BASIN FAILURE

A Case Study on a Skimmer Basin Failure and Downstream Remediation

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TIMELINE

- July 21, 2016 – Early grading approval
- August 4, 2016 – Preconstruction Mtg
- November 11, 2016 – Permit issued
- August 21, 2017 – Basin failure
- November 3, 2017 – Clean up completed
Located in SW Mecklenburg Co.
EC Basin I

2.22 acres
1.5 million gallons
EC Basin I (Critical Watershed)

Grading limited to 20 acres

Diversion ditches, interior and exterior basin slopes stabilized with RECP

Temporary groundcover within 5 days

1,400 linear feet of downstream channel.
Installation of EC Basin I
Installation of EC Basin I
Dewater Basin from Littoral Shelf
Addition of Polyacrylamides (PAM)
Floc logs in Storm Sewer System
AUGUST 21, 2017

- Received calls from downstream residents in NC and SC
- Developer called to self-report the incident
• Sunny day breach; had not rained in a week
• Trench-type failure over the barrel pipe
Before failure...
After failure...
12-18” of deposition

Picture courtesy of Carolina Wetland Services, Inc.
6-12” of deposition

Picture courtesy of Carolina Wetland Services, Inc.
1-6” of deposition

Picture courtesy of Carolina Wetland Services, Inc.
POST-FAILURE PRIORITIES

• Safety
• Assessment of impacts
• Remediation and clean up plan
• Repair and/or modification of dam
• Appropriate plan of action for future phases
SAFETY

• City required:
  • Temporary and/or permanent repairs take place under direct supervision of qualified, licensed professional
  • Engineers and regulatory staff were on site within 1.5 hours of notification
  • Engineering memos received on 8/23 with field observations and plan of action for ensuring interim dam safety (while causes were identified and repairs designed/constructed)
FIELD OBSERVATIONS:

- Approximate 10’ gap over barrel pipe at location of breach
- Pipe joints aligned but disrupted
- Grout seal between OCS riser and barrel pipe “rough”
- No visible external grout at pipe joints
- No anti-seep collar constructed
- Organic debris observed within embankment fill material
- Insufficient compaction
- Soil types not ideal (sandy Pacolet series)
• Upland impacts assessed quickly
• Report from Carolina Wetland Services, Inc. received on 8/22 – “Sediment Assessment and Stream Restoration Plan”
• Noted approximately 200 feet of buried tributary channel
• Noted “very little sediment was deposited within the Lake Wylie cove” and recommended no remediation within cove
Sediment Assessment and Stream Restoration Plan

- Remove sediment where possible by shovels and/or hand tools
- Application of wetland seed mix and coconut matting
- Use coir logs for grade control in 100-foot intervals along stream channel, to prevent sediment from migrating downstream
AUGUST 22, 2017

- Coordination between City of Charlotte, York County and Duke Energy Lake Management Officials
- Adjacent property owner disputed location of property line
- Would not allow anyone on their property to remove offsite sediment
AUGUST 24, 2017

• Imported clay material for new barrel pipe
• Surveyed property line
• Began removing deposited sediment from tree save area with skid steers
• Turbidity curtain installed
AUGUST 28, 2017

- Anti-seep collars installed with new barrel pipe
- All sediment had been removed from the Developer’s tree save area
Damaged roots?
AUGUST 31, 2017

• Biodegradable coconut jute matting installed in the Developer's tree save area.

• Allowed temporary conveyance of stormwater around deposited sediment.

• Embankment dam repaired
OCTOBER 30, 2017

• Finally obtained approval from downstream property owner to remove offsite sediment

• No machinery was allowed on their property, hand tool removal only

• Oversight by City Officials at all times
NOVEMBER 1, 2017

- Located and flagged the original stream with assistance from Carolina Wetland Services, Inc.
- Used a Dutch auger to differentiate between existing streambed substrate and deposited sediment
Required by Charlotte Land Development

Received on 9/11

Eight (8) core samples were collected
- 5 from upland areas
- 3 from within the cove
- 2 submerged samples

Demonstrated no impacts to cove bottom
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• Biodegradable coconut jute matting installed in impacted bottomland
• Two layers installed in stream channel and on banks
• Matting secured with metal pins and wooden stakes every 2 sqft.
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CORE REPORT 1
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REMEDIATION AND CLEAN UP

• Began on August 22, 2017
• Continued in stops and starts due to access concerns from adjacent neighbor
• Completed on November 3, 2017
• Seventy-four (74) calendar days, twelve (12) days of actual clean up
REMEDIATION AND CLEAN UP

• Roughly 2.75 acres of impacted bottomland (0.75 acres in NC)
• An estimated 500 cubic yards of material was removed in total
• Of that 500 cubic yards, roughly 450 cubic yards was removed by hand, using buckets, shovels, and rakes
• Willow and River Birch live stakes will be planted in Fall of 2018
Spring 2018
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