structures. If the concentration exceeds the specified limits, steps must be taken to ensure the protection of public health and a remediation plan must be implemented immediately. A landfill gas monitoring plan is necessary to ensure that these performance standards are met and this guidance document was developed to assist in establishing a standardized procedure for the monitoring of landfill gas.

### ***Background***

Organic matter in landfills begins to decompose almost immediately after being placed in a disposal site. Putrescible wastes such as food products and sewage sludges begin to break down by biological processes very rapidly whereas paper, cardboard or cellulose based materials are slower to decompose. However, when conditions become favorable, most organic matter will decompose. The decomposition process typically goes through several stages that depend on conditions such as pH, temperature, and moisture content. The final stage results in the production of methane and although the rate of production may vary, most landfills produce methane.

### ***Landfill Gas Generation***

Landfill gas is a natural by-product of the anaerobic decomposition of organic waste in a landfill. The composition, quantity and rate of landfill gas generation are dependent on the types of waste that are decomposing and the level of microbial activity within the wastes. The decomposition of biodegradable waste begins with aerobic decomposition which lasts until the oxygen in the landfill is depleted. The anaerobic phase then begins, resulting in landfill gas production.

There are four stages of landfill gas composition: the first stage is characterized by elevated nitrogen levels and occurs when the landfill is new. The second stage is characterized by elevated carbon dioxide levels and occurs for a relatively short period of time after the initial stage is complete. The third and fourth stages are characterized by elevated methane concentrations and represent the active life of a landfill and the post-closure time frame.

Landfill gas is generally composed of 50-55% methane (CH<sub>4</sub>); 45-50% carbon dioxide (CO<sub>2</sub>); less than 5% nitrogen (N<sub>2</sub>); and less than 1% non-methane organic compounds. These individual gases generally remain co-mingled and do not naturally separate. The Solid Waste Section (SWS) Rules typically focus on methane (CH<sub>4</sub>) and its explosive properties due to public safety issues. Hydrogen sulfide (H<sub>2</sub>S) is also of particular concern in landfills and is typically recognized by its rotten egg odor. H<sub>2</sub>S is immediately dangerous to life and health at concentrations of 100 parts per million (ppm).

### ***Landfill Gas Migration***

The production of landfill gas creates a positive pressure within the landfill that forces the gas to migrate. Landfill gas migrates from place to place by diffusion and pressure gradient and will follow the path of least resistance. Subsurface gas typically migrates above the groundwater table and is restricted laterally by streams. Porous soils lying above the bedrock can serve as pathways to transmit large volumes of gas. Underground off-site migration is common and can be facilitated by the presence of pipelines, buried utility corridors or trenches located within or adjacent to the landfill boundaries. Movement depends on soil type and moisture, and migration distances of 1,500 feet have been observed. Barometric pressure also influences movement. Falling barometric pressure allows methane to migrate out of the landfill and into surrounding areas.

## **SECTION 2 - Factors Influencing Landfill Gas Generation and Migration**

Factors that affect landfill gas generation and migration through the subsurface include the following:

### ***Waste Composition***

The production of landfill gas is directly related to the amount of organic matter present in waste. The bacteria that break down the waste require small amounts of specific minerals such as calcium, potassium, magnesium and other micronutrients. Bacteria are able to thrive and produce landfill gas if the minerals/micronutrients are present. If the minerals/micronutrients are not present or if substances that inhibit bacterial growth exist, landfill gas production will occur at a reduced rate. Some forms of organic matter such as cellulose break down quickly whereas matter such as lignin breaks down more slowly. The rate at which landfill gas is produced depends on the proportions of each type of organic matter present in the waste.

### ***Moisture Content***

Landfills with higher moisture content generate higher concentrations of landfill gas in earlier stages of development (such as during leachate recirculation). Moisture accelerates the methanogenic process.

### ***Temperature***

Landfill bacteria are temperature dependant. They are able to survive and function below the freezing point, but they also function well at temperatures up to 65°C. Anaerobic bacteria produce small amounts of heat and may not be able to maintain the temperature of a shallow landfill when external temperatures decrease, so LFG generation may exhibit seasonal variations. Saturated landfills may not achieve ideal temperatures because the bacteria do not generate sufficient heat to raise the temperature of the excess water. Higher temperatures promote volatilization and chemical reactions with the waste so the trace gas component of landfill gas tends to increase with higher landfill temperatures.

### ***Age of Landfill***

Typically, landfills have an increasing generation of landfill gas for a number of years until closure at which time landfill gas generation reaches a peak and begins to subside. An evaluation of the age of the landfill and use of a landfill gas generation curve can be helpful in determining the likelihood of significant landfill gas concentrations from the landfill.

### ***Landfill Cap***

The type or presence of landfill cover can influence landfill gas generation and migration. Although a low permeability cap will reduce moisture and landfill gas generation over the longer term, initially, the installation of a landfill cap could drive landfill gas migration further from the landfill in the subsurface without proper ventilation (either passive or active). This is especially true in the case of unlined (unvented) landfills.

### ***Water Table***

Landfill gas movement in unlined landfills may be influenced by groundwater table variations. A rising water table could cause displacement and force upward movement of landfill gas.

### ***Man-made and Natural Conduits***

Structures such as drains, trenches, and buried utility corridors can act as conduits for landfill gas migration. Geologic features including fractured bedrock, porous soil, and permeable strata also provide conduits for landfill gas migration

### ***Landfill Liner Conditions***

The presence of a Subtitle-D (or equivalent) landfill liner has the capability to limit the lateral migration of landfill gas in the subsurface. Unlined landfills have no barrier to prevent lateral landfill gas migration in the subsurface.

### ***Weather Conditions***

Barometric pressure and precipitation have significant effects on landfill gas migration. Increased barometric pressure yields decreased landfill gas venting from the subsurface, until the pressure within the subsurface is greater than the atmospheric (barometric) pressure. Conversely, as the barometric pressure decreases, the landfill will vent the stored gas until pressure equilibrium is reached. Capping of a landfill can influence the effect of barometric pressure on landfill gas migration. Generally, a more permeable landfill cap will allow greater influence by barometric pressure than a less permeable landfill cap.

## **SECTION 3 – Current Solid Waste Section Rules Pertaining to Landfill Gas Monitoring**

**Web link to the 15A NCAC 13B rules - <http://portal.ncdenr.org/web/wm/sw/rules>**

### **15A NCAC 13B**

#### **.0101- DEFINITIONS**

.0101 (14) "Explosive gas" means Methane (CH<sub>4</sub>)

.0101(25) "Lower explosive limit" (LEL) means the lowest percent by volume of a mixture of explosive gases which will propagate a flame in air at 25 degrees Celsius and atmospheric pressure.

#### **.0503 - SITING AND DESIGN REQUIREMENTS FOR DISPOSAL FACILITIES**

.0503(2) A site shall meet the following design requirements:

- (a) The concentration of explosive gases generated by the site shall not exceed:
  - (i) twenty-five percent of the limit for the gases in site structures (excluding gas control or recovery system components); and
  - (ii) the lower explosive limit for the gases at the property boundary;

#### **.0543 - CLOSURE AND POST-CLOSURE REQUIREMENTS FOR C&DLF FACILITIES**

.0543(e) Post-closure criteria.

- (1) Following closure of each C&DLF unit, the owner and operator must conduct post-closure care. Postclosure care must be conducted for 30 years, except as provided under Subparagraph (2) of this Paragraph, and consist of at least the following:
  - (C) maintaining and operating the gas monitoring system in accordance with the requirements of Rule .0544 of this Section; and
- (2) The length of the post-closure care period may be:
  - (A) decreased by the Division if the owner or operator demonstrates that the reduced period is sufficient to protect human health and the environment and this demonstration is approved by the Division; or
  - (B) increased by the Division if the Division determines that the lengthened period is necessary to protect human health and the environment.

#### **.0544 - MONITORING PLANS AND REQUIREMENTS FOR C&DLF FACILITIES**

.0544(d) Gas Control Plan

- (1) Owners and operators of all C&DLF units must ensure that:
  - (A) the concentration of methane gas or other explosive gases generated by the facility does not exceed 25 percent of the lower explosive limit in on-site facility structures (excluding gas control or recovery system components);
  - (B) the concentration of methane gas or other explosive gases does not exceed the lower explosive limit for methane or other explosive gases at the facility property boundary; and
  - (C) the facility does not release methane gas or other explosive gases in any concentration that can be detected in offsite structures.
- (2) Owners and operators of all C&DLF units must implement a routine methane monitoring program to ensure that the standards of this Paragraph are met.
  - (A) The type of monitoring must be determined based on soil conditions, the Hydrogeologic conditions under and surrounding the facility, hydraulic conditions on and surrounding the facility, the location of facility structures and property boundaries, and the location of all offsite structures adjacent to property boundaries.

- (B) The frequency of monitoring shall be quarterly or as approved by the Division.
- (3) If methane or explosive gas levels exceeding the limits specified in Subparagraph (d)(1) of this Rule are detected, the owner and operator must:
  - (A) immediately take all steps necessary to ensure protection of human health and notify the Division;
  - (B) within seven days of detection, place in the operating record the methane or explosive gas levels detected and a description of the steps taken to protect human health; and
  - (C) within 60 days of detection, implement a remediation plan for the methane or explosive gas releases, place a copy of the plan in the operating record, and notify the Division that the plan has been implemented. The plan must describe the nature and extent of the problem and the proposed remedy.
- (4) Based on the need for an extension demonstrated by the operator, the Division may establish alternative schedules for demonstrating compliance with Parts (3)(B) and (3)(C) of this Paragraph.
- (5) For purposes of this Item, "lower explosive limit" means the lowest percent by volume of a mixture of explosive gases in air that will propagate a flame at 25 C and atmospheric pressure.

#### **.0566 - OPERATIONAL REQUIREMENTS FOR LAND CLEARING/INERT DEBRIS (LCID) LANDFILLS**

- .0566(13) The concentration of explosive gases generated by the facility shall not exceed:
  - (a) Twenty-five percent of the lower explosive limit for the gases in facility structures.
  - (b) The lower explosive limit for the gases at the property boundary.

#### **.1626 – OPERATIONAL REQUIREMENTS FOR MSWLF FACILITIES**

- .1626(4) Explosive gases control.
  - (a) Owners or operators of all MSWLF units must ensure that:
    - (i) The concentration of methane gas generated by the facility does not exceed 25 percent of the lower explosive limit for methane in facility structures (excluding gas control or recovery system components); and
    - (ii) The concentration of methane gas does not exceed the lower explosive limit for methane at the facility property boundary.
  - (b) Owners or operators of all MSWLF units must implement a routine methane monitoring program to ensure that the standards of (4)(a) are met. A permanent monitoring system shall be constructed on or before October 9, 1994. A temporary monitoring system shall be used prior to construction of the permanent system.
    - (i) The type and frequency of monitoring must be determined based on the following factors:
      - (A) Soil conditions;
      - (B) The hydrogeologic conditions surrounding the facility;
      - (C) The hydraulic conditions surrounding the facility; and
      - (D) The location of facility structures and property boundaries.
    - (ii) The minimum frequency of monitoring shall be quarterly.
  - (c) If methane gas levels exceeding the limits specified in (4)(a) are detected, the owner or operator must:
    - (i) Immediately take all necessary steps to ensure protection of human health and notify the Division;
    - (ii) Within seven days of detection, place in the operating record the methane gas levels detected and a description of the steps taken to protect human health; and
    - (iii) Within 60 days of detection, implement a remediation plan for the methane gas releases, place a copy of the plan in the operating record, and notify the Division that the

plan has been implemented. The plan shall describe the nature and extent of the problem and the proposed remedy.

(iv) Based on the need for an extension demonstrated by the operator, the Division may establish alternative schedules for demonstrating compliance with (4)(c)(ii) and (iii) of this Rule.

(d) For purposes of this Item, "lower explosive limit" means the lowest percent by volume of a mixture of explosive gases in air that will propagate a flame at 25°C and atmospheric pressure.

.1626(10) Recordkeeping requirements.

(a) The owner or operator of a MSWLF unit must record and retain at the facility, or an alternative location near the facility approved by the Division, in an operating record the following information as it becomes available:

(iii) Gas monitoring results and any remediation plans required by Item (4) of this Rule;

## **.1627 – CLOSURE AND POST CLOSURE REQUIREMENTS FOR MSWLF ACTIVITIES**

.1627(d) Post-Closure Criteria

(1) Following closure of each MSWLF unit, the owner or operator shall conduct post-closure care. Post-closure care shall be conducted for 30 years, except as provided under Subparagraph (2) of this Paragraph, and consist of at least the following:

(D)-Maintaining and operating the gas monitoring system in accordance with the requirements of Rule .1626 of this Section.

(2) The length of the post-closure care period may be:

(A) Decreased by the Division if the owner or operator demonstrates that the reduced period is sufficient to protect human health and the environment and this demonstration is approved by the Division; or

(B) Increased by the Division if the Division determines that the lengthened period is necessary to protect human health and the environment.

(3) Following completion of the post-closure care period for each MSWLF unit, the owner or operator shall notify the Division that a certification, signed by a registered professional engineer, verifying that post-closure care has been completed in accordance with the post-closure plan, has been placed in the operating record.

### **NOTES:**

Based on the referenced rules above, the following words / phrases are presently in the Solid Waste Section rules pertaining to methane and explosive landfill gas.

Rule .0101(14) states: "*Explosive gas means Methane (CH)*".

Rule .0503 (2)(a) refers to "*explosive gases*".

Rule .0544(d) refers to "*Gas Control Plan*"

Rule .0544(d)(1) refers to "*methane or other explosive gases*".

Rule .0544(d)(2) refers to "*methane monitoring program*"

Rule .0544(d)(3) refers to "*methane or explosive gas levels*"

Rule .0566 (13) refers to "*explosive gases*".

Rule .1626 (4) refers to "*explosive gases control*"

Rule .1626(4)(a-b) refers to "*methane monitoring*" and "*methane monitoring program*".

### ***Monitoring Goals***

Landfill design and landfill gas monitoring regulations in North Carolina require that there not be an exceedance of 100% of the Lower Explosion Limit (LEL) (equivalent to 5% methane) at the property boundary, or 25% LEL in on-site structures. These regulations were developed over time to protect the health and safety of the citizens of North Carolina and the U.S. from the asphyxiation and explosive hazards of landfill gas.

### ***NC Rule History***

A review of NC landfill guidance documents and regulations from 1972 to the present indicates that from 1972 through 1982, there was no mention of design requirements regarding the control of landfill gas, nor were there any landfill monitoring requirements for landfill gas. In 1982, the regulations were changed to require that sanitary landfill design prevent landfill gas concentrations of 100% LEL at the property boundary line and 25% inside on-site structures. Although a design requirement was added, no design requirement was established to determine if the design requirement was being met. In 1993 with the establishment of .1600 rules, requirements for designs to limit landfill gas levels to below 100% at the property boundary line and 25% in on-site structures and monitoring of landfill gas concentrations around the perimeter of the landfill and inside on-site structures were adopted.

## SECTION 4 – Landfill Gas Incidents and Explosions

### *Hazards Involving Landfill Gas*

Landfill fires may or may not be directly caused by landfill gas. The primary concern with these fires is air contamination from the resulting smoke; however they also present a variety of additional problems. In addition to concerns with containing and extinguishing landfill fires, potential reactions involving unknown chemicals in the landfill can cause uncertain hazards. Discarded consumer products in a landfill, such as pesticides, paints, solvents, cleaners, and other material can be the source of chemical releases. Heat from the fire can cause chemicals to volatilize, breakdown, and enter the environment. Also to be considered is the presence of other combustible gases in addition to methane. Whenever an environmental investigation of a landfill is prompted by odorous compounds or explosive gases, the presence of toxic substances should also be investigated. One example is hydrogen sulfide (H<sub>2</sub>S) that can cause asphyxiation and is flammable. An analysis should include alkyl benzenes, sulfur compounds, vinyl chloride, and methane, and other products associated with industrial wastes, construction and debris waste, and normal organic and inorganic waste.

Fires and explosion hazards become a concern when gases collect in confined spaces. Buildings, basements, and pits are typically regarded as confined spaces. However, landfill gases also collect in and migrate to cracks in the landfill cover, leachate “springs”, cracks in adjacent structures, paved parking areas, etc. Fires can occur on the surface and underground. Surface fires involve recently buried waste near the surface in an aerobic decomposing layer, typically 1 to 4 feet below ground. These fires can be intensified by subsurface landfill gas and spread throughout the landfill. Subsurface fires occur deeper within the landfill, involve material buried for months or years, and can burn for days and months.

The following is a brief summary of some incidents involving landfill gas migration from landfills:

- 2007 Four employees died as a result of exposure to high concentrations of hydrogen sulfide while attempting to repair a leachate pump at a C&D landfill in Superior, Wisconsin (Journal of Environmental Health 2008).
- 1999 An 8-year old girl was burned on her arms and legs when playing in an Atlanta, Georgia playground. The area was reportedly used as an illegal dumping ground many years ago (Atlanta Journal-Constitution 1999).
- 1994 While playing soccer in a park built over an old landfill in Charlotte, North Carolina, a woman was seriously burned by a methane explosion (Charlotte Observer 1994).
- 1987 Offsite landfill gas migration is suspected to have caused a house to explode in Pittsburgh, Pennsylvania (EPA 1991).
- 1984 Landfill gas migrated to and destroyed one house near a landfill in Akron, Ohio. Ten houses were temporarily evacuated (EPA 1991).
- 1983 An explosion destroyed a residence across the street from a landfill in Cincinnati, Ohio. Minor injuries were reported (EPA 1991).
- 1975 In Sheridan, Colorado, landfill gas accumulated in a storm drain pipe that ran through a landfill. An explosion occurred when several children playing in the pipe lit a candle, resulting in serious injury.

1969 Methane gas migrated from an adjacent landfill into the basement of an armory in Winston-Salem, North Carolina. A lit cigarette caused the gas to explode, killing three men and seriously injuring five others (USACE 1984).

## **SECTION 5 - Landfill Gas Monitoring Wells**

### ***Locations***

Landfill gas monitoring well locations will be site specific depending upon site geology, depth to groundwater, surface water features, on-site and off-site structures and sensitive receptors. The landfill gas monitoring wells must be spaced no more than 500 feet apart depending upon site specifics. A readily accessible, unobstructed path must be maintained so that landfill gas monitoring wells are always accessible using four-wheel drive vehicles. Regardless of site specifics, the permittee must obtain approval from the Solid Waste Section for the design and installation of any landfill gas monitoring well system.

### ***Well Construction and Installation***

Landfill gas monitoring wells are the same as groundwater monitoring wells with two exceptions. Landfill gas monitoring wells are installed just above the water table within the unsaturated zone and are equipped with a stopcock valve or a quick connect coupling on the cap, which allows for accurate landfill gas measurements. The stopcock valve must be equipped with flexible tubing and a barb connection that will fit the gas meter's inlet tube. The stopcock valve or a quick connect coupling must be closed between monitoring events. The landfill gas monitoring well must also be capped, locked, and labeled with a permanently affixed identification plate stating the well contractor name and certification number, date of well completion, total depth of well, screen length and well ID number. See detailed schematics of a landfill gas monitoring well (Figure 1).

The depth of each landfill gas monitoring well will be site specific depending upon depth to groundwater. Landfill gas monitoring wells must be constructed the same as groundwater monitoring wells as described in 15A NCAC Subchapter 2C. Typically landfill gas monitoring wells must be installed using 2" PVC piping and screen. The screen length, also site specific, must span the majority of the unsaturated zone while still allowing for proper well construction. A North Carolina Professional Geologist or Professional Engineer must be present to supervise the installation of all landfill gas monitoring wells. The exact locations, screened intervals, and nesting of the wells must be approved by the Solid Waste Section Hydrogeologist prior to landfill gas monitoring well installation. Each landfill gas monitoring well must be surveyed for location and elevation by a North Carolina Registered Land Surveyor. Within thirty (30) days of the completed construction of each new landfill gas monitoring well, the boring log and a diagram of each well including, but not limited to total depth, screened interval and distance above seasonal high water table must be submitted to the Solid Waste Section. The submittal must also include a scaled topographic map showing the location and identification of new, existing and abandoned landfill gas monitoring wells.

### ***Nested and Clustered Landfill Gas Monitoring Wells***

Nested and/or clustered landfill gas monitoring wells may be required in unsaturated zones of 45 feet or more to measure specific depths of the unsaturated zone. Initially, the installation of one long screen shall be sufficient. If a monitoring event shows an exceedance of the lower explosive limit, then the Solid Waste Section may require the installation of nested and/or clustered landfill gas monitoring wells.

### ***Abandonment of Wells***

An abandonment record must be submitted to the Solid Waste Section within 30 (thirty) days of the abandonment of a landfill gas monitoring well. The landfill gas monitoring well(s) must be overdrilled and sealed with grout in accordance with 15A NCAC 2C .0113(d) and certified by a North Carolina Professional Geologist or Professional Engineer.

***Professional Certification***

The certification statement below must be signed and sealed by a North Carolina Professional Geologist or Professional Engineer and submitted with the Landfill Gas Monitoring Plan.

The landfill gas monitoring plan for this facility has been prepared by a qualified geologist or engineer who is licensed to practice in the State of North Carolina. The plan has been prepared based on first-hand knowledge of site conditions and familiarity with North Carolina solid waste rules and industry standard protocol. This certification is made in accordance with North Carolina Solid Waste Regulations, indicating this Landfill Gas Monitoring Plan should provide early detection of any release of hazardous constituents to the uppermost aquifer, so as to be protective of public health and the environment. No other warranties, expressed or implied, are made.

Signed \_\_\_\_\_

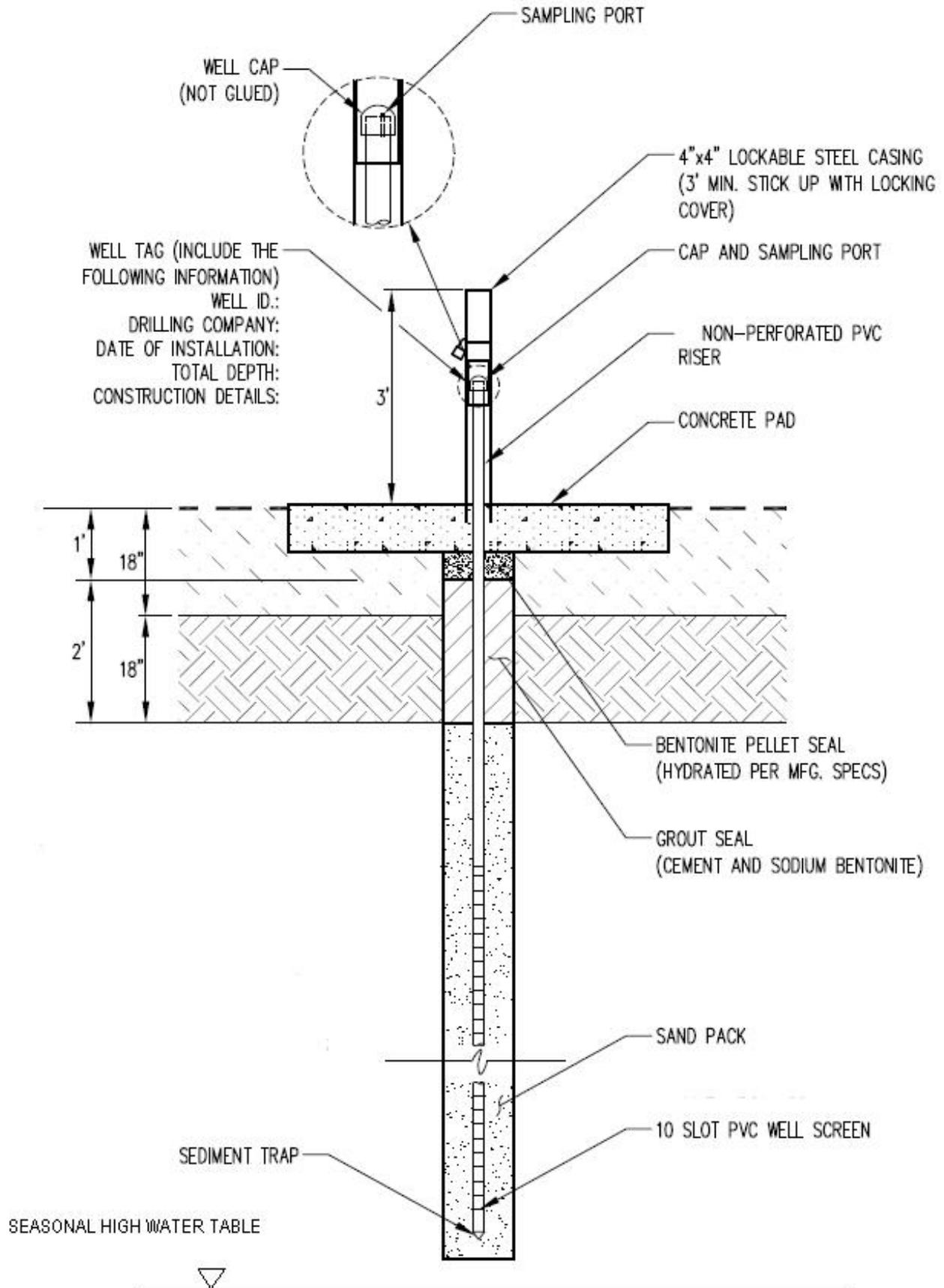
Printed \_\_\_\_\_

Date \_\_\_\_\_

Not valid unless this document bears the seal of the above mentioned licensed professional.

In addition, the boring logs and/or well diagram must be signed and sealed with the stamp of a North Carolina Registered Land Surveyor.

Figure 1 – Landfill Gas Monitoring Well Detail



## **SECTION 6 – Landfill Gas Monitoring Instrumentation**

The person using the landfill gas monitoring instrument must understand the principles of operation and follow the manufacturer's instructions. This includes calibrating the instrument according to the manufacturer's specifications. Include the following on the top portion of the landfill gas monitoring form (See example below) : facility name, permit number, type and serial number of gas monitoring instrument, calibration date of the instrument, date and time of field calibration, type of gas used for field calibration (15/15 or 35/50), expiration date of field calibration gas canister, date of landfill gas monitoring event, name and position of sample collector, pump rate of instrument being used, ambient air temperature, and general weather conditions. Verification that the equipment was calibrated in accordance with the manufacturer's specifications is also required. When determining which field calibration gas to use, take into consideration the expected levels of methane in the landfill gas monitoring wells. If the methane levels are expected to be low, use the 15/15 gas canister (15% CO<sub>2</sub>/15% CH<sub>4</sub>). If the methane levels are expected to be high, use the 35/50 gas canister (35% CO<sub>2</sub>/50% CH<sub>4</sub>).

For every landfill gas monitoring well, please include the following: verification of sample tube purge prior to each sample taken (should be one minute), the time pumped in seconds (should be at least one minute), barometric pressure, time stabilized reading collected, percent lower explosive limit, percent methane by volume, percent oxygen, percent carbon dioxide, and any observations or comments.

The landfill gas monitoring data form (See example below) and results should be retained in the facility's operating record unless an exceedance has occurred and/or is requested by the Solid Waste Section.

Landfill gas monitoring readings from non-calibrated or inaccurately calibrated instruments are not reliable, and will therefore be rejected by the Solid Waste Section. Landfill gas monitoring readings collected with monitoring equipment that was not designed for landfill gas monitoring will also be rejected by the Solid Waste Section. There are several different landfill gas monitoring instruments on the market which may be used in order to obtain all of the information required by the Solid Waste Section.

### ***Monitoring Times***

Monitoring times are also important when conducting landfill gas monitoring. Proper landfill gas monitoring should include sampling during times when landfill gas is most likely to migrate. Landfill gas can migrate and accumulate not only in landfill gas monitoring wells; it can also migrate and accumulate in buildings and other structures. Because subsurface gas pressures are considered to be at a maximum during the afternoon hours, monitoring should be conducted in the afternoon or whenever the barometric pressure is low.

Scientific evidence also indicates that weather and soil conditions influence the migration of landfill gas. Barometric pressure and precipitation have significant effects on landfill gas migration. Increased barometric pressure generates decreased landfill gas venting from the subsurface, until the pressure within the subsurface is greater than the atmospheric (barometric) pressure. On the other hand, when the barometric pressure decreases, the landfill will vent the stored gas until a pressure equilibrium is reached. Capping of a landfill can influence the effect of barometric pressure on landfill gas migration. Generally, a more permeable landfill cap will allow greater influence by barometric pressure than a less permeable landfill cap. As a result, landfill gas monitoring should be conducted when the barometric pressure is low and soils are saturated. During the winter season when snow cover is just beginning to melt or when the ground is frozen or ice covered, landfill gas monitoring should be conducted when the barometric pressure is low.

### ***Landfill Gas Sampling Procedures***

Any accumulation of landfill gas in the landfill gas monitoring wells is the result of landfill gas migration. The following procedure is a recommended example for conducting landfill gas monitoring well sampling, but always read and follow the manufacturer's instructions because each instrument will be different.

**Step 1** – Calibrate the instrument according to the manufacturer's specifications. In addition, prepare the instrument for monitoring by allowing it to properly warm up as directed by the manufacturer. Make sure the static pressure shows a reading of zero on the instrument prior to taking the first sample.

**Step 2** – Purge sample tube for at least one minute prior to taking reading. Connect the instrument tubing to the landfill gas monitoring well cap fitted with a stopcock valve or quick connect coupling.

**Step 3** – Open the valve and record the initial reading and then the stabilized reading. A stable reading is one that does not vary more than 0.5 percent by volume on the instrument's scale.

**Step 4** - Record the stabilized reading including the oxygen concentration and barometric pressure. A proper reading should have two percent oxygen by volume or less. If levels of oxygen are higher, it may indicate that air is being drawn into the system giving a false reading.

**Step 5** – Turn the stopcock valve to the off position and disconnect the tubing.

**Step 6** – Proceed to the next landfill gas monitoring well and repeat Steps 2 – 5.

### ***Landfill Gas Constituent Sampling and Analysis***

Sampling of landfill gas to determine volume percentages/concentrations of each constituent can be accomplished through the use of canisters which are specifically designed for landfill gas analysis.

Several analytical methods are available to determine the concentrations of a variety of constituents.

Typically, landfill gas analysis of this type is performed to determine the non-methane organic compounds emission rate for Tier 2 testing under the Clean Air Act (Title V Subpart WWW 60.754).

Isotopic identification of landfill methane can be accomplished to identify one source of methane from another. In this case, isotopes of carbon and hydrogen in the methane are analyzed to determine the methane source.

**NC Division of Waste Management - Solid Waste Section**

**Landfill Gas Monitoring Data Form**

**Notice:** This form and any information attached to it are "Public Records" as defined in NC General Statute 132-1. As such, these documents are available for inspection and examination by any person upon request (NC General Statute 132-6).

Facility Name: \_\_\_\_\_ Permit Number: \_\_\_\_\_

Date of Sampling: \_\_\_\_\_ NC Landfill Rule (.0500 or .1600): \_\_\_\_\_

Name and Position of Sample Collector: \_\_\_\_\_

Type and Serial Number of Gas Meter: \_\_\_\_\_ Calibration Date of Gas Meter: \_\_\_\_\_

Date and Time of Field Calibration: \_\_\_\_\_

Type of Field Calibration Gas (15/15 or 35/50): \_\_\_\_\_ Expiration Date of Field Calibration Gas Canister: \_\_\_\_\_

Pump Rate of Gas Meter: \_\_\_\_\_

Ambient Air Temperature: \_\_\_\_\_ Barometric Pressure: \_\_\_\_\_ General Weather Conditions: \_\_\_\_\_

**Instructions:** Under "Location or LFG Well" identify the monitoring wells or describe the location for other tests (e.g., inside buildings). A drawing showing the location of test must be attached. Report methane readings in both % LEL and % methane by volume. A reading in percent methane by volume can be converted to % LEL as follows: % methane by volume = % LEL/20

Location or LFG Well ID	Sample Tube Purge	Time	Time Pumped (s)	Initial %LEL	Stabilized %LEL	%CH4 by Volume	%O2	%CO2	Notes

If your facility has more gas monitoring locations than there is room on this form, please attach additional sheets listing the same information as contained on this form.

**Certification**

**To the best of my knowledge, the information reported and statements made on this data submittal and attachments are true and correct. I am aware that there are significant penalties for making any false statement, representation, or certification including the possibility of a fine and imprisonment.**

\_\_\_\_\_  
SIGNATURE

\_\_\_\_\_  
TITLE

## SECTION 7 - References

Agency for Toxic Substances & Disease Registry. “Landfill Gas Primer- An Overview for Environmental Health Professionals. 2001.” <http://www.atsdr.cdc.gov/HAC/landfill/html/toc.html> (accessed February 24, 2010).

California Environmental Protection Agency. “Landfill Gas Monitoring Well Functionality at 20 California Landfills, 2008”. <http://www.calrecycle.ca.gov/Publications/Organics/2008022.pdf> (accessed February 24 2010).

Florida Department of Environmental Protection. Gas Management Systems, under Rule 62-701.530. [http://www.dep.state.fl.us/waste/quick\\_topics/rules/default.htm](http://www.dep.state.fl.us/waste/quick_topics/rules/default.htm) (accessed February 24, 2010).

Missouri Department of Natural Resources, Flood Grant Team. “An Analysis of Landfill Gas Monitoring Well Design and Construction, 2007”. [http://www.clu-in.org/conf/itrc/directpush/prez/Missouri\\_Study.pdf](http://www.clu-in.org/conf/itrc/directpush/prez/Missouri_Study.pdf) (accessed February 24, 2010).

Missouri Department of Natural Resources. “Design and Construction of Landfill Gas Monitoring Wells”. <http://www.dnr.missouri.gov/pubs/pub2054.pdf> (accessed February 24, 2010).

Wisconsin Department of Natural Resources. Environmental Monitoring for Landfills, under Chapter NR 507.22. <http://www.dnr.state.wi.us/org/aw/wm/information/wiacsss.htm> (accessed February 24, 2010).

“Landfill Gas-an Overview” Landfill-gas.com. Web, 22, Feb. 2010  
<http://www.landfill-gas.com/webpage -LFG-overview.doc>

## **SECTION 8 – Suggested Outline for a Landfill Gas Monitoring Plan**

1. Introduction
  - 1.1. Background (project overview, site observations, NCDENR rules referenced)
  - 1.2. Site Geology with discussion of groundwater depth and flow (potentiometric surface map)
  - 1.3. Regulatory Limits
2. Landfill Gas Monitoring
  - 2.1. Landfill Gas Monitoring Well Locations (discussion of reasoning behind proposed locations, discussion of well construction, reference map showing proposed locations, reference table displaying well ID, well depth, screen interval and depth to groundwater)
  - 2.2. Structure and Ambient Sampling
  - 2.3. Landfill Gas Monitoring Frequency
3. Landfill Gas Sampling Procedures
  - 3.1. Detection Equipment Used (discussion of calibration procedures)
  - 3.2. Landfill Gas Sampling Procedure
4. Record Keeping and Reporting
  - 4.1. Landfill Gas Monitoring Data Form
  - 4.2. Sampling Reports
  - 4.3. Permanent Record Keeping
5. Contingency Plan
6. Certification of Professional Geologist or Professional Engineer
7. Certification of Registered Land Surveyor

### **Figures**

Map displaying proposed landfill gas monitoring well locations

Potentiometric Surface Map

Diagram showing construction of stopcock valve or quick connect coupling on well cap

Diagram showing well construction of each landfill gas monitoring well

### **Table**

Table displaying well ID, well depth, screen interval, depth to groundwater

Example of landfill gas monitoring data form

## **SECTION 9 – Checklist of Items to be Included in a Landfill Gas Monitoring Plan**

1. Depth to groundwater discussion
2. Well locations
  - a. Number of wells
  - b. Well spacing
3. Instrumentation being used
  - a. Calibration procedures
4. Sampling procedures as per the manufacture's instructions
5. Map of well locations
6. Table describing each well location
  - a. Well ID
  - b. Well depth
  - c. Screen interval
  - d. Depth to groundwater
  - e. Subsurface lithology
7. Diagram of cap construction w/ stopcock valve or quick connect coupling
8. Diagram of well construction
9. Potentiometric surface map
10. Professional Geologist or Professional Engineer certification
11. Registered Land Surveyor certification

## Emergency/Disaster Site - Spontaneous Combustion Guidance

When ground organic debris is put into piles, microorganisms can very quickly begin to decompose the organic materials. The microorganisms generate heat and volatile gases as a result of the decomposition process. Temperatures in these piles can easily rise to more than 160 degrees Fahrenheit. Spontaneous combustion can occur in these situations.

Spontaneous combustion is more likely to occur in larger piles of debris because of a greater possibility of volatile gases building up in the piles and being ignited by the high temperatures. If wind rows can be maintained 5 feet to 6 feet high and 8 feet to 10 feet wide, volatile gases have a better chance of escaping the piles; and the possibility of spontaneous combustion will be reduced.

Turning piles when temperatures reach 160 degrees can also reduce the potential for spontaneous combustion. Pile turning provides an opportunity for gases to escape and for the contents of the pile to cool. Adding moisture during turning will increase cooling. Controlling the amount of nitrogen-bearing (green) wastes in piles will also help to reduce the risk of fire. The less nitrogen in the piles the slower the decomposition process and consequently the less heat generated and gases released.

Large piles should be kept away from wooded areas and structures and shall be accessible to fire fighting equipment, if a fire were to occur. Efforts should be made to avoid driving or operating heavy equipment on large piles because the compaction will increase the amount of heat build-up, which could increase the possibility of spontaneous combustion.



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[mikerice@robertmchilespe.com](mailto:mikerice@robertmchilespe.com)

August 8, 2013

Certified Mail Receipt No. 7009 2820 0001 4222 9253

Mr. Patrick McClain, P.E.  
NCDENR, DLR, Land Quality Section  
943 Washington Square Mall  
Washington, N. C. 27889

Re: Crave-2013-019, Craven LCID, LLC

Enclosures: (1) 2 Copies, Revised Erosion and Sediment Control Plan Application Checklist Attachment for Craven LCID, 356 Sanders Lane  
(2) 2 Copies, Drawing, Erosion and Sediment Control Plan for Craven LCID, 356 Sanders Lane, for Craven LCID, LLC, prepared by Robert M. Chiles, PE, Revised 8-6-2013.

Dear Mr. McClain:

On behalf of our client, Craven LCID, LLC and its agent, Mr. Terry Morris, we submit the enclosed revised information in response to the July 1 letter of disapproval for your review and approval.

We have made a number of revisions to the proposed LCID plans following receipt of comments from Mr. Ming -Tai Choa of the Division of Waste Management, Solid Waste Section. These revisions include changes to the configuration of the proposed LCID disposal area, corrections to the onsite ditches, and changes to the proposed ditches. We have incorporated a number of other changes as a result of our recent telephone conversation.

With regards to the proposed ditches, we have removed the proposed ditch alongside the entrance road. Apparently, the site has functioned satisfactorily to date without one, and the existing gradual slope of the original ground will direct any runoff from the disposal area to the west and south, toward existing ditches. We corrected the depiction of the existing ditches near the Sanders Lane entrance. This is based upon recently acquired information which indicates there is only one ditch south of the entrance, not two as previously depicted. The proposed ditch realignment is now labeled as a possible ditch realignment. During the revision process, we realized that realigning the ditch provided only an insignificant increase in the disposal area. In the event that the owner decides to realign the ditch anyway, a note is added to the construction sequence on the drawing which indicates that the alignment should be cleared, the realignment ditch excavated without making connections to the existing ditches, vegetation established within the realignment, and then the connections made to the existing ditches. The portion of the existing ditch that is replace by the realignment is then plugged and filled.

We have added check dams (with a note that they can be rock, coir logs, or compost socks) to the ditch alongside the access ramp at every 5 feet of vertical rise. We have also changed the plateau at the top of the disposal area from the previously submitted 0.25 acres to 0.08 acres, to reduce the watershed for the ditch considerably.

The revisions expand the erosion and sedimentation control measures for the site to now include temporary and permanent seeding, mulch, check dam, temporary gravel construction entrance, and compost sock, using the specifications directly from the Division's manual.

During our telephone conversation I clarified that the woody vegetation to be removed is located within the overgrown existing LCID disposal area, and that the general cleanup of stray fill material left behind by the previous operator is solid material stockpiled on the original ground that will be relocated to the disposal area.

Lastly, we have revised the application checklist attachment to include the discussed revisions, and to provide estimated stormwater runoff calculations.

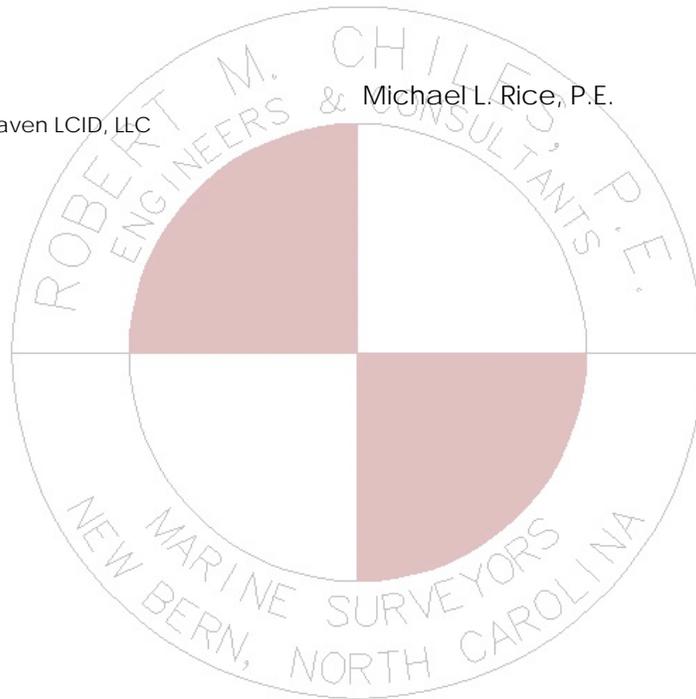
Should you require additional information or have any questions, please contact us your convenience.

Very truly yours,  
ROBERT M. CHILES, P.E.

ELECTRONIC COPY  
SEE ORIGINAL FOR SIGNATURE

cc: Mr. Terry Morris, agent, Craven LCID, LLC

Michael L. Rice, P.E.





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NEW BERN, NORTH CAROLINA 28564-3496

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June 21, 2013

Mrs. Allison Ward  
NCDENR, DLR, Land Quality Section  
943 Washington Square Mall  
Washington, N. C. 27889

Re: Craven LCID, 356 Sanders Lane

- Enclosures: (1) 2 copies, Revised Drawing, Erosion and Sediment Control plan for Craven LCID, 356 Sanders Lane, for Craven LCID, LLC, prepared by Robert M. Chiles, PE.  
(2) Copy, Temporary Gravel Construction Entrance standard specification.  
(3) Copy of Deed

Dear Mrs. Ward:

On behalf of our client, Craven LCID, LLC and its agent, Mr. Terry Morris, we submit the enclosures in response to your request for additional information for your review and approval.

Enclosure one provides two signed and sealed copies of the revised Craven LCID erosion control plan drawing that we provided via email today. As discussed in our email to you, it is revised to include a typical ditch cross section, a gravel construction entrance location and detail, and an emphasized disturbed boundary per your requests.

Enclosure two is the standard two page specification for the temporary gravel construction entrance contained in the NCDENR, LOS erosion control manual.

Enclosure three provides a hard copy of the deed for the property that we provided via email today.

We typically withhold issuing plans to clients until they are approved by the regulatory agency with permitting authority. We will insert the revised and additional information into the copies we have prepared for Mr. Morris prior to issuing those documents to him.

Should you require additional information or have any questions, please contact us your convenience.

Very truly yours,  
ROBERT M. CHILES, P.E.

ELECTRONIC COPY  
SEE ORIGINAL FOR SIGNATURE

Michael L. Rice, P.E.

cc: Mr. Terry Morris, agent, Craven LCID, LLC



June 11, 2013

Certified Mail Receipt No. 7009 2820 0001 4222 9208

Mr. Patrick McClain, P.E.  
NCDENR, DLR, Land Quality Section  
943 Washington Square Mall  
Washington, N. C. 27889

Re: Craven LCID, 356 Sanders Lane

- Enclosures: (1) Erosion and sedimentation control plan for Craven LCID, 356 Sanders Lane, Township No. 8, Craven County, NC, for Craven LCID, LLC, prepared by Robert M. Chiles, PE.  
(2) Check for \$325

Dear Mr. McClain:

On behalf of our client, Craven LCID, LLC and its agent, Mr. Terry Morris, we submit the enclosed information for your review and approval.

Craven LCID, LLC recently purchased property from Robert Jones Bushhogging located on Sanders Lane, west of New Bern, in township number 8. Mr. Jones operated a land clearing and inert debris landfill (LCID) on part of the property, and Craven LCID, LLC is applying for the several permits required to re-activate the LCID.

In August 2005, the LCID was issued a letter of approval of revised plan bearing erosion and sedimentation control plan no. Craven-2005-007 and the title Jones Land Disturbance. The disposal area of the LCID and the use of the surrounding property within which it is located remains unchanged from the previously permitted site. The existing disposal area contains approximately 4.05 acres, and is contained within a property that contains 10.01 acres.

Erosion and sedimentation control measures for the site include temporary and permanent seeding, and mulch, using the specifications directly from the Division's manual. The site is already constructed, and no work is required to reactivate the site following receipt of permits. You will note that the 4.5 acres disturbed area indicated on the financial responsibility form is slightly larger than the disposal area. The reason for this is to allow for removal of woody vegetation and consolidation of existing fill material within the entire disposal area, to include the area required realign one section of existing ditch onsite in order to establish the required separation distance between it and the disposal area, and to allow for some general cleanup of stray fill material left behind by the previous operator.

Should you require additional information or have any questions, please contact us your convenience.

Very truly yours,  
ROBERT M. CHILES, P.E.

See original for signature - electronic copy provided for information only

Michael L. Rice, P.E.

cc: Mr. Terry Morris, agent, Craven LCID, LLC

**FINANCIAL RESPONSIBILITY/OWNERSHIP FORM  
SEDIMENTATION POLLUTION CONTROL ACT**

No person may initiate any land-disturbing activity on one or more acres as covered by the Act before this form and an acceptable erosion and sedimentation control plan have been completed and approved by the Land Quality Section, N.C. Department of Environment and Natural Resources. (Please type or print and, if the question is not applicable or the e-mail and/or fax information unavailable, place N/A in the blank.)

**Part A.**

1. Project Name Craven LCID
2. Location of land-disturbing activity: County Craven City of Township 8  
 Highway/Street Sanders Lane (NCSR 1243) River Basin: Neuse  
 Latitude 35.1583 Longitude 77.1633 Datum: NCGS QUAD  
 (Lats and Longs given to **4 decimal places** i.e. xx.xxxx N, -xx.xxxx W, not xx° xx' xx" N, -xx° xx' xx" W)
3. Approximate date land-disturbing activity will commence: Upon receipt of permits
4. Purpose of development (residential, commercial, industrial, institutional, etc.): Land clearing and inert debris landfill
5. Total acreage disturbed or uncovered (including off-site borrow and waste areas): 4.5
6. Amount of fee enclosed: \$ 325 The application fee of \$65.00 per acre (rounded up to the next acre) is assessed without a ceiling amount (Example: a 9-acre application fee is \$585).
7. Has an erosion and sediment control plan been filed? Yes  No  Enclosed
8. Person to contact should erosion and sediment control issues arise during land-disturbing activity:  
 Name Terry D. Morris E-mail Address \_\_\_\_\_  
 Telephone 252 670-6749 Cell # \_\_\_\_\_ Fax # \_\_\_\_\_
9. Landowner(s) of Record (attach accompanied page to list additional owners):  
Craven LCID, LLC  

Name	Telephone	Fax Number
<u>109 Swift Creek Road</u>		
Current Mailing Address	Current Street Address	
<u>Vanceboro, NC 28586</u>		
City	State	Zip
<u></u>	<u></u>	<u></u>
10. Deed Book No. 3193 Page No. 218 Provide a copy of the most current deed.

**Part B.**

1. Person(s) or Legal Entity(s) who are financially responsible for the land-disturbing activity (Provide a comprehensive list of all responsible parties on an attached sheet):

Craven LCID, LLC

Name	E-mail Address
<u>109 Swift Creek Road</u>	
Current Mailing Address	Current Street Address
<u>Vanceboro, NC 28586</u>	
City	State
<u></u>	<u></u>
Telephone	Fax Number
<u>252 670-6749</u>	

2. (a) If the Financially Responsible Party is not a resident of North Carolina, give name and street address of the designated North Carolina Agent:

_____			_____		
Name			E-mail Address		
_____			_____		
Current Mailing Address			Current Street Address		
_____		_____	_____		_____
City		State	City		State
_____		_____	_____		_____
Telephone		Fax Number			

- (b) If the Financially Responsible Party is a Partnership or other person engaging in business under an assumed name, **attach a copy of the Certificate of Assumed Name**. If the Financially Responsible Party is a Corporation, give name and street address of the Registered Agent:

_____			_____		
Name of Registered Agent			E-mail Address		
_____			_____		
Current Mailing Address			Current Street Address		
_____		_____	_____		_____
City		State	City		State
_____		_____	_____		_____
Telephone		Fax Number			

The above information is true and correct to the best of my knowledge and belief and was provided by me under oath (This form must be signed by the financially Responsible Person if an individual or his attorney-in-fact, or if not an individual, by an officer, director, partner, or registered agent with the authority to execute instruments for the Financially Responsible Person). I agree to provide corrected information should there be any change in the information provided herein.

Terry D. Morris \_\_\_\_\_ Agent  
 \_\_\_\_\_  
 Type of print name Title or Authority

\_\_\_\_\_  
 Signature Date

I, Barbara D. Francis a Notary Public of the County of Craven  
 State of North Carolina, hereby certify that Terry D. Morris appeared  
 personally before me this day and being duly sworn acknowledged that the above form was  
 executed by him.

Witness my hand and official seal, this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

Seal

\_\_\_\_\_  
 Notary Public

My commission expires \_\_\_\_\_, 20\_\_\_\_

2. (a) If the Financially Responsible Party is not a resident of North Carolina, give name and street address of the designated North Carolina Agent:

Name _____			E-mail Address _____		
Current Mailing Address _____			Current Street Address _____		
City _____	State _____	Zip _____	City _____	State _____	Zip _____
Telephone _____			Fax Number _____		

(b) If the Financially Responsible Party is a Partnership or other person engaging in business under an assumed name, **attach a copy of the Certificate of Assumed Name**. If the Financially Responsible Party is a Corporation, give name and street address of the Registered Agent:

Name of Registered Agent _____			E-mail Address _____		
Current Mailing Address _____			Current Street Address _____		
City _____	State _____	Zip _____	City _____	State _____	Zip _____
Telephone _____			Fax Number _____		

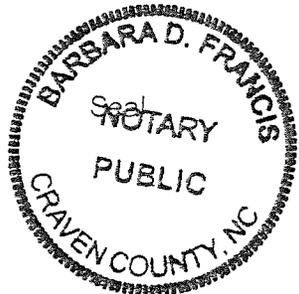
The above information is true and correct to the best of my knowledge and belief and was provided by me under oath (This form must be signed by the financially Responsible Person if an individual or his attorney-in-fact, or if not an individual, by an officer, director, partner, or registered agent with the authority to execute instruments for the Financially Responsible Person). I agree to provide corrected information should there be any change in the information provided herein.

Terry D. Morris	Agent
_____	_____
Type of print name	Title or Authority
<i>Terry D. Morris</i>	6-6-13
Signature	Date

I, Barbara D. Francis a Notary Public of the County of Craven

State of North Carolina, hereby certify that Terry D. Morris appeared personally before me this day and being duly sworn acknowledged that the above form was executed by him.

Witness my hand and official seal, this 6<sup>th</sup> day of JUNE, 2013



Barbara D. Francis  
 Notary Public  
 My commission expires JUNE 24, 2017

**NORTH CAROLINA DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES  
LAND QUALITY SECTION**

**REVISED EROSION & SEDIMENT CONTROL PLAN APPLICATION CHECKLIST ATTACHMENT**

**CRAVEN LCID  
356 SANDERS LANE  
TOWNSHIP NO. 8, CRAVEN COUNTY, NC**

**EROSION CONTROL MEASURES**

**MAINTENANCE REQUIREMENTS OF MEASURES**

The Owner is responsible for installation and maintenance of all erosion and sediment control devices. It is his responsibility to ensure removal of any debris from the erosion control devices (ditches), and that accumulated sediment is removed when the control device becomes one-half full, in order to maintain the erosion control devices. Also, the project site perimeter shall be inspected weekly and after every major rain event while the project area remains active. Reseed bare areas where vegetation did not germinate, is damaged, and/or erodes.

**SITE DRAINAGE FEATURES**

**SOILS IN THE PROJECT AREA**

Soil Survey Craven County, NC

1. CrB: Craven Silt Loam, 1 to 4 percent slopes.
2. Le: Lenoir Silt Loam

**SOIL INFORMATION BELOW THE STORMWATER OUTLETS**

N/A this application.

**NAME AND CLASSIFICATION OF RECEIVING WATER COURSE, AND BASIN**

Bachelor Creek C Sw NSW – Neuse River Basin

**STORMWATER CALCULATIONS—Revised 8-6-13**

Grassed fill slopes at 3H:1V or flatter and possible ditch realignment is only proposed construction. Estimated runoff from the 4 acre disposal area using the rational method is approximately 3.6 CFS (assuming  $T_p = 5$  min,  $C = 0.15$ ,  $I = 6$  in/hr). With a disposal area perimeter of approx 2,000 ft, 100 ft long 3H:1V slope, the resulting overland runoff depth and velocity are approx .02 inches and 0.5-1.0 ft/sec, respectively.

## **VEGETATIVE STABILIZATION**

### **AREA AND ACREAGE TO BE VEGETATIVELY STABILIZED**

The areas to be vegetatively stabilized are those disturbed during consolidation of the existing LCID and those slopes/fill surfaces created within the LCID disposal area. Temporary seeding and/or permanent seeding shall be used, as is seasonally appropriate.

The LCID disposal area is contained within an area of approximately 4.05 acres.

### **STABILIZATION TIMELINE**

In accordance with NPDES General Permit - NCG010000, soil stabilization shall be achieved on any area of a site where land-disturbing activities have temporarily or permanently ceased according to the following schedule:

All swales, ditches, perimeter slopes and all slopes steeper than 3 horizontal to 1 vertical (3H:1V) shall be provided temporary or permanent stabilization with ground cover as soon as practicable but in any event within 7 calendar days from the last land-disturbing activity

All other disturbed areas shall be provided temporary or permanent stabilization with ground cover as soon as practicable but in any event within 14 calendar days from the last land-disturbing activity.

For all slopes 50' in length or greater, apply the ground cover within 7 days except when the slope is flatter than 4:1. For slopes less than 50', apply ground cover within 14 days except when slopes are steeper than 3:1, the 7 day-requirement applies.

Slopes 10' or less in length are exempt from the 7-day ground cover requirement except when the slope is steeper than 2:1.

Note: Annual rye grass is not in the NC DENR LQS approved seeding specifications, nor is it an acceptable substitute for the providing of a "nurse" cover for permanent grass cover.

For specifications concerning method of soil preparation, seeding, fertilizer, and mulch see the specification sheets located with this document, or the NC DENR LQS Design Manual, latest edition.

## **NARRATIVE AND CONSTRUCTION SEQUENCE--Revised 8-6-13**

### **NATURE AND PURPOSE OF CONSTRUCTION ACTIVITY**

The proposed landfill will incorporate and reactivate an existing land clearing and inert debris landfill that is located on the site. The landfill will be operated entirely above the original ground surface and within the boundary of the existing disposal area.

### **CONSTRUCTION SEQUENCE**

The site is already established, and a notice of closure was issued for the previous owner. Re-initiation of landfill operations requires no other construction and can begin following receipt of operating permit from NCDENR, DWM, Solid Waste Section and other applicable permits.

There are portions of the existing LCID disposal area where new material cannot be added because of its proximity to the property line. A small area near the Sanders Lane entrance can only be used after re-aligning the existing ditch in order to provide 50 feet of clearance

between the new fill and ditch. If constructed, the re-aligned portion shall be excavated and stabilized with vegetation prior to connecting it to the existing ditches. After vegetation is established and the new alignment is connected to the existing ditches, then the replaced section will be filled and stabilized.

#### **EROSION AND SEDIMENT CONTROL SPECIFICATIONS –Revised 8-6-13**

Sedimentation and erosion control measures proposed for use at the LCID site include fill slopes that rise one foot or less for every three feet of horizontal distance (1V:3H or flatter), stabilized vegetatively with temporary and permanent seeding.

As perimeter fill slopes are constructed within the LCID, cover soils will be placed and vegetation planted/seeded to stabilize slopes.

An existing paved entrance road will serve to reduce/eliminate any offsite transportation of sediment on vehicle wheels. Any dirt/debris carried onto and deposited on the public roads from the LCID site will be swept and removed from the road as discovered.

The paved entrance will be supplemented with a gravel construction entrance at the existing gravel/paved surface interface if necessary.

Check dams will be added to the proposed access ramp ditch approximately every five feet of vertical elevation change.

- 6.10 Temporary Seeding
- 6.11 Permanent Seeding
- 6.14 Mulching
- 6.06 Temporary Gravel Construction Entrance
- 6.66 Compost Sock
- 6.83 Check Dam

#### **EROSION AND SEDIMENT CONTROL DRAWINGS**

Erosion & Sediment Control Plan for Craven LCID, 356 Sanders Lane, for Craven LCID, LLC, Rev 2.

**NCDENR DEMLR LQS, E&SC PLAN PRELIMINARY REVIEW CHECKLIST:**

The following items shall be incorporated with respect to specific site conditions, in an erosion & sediment control plan:

NPDES Construction Stormwater General Permit NCGO010000

- X Designation on the plans where the 7 or 14 day ground stabilization requirements apply per Section II.B.2 of the permit.
- N/A Design of basins with one acre or more of drainage area for surface withdrawal as per Section II.B.4 of the permit.

LOCATION INFORMATION

- X Project location & labeled vicinity map (roads, streets, landmarks)
- X North arrow and scale
- X Identify River Basin.
- X Provide a copy of site located on applicable USGS quadrangle and NRCS Soils maps if it is in a River Basin with Riparian Buffer requirements.

GENERAL SITE FEATURES (Plan elements)

- X Property lines & ownership ID for adjoining properties
- X Existing contours (topographic lines)
- X Proposed contours
- X Limits of disturbed area (provide acreage total, delineate limits, and label). Be sure to include all access to measures, lots that will be disturbed, and utilities that may extend offsite.
- N/A Planned and existing building locations and elevations
- X Planned & existing road locations & elevations, including temporary access roads
- N/A Lot and/or building numbers
- N/A Hydrogeologic features: rock outcrops, seeps, springs, wetland and their limits, streams, lakes, ponds, dams, etc. (include all required local or state buffer zones and any DWQ Riparian Buffer determinations)
- N/A Easements and drainageways, particularly required for offsite affected areas. Include copies of any recorded easements and/or agreements with adjoining property owners.
- N/A Profiles of streets, utilities, ditch lines, etc.
- N/A Stockpiled topsoil or subsoil locations
- OKAY If the same person conducts the land-disturbing activity & any related borrow or waste activity, the related borrow or waste activity shall constitute part of the land-disturbing activity unless the borrow or waste activity is regulated under the Mining Act of 1971, or is a landfill regulated by the Division of Waste Management. If the land-disturbing activity and any related borrow or waste activity are not conducted by the same person, they shall be considered separate land-disturbing activities and must be permitted either through the Sedimentation Pollution Control Act as a one-use borrow site or through the Mining Act.
- N/A Location and details associated with any onsite stone crushing or other processing of material excavated. If the affected area associated with excavation, processing, stockpiles and transport of such materials will comprise 1 or more acres, and materials will be leaving the development tract, a mining permit will be required.
- N/A Required Army Corps 404 permit and Water Quality 401 certification (e.g. stream disturbances over 150 linear feet)

EROSION & CONTROL MEASURES (on plan)

- X Legend (provide appropriate symbols for all measures and reference them to the construction details)
- X Location of temporary measures
- X Location of permanent measures
- N/A Construction drawings and details for temporary and permanent measures. Show measures to scale on plan and include proposed contours where necessary. Ensure design storage requirements are maintained through all phases of construction.
- N/A Maintenance requirements for measures
- X Contact person responsible for maintenance

SITE DRAINAGE FEATURES

- N/A Existing and planned drainage patterns (include off-site areas that drain through project and address temporary and permanent conveyance of stormwater over graded slopes)
- N/A Method used to determine acreage of land being disturbed and drainage areas to all proposed measures (e.g. delineation map)
- N/A Size, pipe material and location of culverts and sewers
- X Soil information: type, special characteristics
- N/A Soil information below culvert storm outlets

- X Name and classification of receiving water course or name of municipal operator (only where stormwater discharges are to occur)

STORMWATER CALCULATIONS

- N/A Pre-construction runoff calculations for each outlet from the site (at peak discharge points). Be sure to provide all supporting data for the computation methods used (rainfall data for required storm events, time of concentration/storm duration, and runoff coefficients).
- N/A Design calculations for peak discharges of runoff (including the construction phase & the final runoff coefficients for the site)
- N/A Design calcs for culverts and storm sewers (include HW, TW and outlet velocities)
- N/A Discharge and velocity calculations for open channel and ditch flows (easement & rights-of-way)
- N/A Design calcs for cross sections and method of stabilization for existing and planned channels (include temporary linings). Include appropriate permissible velocity and/or shear stress data.
- N/A Design calcs and construction details for energy dissipaters below culvert and storm sewer outlets (include stone/material specs & apron dimensions). Avoid discharges on fill slopes.
- N/A Design calcs and dimension of sediment basins (note current surface area and dewatering standards as well as diversion of runoff to the basins). Be sure that all surface drains, including ditches and berms, will have positive drainage to the basins.

VEGETATIVE STABILIZATION

- X Area & acreage to be vegetatively stabilized
- X Method of soil preparation
- X Seed type & rates (temporary & permanent)
- X Fertilizer type and rates
- X Mulch type and rates (include mulch anchoring methods to be used)

NOTE: Plan should include provisions for groundcover in accordance with NPDES Construction Stormwater General Permit NCG010000 and; permanent groundcover for all disturbed areas within 15 working days or 90 calendar days (whichever is shorter) following completion of construction or development.

FINANCIAL RESPONSIBILITY/OWNERSHIP FORM

- X Completed, signed & notarized FR/O Form
- X Accurate application fee payable to NCDENR (\$65.00 per acre rounded up the next acre with no ceiling amount)
- N/A Certificate of assumed name, if the owner is a partnership
- X Name of Registered Agent (if applicable)
- X Copy of the most current Deed for the site. Please make sure the deed(s) and ownership information are consistent between the plan sheets, local records and this form.
- X Provide latitude & longitude (in decimal degrees) at the project entrance.

NOTE: For the Express Permitting Option, inquire at the local Regional Office for availability.

NARRATIVE AND CONSTRUCTION SEQUENCE

- X Narrative describing the nature & purpose of the construction activity
- N/A Construction sequence related to erosion and sediment control (including installation of critical measures prior to the initiation of the land-disturbing activity & removal of measures after areas they serve are permanently stabilized). Address all phases of construction and necessary practices associated with temporary stream bypasses and/or crossings
- N/A Bid specifications related only to erosion control

COPY

# EROSION AND SEDIMENTATION CONTROL PLAN

FOR

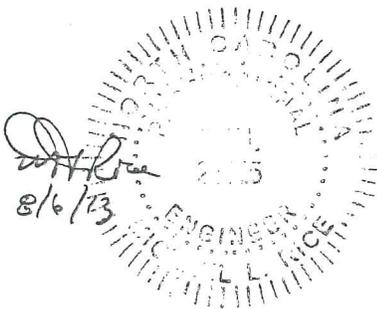
**CRAVEN LCID**  
**356 Sanders Lane**  
Township No. 8, Craven County, NC



FOR

**CRAVEN LCID, LLC**  
109 Swift Creek Road  
Vanceboro, NC 28586  
(252) 670-6749

PREPARED BY



Permit No.	Date	Document ID No.
<b>P1263</b>	<b>September 03, 2013</b>	<b>19643</b>

Received by a mail  
Date: **September 03, 2013**  
Solid Waste Section  
Raleigh Central Office

Michael L. Rice, P.E.  
**ROBERT M. CHILES, P.E.**  
**ENGINEERS & CONSULTANTS**  
417 - A BROAD STREET  
P.O. BOX 3496  
NEW BERN  
NORTH CAROLINA 28564-3496  
(252) 637-4702  
(252) 637-3100 FAX  
REVISED August 6, 2013

**FINANCIAL RESPONSIBILITY/OWNERSHIP FORM  
SEDIMENTATION POLLUTION CONTROL ACT**

No person may initiate any land-disturbing activity on one or more acres as covered by the Act before this form and an acceptable erosion and sedimentation control plan have been completed and approved by the Land Quality Section, N.C. Department of Environment and Natural Resources. (Please type or print and, if the question is not applicable or the e-mail and/or fax information unavailable, place N/A in the blank.)

**Part A.**

1. Project Name Craven LCID
2. Location of land-disturbing activity: County Craven City of Township 8  
 Highway/Street Sanders Lane (NCSR 1243) River Basin: Neuse  
 Latitude 35.1583 Longitude 77.1633 Datum: NCGS QUAD  
 (Lats and Longs given to **4 decimal places** i.e. xx.xxxx N, -xx.xxxx W, not xx° xx' xx" N, -xx° xx' xx" W)
3. Approximate date land-disturbing activity will commence: Upon receipt of permits
4. Purpose of development (residential, commercial, industrial, institutional, etc.): Land clearing and inert debris landfill
5. Total acreage disturbed or uncovered (including off-site borrow and waste areas): 4.5
6. Amount of fee enclosed: \$ 325 The application fee of \$65.00 per acre (rounded up to the next acre) is assessed without a ceiling amount (Example: a 9-acre application fee is \$585).
7. Has an erosion and sediment control plan been filed? Yes  No  Enclosed
8. Person to contact should erosion and sediment control issues arise during land-disturbing activity:  
 Name Terry D. Morris E-mail Address \_\_\_\_\_  
 Telephone 252 670-6749 Cell # \_\_\_\_\_ Fax # \_\_\_\_\_
9. Landowner(s) of Record (attach accompanied page to list additional owners):  
Craven LCID, LLC  

Name	Telephone	Fax Number
<u>109 Swift Creek Road</u>		
Current Mailing Address	Current Street Address	
<u>Vanceboro, NC 28586</u>		
City	State	Zip
<u></u>	<u></u>	<u></u>
10. Deed Book No. 3193 Page No. 218 Provide a copy of the most current deed.

**Part B.**

1. Person(s) or Legal Entity(s) who are financially responsible for the land-disturbing activity (Provide a comprehensive list of all responsible parties on an attached sheet):

Craven LCID, LLC

Name	E-mail Address
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2. (a) If the Financially Responsible Party is not a resident of North Carolina, give name and street address of the designated North Carolina Agent:

Name			E-mail Address		
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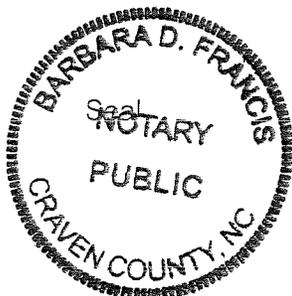
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Terry D. Morris	Agent
_____ Type of print name	_____ Title or Authority
 Signature	6-6-13 Date

I, Barbara D. Francis a Notary Public of the County of Craven

State of North Carolina, hereby certify that Terry D. Morris appeared personally before me this day and being duly sworn acknowledged that the above form was executed by him.

Witness my hand and official seal, this 6<sup>th</sup> day of JUNE, 2013



Barbara D. Francis  
Notary Public

My commission expires JUNE 24, 2017

**NCDENR DEMLR LQS, E&SC PLAN PRELIMINARY REVIEW CHECKLIST:**

The following items shall be incorporated with respect to specific site conditions, in an erosion & sediment control plan:

NPDES Construction Stormwater General Permit NCG0010000

- X Designation on the plans where the 7 or 14 day ground stabilization requirements apply per Section II.B.2 of the permit.
- N/A Design of basins with one acre or more of drainage area for surface withdrawal as per Section II.B.4 of the permit.

LOCATION INFORMATION

- X Project location & labeled vicinity map (roads, streets, landmarks)
- X North arrow and scale
- X Identify River Basin.
- X Provide a copy of site located on applicable USGS quadrangle and NRCS Soils maps if it is in a River Basin with Riparian Buffer requirements.

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- X Property lines & ownership ID for adjoining properties
- X Existing contours (topographic lines)
- X Proposed contours
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- N/A Planned and existing building locations and elevations
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STORMWATER CALCULATIONS

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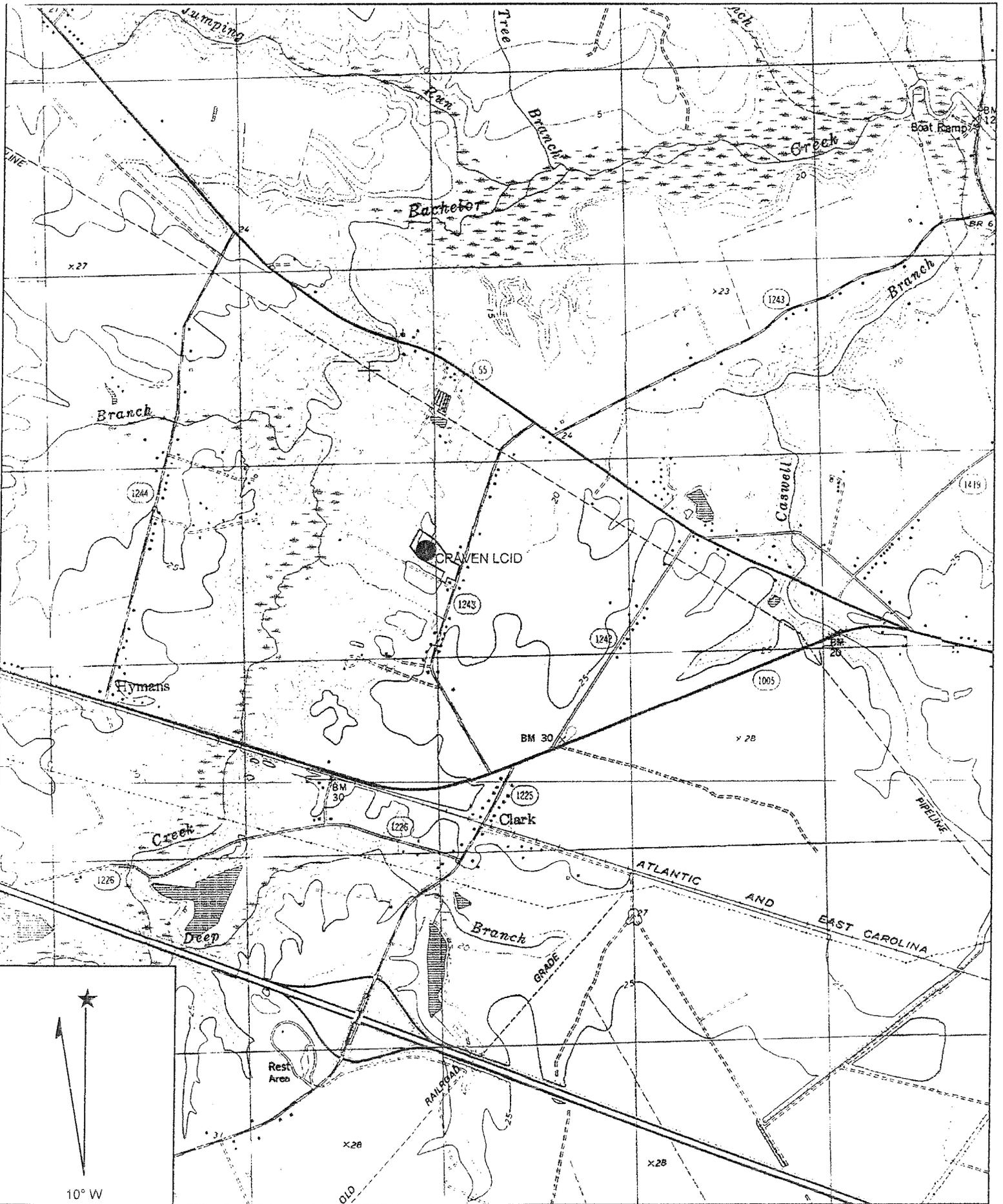
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NOTE: For the Express Permitting Option, inquire at the local Regional Office for availability.

NARRATIVE AND CONSTRUCTION SEQUENCE

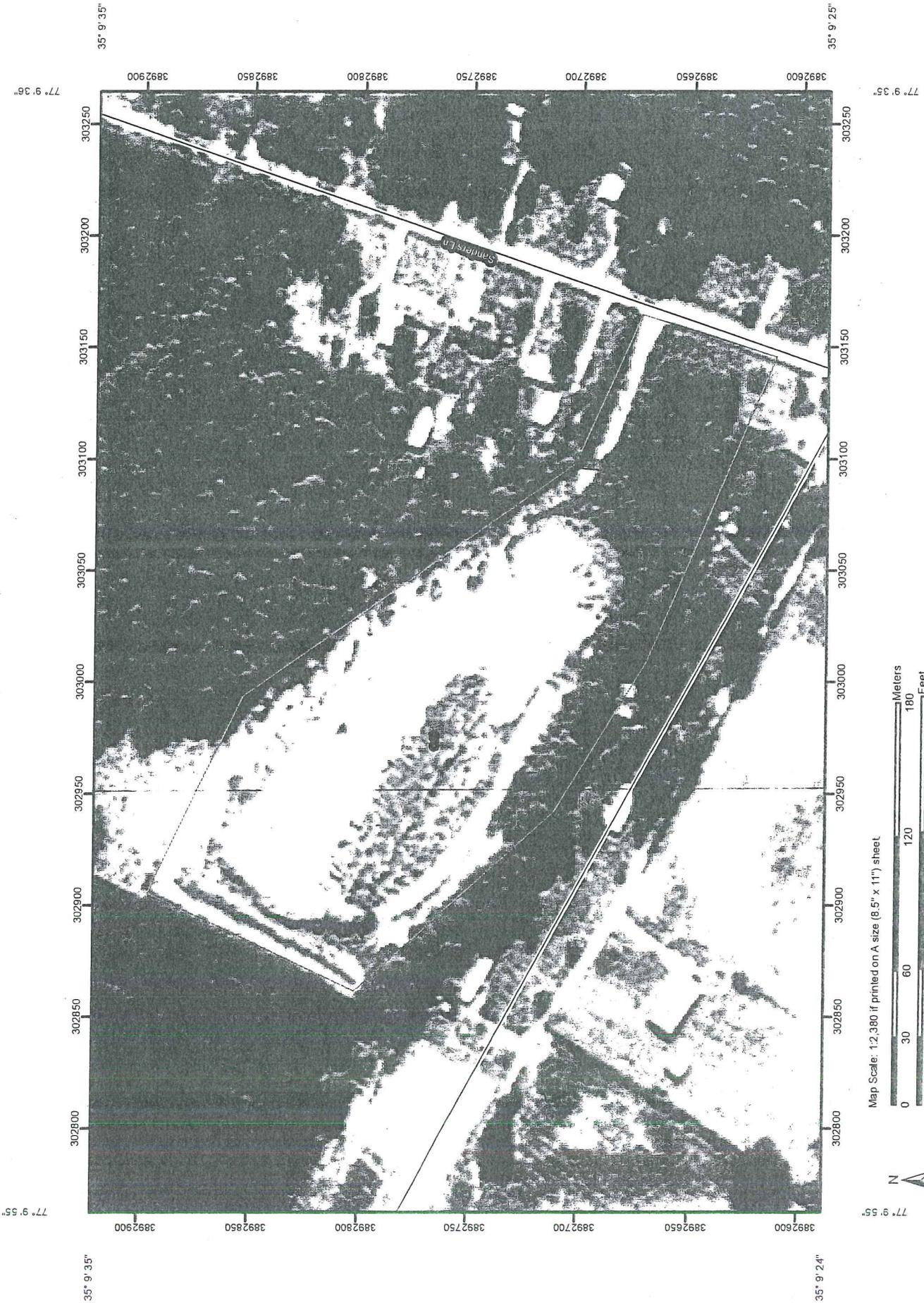
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- N/A Bid specifications related only to erosion control



Name: JASPER  
 Date: 5/31/2013  
 Scale: 1 inch equals 2000 feet

Location: 035° 09' 30.0" N 077° 09' 48.0" W  
 Caption: Craven LCID  
 356 Sanders Lane

Soil Map—Craven County, North Carolina  
(CRAVEN LC1D)



## MAP LEGEND

	Area of Interest (AOI)		Very Stony Spot
	Soils		Wet Spot
	Soil Map Units		Other
<b>Special Point Features</b>			
	Blowout	<b>Special Line Features</b>	
	Borrow Pit		Gully
	Clay Spot		Short Steep Slope
	Closed Depression		Other
	Gravel Pit	<b>Political Features</b>	
	Gravelly Spot		Cities
	Landfill	<b>Water Features</b>	
	Lava Flow		Streams and Canals
	Marsh or swamp	<b>Transportation</b>	
	Mine or Quarry		Rails
	Miscellaneous Water		Interstate Highways
	Perennial Water		US Routes
	Rock Outcrop		Major Roads
	Saline Spot		Local Roads
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		
	Spoil Area		
	Stony Spot		

## MAP INFORMATION

Map Scale: 1:2,380 if printed on A size (8.5" x 11") sheet.  
The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: UTM Zone 18N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Craven County, North Carolina  
Survey Area Date: Version 12, Jul 3, 2012

Date(s) aerial images were photographed: 7/10/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Craven County, North Carolina (NC049)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CrB	Craven silt loam, 1 to 4 percent slopes	7.5	87.3%
Le	Lenoir silt loam	1.1	12.6%
Totals for Area of Interest		8.5	100.0%

**NORTH CAROLINA DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES  
LAND QUALITY SECTION**

**REVISED EROSION & SEDIMENT CONTROL PLAN APPLICATION CHECKLIST ATTACHMENT**

**CRAVEN LCID  
356 SANDERS LANE  
TOWNSHIP NO. 8, CRAVEN COUNTY, NC**

**EROSION CONTROL MEASURES**

**MAINTENANCE REQUIREMENTS OF MEASURES**

The Owner is responsible for installation and maintenance of all erosion and sediment control devices. It is his responsibility to ensure removal of any debris from the erosion control devices (ditches), and that accumulated sediment is removed when the control device becomes one-half full, in order to maintain the erosion control devices. Also, the project site perimeter shall be inspected weekly and after every major rain event while the project area remains active. Reseed bare areas where vegetation did not germinate, is damaged, and/or erodes.

**SITE DRAINAGE FEATURES**

**SOILS IN THE PROJECT AREA**

Soil Survey Craven County, NC

1. CrB: Craven Silt Loam, 1 to 4 percent slopes.
2. Le: Lenoir Silt Loam

**SOIL INFORMATION BELOW THE STORMWATER OUTLETS**

N/A this application.

**NAME AND CLASSIFICATION OF RECEIVING WATER COURSE, AND BASIN**

Bachelor Creek C Sw NSW – Neuse River Basin

**STORMWATER CALCULATIONS--Revised 8-6-13**

Grassed fill slopes at 3H:1V or flatter and possible ditch realignment is only proposed construction. Estimated runoff from the 4 acre disposal area using the rational method is approximately 3.6 CFS (assuming  $T_p = 5$  min,  $C = 0.15$ ,  $I = 6$  in/hr). With a disposal area perimeter of approx 2,000 ft, 100 ft long 3H:1V slope, the resulting overland runoff depth and velocity are approx .02 inches and 0.5-1.0 ft/sec, respectively.

## VEGETATIVE STABILIZATION

### AREA AND ACREAGE TO BE VEGETATIVELY STABILIZED

The areas to be vegetatively stabilized are those disturbed during consolidation of the existing LCID and those slopes/fill surfaces created within the LCID disposal area. Temporary seeding and/or permanent seeding shall be used, as is seasonally appropriate.

The LCID disposal area is contained within an area of approximately 4.05 acres.

### STABILIZATION TIMELINE

In accordance with NPDES General Permit - NCG010000, soil stabilization shall be achieved on any area of a site where land-disturbing activities have temporarily or permanently ceased according to the following schedule:

All swales, ditches, perimeter slopes and all slopes steeper than 3 horizontal to 1 vertical (3H:1V) shall be provided temporary or permanent stabilization with ground cover as soon as practicable but in any event within 7 calendar days from the last land-disturbing activity

All other disturbed areas shall be provided temporary or permanent stabilization with ground cover as soon as practicable but in any event within 14 calendar days from the last land-disturbing activity.

For all slopes 50' in length or greater, apply the ground cover within 7 days except when the slope is flatter than 4:1. For slopes less than 50', apply ground cover within 14 days except when slopes are steeper than 3:1, the 7 day-requirement applies.

Slopes 10' or less in length are exempt from the 7-day ground cover requirement except when the slope is steeper than 2:1.

Note: Annual rye grass is not in the NC DENR LQS approved seeding specifications, nor is it an acceptable substitute for the providing of a "nurse" cover for permanent grass cover.

For specifications concerning method of soil preparation, seeding, fertilizer, and mulch see the specification sheets located with this document, or the NC DENR LQS Design Manual, latest edition.

## NARRATIVE AND CONSTRUCTION SEQUENCE--Revised 8-6-13

### NATURE AND PURPOSE OF CONSTRUCTION ACTIVITY

The proposed landfill will incorporate and reactivate an existing land clearing and inert debris landfill that is located on the site. The landfill will be operated entirely above the original ground surface and within the boundary of the existing disposal area.

### CONSTRUCTION SEQUENCE

The site is already established, and a notice of closure was issued for the previous owner. Re-initiation of landfill operations requires no other construction and can begin following receipt of operating permit from NCDENR, DWM, Solid Waste Section and other applicable permits.

There are portions of the existing LCID disposal area where new material cannot be added because of its proximity to the property line. A small area near the Sanders Lane entrance can only be used after re-aligning the existing ditch in order to provide 50 feet of clearance

between the new fill and ditch. If constructed, the re-aligned portion shall be excavated and stabilized with vegetation prior to connecting it to the existing ditches. After vegetation is established and the new alignment is connected to the existing ditches, then the replaced section will be filled and stabilized.

#### **EROSION AND SEDIMENT CONTROL SPECIFICATIONS –Revised 8-6-13**

Sedimentation and erosion control measures proposed for use at the LCID site include fill slopes that rise one foot or less for every three feet of horizontal distance (1V:3H or flatter), stabilized vegetatively with temporary and permanent seeding.

As perimeter fill slopes are constructed within the LCID, cover soils will be placed and vegetation planted/seeded to stabilize slopes.

An existing paved entrance road will serve to reduce/eliminate any offsite transportation of sediment on vehicle wheels. Any dirt/debris carried onto and deposited on the public roads from the LCID site will be swept and removed from the road as discovered.

The paved entrance will be supplemented with a gravel construction entrance at the existing gravel/paved surface interface if necessary.

Check dams will be added to the proposed access ramp ditch approximately every five feet of vertical elevation change.

- 6.10 Temporary Seeding
- 6.11 Permanent Seeding
- 6.14 Mulching
- 6.06 Temporary Gravel Construction Entrance
- 6.66 Compost Sock
- 6.83 Check Dam

#### **EROSION AND SEDIMENT CONTROL DRAWINGS**

Erosion & Sediment Control Plan for Craven LCID, 356 Sanders Lane, for Craven LCID, LLC, Rev 2.

6.06

## TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT



**Definition** A graveled area or pad located at points where vehicles enter and leave a construction site.

**Purpose** To provide a buffer area where vehicles can drop their mud and sediment to avoid transporting it onto public roads, to control erosion from surface runoff, and to help control dust.

**Conditions Where Practice Applies** Wherever traffic will be leaving a construction site and moving directly onto a public road or other paved off-site area. Construction plans should limit traffic to properly constructed entrances.

**Design Criteria** **Aggregate Size**—Use 2-3 inch washed stone.

**Dimensions of gravel pad—**

Thickness: 6 inches minimum

Width: 12-foot minimum or full width at all points of the vehicular entrance and exit area, whichever is greater

Length: 50-foot minimum

**Location**—Locate construction entrances and exits to limit sediment from leaving the site and to provide for maximum utility by all construction vehicles (Figure 6.06a). Avoid steep grades, and entrances at curves in public roads.

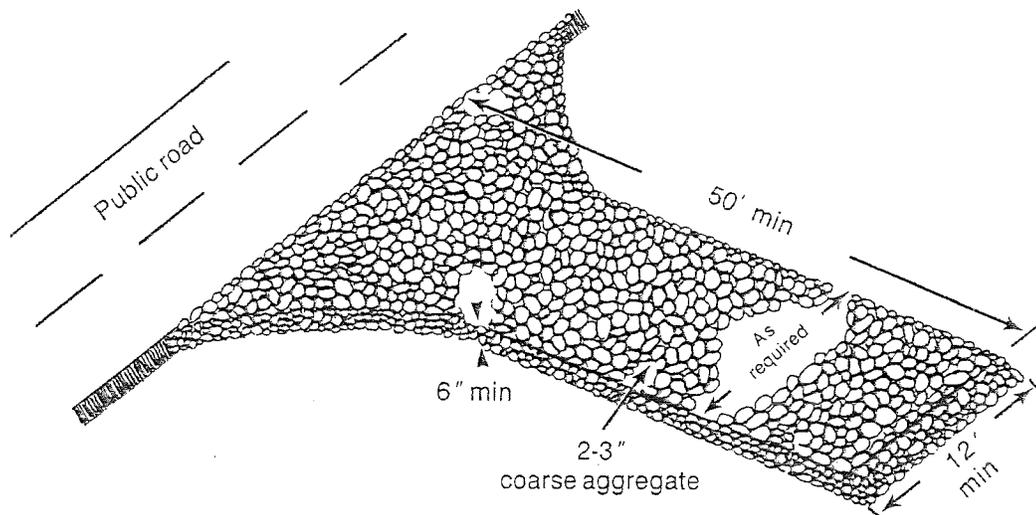


Figure 6.06a Gravel entrance/exit keeps sediment from leaving the construction site (modified from Va SWCC).

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**Washing**—If conditions at the site are such that most of the mud and sediment are not removed by vehicles traveling over the gravel, the tires should be washed. Washing should be done on an area stabilized with crushed stone that drains into a sediment trap or other suitable disposal area. A wash rack may also be used to make washing more convenient and effective.

### Construction Specifications

1. Clear the entrance and exit area of all vegetation, roots, and other objectionable material and properly grade it.
2. Place the gravel to the specific grade and dimensions shown on the plans, and smooth it.
3. Provide drainage to carry water to a sediment trap or other suitable outlet.
4. Use geotextile fabrics because they improve stability of the foundation in locations subject to seepage or high water table.

### Maintenance

Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site. This may require periodic topdressing with 2-inch stone. After each rainfall, inspect any structure used to trap sediment and clean it out as necessary. Immediately remove all objectionable materials spilled, washed, or tracked onto public roadways.

### References

*Runoff Conveyance Measures*  
6.30. Grass-lined Channels

*Sediment Traps and Barriers*  
6.60. Temporary Sediment Trap

6.10

**TEMPORARY SEEDING**



**Definition** Planting rapid-growing annual grasses, small grains, or legumes to provide initial, temporary cover for erosion control on disturbed areas.

**Purpose** To temporarily stabilize denuded areas that will not be brought to final grade for a period of more than 21 calendar days.

Temporary seeding controls runoff and erosion until permanent vegetation or other erosion control measures can be established. In addition, it provides residue for soil protection and seedbed preparation, and reduces problems of mud and dust production from bare soil surfaces during construction.

**Conditions Where Practice Applies** On any cleared, unvegetated, or sparsely vegetated soil surface where vegetative cover is needed for less than 1 year. Applications of this practice include diversions, dams, temporary sediment basins, temporary road banks, and topsoil stockpiles.

**Planning Considerations** Annual plants, which sprout and grow rapidly and survive for only one season, are suitable for establishing initial or temporary vegetative cover. Temporary seeding preserves the integrity of earthen sediment control structures such as dikes, diversions, and the banks of dams and sediment basins. It can also reduce the amount of maintenance associated with these devices. For example, the frequency of sediment basin cleanouts will be reduced if watershed areas, outside the active construction zone, are stabilized.

Proper seedbed preparation, selection of appropriate species, and use of quality seed are as important in this Practice as in Practice 6.11, *Permanent Seeding*. Failure to follow established guidelines and recommendations carefully may result in an inadequate or short-lived stand of vegetation that will not control erosion.

Temporary seeding provides protection for no more than 1 year, during which time permanent stabilization should be initiated.

**Specifications** Complete grading before preparing seedbeds, and install all necessary erosion control practices such as, dikes, waterways, and basins. Minimize steep slopes because they make seedbed preparation difficult and increase the erosion hazard. If soils become compacted during grading, loosen them to a depth of 6-8 inches using a ripper, harrow, or chisel plow.

**SEEDBED PREPARATION**

Good seedbed preparation is essential to successful plant establishment. A good seedbed is well-pulverized, loose, and uniform. Where hydroseeding methods are used, the surface may be left with a more irregular surface of large clods and stones.

**Liming**—Apply lime according to soil test recommendations. If the pH (acidity) of the soil is not known, an application of ground agricultural limestone at the

rate of 1 to 1 1/2 tons/acre on coarse-textured soils and 2-3 tons/acre on fine-textured soils is usually sufficient. Apply limestone uniformly and incorporate into the top 4-6 inches of soil. Soils with a pH of 6 or higher need not be limed.

**Fertilizer**—Base application rates on soil tests. When these are not possible, apply a 10-10-10 grade fertilizer at 700-1,000 lb/acre. Both fertilizer and lime should be incorporated into the top 4-6 inches of soil. If a hydraulic seeder is used, do not mix seed and fertilizer more than 30 minutes before application.

**Surface roughening**—If recent tillage operations have resulted in a loose surface, additional roughening may not be required, except to break up large clods. If rainfall causes the surface to become sealed or crusted, loosen it just prior to seeding by disking, raking, harrowing, or other suitable methods. Groove or furrow slopes steeper than 3:1 on the contour before seeding (Practice 6.03, *Surface Roughening*).

#### PLANT SELECTION

Select an appropriate species or species mixture from Table 6.10a for seeding in late winter and early spring, Table 6.10b for summer, and Table 6.10c for fall.

In the Mountains, December and January seedings have poor chances of success. When it is necessary to plant at these times, use recommendations for fall and a securely tacked mulch.

#### SEEDING

Evenly apply seed using a cyclone seeder (broadcast), drill, cultipacker seeder, or hydroseeder. Use seeding rates given in Tables 6.10a-6.10c. Broadcast seeding and hydroseeding are appropriate for steep slopes where equipment cannot be driven. Hand broadcasting is not recommended because of the difficulty in achieving a uniform distribution.

Small grains should be planted no more than 1 inch deep, and grasses and legumes no more than 1/2 inch. Broadcast seed must be covered by raking or chain dragging, and then lightly firmed with a roller or cultipacker. Hydroseeded mixtures should include a wood fiber (cellulose) mulch.

#### MULCHING

The use of an appropriate mulch will help ensure establishment under normal conditions, and is essential to seeding success under harsh site conditions (Practice 6.14, *Mulching*). Harsh site conditions include:

- seeding in fall for winter cover (wood fiber mulches are not considered adequate for this use),
- slopes steeper than 3:1,
- excessively hot or dry weather,
- adverse soils (shallow, rocky, or high in clay or sand), and
- areas receiving concentrated flow.

If the area to be mulched is subject to concentrated waterflow, as in channels, anchor mulch with netting (Practice 6.14, *Mulching*).

**Maintenance** Reseed and mulch areas where seedling emergence is poor, or where erosion occurs, as soon as possible. Do not mow. Protect from traffic as much as possible.

**References**

- Site Preparation*
  - 6.03. Surface Roughening
  - 6.04. Topsoiling
- Surface Stabilization*
  - 6.11. Permanent Seeding
  - 6.14. Mulching
- Appendix*
  - 8.02. Vegetation Tables



Table 6.10b  
Temporary Seeding  
Recommendations for  
Summer

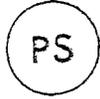
<b>Seeding mixture</b>	
Species	Rate (lb/acre)
German millet	40
In the Piedmont and Mountains, a small-stemmed Sudangrass may be substituted at a rate of 50 lb/acre.	
<b>Seeding dates</b>	
Mountains—May 15 - Aug. 15	
Piedmont—May 1 - Aug. 15	
Coastal Plain—Apr. 15 - Aug. 15	
<b>Soil amendments</b>	
Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.	
<b>Mulch</b>	
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.	
<b>Maintenance</b>	
Refertilize if growth is not fully adequate. Reseed, refertilize and mulch immediately following erosion or other damage.	

Table 6.10c  
Temporary Seeding  
Recommendations for Fall

<b>Seeding mixture</b>	
Species	Rate (lb/acre)
Rye (grain)	120
<b>Seeding dates</b>	
Mountains—Aug. 15 - Dec. 15	
Coastal Plain and Piedmont—Aug. 15 - Dec. 30	
<b>Soil amendments</b>	
Follow soil tests or apply 2,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.	
<b>Mulch</b>	
Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.	
<b>Maintenance</b>	
Repair and refertilize damaged areas immediately. Topdress with 50 lb/acre of nitrogen in March. If it is necessary to extend temporary cover beyond June 15, overseed with 50 lb/acre Kobe (Piedmont and Coastal Plain) or Korean (Mountains) lespedeza in late February or early March.	

6.11

**PERMANENT SEEDING**



**Definition** Controlling runoff and erosion on disturbed areas by establishing perennial vegetative cover with seed.

**Purpose** To reduce erosion and decrease sediment yield from disturbed areas, to permanently stabilize such areas in a manner that is economical, adapts to site conditions, and allows selection of the most appropriate plant materials.

**Conditions Where Practice Applies** Fine-graded areas on which permanent, long-lived vegetative cover is the most practical or most effective method of stabilizing the soil. Permanent seeding may also be used on rough-graded areas that will not be brought to final grade for a year or more.

Areas to be stabilized with permanent vegetation must be seeded or planted within 15 working days or 90 calendar days after final grade is reached, unless temporary stabilization is applied.

**Introduction** During the initial phase of all land disturbing projects, the protective layer, either natural or man-made, is removed from the earth's surface. As the protective layer is removed, the resulting bare areas are exposed to the natural forces of rainfall, freezing, thawing, and wind. The result is soil erosion that leads to sediment pollution of North Carolina streams, rivers, lakes, and estuaries.

This design manual presents many alternative strategies for preventing erosion and reducing sediment loss during the construction process. Establishment of protective vegetative cover during the construction project, however, is the crucial step in achieving soil stabilization, controlling soil erosion, and preventing sedimentation of waterways. Without a sufficient amount of root mat and leaf cover to protect and hold the soil in place, large volumes of soil will be lost and waterways will be degraded long after projects are considered complete.

Sections of this practice standard address many of these various situations and set forth selection criteria for the appropriate cover based on purpose and adaptability. Some sediment and erosion control practices recommended in earlier editions of the manual may no longer be applicable. For example, many popular and commonly used seed and plant varieties have been identified as invasive. Invasive plants are defined as species that aggressively compete with, and displace, locally adapted native plant communities. In select cases where no practical alternative is available, these plants may be considered on a limited basis for soil stabilization, understanding that the goal is to eliminate the use of all invasive plants in favor of non-invasive native and/or introduced species that will provide an equally acceptable vegetative cover. Where there is no alternative to the use of invasive species, measures need to be incorporated in the installation and maintenance of these plants to limit their impacts.

It is imperative that disturbed soils be totally protected from erosion and sediment loss during construction and before a project is considered complete and acceptable. Installing appropriate vegetation in an immediate and timely fashion is the optimal means of achieving this stabilization. Vegetative specifications for most exposed soil conditions across North Carolina are provided in this section of the manual. It should be noted however, that no two sites in the State are exactly alike; therefore the protective vegetative cover for individual sites should be carefully selected. Each requires its own investigation, analysis, design and vegetative prescription as set forth in this section of the manual.

This practice standard describes three stages of vegetative cover: immediate, primary and long term. Effective and acceptable stabilization can be provided only when the optimum combination of immediate, primary, and long term vegetative practices are applied.

The vegetative measures presented in this chapter include application of seed, sod and sprigs. Use of field and container grown plants are not addressed in this manual. Planting of these types of vegetation is typically at spacing and intervals that will not provide the required protective cover. However, the design professional is encouraged to utilize these larger plants to compliment the required protective cover, particularly where these types of plants will provide seed for continued long term cover and wildlife habitat.

## PLANNING CONSIDERATIONS

### SOILS

Test and analyze the type(s) and quality of the existing soils on a site, their pH ranges, and their nutrient levels. Taking soil samples from the different areas of the project site and having them tested at a state or independent lab will provide a baseline for determining the pH modifiers and additional nutrients required for the selected plant varieties.

Disturbed conditions on a site may produce a variety of soil communities. Nutrient and pH levels in deeply cut soils will be quite different from those soils found on the original surface. When sites are highly disturbed through mechanical means such as grading, the soils become mixed together in many different ratios. These areas should be identified and tested.

Results from soil tests will usually include recommended application rates of soil modifiers such as lime and fertilizer for the selected plant species in the particular soils. Application rates will be itemized in the report.

The texture of the soil on a site, which is the proportion of sand, silt, and clay in the soil, is an important physical indicator of the site's ability to support vegetation. In heavy clay soils amendments may be necessary to provide an adequately drained planting medium. Conversely, in extremely sandy soils, amendments may be required to provide for moisture and nutrient retention.

Soil tests will indicate the texture of the given soil but will not provide recommendations for amendments that will improve the soil texture. Generally, the addition of organic materials will improve the porosity of heavy clay soils and improve the water holding capacity of extremely sandy soils. On sites where these different soil conditions exist, it is recommended that a design professional with experience in soil modification be employed to recommend the proper amendments.

For more information visit the NCDA Agronomic Services Soil Testing web page <http://www.agr.state.nc.us/agronomic/sthome.htm>

#### **SOIL PREPARATION**

Proper soil preparation is necessary for successful seed germination and root establishment. It is also necessary for establishment of rooted sprigs, sod and woody plants. Heavily compacted soils prevent air, nutrients and moisture from reaching roots thereby retarding or preventing plant growth. The success of site stabilization and reduction of future maintenance are dependent on an adequately prepared soil bed. Following are the requirements for preparation of areas to be vegetated by grassing, sprigging, sodding, and/or planting of woody plants:

##### **General Requirements:**

- Preparation for primary/permanent stabilization shall not begin until all construction and utility work within the preparation area is complete. However, it may be necessary to prepare for nurse crops prior to completion of construction and installation of utilities.
- A North Carolina Department of Agriculture Soils Test (or equal) shall be obtained for all areas to be seeded, sprigged, sodded or planted. Recommended fertilizer and pH adjusting products shall be incorporated into the prepared areas and backfill material per the test.
- All areas to be seeded or planted shall be tilled or ripped to a depth specified on the approved plans, construction sequence and/or construction bid list. Ripping consists of creating fissures in a criss-cross pattern over the entire surface area, utilizing an implement that will not glaze the side walls of the fissures. Site preparation that does not comply with these documents shall not be acceptable. The depth of soil preparation may be established as a range based on the approval of the reviewing state or local agency. Once tilled or ripped according to the approved plan, all areas are to be returned to the approved final grade. pH modifiers and/or other soil amendments specified in the soil tests can be added during the soil preparation procedure or as described below.
- All stones larger than three (3) inches on any side, sticks, roots, and other extraneous materials that surface during the bed preparation shall be removed.

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**Areas to be Seeded:**

- Till or disc the prepared areas to be seeded to a minimum depth of four (4) inches. Remove stones larger than three (3) inches on any side, sticks, roots and other extraneous materials that surface. If not incorporated during the soil preparation process, add pH modifier and fertilizers at the rate specified in the soil test report.
- Re-compact the area utilizing a cultipacker roller. The finished grade shall be a smooth even soil surface with a loose, uniformly fine texture. All ridges and depressions shall be removed and filled to provide the approved surface drainage. Seeding of graded areas is to be done immediately after finished grades are obtained and seedbed preparation is completed.

**Areas to be Sprigged, Sodded, and/or Planted:**

- At the time of planting till or disc the prepared areas to a depth of four (4) to six (6) inches below the approved finished grade. Remove all stones larger than three (3) inches on any side, sticks, roots and other extraneous materials that surface. If not incorporated in the ripping process, add pH modifier, fertilizer, and other recommended soil amendments.
- Re-compact the area utilizing a cultipacker roller and prepare final grades as described above. Install sprigs, sod and plants as directed immediately after fine grading is complete. Mulch, mat and/or tack as specified.

**VEGETATION**

Availability of seed and plant materials is an important consideration of any construction stabilization effort. Throughout North Carolina, climate, economics, construction schedule delays and accelerations, and other factors present difficult challenges in specifying the different vegetation needed for site stabilization. To help resolve this issue, vegetative stabilization requires consideration in three categories:

- Immediate Stabilization – nurse crop varieties (Note: temporary mulching may be utilized for immediate stabilization if outlined on the approved plans and construction sequence.)
- Primary Stabilization – plant varieties providing cover up to 3 years with a specified maintenance program
- Long Term Stabilization – plant varieties providing protective cover with maintenance levels selected by the owner

An adequate job in one of these areas does not guarantee success in the later phases. Horticultural maintenance must be included in the plans.

Immediate vegetative cover will always require additional fertilization, soil amendments, soil tests, overseeding and/or other horticultural maintenance until primary vegetative cover is established.

Where provisions are made for regular maintenance, primary vegetative cover may be the end result. An example of primary vegetative cover being acceptable as an end use would be lawns in residential and commercial developments that are established, monitored and complimented with regular and approved horticultural maintenance practices. (See Example 6.11.a.)

In projects where continual maintenance will not be provided or scheduled following the primary stabilization of a project, long-term stabilization will be necessary. Maintenance of initial and long-term stabilization can cease only after the long-term cover has established and hardened to local climatic conditions. Maintenance of long-term vegetation must be included in the project construction sequence and on the approved plans. Examples of areas suitable for long term vegetation include roadsides, reforestation areas, restored flood plains, restored riparian areas, phased closing of landfills, and mining reclamations.

Complete stabilization requires using at least two, and most times, all three vegetative phases. The design professional must clearly communicate this point in their specifications, construction sequence, and in direct communications to owners and installers. The charts in tables 6.11.a through 6.11.d provide information to assist the design professional in this task. The tables are not inclusive and are presented only as alternatives. The professional is expected and required to provide design and specifications that combine the information in the manual with knowledge of the particular sites and their constraints.

#### **pH AND NUTRIENT AMENDMENTS**

Determining the nutrients that enable seed and container plants to grow, flourish, and become established after planting are critical elements of the design and stabilization process. The soils tests previously described will provide a recipe for amendments based on particular plants and particular soils. The test results will recommend the amounts of base elements (nitrogen, phosphorous, potassium), pH modifiers and other trace elements that should to be added to the soil for selected species of seeds and plants.

The acid/base characteristic of the soil is a primary component of soil fertility. If the soil acidity is not in the proper range, other nutrients will be ineffective, resulting in less productive plant growth. Most plants grow best in a pH range of 6.5 – 7.0 (slightly acidic to neutral). The soil tests will recommend the specific amendments and application rates required to achieve this range. These amendments must be incorporated into the soil (not applied on the surface) to be effective. (See the General Requirements for soil preparation specifications and timing for incorporation of soil amendments.)

The base elements are easily found in bulk quantities. Lime can also be obtained in large quantities. They all must be thoroughly incorporated into the soil through appropriate mechanical means. Ground surface applications without proper soil mixing will result in poor results.

In addition to the base fertilizers, other trace elements are needed to produce healthy and vigorous growth. These include but may not be limited to sulfur, manganese, zinc, boron, chlorine and molybdenum. If not already included with bulk mixes of the base elements, they can be obtained from commercial suppliers.

Provisions for soils test during and/or after initial grading is complete shall be included on the approved plan, in the approved construction sequence, and on the bid item list utilized for the project. *If you did not obtain a soil test:* Follow these recommendations for all grasses except centipedegrass.

1. Apply 75 pounds of ground limestone per 1,000 sq. ft.
2. Apply a starter type fertilizer (one that is high in phosphorus) based on the type of grass and planting method. Fertilizer bags have a three-number system indicating the primary nutrients, such as 8-8-8 or 5-10-10. These numbers denote the N-P-K ratio—the percentage of each nutrient in a fertilizer. The percentages are always noted in the following order:

N Nitrogen for green color and growth.

P<sub>2</sub>O<sub>5</sub> Phosphorus for good establishment and rooting.

K<sub>2</sub>O Potassium to enhance pest and environmental stress tolerance.

Some common examples of starter type fertilizers required for a 1,000 sq. ft. area include 40 pounds of 5-10-10, 20 pounds of 10-20-20, or 16 pounds of 18-24-6. For sandy soils, typical to coastal plain and sandhills of North Carolina, fertilizer rates should be increased by 20 percent.

Where available, it is recommended that the design professional specify organic compounds that meet the fertilization requirements, pH and other element requirements. Initial studies have indicated that these compounds have a more positive effect on the environment than some of the synthetic compounds used to manufacture inorganic fertilizers. These materials are readily available in the commercial trade as well as found in recycled yard waste debris, sewerage sludge, lime-stabilized sludge and animal manures. Materials proposed for use must be industry certified and/or privately tested and certified to be acceptable for proposed areas of use and application prior to approval.

#### MULCHES AND TACKING AGENTS

Mulches and tacking agents may be required or necessary to protect a seedbed's disturbed surface until the seed can germinate and provide the required protection from erosion. Selection of the materials used in this application should be based on their ability to hold moisture in the soil, as well as protect exposed soil from rainfall, storm water runoff, and wind. The availability of the selected material and the means to apply it are critical factors to consider when planning for the stabilization of any disturbed area. The mulch must cover a minimum of eighty (80) percent of the soil surface and must be secured by a tacking agent, crimping, or protective biodegradable netting. Netting that incorporates plastic mesh and/or plastic twine should not be used in wetlands, riparian buffers or floodplains due to the potential of small animal mortality. See Section 6.14 for detailed specifications and product applications.

#### SOIL BLANKETS

Soil blankets can be an acceptable and effective method of temporary sediment and erosion control in lieu of nurse crops. See Section 6.17 of the manual for descriptions of this product and how it can be used in conjunction with this section. In absence of mulches and tracking agents other means of protection may be necessary and required.

#### **PROTECTIVE MATTING**

Protective matting consists of an impervious cover secured to the soil surface in lieu of vegetative cover. It is used to protect and stabilize the surface where the process of seeding or planting forms of vegetation may cause more erosion and off-site sedimentation than application of the mat. It is also used where a disturbed area is intended to lay fallow for a period of time before additional construction or land disturbance takes place. If a pervious matting is selected, a combination of vegetation and matting is required. Seeds can be applied prior to installation of the matting only after proper seedbed preparation has been provided. Also, live stakes, dormant sprigs, and other vegetation forms can be inserted in the pervious matting once it has been installed. Pre-seeded pervious matting may be used for quicker root establishment and stabilization only if certified dating and germination guarantees are provided. The reviewing agency must approve all pre-seeded matting on site prior to installation. Matting that incorporates plastic mesh and/or plastic twine should not be used in wetlands, riparian buffers or floodplains due to the potential of small animal mortality. See Section 6.17 for detailed specifications and recommended product applications.

#### **STABILIZATION IN WETLANDS, RIPARIAN BUFFERS, AND FLOODPLAINS**

Land disturbing activity involving streams, wetlands or other waterbodies may also require permitting by the U.S. Army Corps of Engineers or the N.C. Division of Water Quality. Approval of an erosion and sedimentation control plan is conditioned upon the applicant's compliance with federal and State water quality laws, regulations, and rules. Additionally, a draft plan should be disapproved if implementation of the plan would result in a violation of rules adopted by the Environmental Management Commission to protect riparian buffers along surface waters. Care should be taken in selecting vegetative stabilization of wetlands and riparian buffers to comply with permitting requirements of other agencies, as well as provide adequate ground cover.

#### **Planning Considerations for Land Disturbing Activities Within Wetland, Riparian, and Floodplain Areas**

Wetlands, riparian areas, floodplains, and/or terrestrial areas between streams and uplands, serve to buffer surface water and provide habitat for aquatic and terrestrial flora and fauna. When cleared and disturbed, these sensitive areas are difficult to protect. Because of their proximity to water courses, relatively high ground water tables, and flooding potential, detailed analysis and design is necessary to determine the appropriate erosion control measures during construction. Determining the appropriate and most expeditious means of permanent vegetative stabilization in these areas requires equally detailed analysis and design. The following considerations for erosion control and stabilization should be taken into account during the design phase of the land disturbing project where sensitive areas are involved:

- Obtain soil tests to determine the soil type, pH, texture and available nutrients.
- Based on the soil tests provide a schedule of nutrients and other soil amendments that will be required.

- Select a seeding mix of non-invasive species that will provide immediate stabilization (a short-term environment that will support and compliment permanent vegetative stabilization) and include a selective native species mix that will eventually provide a permanent cover (a long-term environment that, with minimal maintenance, will provide adequate root and leaf cover).
- Invasive species are to be avoided. If native species and introduced non-invasive seed sources are not available, protective matting that will hold and foster the development of native cover from adjacent seed sources should be used. Continuous maintenance must be employed until the selected species have matured and are no longer susceptible to competition from invasive plants. If no alternative to the use of invasive seeds and plants is available, invasives approved on the plans may be utilized only with strict containment measures outlined in detail on the plans, in the construction sequence and in the maintenance specifications.
- A quickly germinating nurse crop of non-invasive, non-competitive annual grass species can be used along with native seeding and/or matting. These temporary systems should be planted at minimal density so that they do not inhibit the growth and establishment of the permanent, native species. (See the plant chart in Table 6.11.a for recommended native and nurse crop species.)
- Seed bed preparation is key to successful establishment of seeds. Particular care should be taken, however, when working in wetlands, riparian areas, or floodplains due to their sensitive nature. Careful consideration should be given to the types and placement of large equipment working in these areas. This process must be outlined in detail on the plan's construction sequence.
- Installation techniques vary and should be planned for accordingly.
- A maintenance plan must be established for optimal plant establishment, submitted with the plans and included in the bid list for the project.

Like all construction sites, wetlands, riparian areas, and floodplains will vary widely in physical makeup across North Carolina. Different conditions will dictate specific treatment, design and plant selection within the Mountains, Piedmont, and Coastal Plain regions. Soil tests, seedbed preparation, mulching, matting, and maintenance will be critical for successful vegetative establishment and long-term protection of these environmentally sensitive areas. Unavoidable impacts to these areas during land disturbing activities need to be addressed in detail on the plan sheets and construction sequence.

**Native Seed and Plant Selection for Stabilization of Wetlands, Riparian Areas, and Floodplains**

Upon the completion of the land disturbing activity, vegetative cover must be established on all areas not stabilized by other means. If work in these areas stops for more than 15 working days, temporary vegetative cover and/or matting must be applied to all disturbed areas. The goal is to protect these areas from erosion and to prevent sedimentation of adjacent streams, wetlands, lakes, and other water bodies.

Planning considerations for wetlands, riparian areas and floodplains will require additional research, detail and specifications. Native grasses are usually required as a condition of a 401 Water Quality Certification or a trout buffer variance.

Native vegetative species are plant species that naturally occur in the region in which they evolved. These plants are adapted to local soil types and climatic variations. Because most native species do not germinate and establish as readily as some introduced species, it is necessary to provide a non-native nurse crop or matting to stabilize the soil until the native crop can become established as the dominant cover. Once established, the native plants will produce an extensive root structure that, if properly maintained, will stabilize soils and reduce erosive forces of rainfall and overland stormwater flow. Many of these plants also possess characteristics that, when established, allow them not only to survive, but also to thrive under local conditions.

Seeding a mixture of perennial native grasses, rushes, and sedges is a way to establish permanent ground cover within wetlands, riparian areas and floodplains. The use of propagated plants is another method of reestablishing natives in these environments. Selecting a seed mixture and/or propagated plants of different species with complimentary characteristics will provide vegetation to fill select niches on sites with varying physical conditions. The design professional should note that because most native species do not germinate and establish as readily as some introduced species, it is necessary to provide a non-native nurse crop or matting to stabilize the soil until the native crop can become established as the dominant cover. For additional information about acceptable nurse crop varieties, consult the planting list in Appendix 8.02, local seed and plant suppliers, the North Carolina Cooperative Extension Service or a qualified design professional to assure the proper selection and plant mix.

Permanent native seed species within the seed mixture should be selected based on natural occurrence of each species in the project site area. Climate, soils, topography, and aspect are major factors affecting the suitability of plants for a particular site and these factors vary widely across North Carolina, with the most significant contrasts occurring among the three major physiographic regions of the state – Mountains, Piedmont, and Coastal Plain. Sub-regions of the state should also be considered. For example, the Triassic Basin in the Piedmont region may have characteristics that call for special soil treatment, limited plant selection, and special maintenance. Even within the riparian area, there may be need for different species depending on site conditions (i.e., dry sandy alluvial floodplains with wet pockets). Therefore, thoughtful planning is required when selecting species for individual sites in order to maximize successful vegetation establishment.

Native seed and plant species are included on the plant list in Appendix 8.02 of this manual.

The design professional should note that regardless of the benefits and advantages of native seeds and plants, there are potential issues if proper planning, installation and maintenance do not occur. These may include:

- Potential for erosion or washout during the establishment stage;
- Seasonal limitation on suitable seeding dates and availability of seed and plants;
- Adaptability of species at specific sites;
- Availability of water and appropriate temperatures during germination and early growth; and
- Lack of maintenance to control invasive plants and undesirable competition.

#### PLANTING

- **Seed** – Prepare the seed bed as described above in soil preparation. Apply seed at rates specified on the plans, and/or as recommended in Tables 6.11a-c of this manual, with a cyclone seeder, prop type spreader, drill, or hydroseeder on and/or into the prepared bed. Incorporate the seed into the seed bed as specified. Provide finished grades as specified on the approved plan and carefully culti-pack the seedbed as terrain allows. If terrain does not allow for the use of a cultipacker, the approved plans and construction sequence must provide an alternative method of lightly compacting the soil. Mulch immediately.
- **Sprigs and Sod** – Install onto the prepared seed bed per the most current guidance in Carolina Lawns, NCSU Extension Bulletin AG-69, or Practice 6.12 *Sodding*.

- **Woody plants (liners, container, B&B)** – These materials are typically used to complement an herbaceous protective cover. They eventually are major components of long-term, permanent stabilization and should be chosen and planned in conjunction with immediate and long-term maintenance. The plants should be selected and specified by the design professional for each individual project. See Practice 6.13 *Trees, Shrubs, Vines, and Ground Covers*.

#### MAINTENANCE

The absence of or an incomplete landscape management specification and/or complete maintenance schedule shall constitute grounds for disapproval of the plans. Proper maintenance is critical for the continued stabilization once vegetative cover is established. Although maintenance strategies for different sites may be similar, no two construction sites in North Carolina have been or will be able to be controlled or protected in identical ways. Variations in climate, topography, soils, available moisture, size and many other conditions will dictate the maintenance methodology to be used. A detailed schedule of maintenance will be required on the plans. This schedule will illustrate how the initial planting will be maintained to assure immediate, short term and permanent protection. The schedule will address topics such as appropriate irrigation of plants during the early establishment phase, drought conditions, excessive rainfall, mulch replacement, supplemental seeding, supplemental soils tests, application of nutrients and amendments, control of competitive and invasive species, disease and insect control, and corrective maintenance, measures to address failure of vegetation to become established. Contractual responsibility for maintenance after initial establishment of vegetative cover will be provided on the plans, in the construction sequence and on the bid list for the project. Maintenance bonds and/or warranty guarantee may be required of the responsible party, especially for areas in or adjacent to environmentally sensitive sites such as wetlands, riparian buffers, floodplains, and waters of the State. See Example 6.11a for a sample maintenance specification and a minimum maintenance check list that shall be provided on all plans.

#### RECOMMENDED BID LIST

(These items should be itemized on documents utilized to obtain pricing for planting pertaining to vegetative stabilization of land disturbing projects in North Carolina.)

- Soil test prior to grading (price per each test).
- Soil test during grading operations (price per each test).
- Soil test at completion of grading and/or prior to seeding, sprigging, sodding and application of fertilizer, lime, and other soil amendments (price per each test).
- Ripping/subsoiling to a depth of six (6) inches. (Provide an alternate for ripping to a depth greater than six (6) inches.) (price per acre)
- Tilling/discing ripped area to a depth of four (4) inches and re-compacting with a cultipacker roller (include in seeding price).

- 
- Seeding (price per square foot).
  - Mulching (price per square foot).
  - Repair seeding (price per square foot).
  - Repair mulching (price per square foot).
  - Matting (price per square yard).
  - Watering (price per thousand gallons).
  - Mowing (price per square foot).

#### SEEDING RECOMMENDATIONS

The following tables list herbaceous plants recommended for use as nurse crops for immediate stabilization and primary crops for initial and long-term stabilization. Nurse crops are expected to develop in two to five weeks and, with adequate maintenance, be an effective method of soil stabilization for a period of six months to one year. Nurse crops are not effective as primary long-term cover, however if properly maintained they can be an adequate cover and protection for the development of primary crops.

The goal for a primary crop is for it to develop over a three-week to one-year period and be effective up to three years with a well-defined maintenance program. The long-term goal for a primary crop is the initial step toward a sustainable protective cover without the need of maintenance. Where the primary crop is intended for a managed lawn and landscape aesthetics, the effective period can be extended by a more intense maintenance program. Where native species are utilized and become established during the planned maintenance program, a permanent cover that will support future succession species should exist and require little or no additional maintenance or management.

In uses of both nurse and primary crops, the development periods listed on the tables are optimal based on normal climatic conditions for the planting dates listed. The sediment and erosion control maintenance program must recognize that optimum temperatures and rainfall are the exception rather than the rule. The design professional needs to provide flexibility in the stabilization plan to address the potential ranges of temperature and moisture conditions we experience in North Carolina.

Information is provided for seeding rates, optimum planting dates in the state's three regions, sun and shade tolerance, invasive characteristics, compatibility in wetlands and riparian buffers, and installation maintenance considerations. By going through the lists the design professional can select the nurse and primary seed varieties and maintenance characteristics they feel are best suited for their site conditions. vegetation management expertise and maintenance capabilities.

To use the information in the seeding charts the plan preparer must:

- Determine what nurse crop best fits their site, soil conditions, and permanent seed mix.
- Obtain soil tests for all areas to be seeded.
- Know the site's region: mountains, piedmont, or coastal plain.
- Know if the areas to be seeded are sunny, part shade, or full shade.
- Know if the areas are well or poorly drained.
- Know if wetlands or riparian buffers are included in the areas to be seeded.
- Know if a chosen crop is invasive and if so, what potential impacts it will have on the site and adjacent properties.

With this knowledge the plan preparation may proceed utilizing the charts provided to provide the several seed mixes that will be applicable to the different areas requiring stabilization.

HERBACEOUS PLANTS-Seeding recommendations for immediate stabilization/nurse crops  
(2 to 5 weeks for development; effectiveness goal: 6 months to 1 year stabilization)

NURSE CROP SPECIES

Table 6.11.a

Common Name	Botanical Name	Native / Introduced	Seeding Rates lbs/acre	Fertilization/ lbs/acre	Optimal Planting Dates	Sun/Shade tolerant	Wellands	Riparian Buffers	Invasive Yes or No	Installation / Maintenance Considerations	Other information, commentary
Rye Grain	<i>Secale cereale</i>	I	40 lbs	By soil test.	Mountains 11/1 - 4/30 Coastal Plains 8/15 - 4/15	Sun	Yes	Yes	No	Must be mown to reduce competitiveness with permanent or long term vegetation	
Wheat	<i>Triticum aestivum</i>	I	30 lbs	By soil test.	11/1 - 4/30 8/15 - 4/15	Sun	Yes	Yes	No	Must be mown to reduce competitiveness with permanent or long term vegetation	Not water tolerant. May be used in wetlands that are not continuously saturated.
German Millet	<i>Setaria italica</i>	I	10 lbs	By soil test.	5/11 - 9/30 5/15 - 8/15	Sun	Yes	Yes	No	Crop should be cut / disc prior to planting primary or long term vegetation	Not water tolerant. May be used in wetlands that are not continuously saturated.
Browntop Millet	<i>Urochloa ramosa</i>	I	10 lbs	By soil test.	5/11 - 9/30 5/15 - 8/15	Sun	Yes	Yes	No	Crop should be cut / disc prior to planting primary or long term vegetation	Not water tolerant. May be used in wetlands that are not continuously saturated.
Sudangrass (hybrids)	<i>Sorghum sudanense</i> <i>S. bicolor</i> ssp. <i>Drummondii</i>	I	15 lbs	By soil test.	NR 4/15 - 8/15	Sun	No	No	Yes	Crop should be cut / disc prior to planting primary or long term vegetation	Use only where plants and seed can be contained and controlled.
Kobe Lespedeza	<i>Kummerowia striata</i> v. <i>kobe</i>	I	10 lbs	By soil test.	5/1 - 9/1 5/1 - 9/1	Sun	No	No	No	Consult qualified horticulturalist or extension agent for over-seeding with primary cover	Use in Coastal Plain
Korean Lespedeza	<i>Kummerowia stipulacea</i>	I	10 lbs	By soil test.	5/1 - 9/1 5/1 - 9/1	Sun	No	No	No	Consult qualified horticulturalist or extension agent for over-seeding with primary cover	Use in Piedmont and Mountains. May become invasive

NOTES:

1. Seeding rates are for hulled seed unless otherwise noted.
2. Fertilizer & Limestone - rates to be applied in absence of soils tests. Recommended application rate assumes significantly disturbed site soils with little or no residual value.
3. NR means Species not recommended for this region or application area.
4. Invasive designation as determined by the N.C. Exotic Pest Plant Council and N.C. Native Plant Society.
5. Sprigging is not recommended for immediate stabilization unless terrain is flat heavy mulch is applied and no other immediate stabilization method is practical.

HERBACEOUS PLANTS-Seeding recommendations for primary stabilization  
 Successful development depends on planting date (effectiveness goal: 6 mo. - 3 yrs. without an ongoing maintenance program)  
 Table 6.11.b  
 NON-NATIVE SPECIES

Common Name	Botanical Name / Cultivar	Native / Introduced	Broadcast Seeding Rates lbs/acre	Fertilization/ Limestone lbs/acre	Optimal Planting Dates				Sun/Shade tolerant	Wetlands	Riparian Buffers	Invasive Yes or No	Installation / Maintenance Considerations	Other information, commentary Severe Threat Invasive species
					Mountrail	Piedmont	Coastal Plains							
sericea Lespedeza	<i>Lespedeza cuneata</i> Dumont	I	15 lbs	By soil test	9/1 - 6/1	9/1 - 5/1	10/1 - 4/1	Sun	NR	NR	Yes	Responds well to controlled burns		
Crown Vetch	<i>Securigera varia</i> ( <i>Coronilla varia</i> )	I	15 lbs	By soil test	3/15-4/30	NR	NR	Sun	NR	NR	Yes	Highly competitive, not recommended unless an acceptable alternative is not available.	Prefers neutral soils	
Centipede Grass	<i>Eremochloa ophiuroides</i>	I	5 lbs 10 lbs, for road shoulders	By soil test	NR	Eastern only	9/1 - 5/1	Sun	NR	NR	No	Significant maintenance may be required to obtain desired cover	Does not tolerate high traffic. Acceptable for sodding	
KY 31 Tall Fescue	<i>Schedonorus phoeniceus</i> ( <i>Festuca arundinacea</i> )	I	100 lbs	By soil test	8/15-5/1	9/1-4/15	9/30 - 3/15	Sun / mod. Shade	NR	NR	Yes	If utilized, it is imperative that maintenance includes a containment plan	Acceptable for sodding	
KY Blue Grass	<i>Poa pratensis</i>	I	15 lbs	By soil test	8/15-5/1	NR	NR	Sun	NR	NR	Yes	If utilized, it is imperative that maintenance includes a containment plan	Prefers neutral soils, highly competitive, not recommended unless an acceptable alternative is not available. Acceptable for sodding	
Hard Fescue	<i>Festuca brevipila</i> ( <i>Festuca longipila</i> )	I	15 lbs	By soil test	8/1 - 6/1	NR	NR	Shade	NR	NR	No	Not recommended for slopes greater than 5%	Low growing, bunch grass	
Bermuda Grass	<i>Cynodon dactylon</i>	I	25 lbs	By soil test	NR	4/15-6/30	4/15-6/30	Sun	NR	NR	Yes	If utilized, it is imperative that maintenance includes a containment plan	Extremely aggressive, not recommended and should be avoided unless an acceptable alternative is not available. May be sodded or sprigged	



HERBACEOUS PLANTS-Seeding recommendations for primary stabilization  
 Successful development depends on planting date (effectiveness goal: 6 mo. - 3 yrs. without an ongoing maintenance program)  
 Table 6.11.c  
 NATIVE SPECIES

Common Name	Botanical Name / Cultivar	Native / Introduced	See Table 6.1d for seeding rates	Fertilization/ Insecticide	Optimal Planting Dates				Wetlands	Riparian Buffers	Invasive Yes or No	Installation / Maintenance Considerations	Other information, commentary
					Mounds 12/1-4/15	Prefront NR	Coastal Plains NR	Sun/Shade tolerant Sun					
Switchgrass	<i>Panicum virgatum</i> / Cave-in-Rock	N	A	By soil test	12/1-4/15	NR	NR	Sun	NR	Well drained only	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	
Switchgrass	<i>Panicum virgatum</i> / Blackwell	N	A	By soil test	12/1-4/15	12/1-4/1	12/1-4/1	Sun	HR	Well drained only	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	
Switchgrass	<i>Panicum virgatum</i> / Shelley	N	A	By soil test	12/1-4/15	12/1-4/1	12/1-4/1	Sun	HR	Well drained only	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	
Switchgrass	<i>Panicum virgatum</i> / Cartilage	N	A	By soil test	12/1-4/15	12/1-4/1	12/1-4/1	Sun	Yes	Yes	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	
Switchgrass	<i>Panicum virgatum</i> / Kantow	N	A	By soil test	12/1-4/15	12/1-4/1	12/1-4/1	Sun	No	Poorly drained	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	
Switchgrass	<i>Panicum virgatum</i> / Alamo	N	A	By soil test	HR	12/1-5/1	1/1-5/1	Sun	No	Poorly drained	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	
Indiangrass	<i>Sorghastrum nutans</i> / Rumsey	N	B	By soil test	12/1-4/15	12/1-4/1	12/1-4/1	Sun	HR	Well drained	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	Western coastal plain only
Indiangrass	<i>Sorghastrum nutans</i> / Osage	N	B	By soil test	12/1-4/15	12/1-4/1	12/1-4/1	Sun	NR	Well drained	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	Western coastal plain only

HERBACEOUS PLANTS- Seeding recommendations for primary stabilization  
 Successful development depends on planting date (effectiveness goal: 6 mo. - 3 yrs. without an ongoing maintenance program)  
 Table 6.11.c (cont)  
 NATIVE SPECIES

Common Name	Botanical Name / Cultivar	Native / Introduced	See Table 6.11.a for variety seeding rates	Fertilizer/ Irrigation/ Insecticide	Planting Dates	Soil/Shade	Wetlands	Reproduction	Invasive	Installation / Maintenance Considerations	Other information, commentary
Indiangrass	<i>Sorghastrum nutans</i> / <i>Corymbia</i>	N	B	By soil test	12/1 - 4/1	Coastal / Sun	MR	Well drained	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	Western coastal plain only
Indiangrass	<i>Sorghastrum nutans</i> / <i>Lone</i>	N	B	By soil test	12/1 - 5/1	1/1 - 5/1 Sun	NR	Well drained	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	Only Indiangrass, adaptable to Eastern coastal plain (Zone 8)
Doortongue	<i>Dichanthium dasycarpum</i> / <i>Topa</i>	N	C	By soil test	5/1 - 4/1	MR Sun & Shade	Yes	Profusely drained to drought	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	
Big Bluestem	<i>Andropogon gerardii</i> / <i>Rourke</i>	N	D	By soil test	12/1 - 4/1	MR Sun	NR	Well drained	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	Warm season grass
Big Bluestem	<i>Andropogon gerardii</i> / <i>Kear</i>	N	D	By soil test	12/1 - 4/1	MR Sun	NR	Well drained	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	Warm season grass
Big Bluestem	<i>Andropogon gerardii</i> / <i>Earl</i>	N	D	By soil test	12/1 - 4/1	12/1 - 5/1 Sun	NR	Well drained	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	Warm season grass
Little Bluestem	<i>Schizanthium scapanum</i> / <i>Albus</i>	N	E	By soil test	12/1 - 4/1	MR Sun	NR	Well drained	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	Warm season grass
Little Bluestem	<i>Schizanthium scapanum</i> / <i>Chimney</i>	N	E	By soil test	12/1 - 4/1	MR Sun	MR	Well drained	No	Responds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	Warm season grass

HERBACEOUS PLANTS-Seedling recommendations for primary stabilization  
 Successfull development depends on planting date (effectiveness goal: 6 mo. - 3 yrs. without an ongoing maintenance program)  
 Table 6.11.c (cont)  
 NATIVE SPECIES

Common Name	Botanical Name / Cultivar	Native / Introduced	See Table 6.11d for variety seeding rates	Fertilizer/ Irrigation	Planting Dates	Wetlands	Riparian Buffers	Invasive Yes or No	Installation / Maintenance Considerations	Other information, commentary
Little Bluestem	<i>Setaria spaldingii</i>	N	E	By soil test	12/1 - 4/1	NR	Well drained	No	Reponds well to controlled burns. Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations.	Warm season grass
Sweet Woodruff	<i>Christa rotundifolia</i>	N	F	By soil test	12/1 - 4/1	Yes	Proxly to well drained	No	Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations	Warm season grass
Rice Cutgrass	<i>Loesia oxyoides</i>	N	G	By soil test	12/1 - 4/1	Yes	Proxly drained	No	Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations	Warm season grass
Indian Woodruff	<i>Chamaecrista fasciculata</i>	N	H	By soil test	3/1 - 5/15 7/15-8/15	2/15 - 4/1 9/15 - 10/1	2/15-3/20 10/1 - 11/1	NR	Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations	Cool season grass
Virginia Wild Ryegrass	<i>Elymus virginicus</i>	N	I	By soil test	3/1 - 5/15 7/15-8/15	2/15 - 4/1 9/15 - 10/1	2/15-3/20 10/1 - 11/1	NR	Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations	Cool season grass
Eastern Baitcbrush Grass	<i>Elymus lyallii</i>	N	J	By soil test	3/1 - 5/15 7/15-8/15	2/15 - 4/1 9/15 - 10/15	NR	NR	Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations	Cool season grass
Soil Rush	<i>Juncus effusus</i>	N	K	By soil test	12/1 - 5/15 8/15-10/15	12/1 - 5/1 9/1 - 11/1	12/1-4/15	Yes	Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations	
Shallow Sedge	<i>Carex flacca</i>	N	L	By soil test	12/1 - 5/15 8/15-10/15	12/1 - 5/1 9/1 - 11/1	12/1-4/15	Yes	Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations	
Fox Sedge	<i>Carex vulpinoidea</i>	N	L	By soil test	12/1 - 5/15 8/15-10/15	12/1 - 5/1 9/1 - 11/1	12/1-4/15	Yes	Mix with 3 to 5 other seed varieties that have similar soil drainage adaptations	

NOTE:  
 1. Seeding rates are for hulled seed unless otherwise noted.  
 2. Fertilizer & Limestone - rates to be applied in absence of soil tests. Recommended application rate assumes significantly disturbed site soils with little or no residual value.  
 3. NR means Species not recommended for this region or application area.  
 4. Native, warm season grasses require six or more months to germinate under optimum conditions. If they are planted in the summer, then a whole year will have to pass before they germinate.  
 5. Invasive designation as determined by the N.C. Exotic Pest Plant Council and N.C. Native Plant Society.  
 6. Springing is not recommended for immediate stabilization unless terrain is flat. Heavy mulch is applied and no other immediate stabilization method is practical.  
 7. Seeding for immediate stabilization - see primary stabilization charts (other information column) and Section 6.12.  
 8. Long term stabilization can only be accomplished with an adequate, immediate, and primary stabilization program. To achieve long term protective cover with the species listed in

Table 6.11.d

**Seed Mixes for Native Species (lbs/ac)**  
**When Mixed with 3, 4, or 5 Other Native Species**  
 (See Table 6.11.a for nurse crop species to be added to these mixes)

	3 Other (total 4 species)	4 Other (total 5 species)	5 Other (total 6 species)
Switch Grasses (A)	3.5 lbs.	3.0 lbs.	2.5 lbs.
Indian Grasses (B)	7.0 lbs.	6.0 lbs.	5.0 lbs.
Deertongue (C)	6.0 lbs.	5.0 lbs.	4.0 lbs.
Big Bluestem (D)	7.0 lbs.	6.0 lbs.	5.0 lbs.
Little Bluestem (E)	7.0 lbs.	6.0 lbs.	5.0 lbs.
Sweet Woodreed (F)	2.5 lbs.	2.0 lbs.	1.5 lbs.
Rice Cutgrass (G)	6.0 lbs.	5.0 lbs.	4.0 lbs.
Indian Woodoats (H)	2.5 lbs.	2.0 lbs.	1.5 lbs.
Virginia Wild Rye (I)	6.0 lbs.	5.0 lbs.	4.0 lbs.
Eastern Bottlebrush Grass (J)	2.5 lbs.	2.0 lbs.	1.5 lbs.
Soft Rush (K)	2.5 lbs.	2.0 lbs.	1.5 lbs.
Sedges (L)	2.5 lbs.	2.0 lbs.	1.5 lbs.

**NOTE:**

With the native varieties, the seed mix should be in the range of 15 pounds per acre. Depending on availability of native seeds adaptable to North Carolina, the percentage of a particular variety used may be reduced or increased accordingly. Although diversity is desirable, it is imperative that the primary crop develop and become an effective protective cover. In addition to the native species mix, additional nurse crop species must be included to provide immediate stabilization and an adequate ground cover.

## Example 6.11.a GUIDELINES FOR WRITING MINIMUM LANDSCAPE MANAGEMENT SPECIFICATIONS

Following is an outline that demonstrates what should be included in specifications that will insure the long term stabilization of disturbed sites in North Carolina. As noted before in this manual, each construction site in the state is unique and has features that will require special provisions for revegetation and stabilization. The outline provided below cannot address these individual sites. It is the responsibility of the design professional and the financially responsible party to see that the specifications are edited to fit their site and to assure that permanent stabilization is achieved.

#### General Provisions

##### A. Intent:

1. These specifications are prepared with the intent of promoting outstanding performance in long-term stabilization. They are to be used as guidelines in establishing sediment control and vegetative standards for the sites. Final technical decisions such as herbicides, fertilizer ratios, times of application and schedules are to be determined by the Contractor, who has the responsibility to obtain soil test and to manage the vegetation to achieve the desired results. The maintenance specifications must address maintenance for sediment and erosion control vegetation during construction and for permanent/long-term stabilization.

##### B. Description of Work:

1. Perform all work necessary and required for the (insert period of contract) maintenance of the project as indicated on the drawings, in the project manual, and specified herein.

##### 2. Licensing:

a) Contractor shall provide verification of current, applicable pesticide applicator licensing for each applicator that will handle pesticides on the contracted sites.

##### 3. Contract Administration

a) Staffing: The Contractor shall provide adequate staffing, with the appropriate expertise, to perform all required work.

b) Monthly Site Review meetings will be held. Attendees will include the Contractor's Project Manager and Site Foreman and the property manager or other representative designated by the financially responsible party. Result of site reviews will be documented and circulated to the attendees and the owner by the contractor.

c) The Contractor will communicate with the proper person on a monthly basis to summarize work performed and immediately notify the project manager of any failure of the site to remain stabilized.

#### II. Materials

A. Soil Additives: Additives are to be applied per soils test taken prior to, during and after construction. (Use this section to provide the types and quantities of fertilizers, lime, and other soil amendments called for in the soils report. Include all soils test reports in the specifications document. This narrative or list should include quantities, rates, mixes, organic information, manufacturer, sources, and other information suggested in the soils test.)

A. Pesticides:

1. Establish an Integrated Pest Management (IPM) program for the site that relies on targeted insect and disease control coupled with sound stabilization management and water management practices.
2. These specifications do not include pesticide treatments for infestations of Southern Pine Beetle, Gypsy Moth, or Fire Ants. The contractor shall notify the Owner if these pests are observed on site.
3. All pesticides shall be applied by a North Carolina licensed applicator in accordance with all State and Federal regulations and per manufacturer's recommendations.

B. Mulches: Mulch for areas not subject to erosion and over wash by storm water should be called out in this section addressing its maintenance, replacement, removal and conversion to other uses. Those subject to erosion and over wash by storm water must be addressed on the plans and in the calculations.

III. Execution

A. General:

1. Good long term stabilization is based on the proper maintenance, management and balance of nutrients, soil moisture and general cultural practices. It is recognized that fewer fungicide and pesticide treatments as well as lower fertility rates are required with a well managed, balanced landscape. The following section is meant to promote this balance and therefore do not highlight specific quantitative standards. **(Quantitative standards should be addressed as site specific by the design professional in conjunction with the owner and contractor.)** Calendar references are general and are to be used only as a guide. Weather and soil conditions that are most appropriate for a given process, procedure and/or area of the state shall be the determining factor in scheduling work.

B. Soil Tests:

1. After the soil test prior to stabilization, tests shall be made yearly in the fall to determine the required soil additives for all stabilized areas. If known nitrogen requirements are not specified by previous test, they need to be determined by the subsequent soils test and the proper applications made. Fertilizer ratios may be determined through analysis of the soil tests coupled with the contractor's experience and knowledge of the site.

C. Mowing

1. Mowing for maintained turf/lawns

- a. Mow areas intended for "groomed appearance" on a schedule during the growing season and as required throughout the year to provide the desired appearance. **(Establish a mowing frequency here that addresses the specific plant species used and their growing habits.)** This frequency will be a minimum standard. Particular properties and their peculiar characteristics as well as individual plant species may require mowing more often than the stated minimum may be required. This should be noted in this section.
- b. The range of turf species suggested for lawns in the three growing regions of North Carolina vary as to optimum maintained height. The selected species should be maintained at a height recommended by the seed producer. Do not cut too short and do not allow the turf to attain a height that will cause the crop to decline or die. Consult individual seed producers and/or packaging for recommended mowing heights.
- c. Mow with a mulching mower to limit the amount of clippings removed, or mow and blow in such a manner that clippings are not evident and not to adversely effect the growing capacity

and/or health of the existing vegetation turf. It is important clippings are allowed to remain spread throughout the lawn area, to the extent possible, so that they might aid in building a more productive soil profile and root zone.

2. Mowing other stabilized areas to promote continued growth. Include mowing specification here for other stabilized areas which require maintenance but not a "groomed" appearance. Also include specifications for mowing areas where it is desirable for woody native volunteer vegetation to become established. This should include attention to mowing stakes or other way of protecting the desired woody natives from the mowing operation.

#### D. Watering

1. Irrigation System Maintenance and Monitoring: If stabilized areas are to be irrigated the design professional should include specifications for the system, its maintenance and its operation in this section.

2. In the absence of an automatic or manual irrigation system, provisions for providing adequate water to stabilized areas should be addressed in this section.

3. (Provisions should be made in this section for adjustments to application rates of water during times of regulated droughts and/or periods of excessive rainfall.)

**E. CONTROL OF INVASIVES:** Competition from invasive species can be detrimental to the establishment of the permanent vegetative cover. Left unchecked, these invasives can undermine a revegetation process in a short period of time and eventually lead to unprotected soil and sediment damage. Make site observations monthly to check for the presence of such species and, if found, treat them immediately with the appropriate cultural practices and/or by the use of seasonally-appropriate and site appropriate herbicides.

F. Maintenance items including fertilization, mowing, continued soils testing, repair, mulching, matting and soil preparation are to be addressed in the approved construction sequence and on the project bid list.

6.14

**MULCHING**

**Definition** Application of a protective blanket of straw or other plant residue, gravel, or synthetic material to the soil surface.

**Purpose** To protect the soil surface from the forces of raindrop impact and overland flow. Mulch fosters the growth of vegetation, reduces evaporation, insulates the soil, and suppresses weed growth. Mulch is frequently used to accent landscape plantings.

**Conditions Where Practice Applies** Mulch temporary or permanent seedings immediately. Areas that cannot be seeded because of the season should be mulched to provide temporary protection of the soil surface. Use an organic mulch in this case (but not wood fiber), and seed the area as soon as possible. Mulch around plantings of trees, shrubs, or ground covers to stabilize the soil between plants.

**Planning Considerations** A surface mulch is the most effective, practical means of controlling runoff and erosion on disturbed land prior to vegetation establishment. Mulch reduces soil moisture loss by evaporation, prevents crusting and sealing of the soil surface, moderates soil temperatures, provides a suitable microclimate for seed germination, and may increase the infiltration rate of the soil.

Organic mulches such as straw, wood chips, and shredded bark have been found to be the most effective. Do not use materials which may be sources of competing weed and grass seeds. Decomposition of some wood products can tie up significant amounts of soil nitrogen, making it necessary to modify fertilization rates, or add fertilizer with the mulch (Table 6.14a).

A variety of mats and fabrics have been developed in recent years for use as mulch, particularly in critical areas such as waterways and channels. Various types of netting materials are also available to anchor organic mulches.

Chemical soil stabilizers or soil binders, when used alone, are less effective than other types of mulches. These products are primarily useful for tacking wood fiber mulches.

The choice of materials for mulching should be based on soil conditions, season, type of vegetation, and size of the area. A properly applied and tacked mulch is always beneficial. It is especially important when conditions for germination are not optimum, such as midsummer and early winter, and on difficult areas such as cut slopes and slopes with southern exposures.

**ORGANIC MULCHES**

**Straw** is the mulch most commonly used in conjunction with seeding. The straw should come from wheat or oats ("small grains"), and may be spread by hand or with a mulch blower. Straw may be lost to wind, and must be tacked down.

**Wood chips** are suitable for areas that will not be closely mowed, and around ornamental plantings. Chips do not require tacking. Because they decompose slowly, they must be treated with 12 pounds of nitrogen per ton to prevent

Table 6.14a  
Mulching Materials and Application Rates

Material	Rate Per Acre	Quality	Notes
<b>Organic Mulches</b>			
Straw	1-2 tons	Dry, unchopped, unweathered; avoid weeds.	Should come from wheat or oats; spread by hand or machine; must be tacked down.
Wood chips	5-6 tons	Air dry	Treat with 12 lbs nitrogen/ton. Apply with mulch blower, chip handler, or by hand. Not for use in fine turf.
Wood fiber	0.5-1 tons		Also referred to as wood cellulose. May be hydroseeded. Do not use in hot, dry weather.
Bark	35 cubic yards	Air dry, shredded or hammer-milled, or chips.	Apply with mulch blower, chip handler, or by hand. Do not use asphalt tack.
Corn stalks	4-6 tons	Cut or shredded in 4-6 in. lengths.	Apply with mulch blower or by hand. Not for use in fine turf.
Sericea lespedeza seed-bearing stems	1-3 tons	Green or dry; should contain mature seed.	
<b>Nets and Mats<sup>1</sup></b>			
Jute net	Cover area	Heavy, uniform; woven of single jute yarn.	Withstands waterflow. Best when used with organic mulch.
Fiberglass net	Cover area		Withstands waterflow. Best when used with organic mulch.
Excelsior (wood fiber) mat	Cover area		Withstands waterflow.
Fiberglass roving	0.5-1 tons	Continuous fibers of drawn glass bound together with a non-toxic agent.	Apply with a compressed air ejector. Tack with emulsified asphalt at a rate of 25-35 gal/1,000 sq ft.
<b>Chemical Stabilizers<sup>2</sup></b>			
Aquatain Aerospray Curasol AK Petroset SB Terra Tack Crust 500 Genaqua 743 M-145	follow manufacturer's specifications		Not beneficial to plant growth.

<sup>1</sup>Refer to Practice No. 6.30, *Grass Lined Channels*.

<sup>2</sup>Use of trade names does not imply endorsement of product.

nutrient deficiency in plants. This can be an inexpensive mulch if chips are obtained from trees cleared on the site.

**Bark chips and shredded bark** are by-products of timber processing often used in landscape plantings. Bark is also a suitable mulch for areas planted to grasses and not closely mowed. It may be applied by hand or with a mulch blower. Unlike wood chips, the use of bark does not require additional nitrogen fertilizer.

**Wood fiber** refers to short cellulose fibers applied as a slurry in hydroseeding operations. Wood fiber does not require tacking, although tacking agents or soil binders can easily be added to the slurry. Wood fiber hydroseeder slurries may be used to tack straw mulch on steep slopes, critical areas, and where harsh climatic conditions exist. **Wood fiber mulch does not provide sufficient erosion protection to be used alone.**

There are other organic materials that make excellent mulches, but may only be available locally or seasonally, for example: dried sewage sludge, corn stalks, animal manure, pine boughs, cotton burs, peanut hulls, and hay. Creative use of these materials can reduce costs.

#### **CHEMICAL MULCHES AND SOIL BINDERS**

A wide range of synthetic mulching compounds is available to stabilize and protect the soil surface. These include emulsions or dispersions of vinyl compounds, asphalt, or rubber mixed with water. They may be used alone, or may be used to tack wood fiber hydromulches.

When used alone, chemical mulches do not insulate the soil or retain moisture, and therefore do little to aid seedling establishment. They are easily damaged by traffic, are usually more expensive than organic mulches, and they decompose in 60-90 days.

**Check labels on chemical mulches and binders for environmental concerns. Take precautions to avoid damage to fish, wildlife, and water resources.**

#### **NETS, MATS, AND ROVING**

**Netting** is very effective in holding mulch in place on waterways and slopes before grasses become established.

**Mats** promote seedling growth in the same way as organic mulches. They are very useful in establishing grass in channels and waterways. A wide variety of synthetic and organic materials are available. "Excelsior" is a wood fiber mat, and should not be confused with wood fiber slurry.

When installing nets and mats, it is critical to obtain a firm, continuous contact between the material and the soil. Without such contact, the material is useless, and erosion will occur underneath.

**Fiberglass roving** consists of continuous strands of fiberglass which, when blown onto the soil surface from a special compressed air ejector, form a mat of glass fibers. This mat must then be tacked down with asphalt.

## Construction Specifications

Select a material based on site and practice requirements, availability of material, labor, and equipment. Table 6.14a lists commonly used mulches and some alternatives.

**Before mulching**, complete the required grading, install sediment control practices, and prepare the seedbed. Apply seed before mulching **except** in the following cases:

- Seed is applied as part of a hydroseeder slurry containing wood fiber mulch.
- A hydroseeder slurry is applied over straw.

### APPLICATION OF ORGANIC MULCH

Organic mulches are effective where they can be tacked securely to the surface. Material and specifications are given in Table 6.14a.

Spread mulch uniformly by hand, or with a mulch blower. When spreading straw mulch by hand, divide the area to be mulched into sections of approximately 1,000 ft<sup>2</sup>, and place 70-90 lb of straw ( 1 1/2 to 2 bales) in each section to facilitate uniform distribution. After spreading mulch, no more than 25% of the ground surface should be visible. In hydroseeding operations a green dye, added to the slurry, assures a uniform application.

### ANCHORING ORGANIC MULCH

**Straw mulch must be anchored immediately after spreading.** The following methods of anchoring mulch may be used:

**Mulch anchoring tool**—A tractor-drawn implement designed to punch mulch into the soil, a mulch anchoring tool provides maximum erosion control with straw. A regular farm disk, weighted and set nearly straight, may substitute, but will not do a job comparable to the mulch anchoring tool. The disk should not be sharp enough to cut the straw. These methods are limited to slopes no steeper than 3:1, where equipment can operate safely. Operate machinery on the contour.

**Liquid mulch binders**—Application of liquid mulch binders and tackifiers should be heaviest at the edges of areas and at crests of ridges and banks, to resist wind. Binder should be applied uniformly to the rest of the area. Binders may be applied after mulch is spread, or may be sprayed into the mulch as it is being blown onto the soil. Applying straw and binder together is the most effective method. Liquid binders include asphalt and an array of commercially available synthetic binders.

Emulsified asphalt is the most commonly used mulch binder. Any type thin enough to be blown from spray equipment is satisfactory. Asphalt is classified according to the time it takes to cure. Rapid setting (RS or CRS designation) is formulated for curing in less than 24 hours, even during periods of high humidity; it is best used in spring and fall. Medium setting (MS or CMS) is formulated for curing within 24 to 48 hours, and slow setting (SS or CSS) is formulated for use during hot, dry weather, requiring 48 hours or more curing time.

Apply asphalt at 0.10 gallons per square yard (10 gal/1,000 ft<sup>2</sup>). Heavier applications cause straw to “perch” over rills.

In traffic areas, uncured asphalt can be picked up on shoes and cause damage to rugs, clothing etc. Use types RS or CRS to minimize such problems.

Synthetic binders such as Petroset, Terratack, and Aerospray may be used, as recommended by the manufacturer, to anchor mulch. These are expensive, and therefore usually used in small areas or in residential areas where asphalt may be a problem (Use of trade names does not constitute an endorsement).

**Mulch nettings**—Lightweight plastic, cotton, jute, wire, or paper nets may be stapled over the mulch according to the manufacturer’s recommendations (see “Nets and Mats” below).

**Peg and twine**—Because it is labor-intensive, this method is feasible only in small areas where other methods cannot be used. Drive 8-10 inch wooden pegs to within 3 inches of the soil surface, every 4 feet in all directions. Stakes may be driven before or after straw is spread. Secure mulch by stretching twine between pegs in a criss-cross-within-a-square pattern. Turn twine two or more times around each peg. Twine may be tightened over the mulch by driving pegs further into the ground.

**Vegetation**—Rye (grain) may be used to anchor mulch in fall plantings, and German millet in spring. Broadcast at 15 lb/acre before applying mulch.

#### **CHEMICAL MULCHES**

Chemical mulches may be effective for soil stabilization if used between May 1 and June 15, or Sept. 15 and Oct. 15, provided that they are used on slopes **no steeper** than 4:1, and that proper seedbed preparation has been accomplished, including surface roughening where required.

Chemical mulches may be used to bind other mulches, or with wood fiber in a hydroseeded slurry at any time. Follow the manufacturer’s recommendations for application.

#### **FIBERGLASS ROVING**

Fiberglass roving (“roving”) is wound into a cylindrical package so that it can be continuously withdrawn from the center using a compressed air ejector. Roving expands into a mat of glass fibers as it contacts the soil surface. It is often used over a straw mulch, but must still be tacked with asphalt.

Spread roving uniformly over the area at a rate of 0.25 to 0.35 lb/yd<sup>2</sup>. Anchor with asphalt immediately after application, at a rate of 0.25 to 0.35 gal/yd<sup>2</sup>.

As a channel lining, and at other sites of concentrated flow, the roving mat must be further anchored to prevent undermining. It may be secured with stakes placed at intervals no greater than 10 feet along the drainageway, and randomly throughout its width, but not more than 10 feet apart. As an option to staking, the roving can be buried to a depth of 5 inches at the upgrade end and at intervals of 50 feet along the length of the channel.

#### **NETS AND MATS**

Nets alone generally provide little moisture conservation benefits and only

limited erosion protection. Therefore, they are usually used in conjunction with an organic mulch such as straw.

Except when wood fiber slurry is used, netting should always be installed over the mulch. Wood fiber may be sprayed on top of an installed net.

**Mats**, including "excelsior" (wood fiber) blankets, are considered protective mulches and may be used alone, on erodible soils, and during all times of the year. Place the matting in firm contact with the soil, and staple securely.

#### INSTALLATION OF NETTING AND MATTING

Products designed to control erosion should be installed in accordance with manufacturer's instructions. Any mat or blanket-type product used as a protective mulch should provide cover of at least 30% of the surface where it is applied. Installation is illustrated in Figure 6.14a.

1. Apply lime, fertilizer, and seed before laying the net or mat.

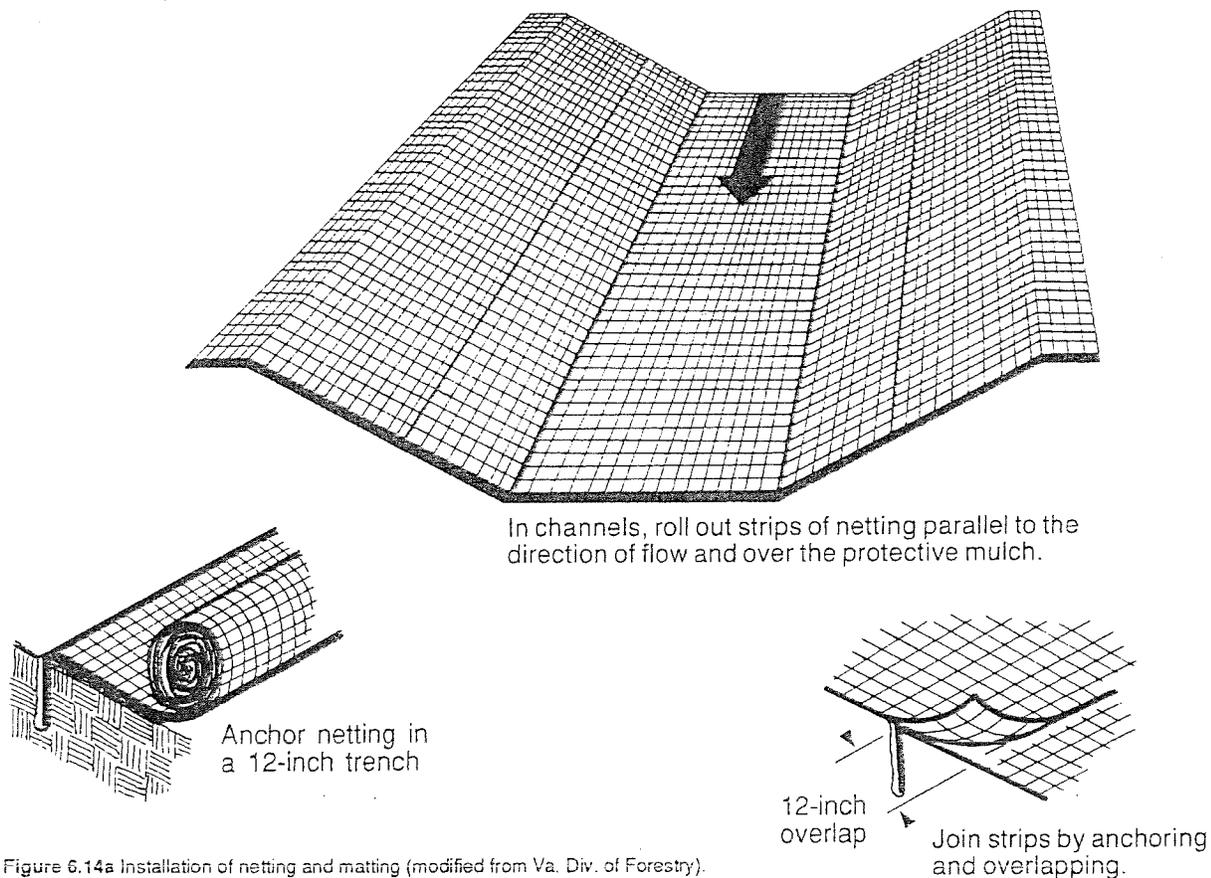


Figure 6.14a Installation of netting and matting (modified from Va. Div. of Forestry).

2. Start laying the net from the top of the channel or slope, and unroll it down the grade. **Allow netting to lay loosely on the soil or mulch cover but without wrinkles—do not stretch.**

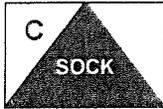
3. To secure the net, bury the upslope end in a slot or trench no less than 6 inches deep, cover with soil, and tamp firmly as shown in Figure 6.14a. Staple the net every 12 inches across the top end and every 3 ft around the edges and bottom. Where 2 strips of net are laid side by side, the adjacent edges should be overlapped 3 inches and stapled together. Each strip of netting should also be stapled down the center, every 3 ft. **Do not stretch the net when applying staples.**

4. To join two strips, cut a trench to anchor the end of the new net. Overlap the end of the previous roll 18 inches, as shown in Figure 6.14a, and staple every 12 inches just below the anchor slot.

**Maintenance** Inspect all mulches periodically, and after rainstorms to check for rill erosion, dislocation or failure. Where erosion is observed, apply additional mulch. If washout occurs, repair the slope grade, reseed and reinstall mulch. Continue inspections until vegetation is firmly established.

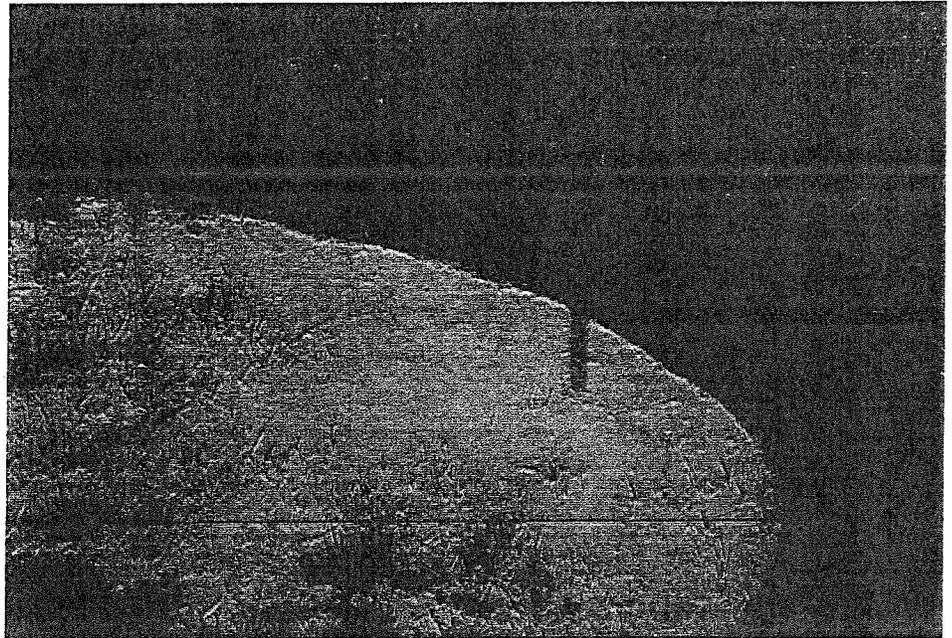
**References** *Surface Stabilization*  
6.11. Permanent Seeding  
*Appendix*  
8.02. Vegetation Tables

6.66

**COMPOST SOCK****Definition**

A compost sock is a three-dimensional tubular sediment control and storm water runoff device typically used for perimeter control of sediment and soluble pollutants (such as phosphorous and petroleum hydrocarbon), on and around construction activities. Compost socks trap sediment and other pollutants in runoff water as it passes through the matrix of the sock and by allowing water to temporarily pond behind the sock, allowing deposition of suspended solids. Compost socks are also used to reduce runoff flow velocities on sloped surfaces.

Compost products acceptable for this application should meet the chemical, physical and biological properties specified for Practice 6.18, *Compost Blankets*.



**Figure 6.66a – Compost Sock**

Photo Credit – Filtrexx International

### Conditions Where Practice Applies

Compost socks are to be installed down slope of disturbed areas requiring erosion and sediment control. Compost socks are effective when installed perpendicular to sheet flow, in areas where sediment accumulation of less than six inches is anticipated. Acceptable applications include (Fifield, 2001):

- Site perimeters
- Below disturbed areas subject to sheet runoff, with minor sheet or rill erosion. Compost socks should not be used alone below graded slopes greater than 10 feet in height.
- Above graded slopes to serve as a diversion berm.

- Check dams
- Along the toe of stream and channel banks
- Around area drains or inlets located in a storm drain system
- Around sensitive trees where trenching of silt fence is not beneficial for tree survival or may unnecessarily disturb established vegetation.
- On paved surfaces where trenching of silt fence is impossible.

A compost sock can be applied to areas of sheet runoff, on slopes up to a 2:1 grade with a maximum height of 10 feet, around inlets, and in other disturbed areas of construction sites requiring sediment control. Compost socks may also be used in sensitive environmental areas, or where trenching may damage roots.

The weight of a filled sock (40 lbs / linear ft. for 8" diameter) effectively prevents sediment migration beneath the sock. It is possible to drive over a compost sock during construction (although not recommended); however, these areas should be immediately repaired by manually moving the sock back into place, if disturbed. Continued heavy construction traffic may destroy the fabric mesh, reduce the dimensions, and reduce the effectiveness of the compost sock. Vegetating the compost sock should be considered.

### Planning Considerations

Compost socks shall either be made on site or delivered to the jobsite assembled. The sock shall be produced from a 5 mil thick continuous HDPE or polypropylene, woven into a tubular mesh netting material, with openings in the knitted mesh of  $\frac{1}{8}$ " -  $\frac{3}{8}$ " (3-10mm). This shall then be filled with compost meeting the specifications outlined in Practice 6.18, *Compost Blankets*, with the exception of particle size, to the diameter of the sock. Compost sock netting materials are also available in biodegradable plastics for areas where removal and disposal are not desired (i.e., when using pre-seeded socks). Compost socks contain the compost, maintaining its density and shape.

Compost socks should be installed parallel to the base of the slope or other affected area, perpendicular to sheet flow. The sock should be installed a minimum of 10 feet beyond the top of graded slopes. When runoff flows onto the disturbed area from a land above the work zone, a second sock may be constructed at the top of the slope in order to dissipate flows.

On locations where greater than a 200-foot long section of ground is to be treated with a compost sock, the sock lengths should be sleeved. After one sock section (200 feet) is filled and tied off (knotted) or zip tied, the second sock section shall be pulled over the first 1-2 feet and 'sleeved' creating an overlap. Once overlapped, the second section is filled with compost starting at the sleeved area to create a seamless appearance. The socks may be staked at the overlapped area (where the sleeve is) to keep the sections together. Sleeving at the joints is necessary because it reduces the opportunity for water to penetrate the joints when installed in the field.

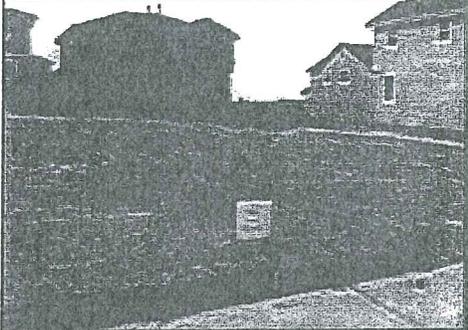
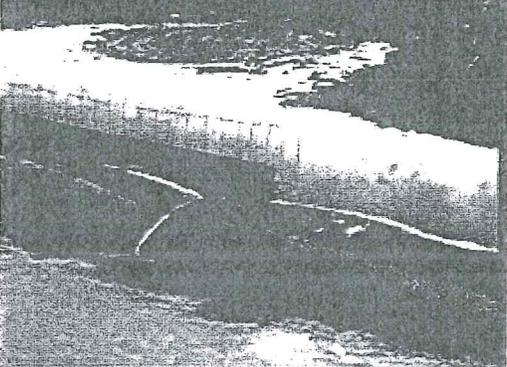
Compost Sock BMP	Conventional Application	Product Description	Example
Silt Socks	Silt Fence (on smaller areas)	A 3-dimensional sediment control measure used for sediment removal	
Inlet Socks	Inlet Protection	Designed to allow stormwater to enter inlets while removing sediment and protecting inlets from clogging	
Ditch Check	Rock Check Dams	Contours to ditch shape and eliminates gullies	

Table 6.66a Compost Sock BMPs as Replacements for Current Erosion Control Practices

Photo credits: Filtrexx International

After filling, the compost sock must be staked in place. Oak or other durable hardwood stakes 2"x 2" in cross section should be driven vertically plumb, through the center of the compost sock. Stakes should be placed at a maximum interval of 4 feet, or a maximum interval of 8 feet if the sock is placed in a 4 inch trench. See Figure 6.66b. The stakes should be driven to a minimum depth of 12 inches, with a minimum of 3 inches protruding above the compost sock.

If the compost sock is to be left as part of the natural landscape, it may be seeded at time of installation for establishment of permanent vegetation using the seeding specification in the erosion and sedimentation control plan. A maximum life of 2 years for photodegradable netting and 6 months for biodegradable netting should be used for planning purposes.

Compost socks may be used as check dams in ditches not exceeding 3 feet in depth. Normally, 8 to 12 inch diameter socks should be used. Be sure to stake the sock perpendicular to the slope of the ditch. When used as check dams, installation should be similar to that of natural fiber wattles. The ends and middle of the sock should be staked, and additional stakes placed at a 2-foot maximum interval. See Table 6.66b for spacing.

## Design Criteria

The sediment and pollutant removal process characteristic to a compost sock allows deposition of settling solids. Ponding occurs when water flowing to the sock accumulates faster than the hydraulic flow through rate of the sock. Typically, initial hydraulic flow-through rates for a compost sock are 50% greater than geotextile fabric (silt fence). However, installation and maintenance is especially important for proper function and performance. Design consideration should be given to the duration of the project, total area of disturbance, rainfall/runoff potential, soil erosion potential, and sediment loading when specifying a compost sock.

### Runoff Flow:

The depth of runoff ponded above the compost sock should not exceed the height of the compost sock. If overflow of the device is a possibility, a larger diameter sock should be constructed, other sediment control devices may be used, or management practices to reduce runoff should be installed. Alternatively, a second sock may be constructed or used in combination with Practice 6.17, *Rolled Erosion Control Products* or Practice 6.18, *Compost Blankets* to slow runoff and reduce erosion.

### Level Contour:

The compost sock should be placed on level contours to assist in dissipating low concentrated flow into sheet flow and reducing runoff flow velocity. Do not construct compost socks to concentrate runoff or channel water. Sheet flow of water should be perpendicular to the sock at impact and un-concentrated. Placing compost socks on undisturbed soil will reduce the potential for undermining by concentrated runoff flows.

### Runoff and Sediment Accumulation:

The compost sock should be placed at a 10 foot minimum distance away from the toe of the slope to allow for proper runoff accumulation for sediment deposition and to allow for maximum sediment storage capacity behind the device. On flat areas, the sock should be placed at the edge of the land-disturbance.

### End Around Flow:

In order to prevent water flowing around the ends of the compost sock, the ends of the sock must be constructed pointing upslope so the ends are at a higher elevation. A minimum of 10 linear feet at each end placed at a 30 degree angle is recommended.

**Vegetated Compost Sock:**

For permanent areas the compost sock can be directly seeded to allow vegetation established directly on the device. Vegetation on and around the compost sock will assist in slowing runoff velocity for increased deposition of pollutants. The option of adding vegetation should be shown on the erosion and sedimentation control plan. No additional soil amendments or fertilizer are required for vegetation establishment in the vegetated compost sock.

**Slope Spacing & Drainage Area:**

Maximum drainage area to and spacing between the compost socks is dependent on rainfall intensity and duration used for specific design/plan, slope steepness, and width of area draining to the sock.

A compost sock across the full length of the slope is normally used to ensure that stormwater does not break through at the intersection of socks placed end-to-end. Ends are jointed together by sleeving one sock end into the other. The diameter of the compost sock used will vary depending upon the steepness and length of the slope; example slopes and slope lengths used with different diameter compost socks are presented in Table 6.66b.

**Table 6.66b - Compost Sock Spacing versus Channel Slope**

Channel Slope (%)	Spacing Between Socks (feet)	
	8-inch Diameter Sock	12-inch Diameter Sock
1	67	100
2	33	50
3	22	33
4	17	25
5	13	20

Source: B. Faucette – 2010

**Material:**

The compost media shall be derived from well-decomposed organic matter source produced by controlled aerobic (biological) decomposition that has been sanitized through the generation of heat and stabilized to the point that it is appropriate for this particular application. Compost material shall be processed through proper thermophilic composting, meeting the US Environmental Protection Agency's definition for a 'Process to Further Reduce Pathogens' (PFRP), as defined at 40 CFR Part 503. The compost portion shall meet the chemical, physical and biological properties specified in Practice 6.18, *Compost Blankets* Table 6.18a, with the exception of particle size. Slightly more coarse compost is recommended for the socks, as follows:

**Particle Size Distribution**

Sieve Size	Percent Passing Selected Sieve Mesh Size, Dry Weight Basis
2"	99 % (3" Maximum Particle Size)
3/8"	30-50 %

See Practice 6.18, *Compost Blankets* for complete information on compost parameters and tests. Installer should provide documentation to support compliance of testing required in the compost specification.

This specification covers compost produced from various organic by-products, for use as an erosion and sediment control measure on sloped areas. The product's parameters will vary based on whether vegetation will be established on the treated slope. Only compost products that meet all applicable state and federal regulations pertaining to its production and distribution may be used in this application. Approved compost products must meet related state and federal chemical contaminant (e.g., heavy metals, pesticides, etc.) and pathogen limit standards pertaining to the feedstocks (source materials) in which it are derived.

In regions subjected to higher rates of precipitation and/or greater rainfall intensity, larger compost socks should be used. In these particular regions, coarser compost products are preferred as the compost sock must allow for an improved water percolation rate. The designer should check the flow rate per foot of sock in order to ensure drainage rate of the compost sock being used is adequate. The required flow rates are outlined in Table 6.66c.

**Table 6.66c – Compost Sock Initial Flow Rates**

Compost Sock Design Diameter	8 inch (200mm)	12 inch (300mm)	18 inch (450mm)	24 inch (600mm)	32 inch (800mm)
Maximum Slope Length (<2%)	600 ft (183m)	750 ft (229m)	1,000 ft (305m)	1,300 ft (396m)	1,650 ft (500m)
Hydraulic Flow Through Rate	7.5 gpm/ft (94 l/m/m)	11.3 gpm/ft (141 l/m/m)	15.0 gpm/ft (188 l/m/m)	22.5gpm/ft (281 l/m/m)	30.0 gpm/ft (374 l/m/m)

Source: B. Faucette-2010

**Construction Specifications**

**INSTALLATION**

1. Materials used in the compost sock must meet the specifications outlined above and in Practice 6.18, Compost Blankets.
2. Compost socks should be located as shown on the erosion and sedimentation control plan.
3. Prior to installation, clear all obstructions including rocks, clods, and other debris greater than one inch that may interfere with proper function of the compost sock.
4. Compost socks should be installed parallel to the toe of a graded slope, a minimum of 10 feet beyond the toe of the slope. Socks located below flat areas should be located at the edge of the land-disturbance. The ends of the socks should be turned slightly up slope to prevent runoff from going around the end of the socks.
5. Fill sock netting uniformly with compost to the desired length such that logs do not deform.
6. Oak or other durable hardwood stakes 2" X 2" in cross section should be driven vertically plumb, through the center of the compost sock. Stakes should be placed at a maximum interval of 4 feet, or a maximum interval of 8 feet if the sock is placed in a 4 inch trench. See Figure 6.66b. The stakes

should be driven to a minimum depth of 12 inches, with a minimum of 3 inches protruding above the compost sock.

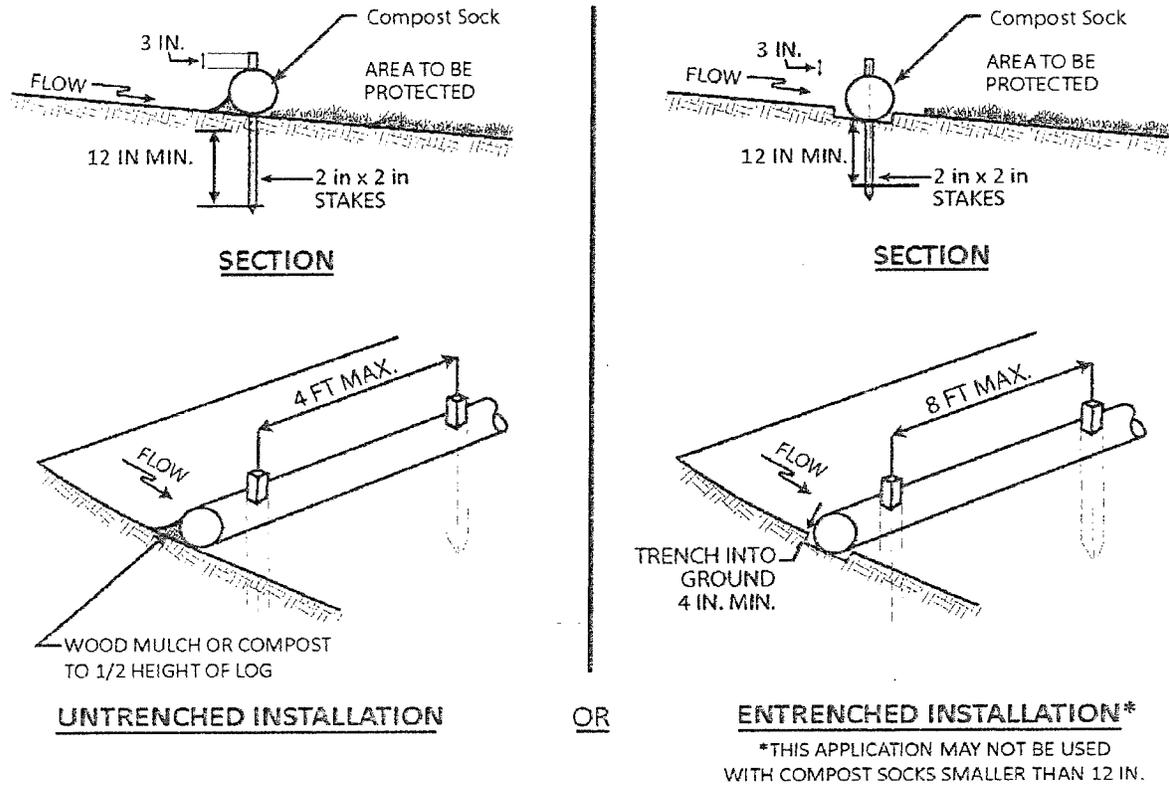
7. In the event staking is not possible (i.e., when socks are used on pavement) heavy concrete blocks shall be used behind the sock to hold it in place during runoff events.
8. If the compost sock is to be left as part of the natural landscape, it may be seeded at time of installation for establishment of permanent vegetation using the seeding specification in the erosion and sedimentation control plan.
9. Compost socks are not to be used in perennial or intermittent streams.

## **Maintenance**

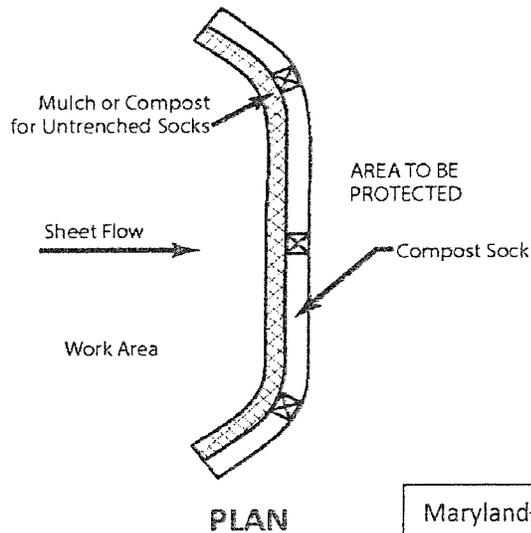
Inspect compost socks weekly and after each significant rainfall event (1/2 inch or greater). Remove accumulated sediment and any debris. The compost sock must be replaced if clogged or torn. If ponding becomes excessive, the sock may need to be replaced with a larger diameter or a different measure. The sock needs to be reinstalled if undermined or dislodged. The compost sock shall be inspected until land disturbance is complete and the area above the measure has been permanently stabilized.

## **DISPOSAL/RECYCLING**

Compost media is a composted organic product recycled and manufactured from locally generated organic, natural, and biologically based materials. Once all soil has been stabilized and construction activity has been completed, the compost media may be dispersed with a loader, rake, bulldozer or similar device and may be incorporated into the soil as an amendment or left on the soil surface to aid in permanent seeding or landscaping. Leaving the compost media on site reduces removal and disposal costs compared to other sediment control devices. The mesh netting material will be extracted from the media and disposed of properly. The photodegradable mesh netting material will degrade in 2 to 5 years if left on site. Biodegradable mesh netting material is available and does not need to be extracted and disposed of, as it will completely decompose in approximately 6 to 12 months. Using biodegradable compost socks completely eliminates the need and cost of removal and disposal.



ISOMETRIC VIEW



Maryland Standards and Specifications for Soil Erosion and Sediment Control, 2011, Maryland Department of Environment, Water Management Administration

Figure 6.66b Compost Sock Installation

References

*Chapter 3 Vegetative Considerations*

*Chapter 6 Practice Standard and Site Specifications*

6.10, Temporary Seeding

6.11, Permanent Seeding

6.17, Rolled Erosion Control Products

6.18, Compost Blankets

Tyler, R., A. Marks, B. Faucette. 2010. *The Sustainable Site: Design Manual for Green Infrastructure and Low Impact Development* Forester Press, Santa Barbara, CA.

Fifield, J. 2001. *Designing for Effective Sediment and Erosion Control on Construction Sites*. Forester Press, Santa Barbara, CA.

Maryland Department of Environment, Water Management Administration, 2011, *Maryland Standards and Specifications for Soil Erosion and Sediment Control*, Filter Log

6.83



## CHECK DAM

**Definition** A small temporary stone dam constructed across a drainage way.

**Purpose** To reduce erosion in a drainage channel by reducing the velocity of flow.

**Conditions Where Practice Applies** This practice may be used as a temporary measure to limit erosion by reducing velocity in small open channels. When needed, they can be used in channels, roadside ditches, and temporary diversions.

Check dams may be used to:

- reduce velocity in small temporary channels that are degrading, but where permanent stabilization is impractical due to their short period of usefulness;
- reduce velocity in small eroding channels where construction delays or weather conditions prevent timely installation of nonerosive liners.

**Do not use check dams in intermittent or perennial streams.**

**Planning Considerations** Check dams are an expedient way to reduce gullying in the bottom of channels that will be filled or stabilized at a later date. The dams should only be used while permanent stabilization measures are being put into place.

Check dams installed in grass-lined channels may kill the vegetative lining if submergence after it rains is too long and/or silting is excessive. All stone and riprap must be removed if mowing is planned as part of vegetative maintenance.

**Design Criteria** The following criteria should be used when designing a check dam:

- The drainage area is limited to one half acre.
- Keep a maximum height of 2 feet at the center of the dam.
- Keep the center of the check dam at least 9 inches lower than the outer edges at natural ground elevation.
- Keep the side slopes of the dam at 2:1 or flatter.
- Ensure that the maximum spacing between dams places the toe of the upstream dam at the same elevation as the top of the downstream dam (Figure 6.83a).
- Stabilize outflow areas along the channel to resist erosion.
- Use NC DOT Class B stone and line the upstream side of the dam with NC DOT #5 or #57 stone.
- Key the stone into the ditch banks and extend it beyond the abutments a minimum of 1.5 feet to avoid washouts from overflow around the dam.

# 6

## Construction Specifications

1. Place stone to the lines and dimensions shown in the plan on a filter fabric foundation.
2. Keep the center stone section at least 9 inches below natural ground level where the dam abuts the channel banks.
3. Extend stone at least 1.5 feet beyond the ditch bank (Figure 6.83b) to keep water from cutting around the ends of the check dam.
4. Set spacing between dams to assure that the elevation at the top of the lower dam is the same as the toe elevation of the upper dam.
5. Protect the channel after the lowest check dam from heavy flow that could cause erosion.
6. Make sure that the channel reach above the most upstream dam is stable.
7. Ensure that other areas of the channel, such as culvert entrances below the check dams, are not subject to damage or blockage from displaced stones.

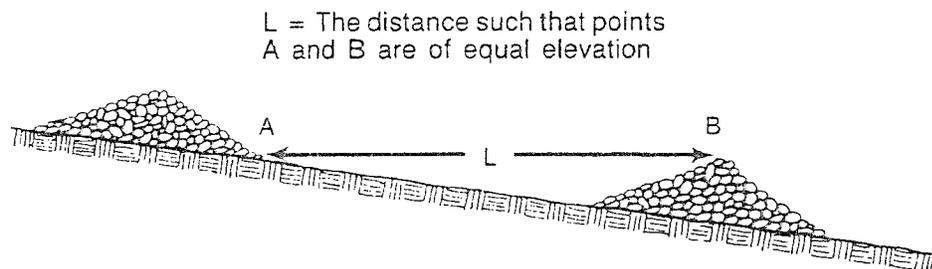


Figure 6.83a Space check dams in a channel so that the crest of downstream dam is at elevation of the toe of upstream dam.

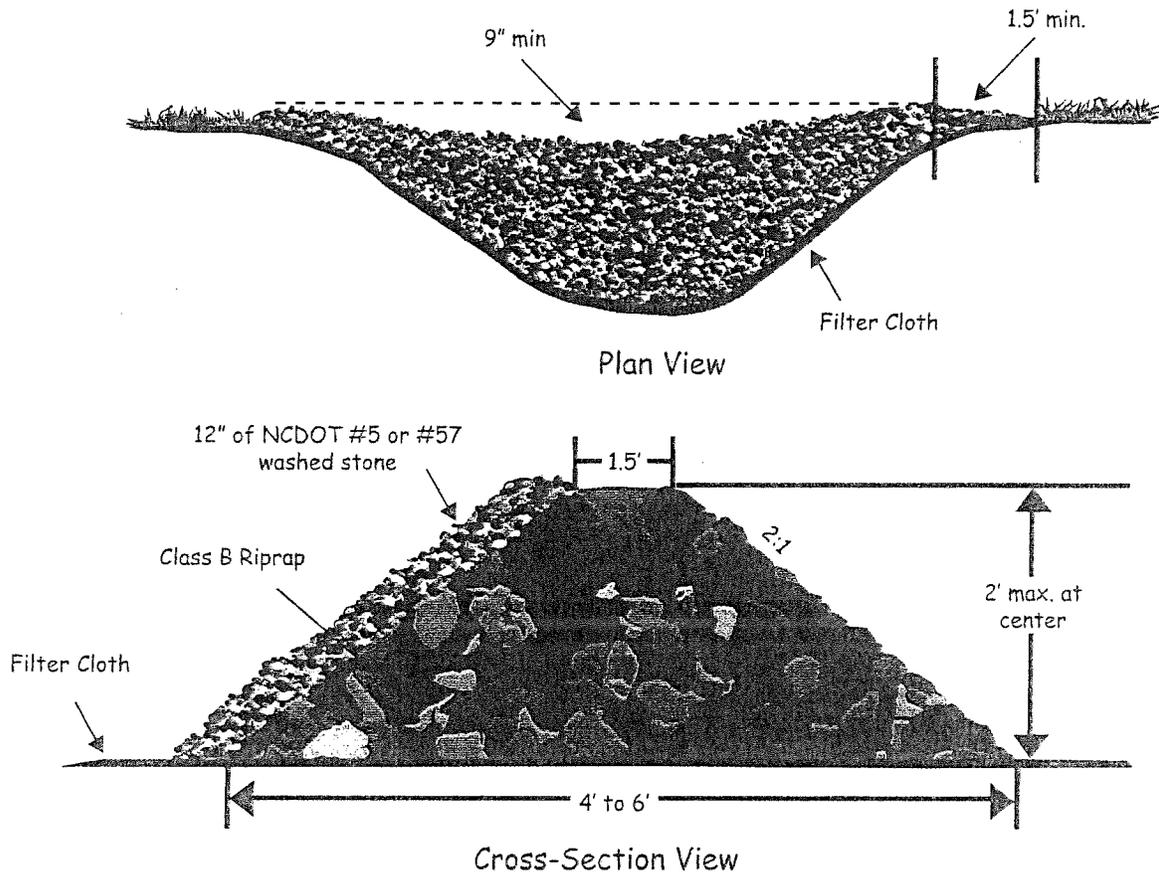


Figure 6.83b Stone check dam stone should be placed over the channel banks to keep water from cutting around the dam.

**Maintenance** Inspect check dams and channels at least weekly and after each significant (1/2 inch or greater) rainfall event and repair immediately. Clean out sediment, straw, limbs, or other debris that could clog the channel when needed.

Anticipate submergence and deposition above the check dam and erosion from high flows around the edges of the dam. Correct all damage immediately. If significant erosion occurs between dams, additional measures can be taken such as, installing a protective riprap liner in that portion of the channel (Practice 6.31, *Riprap-lined and Paved Channels*).

Remove sediment accumulated behind the dams as needed to prevent damage to channel vegetation, allow the channel to drain through the stone check dam, and prevent large flows from carrying sediment over the dam. Add stones to dams as needed to maintain design height and cross section.

**References** *Runoff Conveyance Measures*  
 6.30, Grass-lined Channels  
 6.31, Riprap-lined and Paved Channels

*North Carolina Department of Transportation*  
 Standard Specifications for Roads and Structures





COPY

North Carolina Department of Environment and Natural Resources  
**Division of Energy, Mineral, and Land Resources**  
Land Quality Section

Tracy E. Davis, PE, CPM  
Director

Pat McCrory, Governor  
John E. Skvarla, III, Secretary

August 23, 2013

**LETTER OF APPROVAL WITH MODIFICATIONS**

Craven LCID, LLC  
ATTN: Mr. Terry D. Morris, Agent  
109 Swift Creek Road  
Vanceboro, North Carolina 28586



RE: Erosion and Sedimentation Control Plan No. Crave-2013-019  
Project Name: Craven LCID  
Location: NCSR 1243 County: Craven  
River Basin: Neuse  
Date Received by LQS: August 13, 2013  
Project Acreage: 4.5 Project Type: Revised  
Project Description: The disturbance is to increase the height of an existing Land Clearing and Inert Debris disposal area.

Dear Sir:

This office has reviewed the subject erosion and sedimentation control plan. We find the plan to be acceptable and hereby issue this Letter of Approval with Modifications. The modifications required for approval are listed on the attached page. This plan approval shall expire three (3) years following the date of approval, if no land-disturbing activity has been undertaken, as required by 15A NCAC 4B.0129, unless modified by other legislation.

Please be advised that 15A NCAC 4B.0118(a) requires that a copy of the approved erosion and sedimentation control plan be on file at the job site. Also, you should consider this letter as giving the Notice required by G.S. 113A-61.1(a) of our right of periodic inspection to ensure compliance with the approved plan.

North Carolina's Sedimentation Pollution Control Program is performance oriented, requiring protection of existing natural resources and adjoining properties. If, following the commencement of this project, it is determined that the erosion and sedimentation control plan is inadequate to meet the requirements of the Sedimentation Pollution Control Act of 1973 (G.S. 113A-51 through 66), this office may require revisions to the plan and implementation of the revisions to ensure compliance with the Act.

Acceptance and approval of this plan is conditioned upon your compliance with Federal and State water quality laws, regulations and rules. In addition, local city or county ordinances or rules may also apply to this land-disturbing activity. This approval does not supersede any other permit or approval.

Washington Regional Office

943 Washington Square Mall, Washington, North Carolina 27889 • Phone: 252-946-6481 / FAX: 252-975-3716

Internet: <http://www.portal.ncdenr.org/web/lr/land-quality>

An Equal Opportunity / Affirmative Action Employer - 50% Recycled / 10% Post Consumer Paper

Craven LCID, LLC  
ATTN: Mr. Terry D. Morris, Agent  
August 23, 2013  
Page 2

Please note that this approval is based in part on the accuracy of the information provided in the Financial Responsibility/Ownership Form, which you have submitted. You are required to file an amended form if there is any change in the information included on the form. NOTE: Neither this approval nor the financial responsibility/liability cited in it automatically transfer with a change in project ownership. In addition, 15A NCAC 4B.0127(c) requires that you notify this office of the proposed starting date for this project (using the enclosed Project Information Sheet). Please notify us if you plan to have a preconstruction conference.

Please be advised that a rule to protect and maintain existing buffers along watercourses in the Neuse River Basin became effective on July 22, 1997. The Neuse River Riparian Area Protection and Maintenance Rule (15A NCAC 2B.0233) applies to the 50-foot wide zone directly adjacent to surface waters (Intermittent streams, perennial streams, lakes, ponds and estuaries) in the Neuse River Basin. For more information about the riparian area rule, please contact the Division of Water Quality's Wetland/401 Unit at 919-807-6300, or DWQ in our regional office at 252-946-6481.

Please be aware that your project will be covered by the enclosed NPDES General Stormwater Permit NCG010000 (Construction Activities). You should first become familiar with all of the requirements for compliance with the enclosed permit.

Sincerely,



Patrick H. McClain, PE  
Regional Engineer

Enclosures

cc w/o enc: Michael L. Rice, PE, Robert M. Chiles, PE  
Amy Adams, Regional Supervisor, Division of Water Resources

**MODIFICATIONS**

Page A

1. **AS THE DECLARED RESPONSIBLE PARTY, YOUR LEGAL RESPONSIBILITY** is to understand the Act and comply with the following minimum requirements of the Act:
  - A. In the event of a conflict between the requirements of the Sedimentation Pollution Control Act, the submitted plan and/or the contract specifications, the more restrictive requirement shall prevail;
  - B. The land disturbing activity shall be conducted in accordance with the approved erosion and sedimentation control plan;
  - C. The **LATEST APPROVED** erosion and sediment control plan will be used during periodic unannounced inspections to determine compliance and a copy of the plan must be on file at the job site. If it is determined that the implemented plan is inadequate, this office may require the installation of additional measures and/or that the plan be revised to comply with state law.
  - D. All site revisions, including those required by other local, state or federal agencies, which affect site layout, drainage patterns, limits of disturbance and/or disturbed acreage must be submitted to this office for approval a minimum of 15 day prior implementing the revision;
  - E. Revisions exceeding the approved scope of this project without this office's prior approval of the plan showing the changes can be considered a violation. Failure to comply with any part of the approved plan or with any requirements of this program could result in appropriate legal action (civil or criminal) against the financially responsible party. Legal actions could include Stop Work Orders, the assessing of a civil penalty of up to \$5000 for the initial violation and/or a civil penalty of up to \$5000 per day for each day the site is out of compliance.
  - F. The **CERTIFICATE OF PLAN APPROVAL** must be posted at the primary entrance to the job site and remain until the site is permanently stabilized
  - G. In cases of natural disaster related changes to the proposed land disturbing activity, all appropriate actions and adequate measure installations may be performed to prevent sediment damage, prior to submitting and receiving approval of the revised plan. A revised plan must be submitted for approval as soon as possible, but no later than 15 days after all emergency actions have been performed;

**MODIFICATIONS**

- H. Erosion and sediment control measures or devices are to be constructed and/or installed to safely withstand the runoff resulting from a 10 year storm event (25 year storm event in High Quality Zones). The 10 year storm event is generally equivalent to a storm producing 6.5 - 7 inches in 24 hours or at the rate of 6.5 - 7 inches in 1 hour, depending on the location of the project within the region;
- I. No earthen material is to be brought on or removed from the project site, until the off-site borrow and/or disposal sites are identified as part of the erosion control plan. If an off-site borrow and/or disposal site is to be utilized, submit the name and identification number (E&SCP# or Mine Permit #), prior to use.
- J. A buffer zone, sufficient to restrain visible sedimentation within the 25% of the width closest to the land disturbance, must be provided and maintained between the land-disturbing activity and any adjacent property or watercourse.
- K. In order to comply with the intent of the Act, the scheduling of the land-disturbing activities is to be such that both the area of exposure and the time between the land disturbance and the providing of a ground cover is minimized.
- L. Unless a temporary, manufactured, lining material has been specified, a clean straw mulch must be applied, at the minimum rate of 2 tons/acre, to all seeded areas. The mulch must cover at least 75% of the seeded area after it is either tacked, with an acceptable tacking material, or crimped in place.
- M. New or affected cut or filled slopes must be at an angle that can be retained by vegetative cover or other adequate erosion-control devices or structures appropriate, **AND must be provided with a ground cover** sufficient to restrain erosion **within 21 calendar days of completion of any phase (rough or final) of grading (ANNUAL RYE GRASS IS NOT in the APPROVED seeding specifications NOR is it an ACCEPTABLE substitute for the providing of a temporary ground cover).**
- N. A **permanent ground cover**, sufficient restrain erosion, **must be provided** within the shorter of 15 working or 90 calendar days (if in a High Quality Zone, the shorter of 15 working or 60 calendar days) after completion of construction or development on any portion of the tract (**ANNUAL RYE GRASS IS NOT in the APPROVED seeding specifications NOR is it an ACCEPTABLE substitute for the providing of a nurse cover for the permanent grass cover).**

Erosion and Sedimentation Control Plan No. Crave-2013-019

Project Name: Craven LCID

August 23, 2013

**MODIFICATIONS**

Page C

- O. All sediment and erosion control details for this project must conform to the standards as shown in the current Erosion & Sediment Control Planning and Design Manual; These details must be utilized for construction and incorporated in the plan. The Design Manual may be found on-line at: <http://portal.ncdenr.org/web/lr/publications>
2. Adequate and appropriate measures must be properly installed downstream, within the limits of disturbance, of any land disturbing activity to prevent sediment from leaving the limits of disturbance, entering existing drainage systems, impacting an on-site natural watercourse or adjoining property.

Mike Rice

---

**From:** "Mike Rice" <mikerice@robertmchilespe.com>  
**To:** "Chao, Ming-tai" <ming.chao@ncdenr.gov>  
**Sent:** Thursday, August 29, 2013 8:30 AM  
**Attach:** 2013030 ESC Approval.pdf  
**Subject:** Re: Permit Application for Craven LCIDLF

COPY

Dear Mr. Chao:

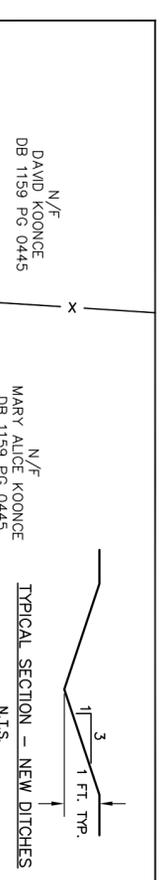
Attached is a copy of the ESC approval for Craven LCID.  
A printed copy of the erosion control plan and this approval will follow via postal service.  
You already have an electronic copy of the plan and its attachments.

If you have any questions or have any problems with the attached file, contact us at your convenience.

Michael L. Rice, P.E., P.L.S.

ROBERT M. CHILES, P.E.  
PO Box 3496  
New Bern, NC 28564  
(252) 637-4702 (ofc)  
(252) 637-3100 (fax)





**NEDES STABILIZATION ESTABLISHMENT TIMELINE:**

ALL CUT/FILL SLOPES SHALL BE 3H:1V OR FLATTER. ESTABLISH TEMPORARY OR PERMANENT STABILIZATION WITH GROUND COVER WITHIN 14 CALENDAR DAYS FROM THE LAST LAND-DISTURBING ACTIVITY PER NDES NCG010000. IF ANY EXPOSED SLOPES (CUT OR FILL) EXCEED 50 FT IN LENGTH, ESTABLISH TEMPORARY OR PERMANENT STABILIZATION WITH GROUND COVER WITHIN 7 CALENDAR DAYS PER NDES NCG010000.

**CONSTRUCTION SEQUENCE**

ACQUIRE REQUIRED PERMITS FROM NODENR REACTIVATE LCID

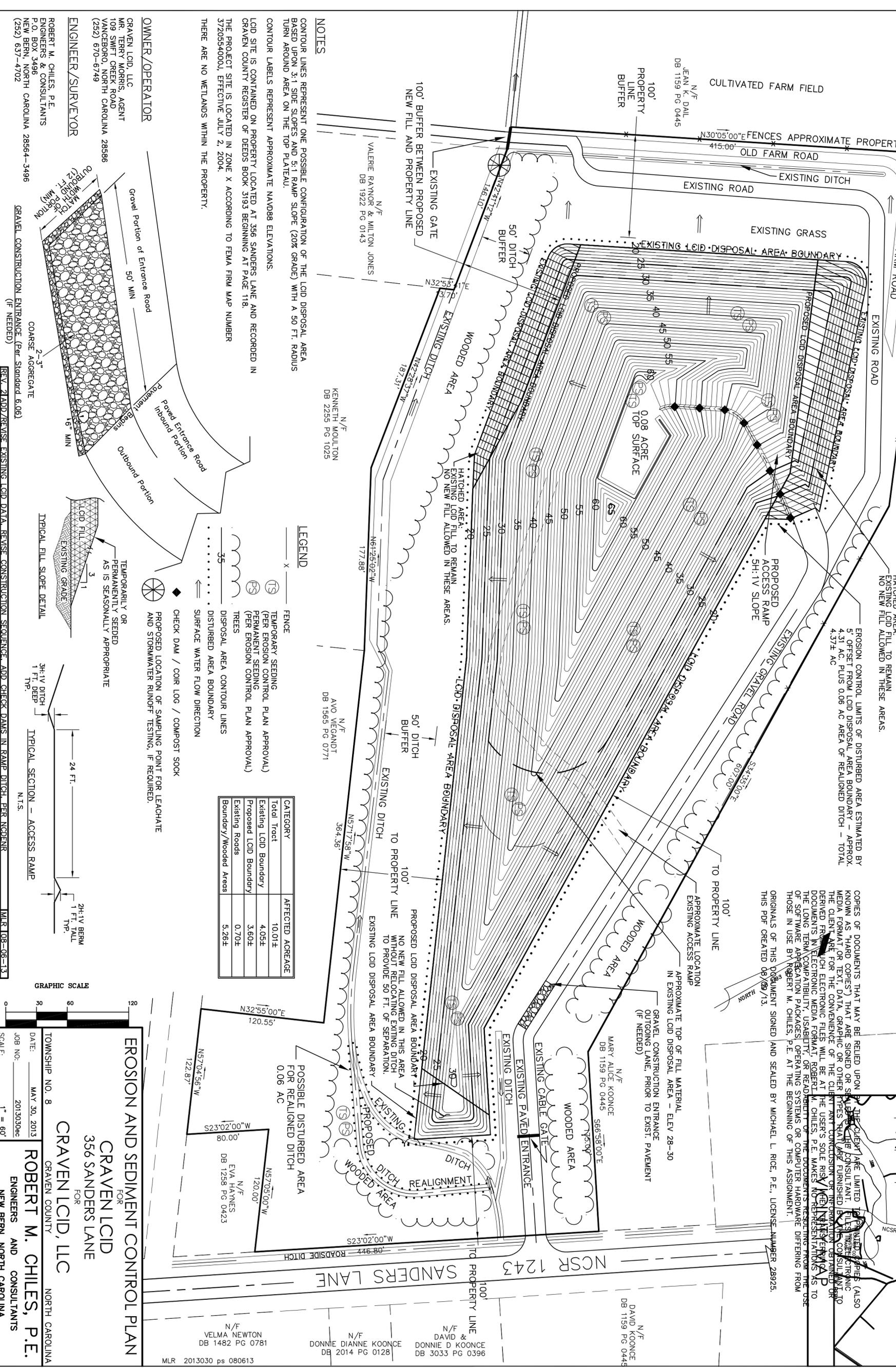
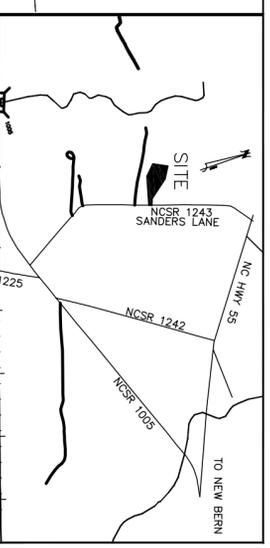
FOR POSSIBLE DITCH REALIGNMENT -

CLEAR ALIGNMENT EXCAVATE VEGETATION WITHOUT MAKING CONNECTIONS TO EXISTING DITCHES ESTABLISH VEGETATIVE STABILIZATION ON SLOPES OF NEW ALIGNMENT PLUG AND FILL PORTION OF EXISTING DITCH REPLACED BY REALIGNMENT

AS ACCESS RAMP IS CONSTRUCTED, INSTALL CHECK DAMS IN THE RAMPSIDE DITCH USING ROCK, COIR LOGS, OR COMPOST SOCKS EVERY 5 FEET OF ELEVATION CHANGE (APPROXIMATELY 25 FT OF DITCH LENGTH)

COPIES OF DOCUMENTS THAT MAY BE RELIED UPON BY THE CLIENT ARE LIMITED TO THE CLIENT'S LIMITED LIABILITY AGREEMENT (ALSO KNOWN AS "HARD COPIES") THAT ARE SIGNED OR SIGNED AND SEALED BY THE CONSULTANT. ALL OTHER ELECTRONIC MEDIA FORMAT OR TEXT, DATA, GRAPHIC OR OTHER TYPES THAT ARE FURNISHED BY THE CONSULTANT TO THE CLIENT ARE FOR THE CONVENIENCE OF THE CLIENT AND NO WARRANTY OR INFORMATION OBTAINED OR DERIVED FROM SUCH ELECTRONIC FILES WILL BE AT THE USER'S SOLE RISK. THE CONSULTANT'S LIABILITY IS LIMITED TO THE LONG TERM COMPATIBILITY, USABILITY, OR READABILITY OF THE DOCUMENTS RESULTING FROM THE USE OF SOFTWARE APPLICATION PACKAGES, OPERATING SYSTEMS OR COMPUTER HARDWARE DIFFERING FROM THOSE IN USE BY ROBERT M. CHILES, P.E. AT THE BEGINNING OF THIS ASSIGNMENT.

ORIGINALS OF THIS DOCUMENT SIGNED AND SEALED BY MICHAEL L. RICE, P.E., LICENSE NUMBER 28925. THIS PDF CREATED 08/09/13.



**NOTES**

CONTOUR LINES REPRESENT ONE POSSIBLE CONFIGURATION OF THE LCID DISPOSAL AREA BASED UPON 3:1 SIDE SLOPES AND 5:1 RAMP SLOPE (20% GRADE) WITH A 50 FT. RADIUS TURN AROUND AREA ON THE TOP PLATEAU.

CONTOUR LABELS REPRESENT APPROXIMATE NAVD88 ELEVATIONS.

LCID SITE IS CONTAINED ON PROPERTY LOCATED AT 356 SANDERS LANE AND RECORDED IN CRAVEN COUNTY REGISTER OF DEEDS BOOK 3193 BEGINNING AT PAGE 118.

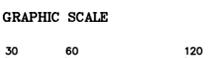
THE PROJECT SITE IS LOCATED IN ZONE X ACCORDING TO FEMA FIRM MAP NUMBER 3720544000, EFFECTIVE JULY 2, 2004.

THERE ARE NO WETLANDS WITHIN THE PROPERTY.

**LEGEND**

- x — FENCE
- (TS) TEMPORARY SEEDING (PER EROSION CONTROL PLAN APPROVAL)
- (PS) PERMANENT SEEDING (PER EROSION CONTROL PLAN APPROVAL)
- TREES
- DISPOSAL AREA CONTOUR LINES
- ..... DISTURBED AREA BOUNDARY
- ⇐ SURFACE WATER FLOW DIRECTION
- ◆ CHECK DAM / COIR LOG / COMPOST SOCK
- ⊗ PROPOSED LOCATION OF SAMPLING POINT FOR LEACHATE AND STORMWATER RUNOFF TESTING, IF REQUIRED.

CATEGORY	AFFECTED ACREAGE
Total Tract	10.01±
Existing LCID Boundary	4.05±
Proposed LCID Boundary	3.80±
Existing Roads	0.70±
Boundary/Wooded Areas	5.26±



**EROSION AND SEDIMENT CONTROL PLAN**

FOR  
**CRAVEN LCID**  
 356 SANDERS LANE  
 FOR  
**CRAVEN LCID, LLC**  
 CRAVEN COUNTY  
 NORTH CAROLINA

ROBERT M. CHILES, P.E.  
 ENGINEERS AND CONSULTANTS  
 NEW BERN, NORTH CAROLINA

TOWNSHIP NO. 8  
 DATE: MAY 30, 2013  
 JOB NO.: 2013030ac  
 SCALE: 1" = 60'

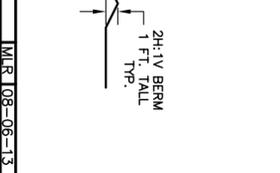
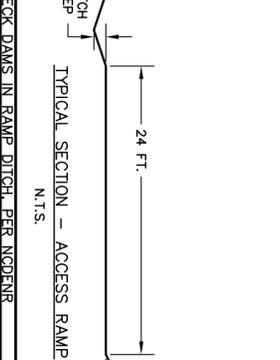
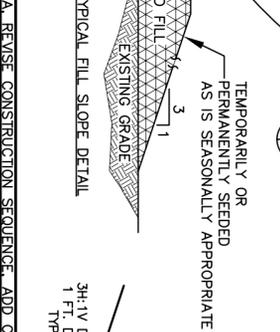
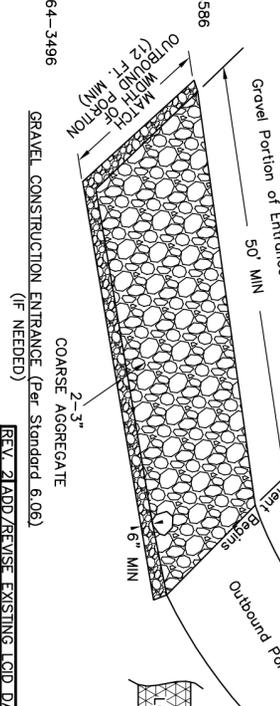
MLR 2013030 ps 080613

**OWNER/OPERATOR**

CRAVEN LCID, LLC  
 MR. TERRY MORRIS, AGENT  
 109 SWIFT CREEK ROAD  
 VANCEBORO, NORTH CAROLINA 28586  
 (252) 670-6749

**ENGINEER/SURVEYOR**

ROBERT M. CHILES, P.E.  
 ENGINEERS & CONSULTANTS  
 P.O. BOX 3496  
 NEW BERN, NORTH CAROLINA 28564-3496  
 (252) 637-4702



Permit No.	Date	Document ID No.
<b>P1263</b>	<b>August 29, 2013</b>	<b>19614</b>

**From:** [Mike Rice](#)  
**To:** [Chao, Ming-tai](#)  
**Subject:** Re: Permit Application for Craven LCIDLF  
**Date:** Thursday, August 29, 2013 8:33:14 AM  
**Attachments:** [2013030 ESC Approval.pdf](#)

Received by an e-mail  
**Date: August 29, 2013**  
**Solid Waste Section**  
**Raleigh Central Office**

---

Dear Mr. Chao:

Attached is a copy of the ESC approval for Craven LCID.  
A printed copy of the erosion control plan and this approval will follow via postal service.  
You already have an electronic copy of the plan and its attachments.

If you have any questions or have any problems with the attached file, contact us at your convenience.

Michael L. Rice, P.E., P.L.S.

ROBERT M. CHILES, P.E.  
PO Box 3496  
New Bern, NC 28564  
(252) 637-4702 (ofc)  
(252) 637-3100 (fax)



North Carolina Department of Environment and Natural Resources  
**Division of Energy, Mineral, and Land Resources**  
**Land Quality Section**

Tracy E. Davis, PE, CPM  
Director

Pat McCrory, Governor  
John E. Skvarla, III, Secretary

August 23, 2013

**LETTER OF APPROVAL WITH MODIFICATIONS**

Craven LCID, LLC  
ATTN: Mr. Terry D. Morris, Agent  
109 Swift Creek Road  
Vanceboro, North Carolina 28586

RE: Erosion and Sedimentation Control Plan No. Crave-2013-019  
Project Name: Craven LCID  
Location: NCSR 1243 County: Craven  
River Basin: Neuse  
Date Received by LQS: August 13, 2013  
Project Acreage: 4.5 Project Type: Revised  
Project Description: The disturbance is to increase the height of an existing Land Clearing and Inert Debris disposal area.

Dear Sir:

This office has reviewed the subject erosion and sedimentation control plan. We find the plan to be acceptable and hereby issue this Letter of Approval with Modifications. The modifications required for approval are listed on the attached page. This plan approval shall expire three (3) years following the date of approval, if no land-disturbing activity has been undertaken, as required by 15A NCAC 4B.0129, unless modified by other legislation.

Please be advised that 15A NCAC 4B.0118(a) requires that a copy of the approved erosion and sedimentation control plan be on file at the job site. Also, you should consider this letter as giving the Notice required by G.S. 113A-61.1(a) of our right of periodic inspection to ensure compliance with the approved plan.

North Carolina's Sedimentation Pollution Control Program is performance oriented, requiring protection of existing natural resources and adjoining properties. If, following the commencement of this project, it is determined that the erosion and sedimentation control plan is inadequate to meet the requirements of the Sedimentation Pollution Control Act of 1973 (G.S. 113A-51 through 66), this office may require revisions to the plan and implementation of the revisions to ensure compliance with the Act.

Acceptance and approval of this plan is conditioned upon your compliance with Federal and State water quality laws, regulations and rules. In addition, local city or county ordinances or rules may also apply to this land-disturbing activity. This approval does not supersede any other permit or approval.

Washington Regional Office

943 Washington Square Mall, Washington, North Carolina 27889 • Phone: 252-946-6481 / FAX: 252-975-3716

Internet: <http://www.portal.ncdenr.org/web/lr/land-quality>

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Craven LCID, LLC  
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Please note that this approval is based in part on the accuracy of the information provided in the Financial Responsibility/Ownership Form, which you have submitted. You are required to file an amended form if there is any change in the information included on the form. NOTE: Neither this approval nor the financial responsibility/liability cited in it automatically transfer with a change in project ownership. In addition, 15A NCAC 4B.0127(c) requires that you notify this office of the proposed starting date for this project (using the enclosed Project Information Sheet). Please notify us if you plan to have a preconstruction conference.

Please be advised that a rule to protect and maintain existing buffers along watercourses in the Neuse River Basin became effective on July 22, 1997. The Neuse River Riparian Area Protection and Maintenance Rule (15A NCAC 2B.0233) applies to the 50-foot wide zone directly adjacent to surface waters (Intermittent streams, perennial streams, lakes, ponds and estuaries) in the Neuse River Basin. For more information about the riparian area rule, please contact the Division of Water Quality's Wetland/401 Unit at 919-807-6300, or DWQ in our regional office at 252-946-6481.

Please be aware that your project will be covered by the enclosed NPDES General Stormwater Permit NCG010000 (Construction Activities). You should first become familiar with all of the requirements for compliance with the enclosed permit.

Sincerely,



Patrick H. McClain, PE  
Regional Engineer

Enclosures

cc w/o enc: Michael L. Rice, PE, Robert M. Chiles, PE  
Amy Adams, Regional Supervisor, Division of Water Resources

**MODIFICATIONS**

1. **AS THE DECLARED RESPONSIBLE PARTY, YOUR LEGAL RESPONSIBILITY** is to understand the Act and comply with the following minimum requirements of the Act:
  - A. In the event of a conflict between the requirements of the Sedimentation Pollution Control Act, the submitted plan and/or the contract specifications, the more restrictive requirement shall prevail;
  - B. The land disturbing activity shall be conducted in accordance with the approved erosion and sedimentation control plan;
  - C. The **LATEST APPROVED** erosion and sediment control plan will be used during periodic unannounced inspections to determine compliance and a copy of the plan must be on file at the job site. If it is determined that the implemented plan is inadequate, this office may require the installation of additional measures and/or that the plan be revised to comply with state law.
  - D. All site revisions, including those required by other local, state or federal agencies, which affect site layout, drainage patterns, limits of disturbance and/or disturbed acreage must be submitted to this office for approval a minimum of 15 day prior implementing the revision;
  - E. Revisions exceeding the approved scope of this project without this office's prior approval of the plan showing the changes can be considered a violation. Failure to comply with any part of the approved plan or with any requirements of this program could result in appropriate legal action (civil or criminal) against the financially responsible party. Legal actions could include Stop Work Orders, the assessing of a civil penalty of up to \$5000 for the initial violation and/or a civil penalty of up to \$5000 per day for each day the site is out of compliance.
  - F. The **CERTIFICATE OF PLAN APPROVAL** must be posted at the primary entrance to the job site and remain until the site is permanently stabilized
  - G. In cases of natural disaster related changes to the proposed land disturbing activity, all appropriate actions and adequate measure installations may be performed to prevent sediment damage, prior to submitting and receiving approval of the revised plan. A revised plan must be submitted for approval as soon as possible, but no later than 15 days after all emergency actions have been performed;

**MODIFICATIONS**

- H. Erosion and sediment control measures or devices are to be constructed and/or installed to safely withstand the runoff resulting from a 10 year storm event (25 year storm event in High Quality Zones). The 10 year storm event is generally equivalent to a storm producing 6.5 - 7 inches in 24 hours or at the rate of 6.5 - 7 inches in 1 hour, depending on the location of the project within the region;
- I. No earthen material is to be brought on or removed from the project site, until the off-site borrow and/or disposal sites are identified as part of the erosion control plan. If an off-site borrow and/or disposal site is to be utilized, submit the name and identification number (E&SCP# or Mine Permit #), prior to use.
- J. A buffer zone, sufficient to restrain visible sedimentation within the 25% of the width closest to the land disturbance, must be provided and maintained between the land-disturbing activity and any adjacent property or watercourse.
- K. In order to comply with the intent of the Act, the scheduling of the land-disturbing activities is to be such that both the area of exposure and the time between the land disturbance and the providing of a ground cover is minimized.
- L. Unless a temporary, manufactured, lining material has been specified, a clean straw mulch must be applied, at the minimum rate of 2 tons/acre, to all seeded areas. The mulch must cover at least 75% of the seeded area after it is either tacked, with an acceptable tacking material, or crimped in place.
- M. New or affected cut or filled slopes must be at an angle that can be retained by vegetative cover or other adequate erosion-control devices or structures appropriate, **AND must be provided with a ground cover sufficient to restrain erosion within 21 calendar days of completion of any phase (rough or final) of grading (ANNUAL RYE GRASS IS NOT in the APPROVED seeding specifications NOR is it an ACCEPTABLE substitute for the providing of a temporary ground cover).**
- N. A **permanent ground cover**, sufficient restrain erosion, **must be provided** within the shorter of 15 working or 90 calendar days (if in a High Quality Zone, the shorter of 15 working or 60 calendar days) after completion of construction or development on any portion of the tract (**ANNUAL RYE GRASS IS NOT in the APPROVED seeding specifications NOR is it an ACCEPTABLE substitute for the providing of a nurse cover for the permanent grass cover).**

Erosion and Sedimentation Control Plan No. Crave-2013-019

Project Name: Craven LCID

August 23, 2013

**MODIFICATIONS**

Page C

- O. All sediment and erosion control details for this project must conform to the standards as shown in the current Erosion & Sediment Control Planning and Design Manual; These details must be utilized for construction and incorporated in the plan. The Design Manual may be found on-line at: <http://portal.ncdenr.org/web/lr/publications>
2. Adequate and appropriate measures must be properly installed downstream, within the limits of disturbance, of any land disturbing activity to prevent sediment from leaving the limits of disturbance, entering existing drainage systems, impacting an on-site natural watercourse or adjoining property.

## **Section 7 - Drawings**

- Craven LCID, A Proposed Land Clearing and Inert Debris Landfill located at 356 Sanders Lane for Craven LCID, LLC, prepared by Robert M. Chiles, PE., Rev. 1, 08-06-13
- Section and Isometric Views of the Proposed LCID Topographic Contours for Craven LCID, prepared by Robert M. Chiles, PE., Rev. 1, 08-06-13
- Area Within 1/4 Mile of the LCID Disposal Area Boundary for Craven LCID, prepared by Robert M. Chiles, PE.

N/F/ DAVID KOONCE  
DB 1159 PG 0445

N/F/ MARY ALICE KOONCE  
DB 1159 PG 0445

N/F/ KENNETH MOUTON  
DB 2293 PG 1025

N/F/ VALERIE RAYNOR & MILTON JONES  
DB 1922 PG 0143

N/F/ AND WEGANDT  
DB 1565 PG 0771

N/F/ MARY ALICE KOONCE  
DB 1159 PG 0445

N/F/ DAVID KOONCE  
DB 1159 PG 0445

N/F/ DONNIE DIANNE KOONCE  
DB 2014 PG 0128

N/F/ DAVID & DONNIE D KOONCE  
DB 3033 PG 0396

N/F/ VELMA NEWTON  
DB 1482 PG 0781

N/F/ EVA HAYNES  
DB 1258 PG 0423

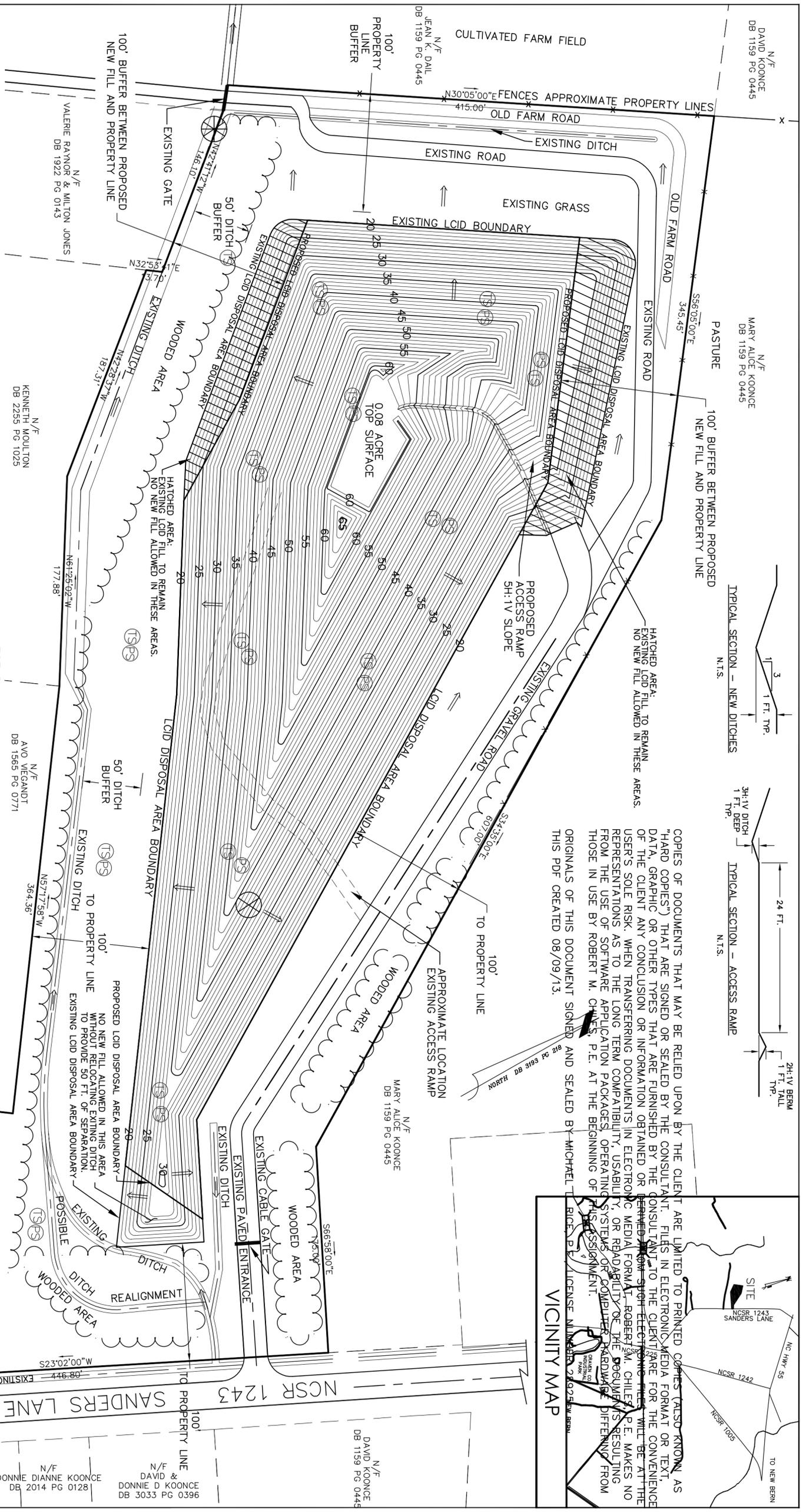
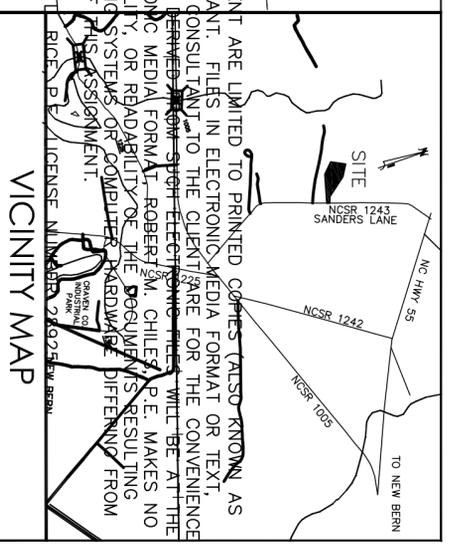
TYPICAL SECTION - NEW DITCHES  
N.T.S.

TYPICAL SECTION - ACCESS RAMP  
N.T.S.

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ORIGINALS OF THIS DOCUMENT SIGNED AND SEALED BY MICHAEL L. RICE, P.E. LICENSE NUMBER 280256, NEW BERN, NC.

THIS PDF CREATED 08/09/13.



**NOTES**

CONTOUR LINES REPRESENT ONE POSSIBLE CONFIGURATION OF THE LCID DISPOSAL AREA BASED UPON 3:1 SIDE SLOPES AND 5:1 RAMP SLOPE (20% GRADE) WITH A 50 FT. RADIUS TURN AROUND AREA ON THE TOP PLATEAU.

CONTOUR LABELS REPRESENT APPROXIMATE NAVD88 ELEVATIONS.

LCID SITE IS CONTAINED ON PROPERTY LOCATED AT 356 SANDERS LANE AND RECORDED IN CRAVEN COUNTY REGISTER OF DEEDS BOOK 3193 BEGINNING AT PAGE 118.

THE PROJECT SITE IS LOCATED IN ZONE X ACCORDING TO FEMA FIRM MAP NUMBER 3720554000J, EFFECTIVE JULY 2, 2004.

THERE ARE NO WETLANDS WITHIN THE PROPERTY.

**ENGINEER/SURVEYOR**

ROBERT M. CHILES, P.E.  
ENGINEERS & CONSULTANTS  
P.O. BOX 3496  
NEW BERN, NORTH CAROLINA 28564-3496  
(252) 637-4702

**OWNER/OPERATOR**

CRAVEN LCID, LLC  
MR. TERRY MORRIS, AGENT  
109 SWIFT CREEK ROAD  
VANCEBORO, NORTH CAROLINA 28586  
(252) 670-6749

Permit No.	Date	Document ID No.
25-13	September 04, 2013	19624

**DOCUMENT APPROVED**

Division of Waste Management  
Solid Waste Section  
Received Dated: June 11, 2013 and revised through August 29, 2013  
Date: September 04, 2013 By: Ming-Tai Chao

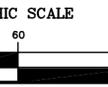
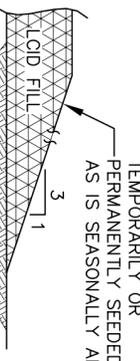
**CRAVEN LCID**  
A PROPOSED LAND CLEARING AND INERT DEBRIS LANDFILL  
LOCATED AT  
**356 SANDERS LANE**  
FOR  
**CRAVEN LCID, LLC**  
CRAVEN COUNTY  
NORTH CAROLINA

**ROBERT M. CHILES, P.E.**  
ENGINEERS AND CONSULTANTS  
NEW BERN, NORTH CAROLINA

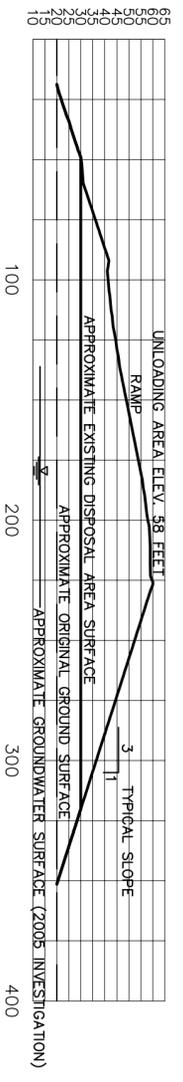
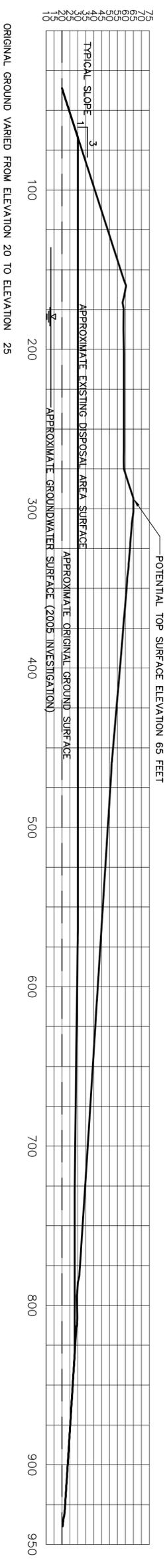
TOWNSHIP NO. 8  
DATE: MAY 30, 2013  
JOB NO.: 20130306c  
SCALE: 1" = 60'

CATEGORY	AFFECTED ACREAGE
Total Tract	10.01±
Existing LCID Boundary	4.05±
Proposed LCID Boundary	3.60±
Existing Roads	0.70±
Boundary/Wooded Areas	5.26±

- LEGEND**
- FENCE
  - TEMPORARY SEEDING (PER EROSION CONTROL PLAN APPROVAL)
  - PERMANENT SEEDING (PER EROSION CONTROL PLAN APPROVAL)
  - TREES
  - DISPOSAL AREA PROPOSED CONTOUR LINES
  - APPROXIMATE LOCATION OF 2005 TEST PIT USED TO DETERMINE GROUNDWATER SURFACE DEPTH.
  - SURFACE WATER FLOW DIRECTION
  - PROPOSED LOCATION OF SAMPLING POINT FOR LEACHATE AND STORMWATER RUNOFF TESTING, IF REQUIRED.
  - TEMPORARILY OR PERMANENTLY SEEDED AS IS SEASONALLY APPROPRIATE
  - TYPICAL FILL SLOPE DETAIL

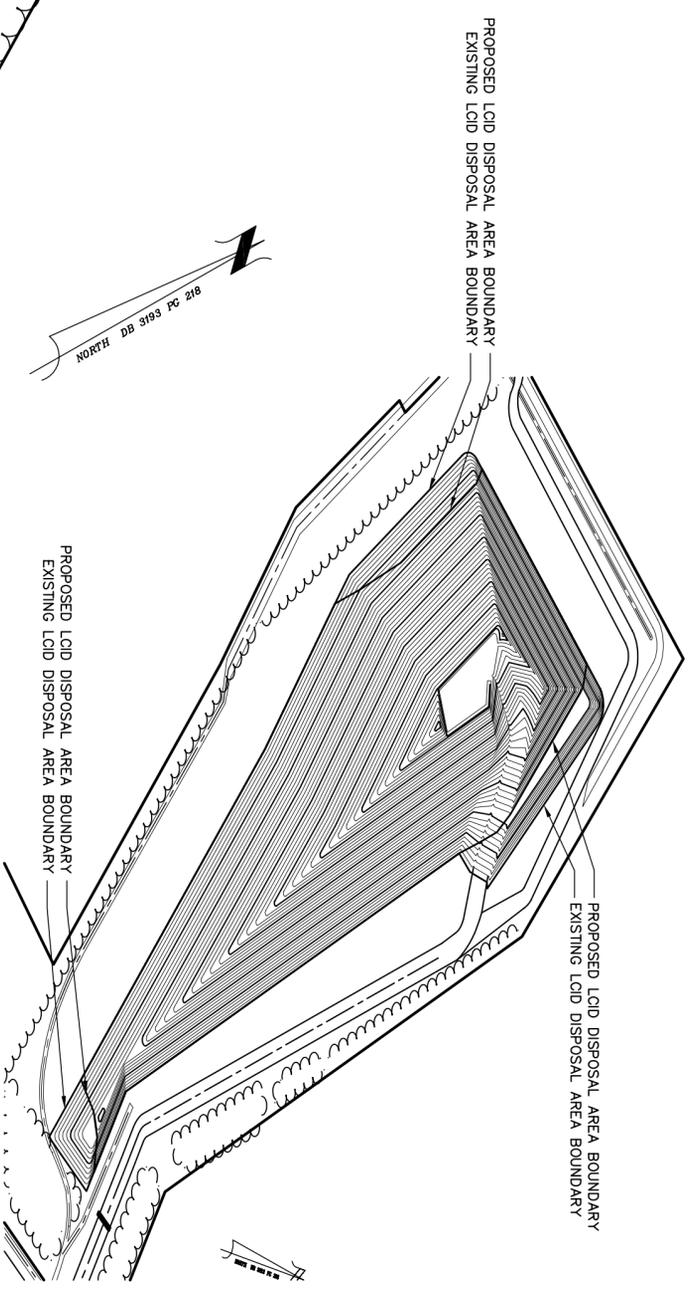


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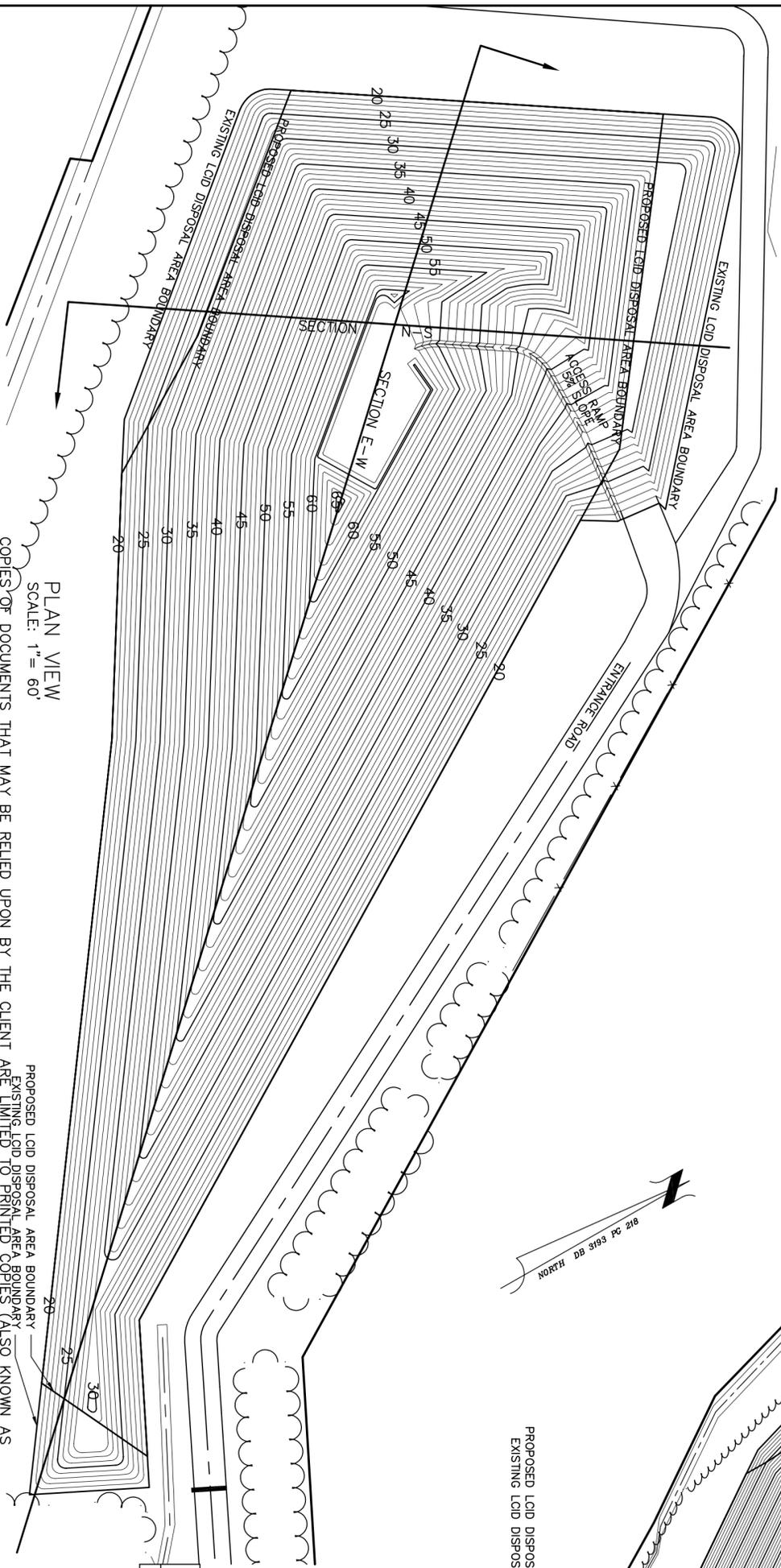


SECTION N-S  
SCALE: 1" = 50'

SECTION E-W  
SCALE: 1" = 50'



ISOMETRIC VIEW  
FOR REFERENCE ONLY  
SCALE: 1" = 100'



PLAN VIEW  
SCALE: 1" = 60'

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Division of Waste Management  
Solid Waste Section  
Received Dated: **June 11, 2013** and revised through **August 29, 2013**  
Date: **September 04, 2013** By: **Ming-Tai Chao**

**SECTION AND ISOMETRIC VIEWS**  
OF THE  
**PROPOSED LCID TOPOGRAPHICAL CONTOURS**  
FOR  
**GRAVEN LCID**

TOWNSHIP NO. 8  
DATE: MAY 30, 2013  
JOB NO.: 20130306c  
SCALE: AS INDICATED

GRAVEN COUNTY  
**ROBERT M. CHILES, P.E.**  
ENGINEERS AND CONSULTANTS  
NEW BERN, NORTH CAROLINA

ENGINEER/SURVEYOR

ROBERT M. CHILES, P.E.  
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MR. TERRY MORRIS, AGENT  
109 SWIFT CREEK ROAD  
VANCEBORO, NORTH CAROLINA 28586  
(252) 670-6749

ORIGINALS OF THIS DOCUMENT SIGNED AND SEALED BY MICHAEL L. RICE, P.E., LICENSE NUMBER 28925.  
THIS PDF CREATED 08/09/13.

REV. 11 ADD LABELS, REVISE SECTIONS TO MATCH REVISED DISPOSAL AREA BOUNDARY. PER NOBENR. IWR 108-06-13



ENGINEER/SURVEYOR

ROBERT M. CHILES, P.E.  
 ENGINEERS & CONSULTANTS  
 P.O. BOX 3496  
 NEW BERN, NORTH CAROLINA 28564-3496  
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MLR 2013030 ps 053013

AREA WITHIN 1/4 MILE  
 OF THE  
 LCID DISPOSAL AREA BOUNDARY  
 FOR  
 CRAVEN LCID

TOWNSHIP NO. 8 NORTH CAROLINA  
 GRAVEN COUNTY  
 DATE: MAY 30, 2013  
 JOB NO.: 2013030  
 SCALE: 1" = 200'  
 ROBERT M. CHILES, P.E.  
 ENGINEERS AND CONSULTANTS  
 NEW BERN, NORTH CAROLINA



APPROXIMATE 1/4 MILE PERIMETER

APPROXIMATE 1/4 MILE PERIMETER