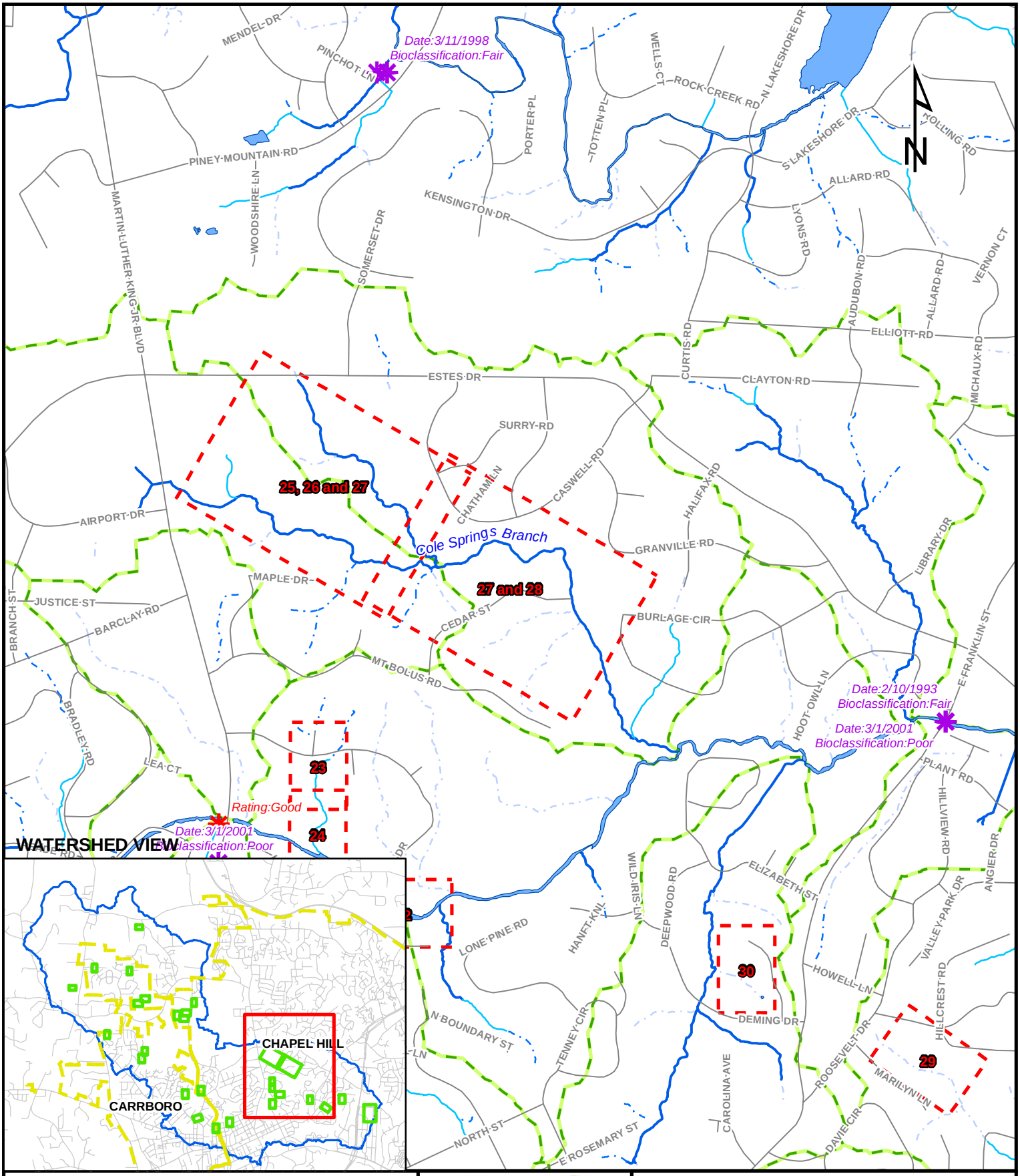
# SITE 28

Index Sheet No.: 26
Raw Data Name: BD 75

Estimated Construction Cost: $36,660


Date:3/11/1998
Bioclassification:Fair
25, 26 and 27
Cole Springs Branch
27 and 28
23
24
Rating:Good
Date:3/1/2001
Bioclassification:Poor
Date:2/10/1993
Bioclassification:Fair
Date:3/1/2001
Bioclassification:Poor
30
29
MENDEL DR
PINCHOT LN
PINEY MOUNTAIN RD
WOODSHIRE LN
MARTIN LUTHER KING JR BLVD
SOMERSET DR
KENSINGTON DR
PORTER PL
TOTTEN PL
WELLS CT
ROCK CREEK RD
N LAKESHORE DR
S LAKESHORE DR
ALLARD RD
LYONS RD
AUDUBON RD
VERNON CT
ELLIOTT RD
CURTIS RD
CLAYTON RD
MICHAUX RD
ESTES DR
SURRY RD
CHATHAM LN
CASWELL RD
HALIFAX RD
AIRPORT DR
GRANVILLE RD
LIBRARY DR
MAPLE DR
JUSTICE ST
BARCLAY RD
BRANCH ST
CEDAR ST
BURLAGE CIR
MT BOLUS RD
BRADLEY RD
LEA CT
HOOT OWL LN
E FRANKLIN ST
PLANT RD
HILLVIEW RD
ANGIER DR
ELIZABETH ST
WILD IRIS LN
DEEPWOOD RD
HANFT KNL
LONE PINE RD
VALLEY PARK DR
HOWELL LN
HILLCREST RD
DEMING DR
N BOUNDARY ST
TENNEY CIR
ROOSEVELT DR
MARILYN LN
CAROLINA AVE
DAVIE CIR
NORTH ST
E ROSEMARY ST
WATERSHED VIEW
CHAPEL HILL
CARRBORO
N
Legend
Ambient Monitoring
Benthic Monitoring
Fish Sampling
Municipal Boundary
Orange County Roads
Subwatersheds
Perennial Stream
Intermittent Stream
Ephemeral Stream
Stream, unknown flow
EarthTech
A tyco International Ltd. Company
SITE 27 and 28
VICINITY MAP
Geomorphic Analysis and Identification of Potential Sites for Stormwater BMPs
Orange County, North Carolina
0 500 1,000 2,000
Feet
1 inch equals 1,000 feet

## *Project Description*

| | Drainage Area (acres) | Impervious Area (acres) | % Impervious |
|---|---|---|---|
| **Site 28** | 16.0 | 4.0 | 25.0% |

### Location

Site 28 is located approximate 150 feet due east of the dead end road Cedar Street, along a small tributary to Cole Springs Branch.

### Problem Description

The perennial stream along which Site 28 is located, Cole Springs Branch, exhibits severe incision and erosion for most of its course from it's headwaters to where it flows into Bolin Creek. The causes of this widespread degradation are apparent when examining the watershed of the stream, which consists of vast areas of impervious surface, including portions of Horace Williams Airport, the UNC facilities management complex, and high density residential developments. The crossing of Martin Luther King Jr. Blvd. also seems to have adversely affected the stream, as the accumulated and concentrated flow of most of the watersheds imperviousness is discharged after passing under that road.

While the riparian corridor of the stream after passing under Martin Luther King Jr. Blvd is largely intact, many small tributaries, most of which discharge from residential storm sewer systems, continue to flow into Cole Springs Branch before it meets Bolin Creek downstream. The combined problems of peak flow and pollutant input from all of these small drainages likely compounds the degradation already being caused by the accumulated flow and pollutants from upstream of Martin Luther King Jr. Blvd.

Site 28 is located just downstream of a utility crossing of Cole Springs Branch. The reach downstream of the crossing has suffered from the contraction and resulting incision from the utility crossing. Adding to the problem, and typical of this sub-watershed, just upstream of the crossing an ephemeral drain comes out of a residential area, down a steep valley, and carries high velocity flows that converge with Cole Springs Branch. The ephemeral drain is showing signs of incision and may become a head cut, creating a more significant sediment contribution in the future. The mass wasting banks that are downstream of the utility crossing are causing significant sediment contributions now.

### Proposed Solution

This site was chosen as another site to use in this sub-watershed due to the blending of solutions that would be required to improve water quality. The ephemeral drain should be treated by the use of a stormwater wetland at the confluence with the floodplain of Cole Springs Branch. This wetland should be discharged via a level spreader, thereby reducing some of the destructive hydraulics that are impacting the immediate site. This would provide water quality treatment and quantity treatment for the runoff from the hill-top development. Immediately downstream of the wetland, the culvert at the utility crossing could be removed and the stream crossing can be accommodated by a stabilized

ford. This will allow flood plain access and reduce the negative effects of contraction that are created by the culvert.

Downstream of the culvert, the already damaged stream banks need stabilization. The combination of these BMP's indicates the typical situation that will be required to restore stream stability in this troubled watershed.

**Table 28.1**

| SITE 26-04 | Pollutant Load (lbs) | | |
|---|---|---|---|
| | TN | TP | TSS |
| EXISTING CONDITION | 66.79 | 6.74 | 56.74 |
| BIORETENTION TREATMENT REMOVAL | 35.00% | 45.00% | 85.00% |
| NET REDUCTION | 23.38 | 3.03 | 48.23 |
| FUTURE CONDITION | 43.41 | 3.71 | 8.51 |

## Constraints

Most of the site consists of a mature hardwood forest, and therefore tree removal will be necessary at this site for implementation of the BMPs.

The nearby utility line must be considered in all proposed final design plans.
MOUs or MOAs may be needed to be executed with the utility owners, as periodic vegetation removal likely occurs in the utility easement.

## Alternatives

No alternatives are proposed for this site.

## Cost-Estimate Breakdown

**Table 28.2** shows a conceptual itemized cost estimate for Site 28. These costs represent construction and maintenance costs only. The cost for the bioretention area is derived from a cost per cubic foot treated for bioretention areas as reported by Schueler, et. al. (2007).

**Table 28.2**
**Site 28**

| Pay Item Description | Estimated Quantity | Unit | Unit Bid Price | Bid Amount |
|---|---|---|---|---|
| | | | | |
| Bio-Retention Area | 2526.00 | CF | 12.62 | $31,878 |
| | | | **Total** | $31,878 |
| Mobilization (5%) | 1.00 | LS | | $1,594 |
| Contingencies (10%) | 1.00 | LS | | $3,188 |
| | | Total + Mobilization and Contingencies | | **$36,660** |
| **Maintenance Costs** | | | | |
| Maintenance (5% of base construction cost of BMP) | 1.0 | Year | | **$1,833** |

# SITE 27 and 28

SURRY RD

CASWELL RD

CHATHAM LN

BURLAGE CIR

CEDAR ST

Site 28

Cole Springs Branch

BIORETENTION AREA

Site 27

SIDE CHANNEL DISCHARGE AREA

SIDE CHANNEL DISCHARGE AREA

## Legend

- Stormwater Lines
- Impervious Surfaces
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Stream, unknown flow
- Contours

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## CONCEPTUAL PLAN VIEW

BOLIN CREEK WATERSHED
Geomorphic Analysis and Potential Site Identification For
Stormwater Structures and Retrofits

0 75 150 300 Feet

1 inch equals 150 feet

# SITE 27 and 28

SURRY RD

CASWELL RD

CHATHAM LN

BURLAGE CIR

Site 28

Cole Springs Branch

BIORETENTION AREA

Site 27

SIDE CHANNEL DISCHARGE AREA

SIDE CHANNEL DISCHARGE AREA

CEDAR ST

## Legend

- Stormwater Lines
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Stream, unknown flow

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## AERIAL PHOTO VIEW

BOLIN CREEK WATERSHED
Geomorphic Analysis and Potential Site Identification For
Stormwater Structures and Retrofits

0 75 150 300 Feet

1 inch equals 150 feet