

CHARLOTTE-MECKLENBURG CERTIFIED SITE INSPECTOR TRAINING COURSE



Sponsored by
City of Charlotte Land Development Division
Charlotte-Mecklenburg Storm Water Services
Mecklenburg County Water Quality Program



Charlotte-Mecklenburg Certified Site Inspector (CMCSI) Training Agenda

(Please turn off all cell phones and pagers)

8:00 – 8:25	Registration
8:30 – 12:00	CMCSI Course Objectives 1-5
12:00 – 12:45	LUNCH
12:45 – 1:45	CMCSI Course Objectives 6 & 7
2:30 – 3:30	CMCSI Examination

Contact Information

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Impacts of Sediment & Turbidity on Water Quality

1. Importance of surface waters in Charlotte-Mecklenburg.
2. Impacts of sediment and other pollutants from construction sites on surface water quality & usability.
3. What you can do to help protect surface water quality.

I. Waters of Charlotte-Mecklenburg

Our Most Precious Natural Resource

Recreational Uses

- Over 10 million people visit the Catawba River annually.
- Visitation is projected to increase 11% per decade through 2050.
- The Mecklenburg County greenway system is quickly becoming one of the finest in the nation.
- There are currently 37 miles of developed and 150 miles of undeveloped greenways in Mecklenburg County.

Other Lake Uses



- 50% of Duke Power's capacity for electric generation relies on the Catawba River.
- This includes hydro power at the dams and cooling water at the nuclear and coal fired plants.



- Latta Plantation Nature Preserve is located on 1,343 acres along Mountain Island Lake.
- This area preserves the habitat for 137 species of birds, mammals, reptiles, and amphibians as well as 2 federally endangered species of plants.



Ladies fishing in Little Sugar Creek – circa 1890

Maintaining good water quality conditions in our streams and lakes is essential for maintaining our livable community.



Swimming hole in Long Creek – circa 1910



Kids wading in Little Sugar Creek – circa 2000



Whitley Mill on Long Creek at Beatties Ford Road - 1820 to 1919

The Mill

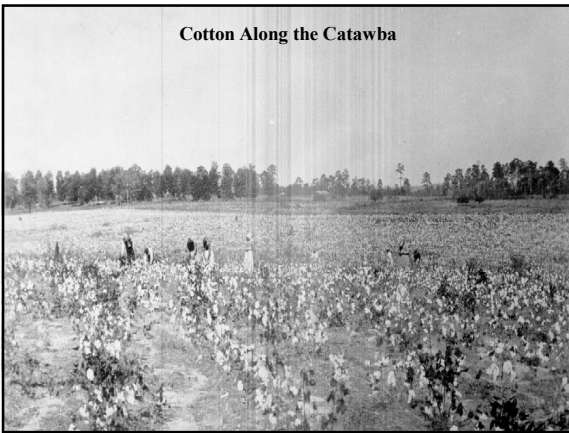
The influence of surface waters on the development of Mecklenburg County cannot be exaggerated beginning with the early water mill.

- Incentives for millers included tax exemptions, freedom from military service and special protection under the law.
- By 1800, there were mills on every Mecklenburg County creek having year-round flow.
- Millers became community leaders and their mills served as popular gathering places.



Fish trapping was one of the earliest commercial enterprises in Mecklenburg County.

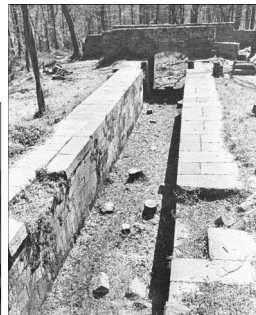
Cotton Along the Catawba



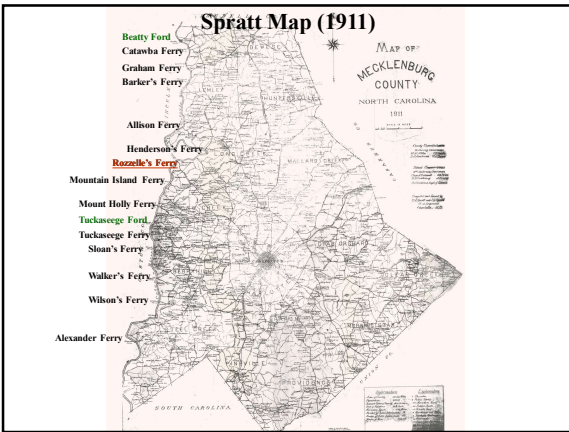
Catawba River & Transportation

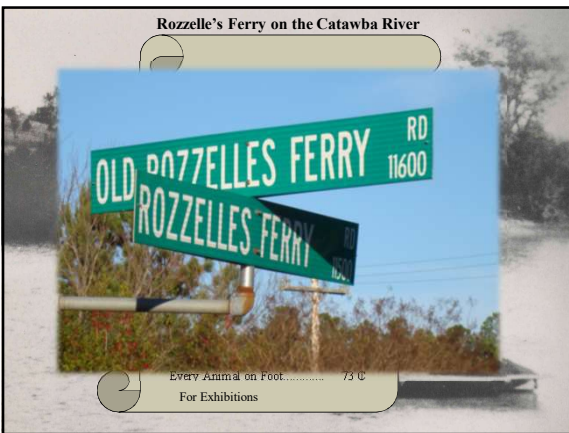


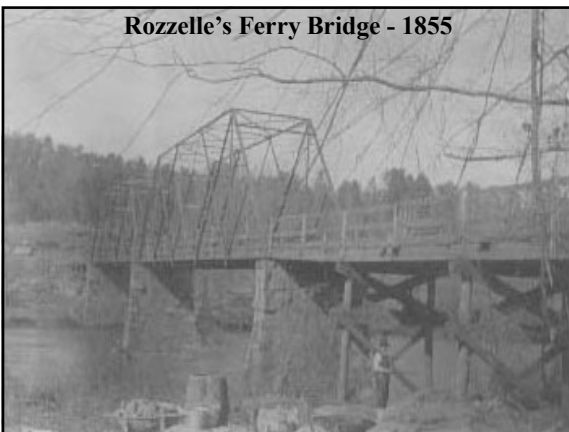
In the early 1800s, flatboats (60 feet long and 7 feet wide) were used on the Catawba to transport goods down river for sale.



Landsford Canal in Chester County, S.C. was operated from 1820 to 1835 to bypass the falls. The canal was 2 miles long, 12 feet wide and 10 feet deep with 5 locks for the 32-foot descent of the river.





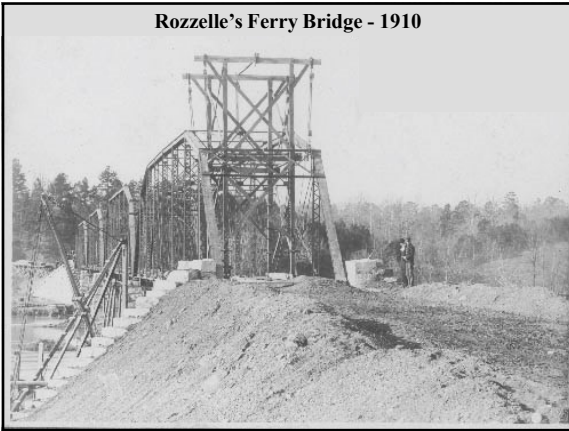


Battle at Rozzelle's Ferry



April 18, 1865

Rozzelle's Ferry Bridge - 1910



Great Catawba River Flood of 1916

Ella Rozzelle Hart 1890 – 1986 (recorded in July 1984):

Terrible time. I'll never forget.

We saw rocking chairs and things going down. Terrible looking.

I went home and went to bed.

Your daddy (Rusty's great grandfather), Ella Aunt Laura saw the bridge go down.

I was in the bed close by the window and your daddy came by and said "Ella the bridge is gone."

It was like somebody had died. Sad Times.

Saw a house go down (the river) with a woman sitting on the porch crocheting.

Rozzelle's Ferry Bridge - 1923

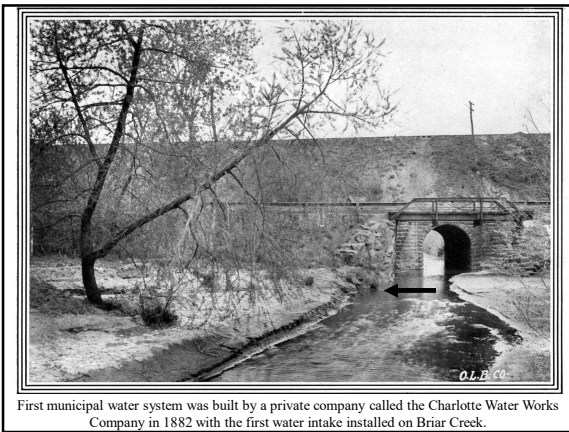


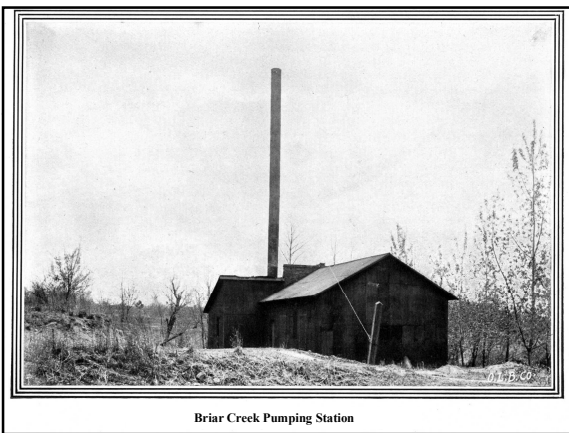
First drinking water supplies in Charlotte were hand dug wells.

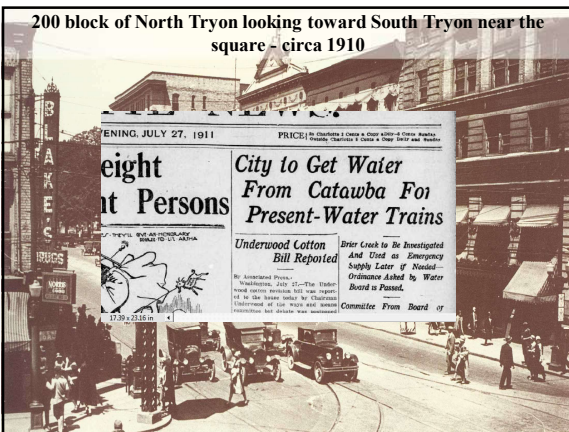


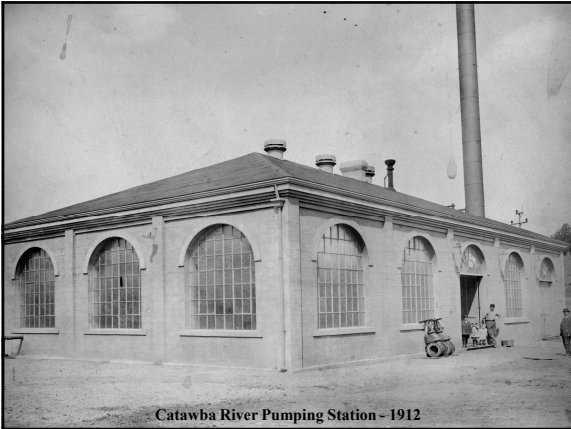
Independence Square in Charlotte in 1875 (intersection of Trade & Tryon). Cisterns had been built to store water in the City, one in each of the four wards.

















Catawba River Pumping Station - 1912

Lakewood Park from 1910 through 1933 on Stewart Creek

- In 1910, a lake was created by the Southern Power Company off Rozelle's Ferry Road west of downtown Charlotte to cool power transformers. A private park was developed around the lake.
- Newspapers called it a "Veritable Coney Island." It was recognized as one of most attractive and up-to-date parks in southeast.
- Park closed in 1933 due poor attendance brought on by the depression. Dam washed out in 1936

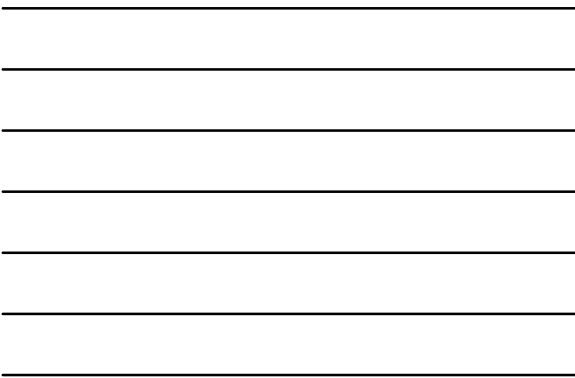


1929 – Charlotte's Storm Sewer Flooded with Liquor



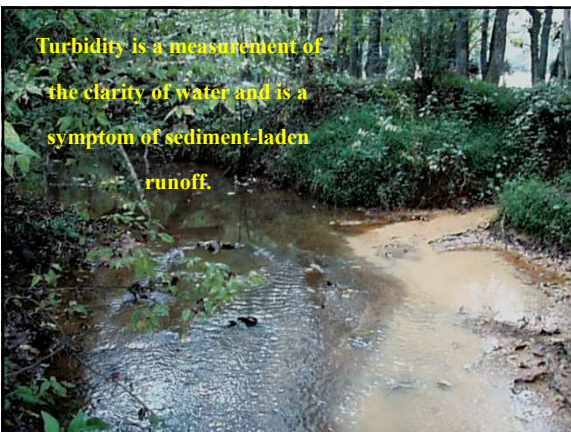
Charlotte Observer Article (November 19, 1929) – Prohibition Era (Liquor Illegal)

- Police confiscated over 1,000 gallons of corn whiskey and poured it down the storm sewer in Charlotte.
- A crowd gathered after someone dipped their finger into the drain and licked off the booze.
- Soon the storm drain grate was torn off and liquor by the hatful was being dipped out of the storm sewer.
- Police had to break up the party to keep the peace.



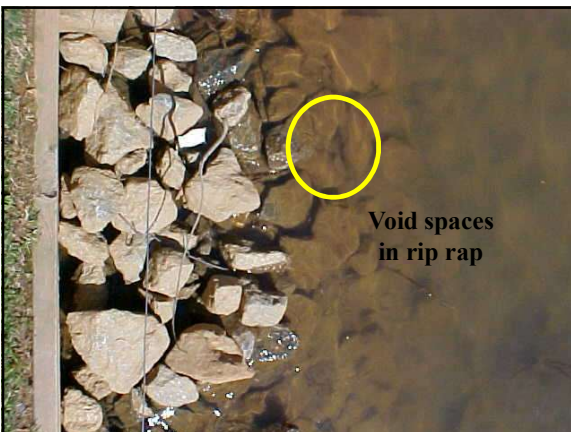




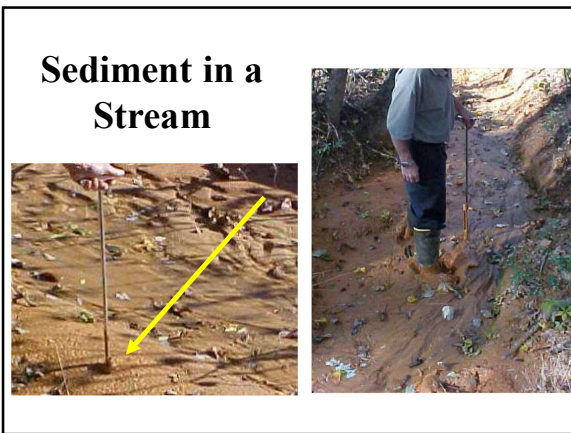














Sediment clogs the gills and fish causing them to suffocate. It also clouds the water interfering with their ability to find food.





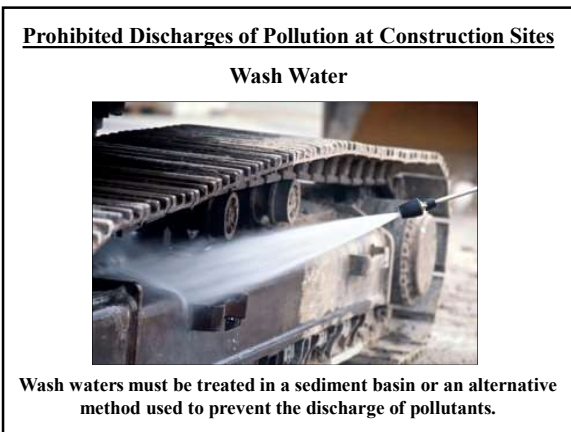
Sediment deposits bacteria, heavy metals and other pollutants in surface waters.



Sediment buries wetlands destroying plants and aquatic life.







Prohibited Discharges of Pollution at Construction Sites

Building Materials, Construction Waste, and Trash



Materials must be properly contained and covered to prevent discharges.

Prohibited Discharges of Pollution at Construction Sites

Spills and Leaks



Measures must be implemented to prevent spills and leaks and a spill response plan developed.

Prohibited Discharges of Pollution at Construction Sites

Concrete



Concrete washout stations must be established to prevent discharges.

Prohibited Discharges of Pollution at Construction Sites

Stucco, Paint, Curing Compounds and Other Construction Products and Materials



Materials must be properly handled, collected and disposed of.

Prohibited Discharges of Pollution at Construction Sites

Fuels, Oils, Antifreeze and other Products Used in Vehicle and Equipment Operation and Maintenance



These materials must be properly stored and handled to prevent discharges.

Prohibited Discharges of Pollution at Construction Sites

Pesticides, Herbicides, Fertilizers and Chemicals



These materials must be properly stored, handled and applied to prevent discharges.

Prohibited Discharges of Pollution at Construction Sites

Sewage



Sewage must be properly stored, handled and disposed of to prevent discharges.

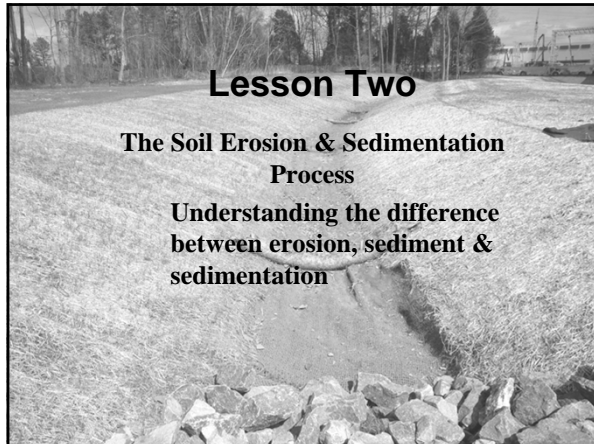
Get Involved in Helping Protect our Waters

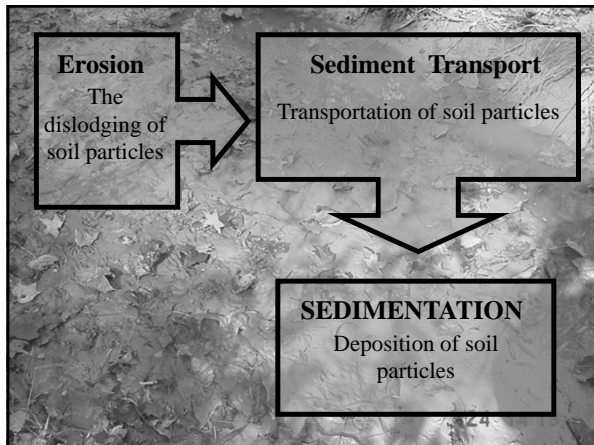


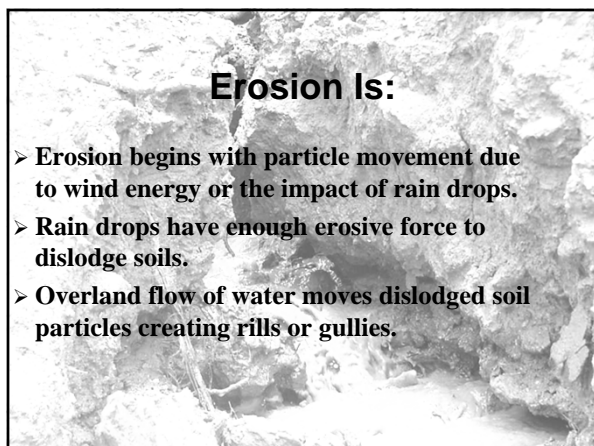
- Don't Pollute
- Adopt-A-Stream
- Mark Storm Drains
- Plant Trees in Buffers
- Be A Water Watcher

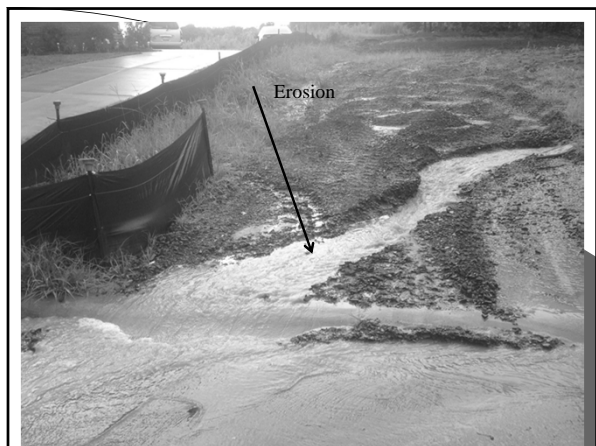
Call 311



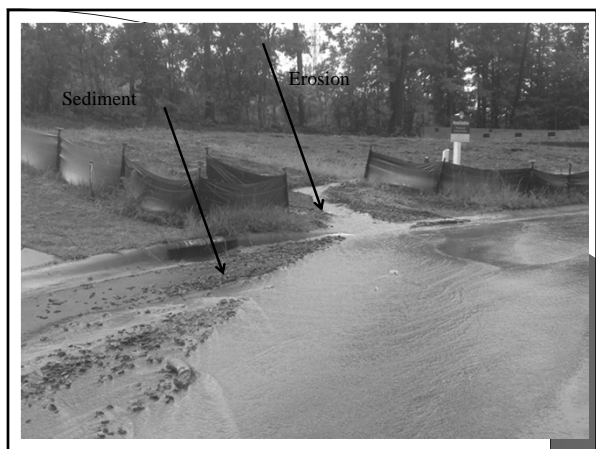
















Sediment Is:

- Dislodged soil particles which can be transported via water or wind.

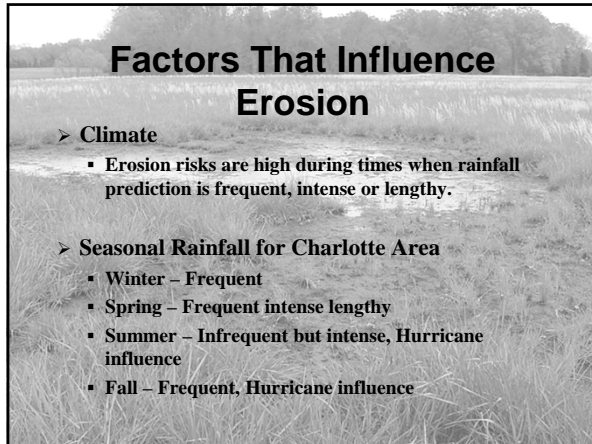
Sedimentation is:

- Accumulation of dislodged soil particles in low points where flow of water slows down.
- Sediment settles out when reduced water velocities no longer have enough energy to carry the particles.



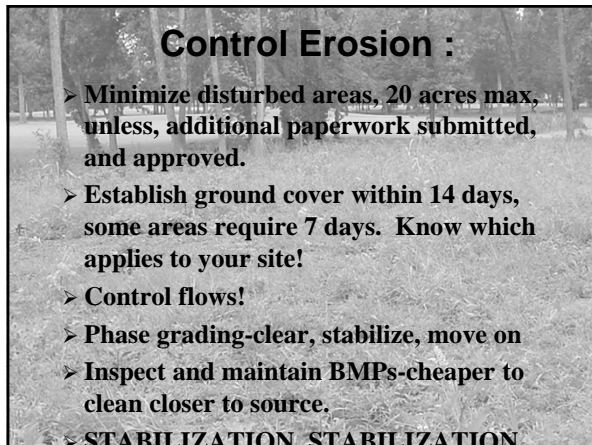
Factors That Influence Erosion

- Soil Type
 - Silt = Extremely susceptible to erosion
 - Clay = Moderately susceptible to erosion
 - Sand = Low susceptibility to erosion
- Vegetative Cover
 - Reduces erosive force of rain drops
 - Roots hold the soil together
- Topography
 - Slope length and steepness greatly influence volume and velocity of surface runoff




Factors That Influence Erosion

- Climate
 - Erosion risks are high during times when rainfall prediction is frequent, intense or lengthy.
- Seasonal Rainfall for Charlotte Area
 - Winter – Frequent
 - Spring – Frequent intense lengthy
 - Summer – Infrequent but intense, Hurricane influence
 - Fall – Frequent, Hurricane influence



Control Erosion :

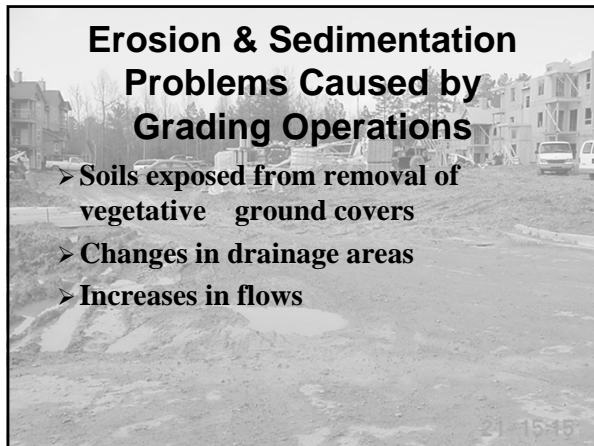
- Minimize disturbed areas, 20 acres max, unless, additional paperwork submitted, and approved.
- Establish ground cover within 14 days, some areas require 7 days. Know which applies to your site!
- Control flows!
- Phase grading-clear, stabilize, move on
- Inspect and maintain BMPs-cheaper to clean closer to source.
- ~~STABILIZATION STABILIZATION~~

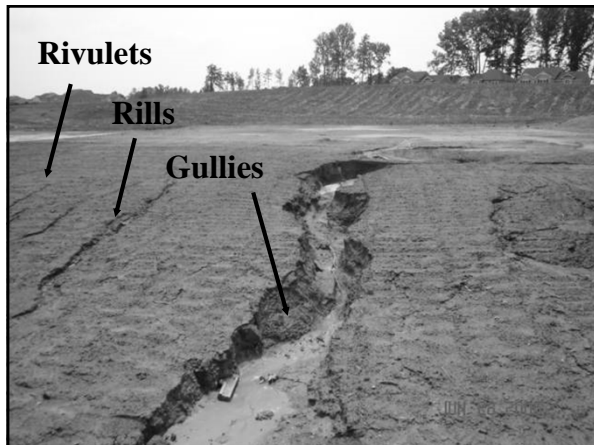


How to Control Sedimentation:

- Reduce erosion potential
- Reduce flow velocities
- Capture sediment near source
- Inspect and maintain BMPs
- You tell the water where you want it to go
- STABILIZATION

16 13:36











Rules & Regulations

Agencies

SESCO

NCG010000

Regulatory Agencies

- Federal
 - US Environmental Protection Agency (USEPA)
 - US Army Corps of Engineers (USACE)
- State
 - NC Department of Environment and Natural Resources (NC DENR)
 - DEMLR Division of Energy, Mineral and Land Resources
 - Division of Water Resources (& Meck. Co-Memorandum of Agreement)
- Local
 - City of Charlotte
 - Mecklenburg County

US EPA



- General Permit Inspection/enforcement
- Civil Penalties >\$25,000

US ACE



US Army Corps
of Engineers®

- Regulates dredge and fill of jurisdictional wetlands and streams under authority of 404 permits
- Issues cease and desist orders

NC DENR – DEMLR



- Sedimentation Pollution Control Act of 1973
 - Five Mandatory Standards
 - Erosion and Sediment Control (E&SC) Plan Required
 - Approved plan must be followed
 - Buffer Zones
 - Stabilization of Cut and Fill Slopes
- Regulate the NCG010000 (Construction Site Stormwater Permit)
- Civil penalties up to \$5,000 per day

NC DENR – Division of Water

Resources



- 401 Certifications for impacts to jurisdictional streams and wetlands.
 - Ensure compliance with the permit
- Civil Penalties up to \$25,000/day/violation

New NCG010000

- Issued - April 1, 2019
 - Old Permit 2011, extended 2 additional years.
- Governs ALL sites equal to or greater than one acre
- Subject to permit in addition to the approved E&SC Plan
- Authority delegated to States from US EPA under requirements of the Clean Water Act

NCG01000 Requirements

- Concrete Handling
 - Managed to avoid surface waters
- Stabilization timeframes
 - 7 Days (Perimeter and Slopes)
 - 14 Days (All other areas)
- Skimmer on all basins 1 acre or greater
- Self Inspection & Reporting
 - Once per 7 calendar days and within 24 hours of a rain event \geq 1.0 inch
 - Retained for 3 years upon completion

NCG01000 Requirements

- E&SC Plan Approval
- Grading Letter of Approval
- Approved Plan Must be Followed
- Equipment Operation & Maintenance
 - Fuels, Lubricants, coolants, petroleum products
- Material Handling
 - Herbicides, Insecticides, Fertilizer
- Building Material Waste Handling
 - Demolition, construction, litter, and sanitary waste

NOTICE OF INTENT

https://edocs.deq.nc.gov/Forms/NCG01-NOI

[Home](#)
[Permits & Rules](#)
[Outreach & Education](#)
[Energy & Climate](#)
[Conservation](#)

- [Water Supply Watershed Map](#) (Interactive web-based map to help determine if your project is located in a water supply watershed) *Always contact your local government to verify current boundaries and classifications of water supply watershed areas.*
- [Stormwater Permitting Interactive Map Viewer](#) (Interactive web-based map to help determine which stormwater permitting requirements may apply to your project)
- [Stormwater Permit Tracker](#) (search for active and expired stormwater permits)
- [Surface Water Classifications](#) (find a stream name, index number, and classification)
- [Impaired Waters Map](#) (check the 303(d) status of a stream or other waterbody)
- [Environmental Permit Application Tracker](#) (check the status of applications for DENR environmental permits, including State Stormwater, NPDES Wastewater, etc.)
- [NC OneMap](#) (Large collection of free, statewide GIS data)

[WSW Maps & GIS Resources](#)
[WSW Program History](#)
[WSW Model Ordinances](#)
[WSW Forms](#)
[Newsletter "Streamlines"](#)
[WSW FAQ](#)

NC Surface Water Classifications

Click a stream for more information

NC Classifications Website

Search Stream Name or ID

Stream Index: 11-137-B-2
 Stream Name: Briar Creek
 Description: From source to Little Sugar Creek
 Classification: C
 Date of Class: July 31, 1995
 River Basin: Catawba
 What does this Class mean? [Mark site](#)

Charlotte/Mecklenburg Soil Erosion and Sediment Control Ordinance

- City of Charlotte Code of Ordinances
 - Chapter 17
 - http://library.municode.com/HTML/19970/level2/Pil_C_17.html
- Mecklenburg County
 - Independent Ordinance
 - <http://charmeck.org/mecklenburg/county/WaterandLandResources/LandDevelopment/Documents/ErosOrd.pdf>

Statement of Purpose:

The sedimentation of streams, lakes, wetlands and other waters of this state constitute a **major pollution problem**. Sedimentation occurs from the erosion or depositing of soil and other materials into the waters. Control of erosion and sedimentation is deemed vital to the public interest and necessary to public health and welfare, and expenditures of funds for erosion and sedimentation control programs shall be deemed for a public purpose. It is the purpose of this chapter to provide for creation, administration, and enforcement of the program through procedures and for the adoption of mandatory standards that will **permit development of the county to continue with the least detrimental effects from pollution by sedimentation**. In recognition of the desirability of early coordination of sedimentation control planning, it is the intention of the city council that preconstruction conferences be held among the affected parties.

Land-disturbing Activity

- Means any use of the land by any Person in residential, governmental, industrial, education, institutional, or commercial development, highway and road construction and maintenance that results in a **change in the Ground Cover or topography and that may cause or contribute to Sedimentation**

Applicability of Ordinance

- All Land-Disturbing Activity Except:
 - Agricultural Activities
 - Timber Harvest Activities Conducted in Accordance with BMPs set out in the NC Forest Practice Guidelines
 - Mining Activities
 - Emergency Operations
 - Land-disturbing activity regulated exclusively by the State

General Requirements

(Chapter 17-31 or Section 6)

- E&SC Plan Approval (sites \geq 1 acre)
- Approved Plan Must be Followed
 - Sequence
 - Installation of measures
- Self Inspection and Reporting
- Civil Penalties up to \$5,000/day/violation

Grading Permits

(Chapter 17-36 or Section 11)

- Required prior to any disturbance > 1 acre
 - Lands developed as a unit will be aggregated regardless of ownership
 - Single Family Lots
 - Borrow and Waste Areas
 - Exceptions:
 - Activities approved at preconstruction conference (installation of measures)
 - Activities for the purpose of fighting fires


Erosion & Sediment Control Plans

(Chapter 17-35 or Section 10)

- Include an authorized statement of financial responsibility
- Must comply with all Federal, State, and Local laws, rules, and regulations
- Specify the Construction Sequence
- Must be followed, or revised...

Getting Started...

- Notification of plan approval
- Apply for a Certificate of Coverage (NOI)
- *Have site flagged* (limits, basins, outfalls, buffers)
- Contact Erosion Control Coordinator to schedule Preconstruction meeting
- Discuss Project scope and installation of tree protection and erosion control BMPs.
- Install measures, clearing only as necessary for installation or as agreed upon in the preconstruction meeting
- Contact Erosion Control Coordinator for inspection of measures and Urban Forestry for tree protection
- After Inspector verifies installation as specified in the approved plan, a grading permit will be issued and site



Field Changes/Disclosures

- Field Change process
 - Contact Inspector for approval
 - May be directed to revise plan
- Failures or deficiencies resulting in off-site sedimentation must be disclosed
- Emergency Situations

Monitoring & Maintenance

- Weekly inspections
- *NEW* NC DENR Inspection requirements
- Qualifying rainfall event inspections
- Documentation of failures/deficiencies
- Correction of failures/deficiencies

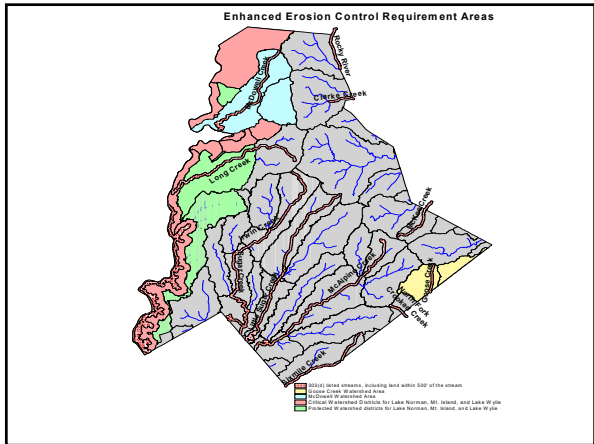
Performance Expectations

ABOVE ALL:

The plan must function to effectively prevent offsite impacts! If field changes are deemed insufficient or ineffective, a plan revision may be required.

Policies

- Any project directly upstream of a privately-owned water feature (pond, lake, impoundment) may be required to survey sediment levels pre and post construction.
- Additional requirements in certain areas (303-d listed streams, Critical Areas, McDowell Creek watershed, Goose Creek watershed)
 - 5 day limit on time of exposure
 - Forebays required
 - Spillways designed for 25-year event
 - 20 acre limit on concurrent disturbance



Violations & Notices

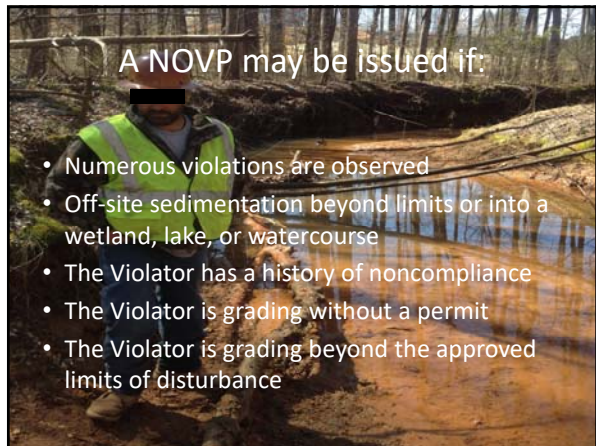
- Notice of Violation (NOV)
- Notice of Continuing Violation (CNOV)
- Notice of Violation with Penalties (NOVP)
- Notice of Compliance (NOC)
- Notice of Compliance with Penalties (NOCP)

A NOV may be Issued if:

- It is first-time violation
- Deficiencies were identified not resulting in significant offsite sedimentation
- Verbal requests for corrections have proven ineffective

A CNOV may be Issued if:

- Corrective actions required by a NOV or inspection report were not completed by the specified date



Penalties

- Violations are subject to civil penalties up to \$5,000.00 **per day per violation**
- Aggravating/Mitigating circumstances will be considered when assessing penalty amounts

Appeals

- Penalty Meeting with Staff Supervisor to discuss factors
 - CMCSI
- Storm Water Advisory Committee Appeal Board (Formal)
 - \$100 filing fee
 - 30 day period to file appeal

Fact Sheet on the New NCG01 Permit

April 2019



The NC Construction General Permit (also known as “NCG01”) was renewed on April 1, 2019. The updated permit does not significantly change the measures that are required to be implemented on construction sites. However, there are some organizational and technical updates to the permit as described below. Most notably, there is a new process in which construction sites will obtain official coverage under an NCG01 permit through an electronic process. DEMLR worked with a broad team of stakeholders to make all of these updates. If you have questions, contact Annette Lucas at Annette.lucas@ncdenr.gov or (919) 707-3639.

Organizational Updates

The new permit:

- Repeats state requirements for E&SC Plans and organizes them with federal construction activity requirements;
- Is clearly organized by topic; and
- Has less text and more tables.

Technical Updates

The new permit:

- Requires that the E&SC Plan meet SWPPP requirements (p. 2);
- Provides a list of items that must be included in the SWPPP, such as the construction sequence, plans, calculations, etc. (p. 2-4);¹
- Has updated language on bypasses and upsets that is tailored to construction activities (p. 10);
- Puts all timeframes for inspections, record-keeping and reporting in “calendar days” for clarity and consistency (p. 11-14);²
- Changes the inspection frequency (during business hours) to at least once per 7 calendar days and after every storm ≥ 1.0 inch (previously 0.5 inch);³ and
- Excludes weekends, state and federal holidays from normal business hours unless construction activities take place (p. 23).

¹ This list is based on website guidance by the DEMLR Sediment Program.

² The number of calendar days was selected to be as equivalent as possible with the previous permit.

³ The intent is to provide predictability to the inspection schedule.

Acronyms to Know

COC: Certificate of Coverage, proof of coverage under an NCG01 permit

DEMLR: NC Division of Energy, Mineral, and Land Resources

E&SC: Erosion & Sedimentation Control

e-NOI: Notice of Intent, application form for the NCG01 permit

e-NOT: Notice of Termination, form for closing out the NCG01 permit

SWPPP: Stormwater Pollution Prevention Plan, required by the NCG01



The NCG01 Process

The new NCG01 applies to permits approved on or after April 1, 2019.

Permittees will no longer receive a copy of the NCG01 permit in the mail with their E&SC Plan approvals and be considered as covered under the permit. Federal rules require that DEMLR receive an NOI on each construction project and issue each construction project its own COC.

Under the new NCG01 process, construction sites will continue to receive approval for E&SC Plans from either DEMLR or the delegated local E&SC program just like before. After receiving E&SC Plan approval, permittees will officially obtain coverage under the NCG01 by completing an e-NOI (available at deq.nc.gov/NCG01). The e-NOI will only take about 20 minutes to fill out and submit on-line.

Initially, there will be no charge associated with applying for an NCG01 permit but on or around June 1, 2019, DEMLR will begin charging a \$100 annual general permit fee as required per §143-215.3D.

DEMLR is working on creating a single application form that will allow an applicant to simultaneously apply for an E&SC permit and an NCG01 COC. That effort is part of a larger Permit Transformation project at DEMLR.

Q&A About the New NCG01 Permit

Why do construction sites have to do this extra application step?

DEMLR is required by the EPA to issue a specific COC to every construction site that disturbs one acre or more. DEMLR is working to create a form that combines the E&SC plan approval and e-NOI processes, but that will take more time. For now, DEMLR has created an efficient e-NOI process.

If an E&SC Plan is approved before April 1, which permit applies?

Projects with already approved E&SC Plans will automatically follow the new NCG01 permit, but will not need to fill out an e-NOI or pay an annual permit fee. However, the permittees should print the new permit and the two standard detail sheets and have them on site.

Will DEMLR offer tools to help permittees comply with the new NCG01?

Yes, DEMLR will provide two sample plan sheets at deq.nc.gov/NCG01 that can be placed into the E&SC plan set. The first covers the site stabilization and materials handling portions of the permit. The second sheet covers the inspection, record-keeping and reporting portions of the permit.

How will the new e-NOI submittal and COC process work?

Permittees will apply for E&SC Plan approvals from DEMLR or the local E&SC program like before. The E&SC approval letter will instruct the permittee to visit deq.nc.gov/NCG01 to submit an e-NOI form to DEMLR. The permittee may begin the construction activity after receipt of the COC (within three days*). The permittee must print and retain a copy of the permit and the COC on site. Initially, the COC will be issued for free but on or around June 1, 2019, a \$100 annual general permit fee will be charged.

Who is allowed to submit an e-NOI form?

Submittal must be by a responsible corporate officer that owns or operates the activity, such as a president, secretary, treasurer, or vice president or a manager that is authorized in accordance with IV.B.6 of the NCG01 permit. Additional signatory options are set forth in IV.B.6 of the permit. It is possible for consultant to prepare the e-NOI, save it as a draft, and email it to the responsible entity for signature & submittal.

What happens to the COC when the construction activity is complete?

When a project is complete, the permittees will contact DEMLR or the local delegated program to close out the E&SC Plan. After DEMLR or the local E&SC program inform the permittee of the project close out via inspection report, the permittee will visit deq.nc.gov/NCG01 to submit an e-NOT.

Will there be a grace period for adherence to the new process?

DEMLR does not have the authority to grant a grace period from a federally mandated permit. Permittees will be informed of the new process via web site, E&SC Plan approval letters and list servs. If a construction activity disturbs one acre or more (or is part of common plan of development that disturbs one acre or more) fails to submit an e-NOI after approval of its E&SC Plan, this is a violation of federal permitting requirements and the permittee could be subject to a penalty assessment.

How does the new NCG01 affect the delegated local E&SC Programs?

Local programs will continue to review and approve E&SC plans. However, they will no longer send copies of the NCG01 with E&SC Plan approvals. DEMLR will provide sample language to use in local E&SC Plan approvals to advise permittees that they must submit an e-NOI to DEMLR.



Local programs are not required to check if permittees have submitted e-NOIs to DEMLR. However, if they wish to do this voluntarily, there will be a tool available on DEMLR's web site for them to view a list of construction projects that have submitted e-NOIs.

When local programs close out an E&SC Plan, the close-out letter will advise permittees that they must submit an e-NOT. DEMLR will provide sample language.

Local programs may approve E&SC plans that meet state sediment laws and rules even if those plans are not compliant with all of the NCG01 requirements. However, their permittees will be required to add two plan sheets (which will be provided by DEMLR) to their E&SC Plans to ensure that they fully comply with the ground stabilization, materials handling, and inspection, record-keeping and reporting portion of the NCG01 permit.

** Or 24 business hours for a project approved under the DEMLR Express review program.*

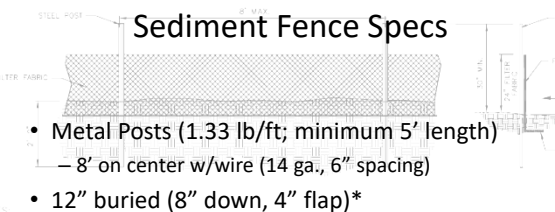
Installation and Maintenance of Erosion Control BMPs

- Common BMPs
- Applications
- Specifications
- Installation
- Problems
- Maintenance

Utility

- Design Professionals
 - Clarifications, proactive problem solving
- Contractors
 - Installation , maintenance and function
- Inspectors
 - Common deficiencies, documentation
- Owners
 - Specifications required by approved plan...

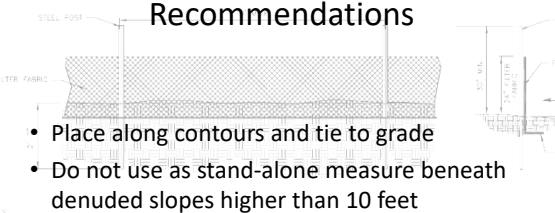
- Silt Fence (30.06A, 30.06B; 6.62.1)
Treat small disturbed areas
Flow diversion (2% grade)



Silt Fence Specs

- Metal Posts (1.33 lb/ft; minimum 5' length)
— 8' on center w/wire (14 ga., 6" spacing)
- 12" buried (8" down, 4" flap)*
- Less than 2% slope
- No concentrated flows
- Treats ¼ acre per 100 feet (refer to Table 6.62a)
- Additional requirements for high-hazard

MAINTENANCE NOTES:
1. FILTER BARRIERS SHALL BE INSPECTED BY THE DISTRICT ENGINEER OR HIS REPRESENTATIVE IMMEDIATELY AFTER EACH RAINFALL EVENT. ANY DAMAGED BARRIERS SHALL BE REPLACED PROMPTLY.
2. SHOULD THE FABRIC DISINTEGRATE OR BECOME UNUSABLE, THE DISTRICT ENGINEER SHALL BE PROMPTLY NOTIFIED.
3. SEDIMENT DEPOSITS SHOULD BE REMOVED TO THE HEIGHT OF THE BARRIER. ANY SEDIMENT REMOVED SHALL BE PLACED PROMPTLY AND SECURED.



Recommendations

- Place along contours and tie to grade
- Do not use as stand-alone measure beneath denuded slopes higher than 10 feet
- Mechanical compaction for anchoring
- Place 12" #5 stone along toe when using fence to divert flows to treatment areas
- J-hook to treat perimeter slopes

MAINTENANCE NOTES:
1. FILTER BARRIERS SHALL BE INSPECTED BY THE DISTRICT ENGINEER OR HIS REPRESENTATIVE IMMEDIATELY AFTER EACH RAINFALL EVENT. ANY DAMAGED BARRIERS SHALL BE REPLACED PROMPTLY.
2. SHOULD THE FABRIC DISINTEGRATE OR BECOME UNUSABLE, THE DISTRICT ENGINEER SHALL BE PROMPTLY NOTIFIED.
3. SEDIMENT DEPOSITS SHOULD BE REMOVED TO THE HEIGHT OF THE BARRIER. ANY SEDIMENT REMOVED SHALL BE PLACED PROMPTLY AND SECURED.

Installation

- Follow specifications
- Adapt to conditions
- Do not use to intercept concentrated flow

Maintenance

- Inspect weekly and after rain
- Restore storage area when sediment accumulation reaches 9"
- Replace worn or damaged sections
- Stabilize/repair drainage areas

Sediment Fence Outlet

- Known to NCDOT as Special Sediment Control Fence
- CLDS 30.06C

Applications

- Treat small disturbed areas where sediment fence is likely to over-topped in low areas
- Short-term

Design Specs

- Posts 4' on center
- Hardware cloth
- 16-18" washed stone or rip-rap faced with washed stone
- Inspect and maintain

Installation

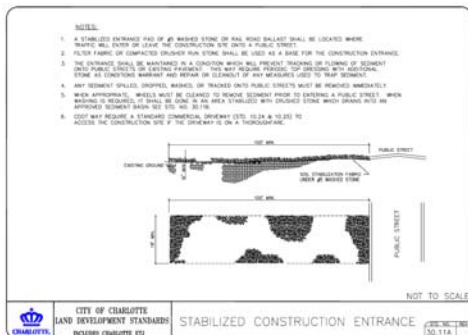
- Offset from low point
- Appropriately spaced
- Hardware cloth and washed stone
- Additional reinforcement

Maintenance

- Inspect weekly and after rain
- Restore storage area when sediment accumulation reaches $\frac{1}{2}$ the storage area or no greater than 1 foot
- Replace worn or damaged sections
- Stabilize/repair drainage areas

Construction Entrances

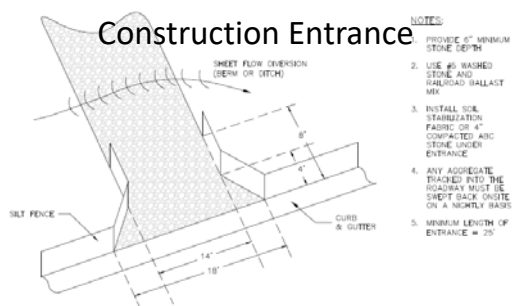
Construction Entrance (CLDS)



Installation

- Compacted subgrade
- Stone base or fabric
- Minimum length...?
- Course aggregate on surface
- Locate on high side (drain to site)
- Cut-off swale if necessary
- Allow for turning movements
- Put them where needed...

Construction Entrance



NOT TO SCALE

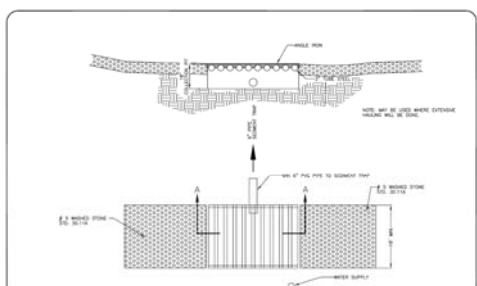


CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE STD

CONSTRUCTION ENTRANCE
SINGLE FAMILY LOT

30.11C 12

Tire Wash (CLDS)



NOT TO SCALE



CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
INCLUDES CHARLOTTE STD

CONSTRUCTION ENTRANCE
TIRE WASH

30.11B 12

Maintenance

- Replace/refresh WHEN NECESSARY
- Require subcontractors/site workers to sweep/shovel at curb and street daily
- Ensure cut-off swale integrity (if needed)
- Consider conditions
- Enlarge if necessary
- Add entrances if necessary

Rolled Erosion Control Product (RECP)

**Netting
Matting
Blankets
Turf-Reinforced Matting**

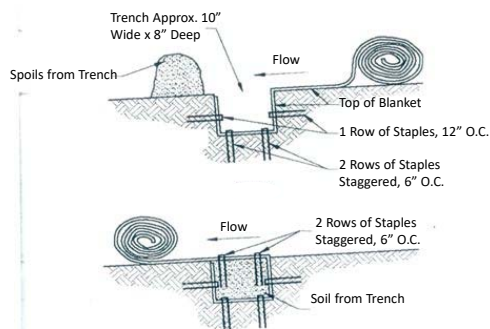
Applications

- Long or steep slopes
- When mulch cannot be adequately tacked
- Where immediate ground cover is needed
- Vegetated channels (check shear stress)

Specifications

- Design specifications (use the right RECP... correctly)
- Ground contact
- Seed bed preparation
- Manufacturer-specific directions

Installation



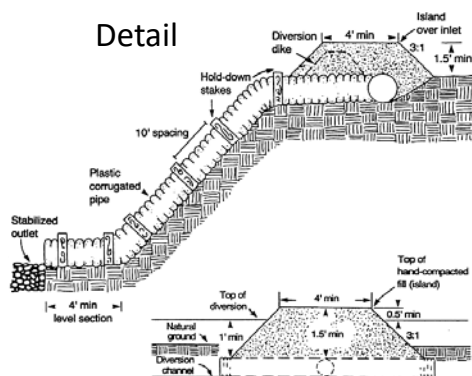
Maintenance

- Inspect weekly and after rains for signs of undermining or washout
- Correct deficiencies and repair damaged areas immediately

Slope Drains

- Convey flows at denuded slopes while permanent vegetation is established
- Convey flows at denuded slopes while permanent drainage is addressed
- Convey diversion ditches to basin forebays

Detail



Installation

- Earthen diversion with storage area and energy dissipation
- Berm 1' above top of pipe at all locations
- Hand compaction around inlet pipe
- Ensure connections are watertight

<u>Drain Area</u>	<u>Pipe Diameter</u>
0.50 acres	12"
0.75 acres	15"
1.00 acres	18"

Maintenance

- Inspect inlet area
- Repair washouts
- Remove accumulated sediment at inlet
- Inspect discharge area
- Inspect berm/slope

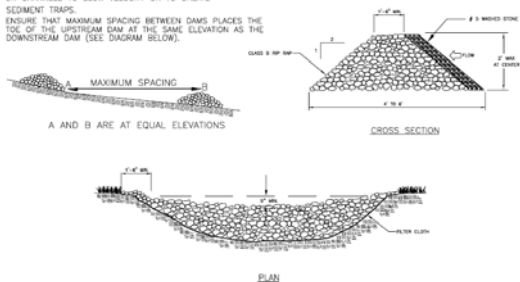
Check Dams / Grade Control

- Reduce velocity
- Reduce rill/gully erosion
- Reduce basin maintenance
- Can provide dosing method for PAM
- Do not use in jurisdictional waters

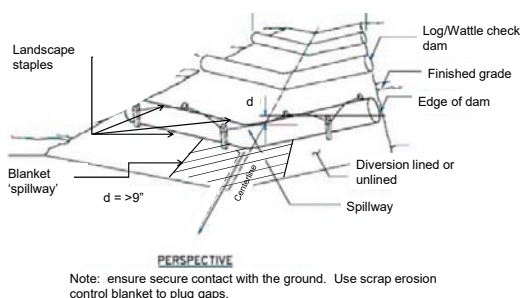
Rock Check Dam Installation

GENERAL NOTES:

1. RIPRAP SIZE TO BE DESIGNED BY ENGINEER.
2. CHECK DAMS MAY BE USED IN SLOPING DITCHES OR CHANNELS TO SLOW VELOCITY OR TO CREATE SEDIMENT TRAPS.
3. ENSURE THAT MAXIMUM SPACING BETWEEN DAMS PLACES THE TOE OF THE UPSTREAM DAM AT THE SAME ELEVATION AS THE DOWNSTREAM DAM (SEE DIAGRAM BELOW).



Wattle/Log Check Dam Installation

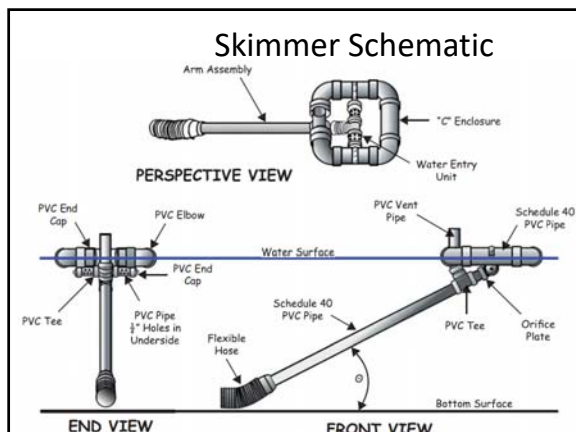


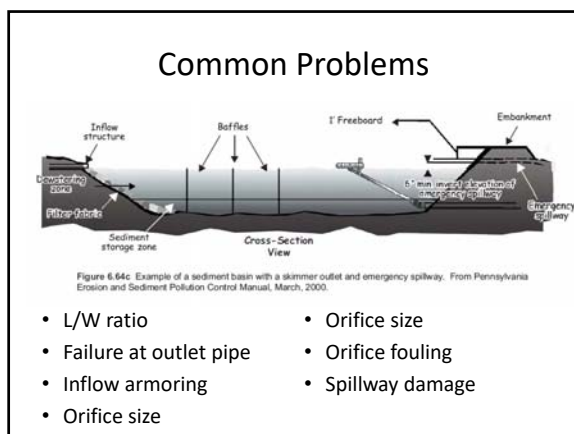
Maintenance

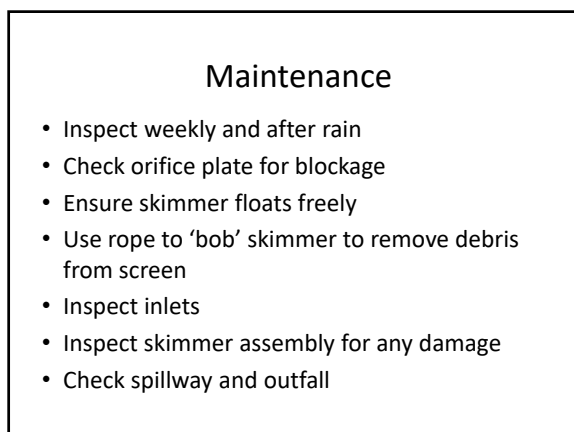
- Inspect weekly and after rain
- Expect damage from high flows washing around edges of the dam; repair immediately
- Remove accumulated sediment as necessary to prevent damage to channel vegetation
- Adjust elevations as necessary
- Do not use in jurisdictional waters

Skimmers

- Dewater from the top of the water surface
- Provide most efficient removal for gravity-treatment basins
- Dewatering rate controlled by orifice plate (drawdown in 2-5 days)
- Can be re-used
- Require more frequent maintenance





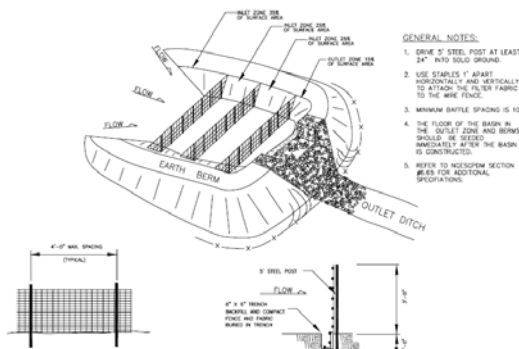


Porous Baffles



- Prevent basin 'short-circuiting'
- Promote plug flow for most effective trapping efficiency

Installation



Installation

- PHASE 1 EROSION CONTROL!
- Ensure basin floor is flat
- Ensure basin floor is one foot below skimmer invert
- Ensure that a permanent outlet structure doesn't change storage capacity or surface area
- Locate inlets opposite of outlet
- Armor inlet zones
- Provide "landing pad" for skimmer, account for sway
- Check seals at first rainfall

Installation

- Cut-off trench (2' deep, max 1:1 sideslope)
- Embankment top width:
 - Height less than 10 feet, top width \geq 8 feet
 - Height 10 to 15 feet, top width \geq 10 feet
- Freeboard 1 foot from settled embankment
- Allowance for settlement (build 10% above design)
- Basin slopes 2.5:1 or flatter
- Stabilize embankments (except bottom half)
- Non-erosive discharge

Maintenance

- Check inlets for scour/stability
- Vegetation
- Sediment depth
- Discharge clarity/turbidity impacts
- Offsite impacts?

What to do when a sediment
release occurs...

Offsite Sedimentation

- Self-report (also in General Permit)
- Investigate receiving waters (when possible) to determine extent of impacts
- Do not wash to storm drain!
- Work in safety – have a plan
- If health or human safety at risk...
- Make sure you weren't "caught by surprise" when the rainfall isn't a surprise!




GREEN SITES

The Environmentally Friendly Way





- Benefits of Stabilization
- NCG010000 NPDES Permit
- Developing a Vegetation Plan
- Seedbed Preparation
- Seedbed Amendments -New NCDENR approved Compost Blankets and Riparian Seeding
- Seed Types
- Mulching and Rolled Erosion Control Products



Environmental Benefits


- Reduces velocity of runoff and runoff volume
- Increases infiltration
- Recharges ground water
- Reduces flooding
- Filters and helps remove pollutants
- Reduces stream temperature
- Provides habitat
- Reduces sediment loads and other pollutants in our streams






Monetary Benefits

- ❑ Reduces the chances for Civil Penalties
- ❑ Reduces maintenance and repair costs on BMPs (sediment basins) and increases the effectiveness of BMPs
- ❑ Reduces cost in watering and fertilizer if topsoil is used
- ❑ Increases the marketing potential of a development





NPDES Requirements


2) Ground Stabilization

a) 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 perimeter dikes, swales, ditches, perimeter slopes and all slopes steeper than 3 horizontal to 1 vertical (3:1) 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.

b) Conditions - In meeting the stabilization requirements above, the following conditions or exemptions shall apply:

- Extensions of time may be approved by the permitting authority based on weather or other site-specific conditions that make compliance impracticable.
- All slopes 50' in length or greater shall apply the ground cover within 7 days except when the slope is flatter than 4:1. Slopes less than 50' shall apply ground cover within 14 days except when slopes are steeper than 3:1, the 7-day requirement applies.
- Any sloped area flatter than 4:1 shall be exempt from the 7-day ground cover requirement.
- Slopes 10' or less in length shall be exempt from the 7-day ground cover requirement except when the slope is steeper than 2:1.
- Although stabilization is usually specified as ground cover, other methods, such as chemical stabilization, may be allowed on a case-by-case basis.
- For portions of projects within the Sediment Control Commission-defined "High Quality Water Zone" (15A NCAC 04A. 0105), stabilization with ground cover shall be achieved as soon as practicable but in any event on all areas of the site within 7 calendar days from the last land-disturbing act.
- Portions of a site that are lower in elevation than adjacent discharge locations and are not expected to discharge during construction may be exempt from the temporary ground cover requirements if identified on the approved E&SC Plan or added by the permitting authority.



NPDES Definitions

Ground Cover – Any vegetative growth or other material which, when applied to the soil surface, renders the soil surface stable against accelerated erosion.

Permanent Stabilization – When soil disturbing activity is completed and exposed soils have been stabilized with a vegetative cover with a density of at least 80% or covered with a structural stabilization method. Permanent perennial vegetation may include the use of sod, shrubs and ground cover plants mixed with mulching, aggregate or other landscaping techniques. Structural methods include concrete, asphalt, retaining wall or other stabilization techniques.

Temporary Stabilization – When the establishment of ground cover over all disturbed areas (such as mulching, rolled erosion control products, vegetation, or other material) renders the surface stable against accelerated erosion. Stabilization shall be achieved with the establishment of a uniform and evenly-distributed (i.e., without large bare areas) ground cover with a cover density of at least 80%.



Develop a Vegetation Plan

Construction Sequence Schedule

Consider critical areas where accelerated erosion may occur:



- ☐ Steep, long, cut and fill slopes
- ☐ Adjacent to a water course, critical watershed, or adjacent to a 303d stream
- ☐ Soil types – Silt, Clay or Sand (note highly erodible soils)
- ☐ Stockpiles – 50' from storm drains or streams

Plans must contain NPDES requirements, seeding schedules, phasing in the construction sequence, and how to stabilize critical areas.

Charlotte/Mecklenburg Land Development Standards 30.17

Develop a Vegetation Plan

☐Climate:


Help determine the appropriate plant selections based on cold-hardiness, heat tolerance, high humidity, and resistance to disease

What time of year will you be seeding?

☐Direction:

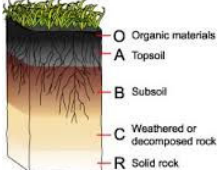
South and West facing slopes tend to be warmer and drier

North facing slopes tend to be more shaded and subject to freezing in the winter




Develop a Vegetation Plan
Soil Types for Piedmont

- ☐ Surface soils – sandy loam to clay loam
- ☐ Subsoils – Thick and heavy clay
- ☐ Deeper subsoils – silts, silt loams and sandy loams



Native NC Soils are typically low in organic matter

- May not hold moisture
- Reduced nutrients and biological life



Seedbed Preparation

Surface Roughening - Slopes




Roughening bare soil surfaces (**4 to 6 inches**) with horizontal grooves running across the slope, stair stepping, or tracking with construction equipment.

Don't forget... **slope breaks and slope spacing**

NCDEQ Erosion and Sediment Control Design Manual (Table 6.02a slope breaks)

Enhanced Measures: terrace 2:1 or steeper slopes over 19 feet



Seedbed Preparation

Scarifying the Soil- Loosen the soil 4-6 inches by using a chain harrow as shown, tilling, disking or a harley rake

☐ Surface roughening will help retain lime, fertilizer, seed, reduce velocity and increase infiltration

☐ Not scarifying the soil will reduce your chance of success to establish grass by up to 50%.



Scarifying can also help construction compacted soils return to pre-development conditions



Seedbed Preparation

Soil Test — Do your test once the top soil has been removed or at final grade. Contact the [Mecklenburg County Soil and Water Conservation](#) or the [North Carolina Department of Agriculture](#) for the test kit (**Free test**)

The test will tell you exactly how much fertilizer and lime is needed.

☐ **Proper pH**
balancing is key
(pH 6.0 – 7.0)

☐ **Proper Seedbed Preparation** –
The seed needs good soil contact so it will not be displaced by wind, rain, or surface runoff.





Seedbed Amendments

Lime and Fertilizer Application- Per the soil test results or

Lime – 4000 lbs/ acre of pulverized agricultural grade




Fertilizer – 1000 lbs/acre of 10-10-10 or equivalent nutrients.
Slow-release Nitrogen and/or Phosphorus Free may be recommended (PCO – Davidson and Matthews).

Apply uniformly and mix well with top 4-6 inches

Seedbed Amendments

Top soiling – preserving topsoil to enhance final site stabilization with vegetation OR apply compost amendments (compost seeding)

- Increases vegetation growth due to high organic matter and increased biological activity – microorganisms that enhance plant growth thrive in topsoil
- Topsoil and compost is less erodible, increases infiltration and reduces runoff
- More cost effective – reduce fertilizer, lime and watering needs

Seeding Schedule

TEMPORARY SEEDING FOR WARM AND COOL SEASON	
	EARLY SUMMER SEASON
SEEDING MIXTURE	40 lbs/acre of German millet 80 lbs/acre of tall fescue
SEEDING DATES	May 1 – August 15 Re-fertilize if growth is not fully adequate. Apply 4000 lbs/acre straw or equivalent hydroseeding.
SEEDING AMENDMENTS	Apply lime and fertilizer per soil tests, or 2000 lbs/acre limestone and 750 lbs/acre 10-10-10 fertilizer.

APPROVED DATE: 02/2007

NOT TO SCALE

MECKLENBURG COUNTY
LAND DEVELOPMENT
STANDARDS

SEEDING SCHEDULE
(SEASONAL)

DATE: 02/2007
30.17B

Seeding Schedule

FOR LATE WINTER AND EARLY SPRING: SEEDING MIXTURE: RYE (GRAIN) – 120 LB/ACRE ANNUAL LESPEDEZA (WIDE) – 50 LB/ACRE (WIDE ANNUAL LESPEDEZA OF TEMPORARY COVER IS NOT TO EXTEND BEYOND LAND) SEEDING DATES: JAN. 1 – MAY 1	SOL AMENDMENTS: FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE AND 750 LB/ACRE 10-10-10 FERTILIZER. MULCH: APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DEK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL. MAINTENANCE: REFERTILIZE IF GROWTH IS NOT FULLY ADEQUATE. RESEED, FERTILIZE AND MULCH IMMEDIATELY FOLLOWING EROSION OR OTHER DAMAGE.
FOR SUMMER: SEEDING MIXTURE: GERMAN MILLET – 40 LB/ACRE (A SMALL-TENDED LESPEDEZA MAY BE SUBSTITUTED AT A RATE OF 50 LB/ACRE) SEEDING DATES: MAY 1 – AUG. 15	SOL AMENDMENTS: FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE AND 750 LB/ACRE 10-10-10 FERTILIZER. MULCH: APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DEK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL. MAINTENANCE: REFERTILIZE IF GROWTH IS NOT FULLY ADEQUATE. RESEED, FERTILIZE AND MULCH IMMEDIATELY FOLLOWING EROSION OR OTHER DAMAGE.
FOR FALL: SEEDING MIXTURE: RYE (GRAIN) – 120 LB/ACRE SEEDING DATES: AUG. 15 – DEC. 30	SOL AMENDMENTS: FOLLOW RECOMMENDATIONS OF SOIL TESTS OR APPLY 2,000 LB/ACRE GROUND AGRICULTURAL LIMESTONE AND 1,000 LB/ACRE 10-10-10 FERTILIZER. MULCH: APPLY 4,000 LB/ACRE STRAW. ANCHOR STRAW BY TACKING WITH ASPHALT, NETTING, OR A MULCH ANCHORING TOOL. A DEK WITH BLADES SET NEARLY STRAIGHT CAN BE USED AS A MULCH ANCHORING TOOL. MAINTENANCE: RESEED 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 RYE LESPEDEZA IN LATE FEBRUARY OR EARLY MARCH.

CITY OF CHARLOTTE
LAND DEVELOPMENT STANDARDS
EXCLUDES CHARLOTTE #2

TEMPORARY SEEDING SCHEDULE

DATE: 02/2007
30.17

FOR ADDITIONAL INFORMATION, REFER TO NCCMR EROSION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL (ESCPDM), SECTION 6.10. FOR TEMPORARY SEEDING OPERATIONS, INCLUDING SEED MIXTURES, SEASONAL LIMITATIONS FOR SEEDING OPERATIONS, THE RATES OF SEEDS OF FERTILIZERS, THE KINDS OF SEEDS, AND THE DATES OF APPLICATION OF LIMESTONE, FERTILIZERS, AND SEEDS, REFER TO NCCMR EROSION SECTION 6.11 AND THE COMPLETE LANDSCAPE CONSTRUCTION STANDARDS SECTION DAVIS SEEDING AND SOILING OF TURFGRASSES.



Seed Types

Perennials – Remain viable over winter and initiate new growth each year. With proper management, they will remain indefinitely and are considered permanent ground cover.


Cool Season grasses:
Tall fescue, Kentucky bluegrass, Redtop



Warm Season grasses:
Bermudagrass, Bahiagrass, Centipedegrass




Use Certified Seed



Seed Types

Warm Season




Bermuda Grass

Pros: Deep roots help nutrient uptake (summer) and sediment removal. Less maintenance once established. Tolerates poor soils and more drought tolerant.

Cons: Longer time to establish (slower germination rates), more expensive to establish.

Cool Season



Fescue Grass

Pros: Helps with nutrient uptake (spring and fall). Quick germination and easier to establish. Cheaper than warm season grasses.

Cons: More maintenance (reseeding), not as tolerant to heat and drought. More susceptible to weeds.



Seed Types

Recommended Native Herbaceous Plants

Switchgrass
(12/1-4/1)

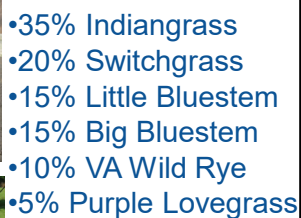


Deer-tongue
(5/1-4/1)



Other Native Species: Indiangrass, Big Bluestem, Little Bluestem, Sweet Woodreed, Rice Cutgrass, Indian Woodoats, Virginia Wild Rye, Eastern Bottlebrush Grass, Soft Rush, Shallow Sedge, Fox Sedge

See NCDEQ Design Manual for additional information







Mulch

Evenly apply **4000 lbs/acre** of clean straw (rye or wheat) or equivalent hydroseeding.





Anchor mulch to prevent displacement:


- Mulch anchoring tool (Crimper tool)
- Synthetic binders or asphalt (10 gallons per 1,000 sf)
- Hydro-Mulch/ Hydro-Seeding AUG 30 2006
- Mulch netting



Other Stabilization Methods






Hydro-seeding

Mixture of water, fertilizer, lime, seed, and fiber mulch (paper, wood, blends)

Wood fiber is better than paper because it allows the seed to breathe

Advantages:

- Jet nozzles and hoses provide accessibility to hard to reach places and steep slopes.
- Quick with high germination rates





Rolled Erosion Control Products



- Manufactured products designed to reduce soil erosion and aid in the germination and establishment of a vegetative cover.
- They are generally used on slopes and in ditches.



Rolled EC Products

This is a **temporary matting** and will usually only last through one growing season.



Excelsior

Can be used on gentle slopes where seed and straw are insufficient.



Rolled EC Products

Used for higher velocities, steeper slopes, and small drainage channels compared to Excelsior.



Straw Blanket with Coir and Jute

This product is biodegradable in approximately 2 years.



Rolled EC Products

Permanent Turf Reinforcement


Some products are not vegetated, partially vegetated and fully vegetated









USES: Steeper slopes, emergency spillways in place of rip rap, areas of high velocities and concentrations.




Rolled EC Products

Installation Techniques



- Matting must always overlap and be adequately stapled.
- The uphill side of the matting should be trenched in, to prevent water from running under the matting.



Rolled EC Products

Slope Installation Detail

Slope surface shall be smooth before placement for proper soil contact.

If there is a berm at the top of slope, anchor upslope of the berm.

Stapling pattern as per manufacturers recommendations.

Min. 2" overlap.

Anchor in 6"x6" min. Trench and staple at 12" intervals.

Min. 6" overlap.

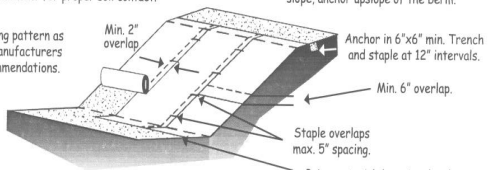
Staple overlaps max. 5" spacing.

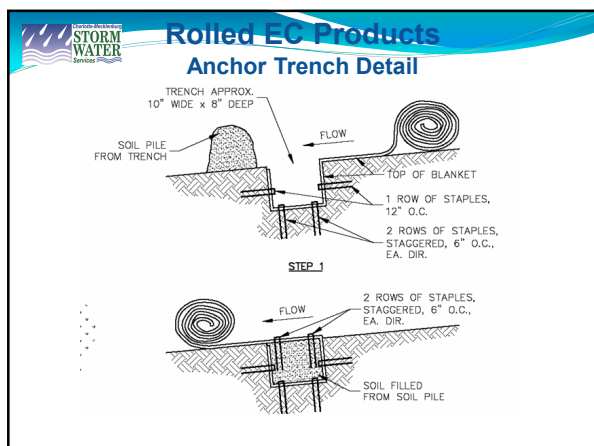
Bring material down to a level area, turn the end under 4" and staple at 12" intervals.

Do not stretch blankets/matting tight-allow the rolls to lay to any irregularities.

For slopes less than 3H:1V, rolls may be placed in horizontal strips.

Lime, fertilize, and seed before installation. Planting of shrubs, trees, etc. should occur after installation.







RECP Problems

Blankets/ Matting undermined

- ☐ Not properly secured with staples
- ☐ Top not properly trenched and anchored






The What, When, and How of Creek Crossings



- Permits
- Waters of the State
- Temporary Crossings
- Permanent Crossings
- Coffer Dams
- Check Dams
- Dewatering footings

Permits

- What types of permits are there for creek crossings?
Federal (Army Corps of Engineers)
 Section 404 of the Clean Water Act (CWA)
 Nationwide 39 (Commercial and Institutional)
 and Nationwide 29 (Residential)
 All Impacts to streams or wetlands require written notification to and approval by the Army Corps of Engineers (zero threshold)

State

Section 401 of CWA
 NCDWQ general certification 3705 required if:
 Impacts of >150'; Any impacts to streams in Catawba Basin; Any
 impacts involving excavating or dredging; impacts to wetlands
 totaling 1/10 of an acre or more

Mitigation required (>150', >1/10 acre wetlands)

Mitigation is **EXPENSIVE** \$323 - \$487 per linear foot, depending on availability...

Permits

When are the permits required?

Anytime there is a temporary or permanent impact to a "Water of the U.S." i.e. a jurisdictional water, meaning any stream that is *perennial* or *intermittent*, or *any wetland, pond or other water...* regardless of current flow.

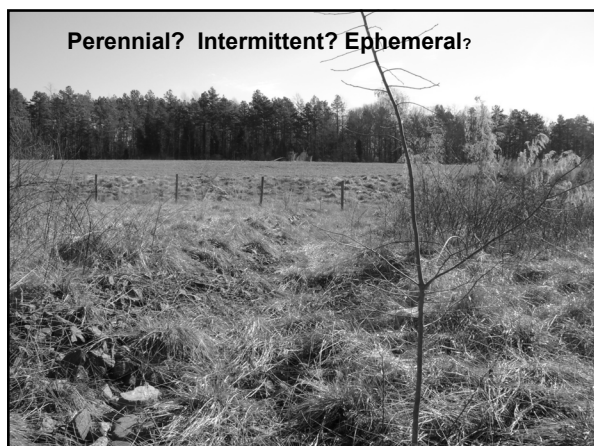
All general & regional conditions must be met or an individual permit is required

Can you tell the difference?

- **Ephemeral** stream channels- convey storm water flow only
- **Intermittent** stream channels- convey ground water and storm water flow, and by name, exhibit periodic flow depending on ground water table
- **Perennial** stream channels- convey ground water and storm water flow, under normal conditions exhibit flow year round
- Remember...permits are required for impacts to jurisdictional waters of the U.S. (**intermittent or perennial streams**)







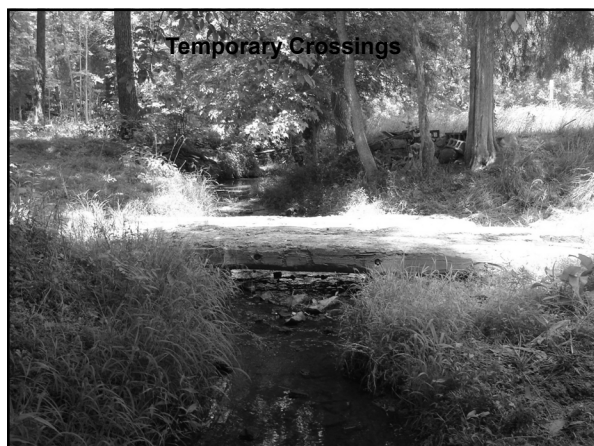


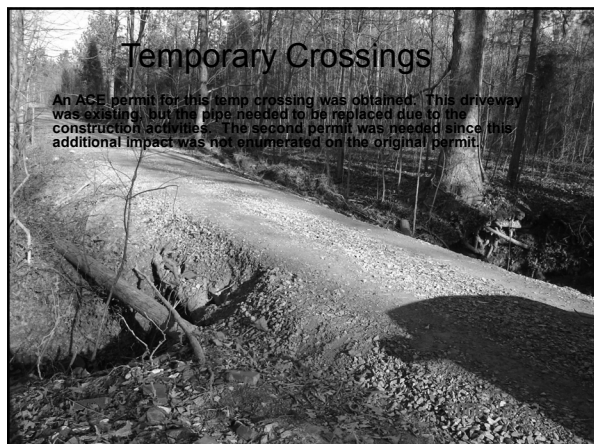




Temporary Crossings

- Temporary culvert crossings will alter the bed and bank
- Mud mats or other temp bridges should be used minimally and **ONLY** for the transfer of equipment
- All temporary crossings **MUST** be coordinated and **approved** by the inspector



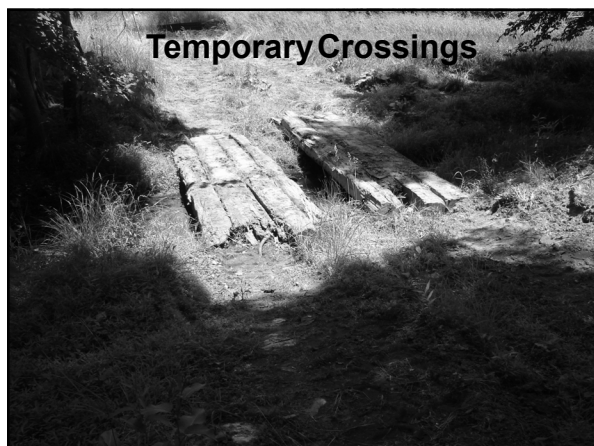


Temporary Crossings

An ACE permit for this temp crossing was obtained. This driveway was existing, but the pipe needed to be replaced due to the construction activities. The second permit was needed since this additional impact was not enumerated on the original permit.

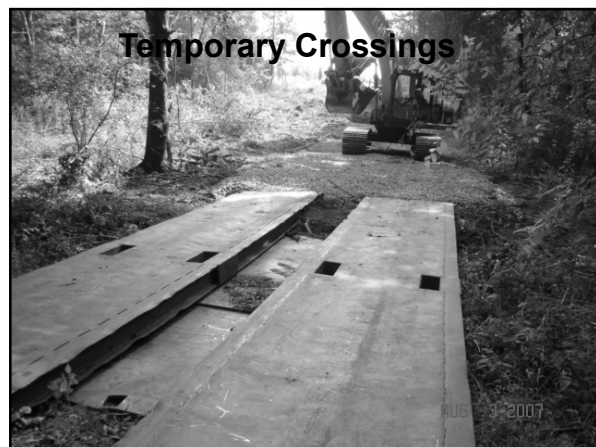


Temporary Crossings



Temporary Crossings



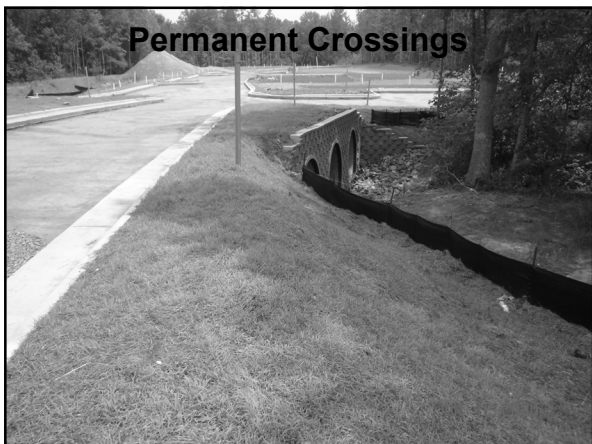






Bottom line...

- Always coordinate with the inspector
- Plan ahead
- There is almost always a way to avoid temporary crossings for the use of logging and clearing



What you must do...

- Be sure you have all the necessary required permits
Impacts must match what's on the 404 permit
- Impacts and restoration must match what's on the permit and 401 certification (NCDWQ conducts periodic compliance inspections)
- Schedule a Pre-Construction meeting with your inspector prior to starting any work!
- Follow approved plans
- Stay in contact with your inspector
- Protect our surface waters

Consider your regulator as a resource...
We are there to help!



How to proceed...

- Schedule a pre-construction meeting
- Determine the method for work taking place in a dry creek channel
- Choices
 - Pump around
 - Temporary pipe
 - Clean water bypass ditch
 - Combination

How to proceed...

- Prior to beginning with construction have a definite plan for coffer dam construction and its location...REMEMBER you must completely stop the flow of the water
- Keep coffer dams and downstream check dams within the permitted linear impact measurement

How to proceed...

- Prior to commencing with the creek crossing, ALL MATERIALS MUST BE ON SITE
- If possible, three days of clear weather should be in the forecast prior to work starting
- Proceed with work only after the inspector gives permission to start

Installation of Coffor Dam

- There are many different types of coffer dams. When selecting the appropriate dam for your site, you must take into consideration watershed, anticipated flow and future weather conditions.
- Consult with your engineer for the correct size of the coffer dam.









Down Stream Check Dams

- The Charlotte/Mecklenburg Land Development Standards Manual requires down stream check dams. Be sure you coordinate with your inspector for the locations and number of check dams prior to installation.
- Remember, these locations must be within the disturbed and permitted area.





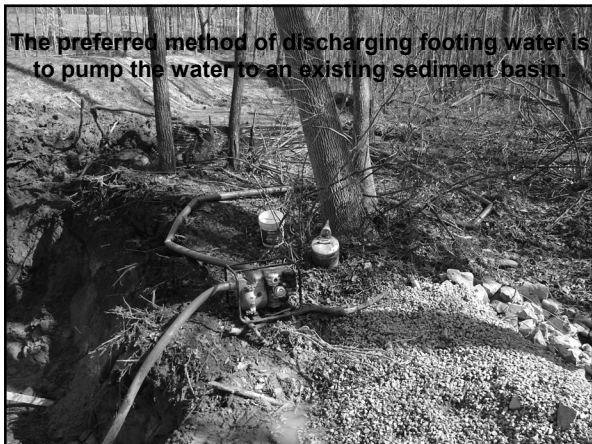
De-Watering Footings

- During the excavation of the footings, consideration must be given not only to sediment control along the creek but how will you de-water your footings.
- Discharge of ground water must be clean!
- Consult with your inspector on how and where this ground water may be discharged.









The preferred method of discharging footing water is to pump the water to an existing sediment basin.



If permission is given and the footing ground water is clean, you may discharge to the upper down stream check dam.



Pump Around The Clean Water

- Remember your coffer dam stops the flow of water to allow work to proceed within the creek channel.
- Provisions must be made to move unexpected storm water around the site.
- Be sure you have large enough pumps to move the creek water below / around your crossing.













Temporary Creek Re-location

- This method is not used often due to the high cost of construction. All temporary creek re-location must be approved by the ACE and NCDWQ and specifically listed on the 401 and 404 permits.
- The design must be done by a registered NC Engineer.







Alternative Method

- Another way of moving the creek's water through the job site is to temporarily pipe the creek. Approval from NCDWQ and the WQ program must be obtained prior to the installation of the temporary pipe.
- It is important that a registered engineer calculate both the type and size of the pipe that will be used.









Setting the Structure

Types of creek crossing structures

- Bottomless culvert
- Box culvert
- Single barrel pipe
- Multiple barrel pipes
- Mickey Mouse pipe

No matter what type of structure is installed, the requirements mandate that the bottom of the pipe is installed approximately 1 foot below the existing creek channel to ensure migration of fish, amphibians, reptiles and our micro-macro invertebrates.

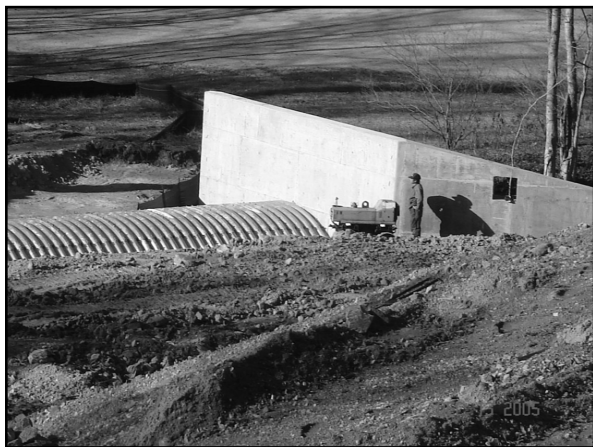


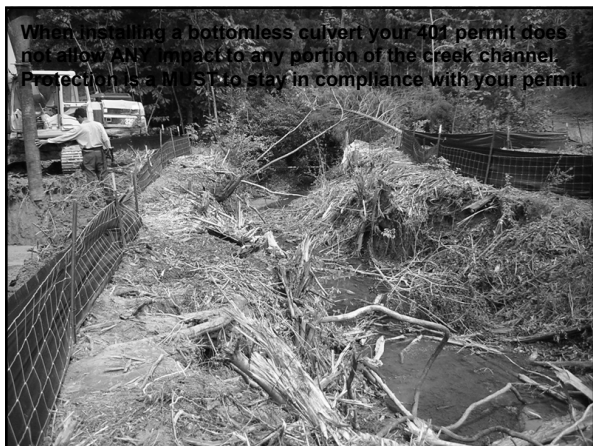




















Clean Water Bypass once the pipes have been installed

- A bypass pipe may be installed in the coffer dam to allow clean water to flow through the pipe during the final phase of completing the creek crossing.
- Be sure to obtain permission from you inspector prior to installing this bypass pipe.







- **Keep the clean water bypass installed and maintained until the construction zone is stabilized.**
- **Remove the pipe only after obtaining the inspector's approval. This includes the Land Development inspector as well.**
- **The crossing is not considered complete until permanent stabilization has been achieved.**

Remember your 401 and 404 permits do not allow rip-rap in the creek channel. The creek channel must remain un-hardened





Examples of BAD Creek Crossings

This is what we don't want to see!







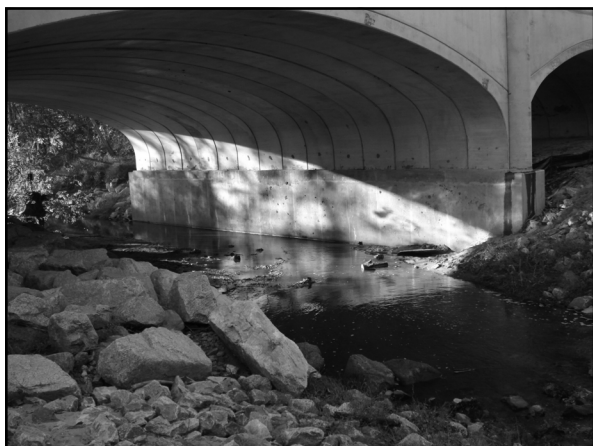
Examples of Good Creek Crossings

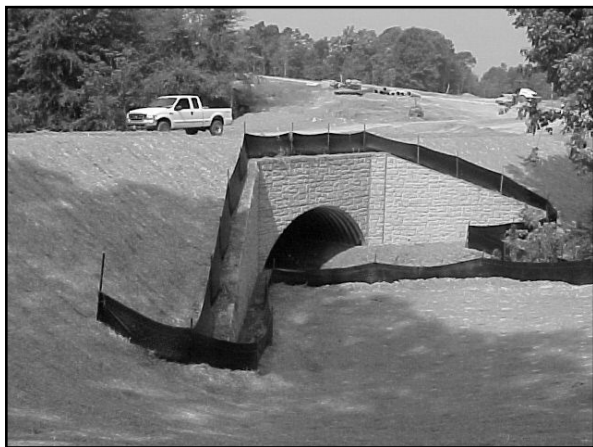
This is what we want to see!

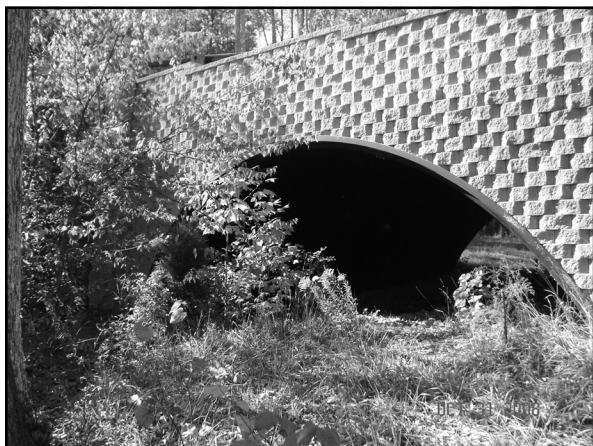




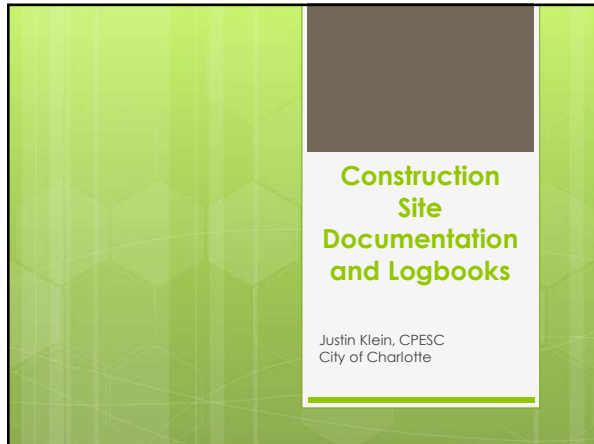


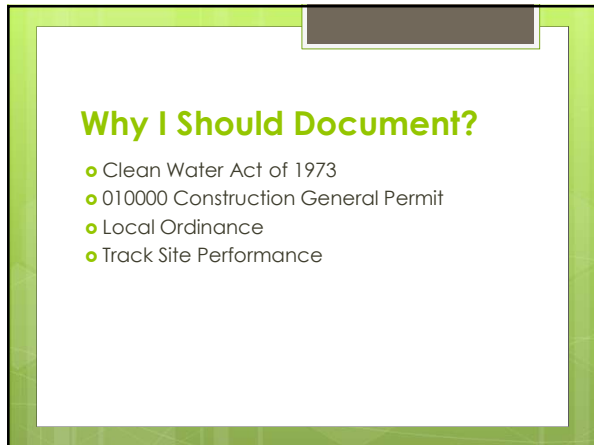














Site Inspection requirements

Required by **General Permit**

- ID Inspected Measures
- Date/Time
- Inspector ID
- Operation of Measures
- Maintenance Required
- Corrective Actions/Date
- Rainfall total by date
- Inspected Outfall/Discharges
- Visible Offsite
- Impacts and evaluation
- Improvement Efforts

Site Inspection requirements

Required by **SPCA of 1973**

- Each Phase of Construction
- Document temporary stabilization
- Note "Significant Deviation" from plan
- Identify measure to correct deviations
- Maintain and present records

Recommended Site Inspection Frequency

- Every working Day
- Before forecasted events
- After any precipitation event
- In-between Phases

Inspection Reports

- Create on-site
- Include as much detail as necessary to convey conditions
- Document ALL corrective actions
- Practice consistency
- Provide to correct contacts
- Kept on location w/ Plans & Permits
- May be used in court
- Prove diligence

Combined Monitoring Form

Control Measure Inspections


- Identification of the measures inspected
- Date and time of the inspection
- Name of the person performing the inspection
- Indication of whether the measures were operating properly
- Description of maintenance needs for the measure
- Corrective actions taken
- Date of actions taken, as well as the date and amounts of rainfall received

Combined Monitoring Form

Stormwater Discharge Inspection

- Identification of the discharge outfall inspected
- Date and time of the inspection
- Name of the person performing the inspection
- Evidence of indicators of stormwater pollution such as oil sheen, floating or suspended solids or discoloration
- Indication of visible sediment leaving the site
- Actions taken to correct/prevent sedimentation
- Date of actions taken.

Page 1 of 6



DEMR Monitoring Form Rev. 08/2019

**INSPECTION AND MONITORING RECORDS FOR ACTIVITIES UNDER STORMWATER GENERAL PERMIT NCG10000
AND SELF-INSPECTION RECORDS FOR LAND DISTURBING ACTIVITIES PER U.S.A. 112.54.1**

Project Name		Land Quality or Local Program Project/Permit #	
Approving Authority	Date of Plan Approved	Expiration Date, if applicable	
NCG10000 Certificate of Coverage Number		Date of Issuance	
Coverage under the NCG10000 permit must be renewed annually, if issued after April 1, 2019 until Notice of Termination is filed and approved.			

PART 1A: Rainfall Data

Day / Date	Rain Amt (inches) Daily Rainfall Required, except for holidays on Weekends. If no rain, indicate with a "zero"
W	
T	
W	
Th	
F	
Sat (Optional)	
Sun (Optional)	

PART 1B: Phases of the Plan

Check ALL applicable box(es) that apply to completed & current phases	X
Installation of perimeter siltation and sediment control measures	
Cleaning and grading of existing ground cover	
Completion of any grading of slopes or fills	
Installation of storm drainage facilities	
Completion of all land-disturbance activity, construction or development	
Permanent ground cover sufficient to restrain erosion has been established	

Are there any site or project conditions that limit completion of inspection?
If yes, explain conditions and areas of site that were inaccessible

Page 2 of 2

DEMR Monitoring Form Rev. 05/2019

PART 2. STORMWATER PLANS AND CONTROLS: For each question below, mark the corresponding box as Yes, No or N/A. For all items marked "No", note the reason for the "No" in the Reference letter and provide the Construction start and location of the deficiency, the original date noted, and the date it was noted as being corrected. **NOTE:** Reference letters may be cited multiple times.

Reference	PART 2a: Storm Water Plans and Related Documents	Yes	No	N/A
A	Is the approval letter or certificate, COC and a copy of the NPDES Construction General Permit (CGP) on site? (Readily available electronic copy of CGP is acceptable)			
B	Is the approved plan on site and current?			
C	Is the construction sequence being followed?			
D	Have all areas within the approved limits of disturbance been inspected?			
Reference	Corrective Actions	Inspection Date	Date Noted as Corrected	

Reference	PART 2b: Stormwater Pollutant Controls	Yes	No	N/A
E	Are erosion and sediment controls that are shown on the approved plan installed and operating properly with no repairs needed?			
F	Are stormwater controls that are shown on the approved plan installed and operating properly with no repairs needed?			
G	Are BMPs needed on any areas of the site where not otherwise indicated on the approved plan?			
H	Vehicle Tracking: Are construction entrances operating properly with no repairs needed?			
I	Soil Stabilization: Are areas of the site where construction activities have ceased been properly stabilized within the required timeframes?			
J	Are earthen stockpiles protected from sediment loss and/or stabilized, and located away or downhill from drainage paths to water sources?			

DEMLR Monitoring Form Rev. 08/02/19 Page 3 of 6

Reference	Part 2C: Non-Storm Water Pollutant Controls	Yes	No	NA
K	Concrete, stone, paint, etc. washouts: Are washouts properly located, installed, posted and operating with no repairs needed?			
L	Solid & hazardous wastes: Are trash, debris, and hazardous materials properly managed?			
M	Sanitary waste: Are portable toilets properly located and operating with no visible repairs needed?			
N	Equipment fluids: Are fuels, lubricants, hydraulic fluids, etc. contained so as not to enter surface and ground waters?			

For any items listed in this section, a full description of sedimentation is required in Part 3A. This includes, but may not be limited to: location, estimated amount of sediment that has left the site and/or entered waters, apparent causes of the sediment loss, and what corrective actions need to be taken to prevent this from recurring.

Reference	Part 2D: Sedimentation	Yes	No	NA
O	Are sediment or other pollutants noted beyond site boundaries?			
P	Are BMPs detected as releasing sediment or other pollutants into receiving waters?			

DEMLR Monitoring Form Rev. 08/02/19 Page 4 of 6

PART 3A: EROSION AND SEDIMENTATION CONTROL MEASURES: Measures must be inspected at least ONCE PER 7 CALENDAR DAYS AND WITHIN 24 HOURS OF A RAINFALL EVENT EQUAL TO OR GREATER THAN 1/8 INCH PER 24 HOUR PERIOD.

Erosion and Sedimentation Control Measures Inspected

Measure ID or Location and Description	Reference(s)	Operating Proper? (Y/N)	Inspection Date	Describe Actions Needed Corrective actions should be performed as soon as possible and before the next storm event	Date Noted as Corrected

PART 3B: STORMWATER DISCHARGE OUTFALLS (SDOs): SDOs must be inspected at least ONCE PER 7 CALENDAR DAYS AND WITHIN 24 HOURS OF A RAINFALL EVENT EQUAL TO OR GREATER THAN 1/8 INCH PER 24 HOUR PERIOD.

Stormwater Discharge Outfalls Inspected

Stormwater Discharge Outfall ID or Location	Any visible sedimentation in stream, wetlands or outside site limits? (Y/N)	Any increased turbidity from discharge? (Y/N)	Any visible erosion in stream, wetlands or outside site limits? (Y/N)	Any visible oil, grease, fueling or suspended solids or discoloration? (Y/N)	Inspection Date	Describe Actions Needed Corrective actions should be performed as soon as possible and before the next storm event	Date Noted as Corrected

Report visible sedimentation into streams or wetlands to the appropriate DEQ Regional Office via phone call or email within 24 hours of discovery. <https://deq.nc.gov/contact/regional-offices>

DEMLR Monitoring Form Rev. 08/02/19 Page 5 of 6

PART 3C: GROUND STABILIZATION Must be recorded, at a minimum, after each phase.

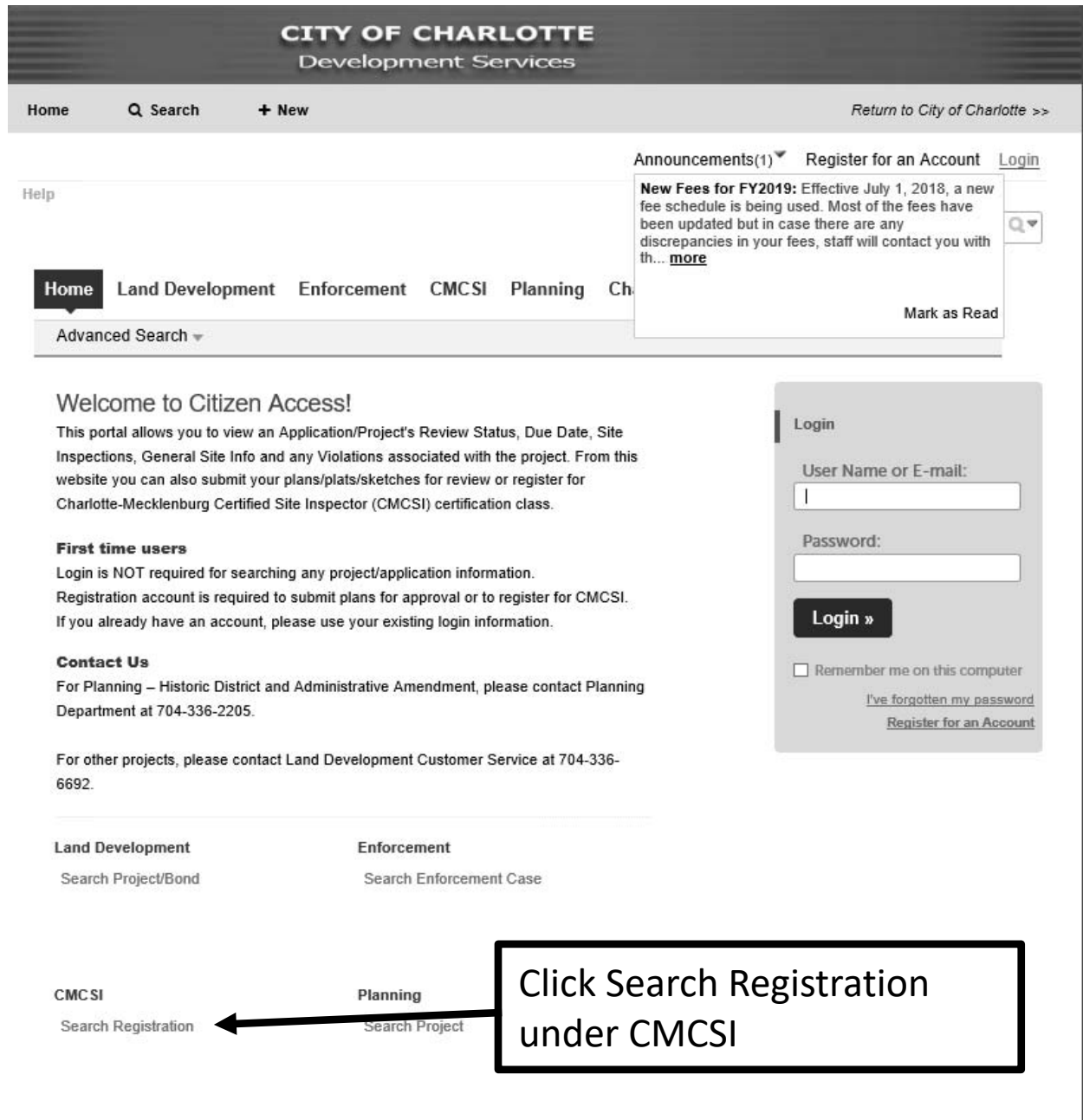
Site Area Description	Time Limit for Ground Cover (see table below)	Have stabilization measures been installed? (Y/N)	Temporary or Permanent Stabilization (TP)	Is Ground Cover Sufficient to Restrict Erosion? (Y/N)	Original Inspection Date	Describe Actions Needed Corrective actions should be performed as soon as possible and before the next storm event	Date Noted as Corrected

GROUND STABILIZATION TIMEFRAMES		
Site Area Description	Stabilization	Timeframe Variations
Perimeter dikes, swales and slopes	7 Days	None
High Quality Water (H2W) Zones	7 Days	None
Slopes Steeper than 3:1	7 Days	7 days for perimeter dikes, swales, slopes and HWQ zones 14 days for slopes 15 ft or less in length and not steeper than 2:1 10 days for Falls Lake Watershed
Slopes 3:1 to 4:1	14 Days	7 days for perimeter dikes, swales, slopes and HWQ zones 7 days for slopes greater than 50 ft in length 10 days for Falls Lake Watershed
All other areas with slopes flatter than 4:1	14 Days	7 days for perimeter dikes, swales, slopes and HWQ zones 10 days for Falls Lake Watershed

Reference Material

- North Carolina Erosion and Sediment Control Planning and Design Manual
- North Carolina Erosion and Sediment Control Inspector's Guide
- Local Standards
- Approved Plan

Retrieving your results/certification.
Visit aca3.accela.com/charlotte



New Fees for FY2019: Effective July 1, 2018, a new fee schedule is being used. Most of the fees have been updated but in case there are any discrepancies in your fees, staff will contact you with th... [more](#)



[Mark as Read](#)

Search Registration

Search for Records

Searches can be conducted using any of the following:

1. CMCSI Number
2. Applicant Name
3. Name of Business

Note:

If you do not have a full spelling of the name, you may use % as a wildcard.

General Search

General Search

☐ Search All Records

CMCSI Number:



Type:

--Select--

Applicant Name:



Start Date:



10/11/2014



End Date:



10/10/2018



License Type:

--Select--

License Number:

First:

Last:

Name of Business:



Enter the name of the participant here. You can use a %last name if you want.

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Announcements(1) Register for an Account [Login](#)

Help

[Home](#) [Land Development](#) [Enforcement](#) **CMCSI** [Planning](#) [Ch...](#)

Search Registration

Application LDCMCSI-2018-00173:
CMCSI
Record Status: Issued

Record Info

Payments

Custom Component

Work Location

7621 Little AV
CHARLOTTE NC 28226

Application Details

Applicant Information:
Scott Wilson
Landworks Design Group PA (704-841-1604)
scott.wilson@landworkspa.com

More Details

New Fees for FY2019: Effective July 1, 2018, a new fee schedule is being used. Most of the fees have been updated but in case there are any discrepancies in your fees, staff will contact you with th... [more](#)

Mark as Read

Once your application comes up click Record Info. From there you can see your status and if your certificate has been generated it will be under Attachments.



Charlotte-Mecklenburg Certified Site Inspector (CMCSI) Seminar Evaluation



**Your feedback is valuable to us. Please check the box
that best describes your experience.**

Lesson 1: “Sediment and Water Quality, Why We Care”

	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree
The material covered is relevant to my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I found this lesson informative.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The instructor was knowledgeable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would recommend this lesson to others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Lesson 2: “Ordinance and Regulations ”

	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree
The material covered is relevant to my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I found this lesson informative.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The instructor was knowledgeable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would recommend this lesson to others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Lesson 3: “Fundamentals of Erosion Control, Soil Erosion and Sedimentation Process”

	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree
The material covered is relevant to my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I found this lesson informative.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The instructor was knowledgeable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would recommend this lesson to others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Lesson 4: “Vegetation and Stabilization”

	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree
The material covered is relevant to my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I found this lesson informative.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The instructor was knowledgeable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would recommend this lesson to others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Lesson 5: “Creek Crossings”

	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree
The material covered is relevant to my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I found this lesson informative.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The instructor was knowledgeable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would recommend this lesson to others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- Continue on Back -



Charlotte-Mecklenburg Certified Site Inspector (CMCSI) Seminar Evaluation



- Continued -

Lesson 6: "Installation and Maintenance of BMPs"

	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree
The material covered is relevant to my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I found this lesson informative.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The instructor was knowledgeable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would recommend this lesson to others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Lesson 7: "Conducting Inspections"

	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree
The material covered is relevant to my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I found this lesson informative.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The instructor was knowledgeable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would recommend this lesson to others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Overall CMCSI Seminar:

	Agree	Somewhat Agree	Neutral	Somewhat Disagree	Disagree
The material covered is relevant to my job.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I found this lesson informative.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The instructor was knowledgeable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would recommend this lesson to others.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Facility Comments:

	Excellent	Fair	Neutral	Dislike
Overall how would you rate the location of the facility,	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional Facility Comments Pros/Cons:

Additional Comments: