

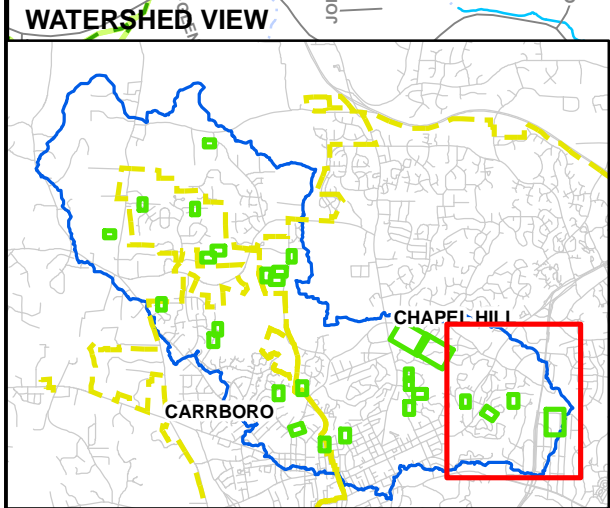
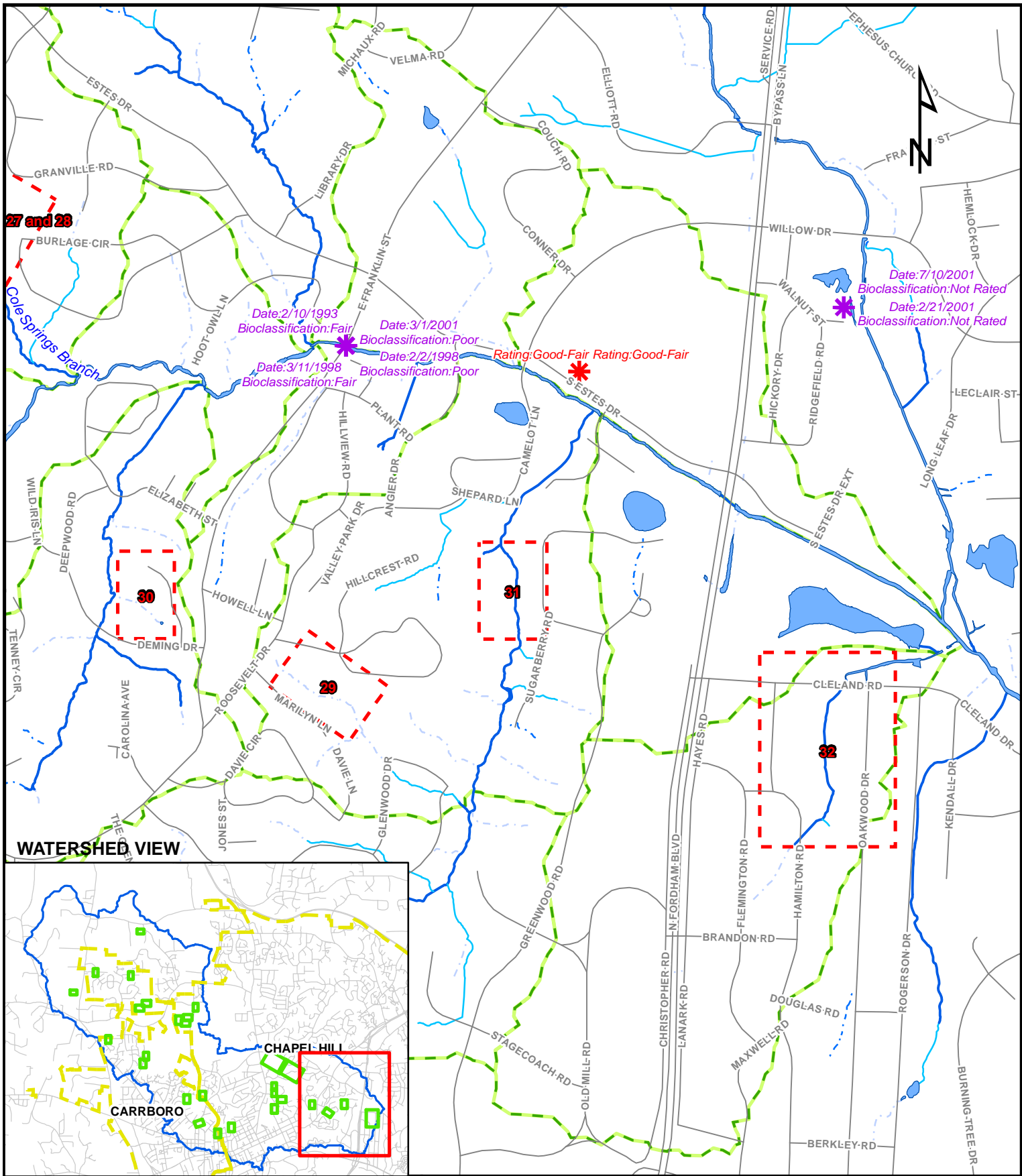
SITE 31

Apply Treatment to an Existing Ditch in the Floodplain of Battle Branch.

Index Sheet No.: 34
Raw Data Name: BD 88



Estimated Construction Cost: \$10,000- \$21,000



Legend

- Ambient Monitoring
- Benthic Monitoring
- Fish Sampling
- Municipal Boundary
- Orange County Roads
- Subwatersheds
- Perennial Stream
- Intermittent Stream
- Ephemeral Stream
- Stream, unknown flow




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SITE 31 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 31	12.2	2.1	17.2%

Location

Site 31 is located to the west and downhill of Sugarberry Rd.

Problem Description

Site 31 consists of an actively eroding ditch in the floodplain of Battle Branch. The ditch is approximately 2.5 feet deep and 5 feet wide and approximately 317 feet long. It appears to have been constructed along with the sewer line that parallels Battle Branch. The ditch receives the flow from a stormwater collection system of a residential arra, and therefore is subject to increased peak flows due to impervious surfaces. The flows from the residential area have no apparent treatment of water quality and do not have treatment of water quantity.

Using the BANCs model, it is estimated that approximately 517 tons of sediment are being exported from the site each year. Concomitant nutrient export associated with the sediment has also been calculated and is listed in **Table 31.1**.

Table 31.1

Pre-Treatment	
Estimated Total Sediment Export	517.4 tons/year
Erosion per length of Channel	1.7 tons/yr/ft
Pounds of Nitrogen	1034.7 lbs/year
Pounds of Phosphorus	517.4 lbs/year
Post-Treatment	
Estimated Total Sediment Export	0 tons/year
Erosion per length of Channel	0 tons/yr/ft
Pounds of Nitrogen	0 lbs/year
Pounds of Phosphorus	0 lbs/year

Proposed Solution

Treatment of the runoff from the contributing drainage area of Site 31, as well as the reduction of sediment can be accomplished through construction of a stormwater wetland in the floodplain of Battle Branch, expanding on the area of the existing ditch. The outlet of this wetland will consist of an overflow structure with a level spreader situated parallel to Battle Branch.

*Bolin Creek Watershed
Geomorphic Analysis and Potential Site Identification for Stormwater BMPs and Retrofits*

The site should also be planted with native vegetation, which is currently lacking from much of the floodplain leading up to Battle Branch.

Constraints

The site is located on three privately owned properties.

Alternatives

Alternative 1:

Construct a stormwater wetland in the place of the existing ditch, as detailed above

Alternative 2:

An alternative to constructing a stormwater wetland at this site is to fill the existing ditch with a filtration media, consisting of a mix of sand, fines and silt, and allow it to function as a bioretention area. The length of the ditch will provide a sufficient flow path for infiltration and treatment of runoff from the contributing drainage area.

Cost-Estimate Breakdown

Table 31.2 shows a conceptual itemized cost estimate for the two alternatives at Site 31. These costs represent construction and maintenance costs only. The cost for stormwater wetlands is derived from an equation developed by Brown and Schueler (1997).

Table 31.2
SITE 31 ALTERNATIVE 1

Pay Item Description	Estimated Quantity	Unit	Unit Bid Price	Bid Amount
Stormwater Wetland	9072.0	CF	Equation Derived	\$17,504
Total				\$17,504
Mobilization (5%)	1.00	LS		\$875
Contingencies (10%)	1.00	LS		\$1,750
Total + Mobilization and Contingencies				\$20,130
Maintenance Costs				
Maintenance (5% of base construction cost of BMP)	1.0	Year		\$1,006

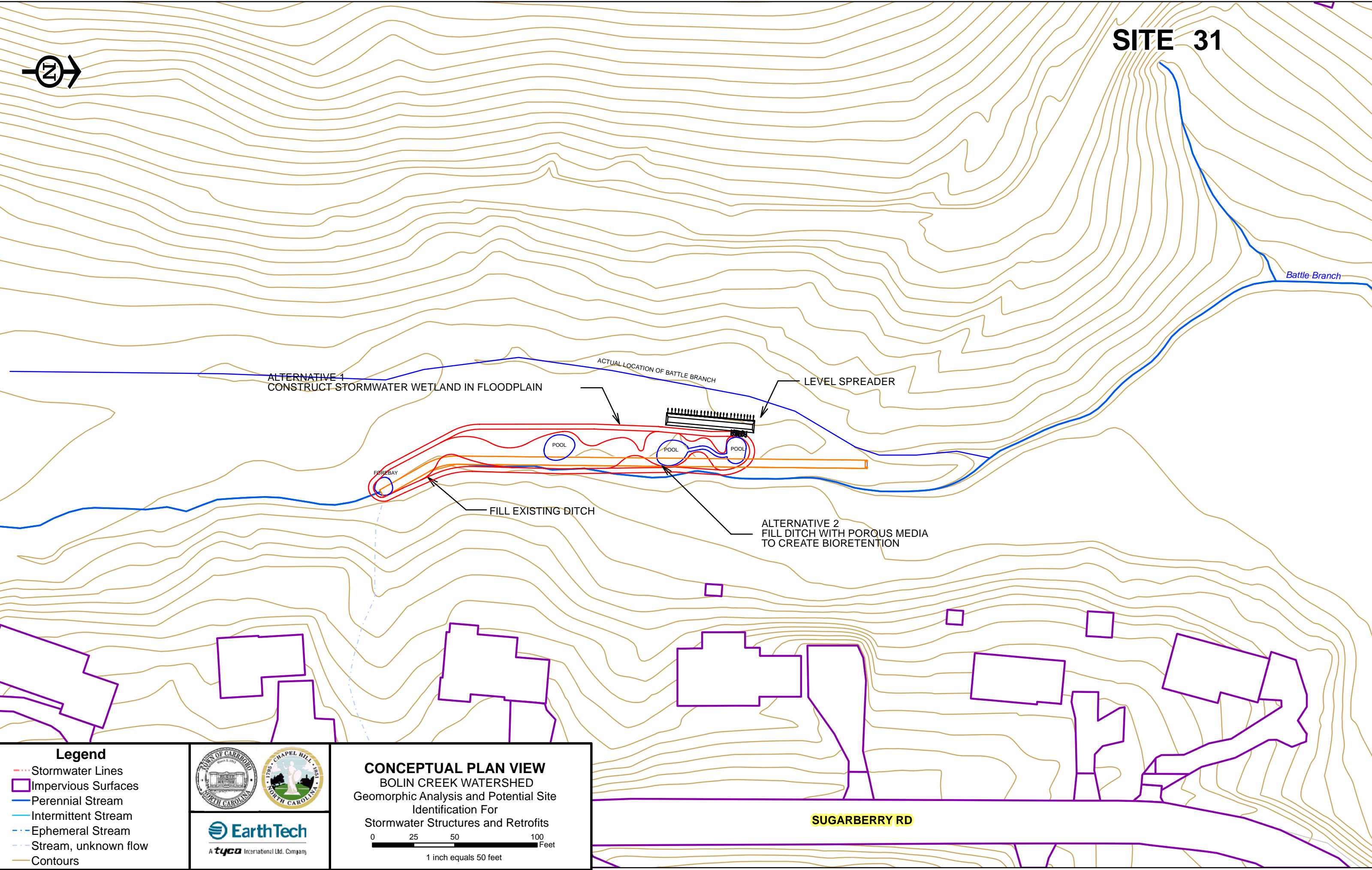
*Bolin Creek Watershed
Geomorphic Analysis and Potential Site Identification for Stormwater BMPs and Retrofits*

Table 31.3
SITE 31 ALTERNATIVE 2

Pay Item Description	Estimated Quantity	Unit	Unit Bid Price	Bid Amount
Excavation	180.00	CY	15.00	\$2,700
Site Preparation and Planting	0.10	Ac	7500.00	\$750
Rip Rap Class B	5.00	Tons	45.00	\$225
Filter Fabric	50.00	SY	5.00	\$250
Silt Fence	350.00	LF	3.75	\$1,313
Construction Safety Fence	400.00	LF	2.50	\$1,000
Construction Entrance	1.00	Ea	2500.00	\$2,500
Total				\$8,738
Mobilization (5%)	1.00	LS		\$437
Contingencies (10%)	1.00	LS		\$874
Total + Mobilization and Contingencies				\$10,048

*Bolin Creek Watershed
Geomorphic Analysis and Potential Site Identification for Stormwater BMPs and Retrofits*

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ALTERNATIVE 1
CONSTRUCT STORMWATER WETLAND IN FLOODPLAIN

ACTUAL LOCATION OF BATTLE BRANCH

LEVEL SPREADER

FOREBAY

FILL EXISTING DITCH

ALTERNATIVE 2
FILL DITCH WITH POROUS MEDIA
TO CREATE BIORETENTION

Battle Branch








POOL

POOL

POOL

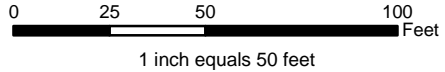
SUGARBERRY RD

Legend

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



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





SITE 31

Battle Branch

ALTERNATIVE 1
CONSTRUCT STORMWATER WETLAND IN FLOODPLAIN

ACTUAL LOCATION OF BATTLE BRANCH

LEVEL SPREADER

FOREBAY

FILL EXISTING DITCH

POOL

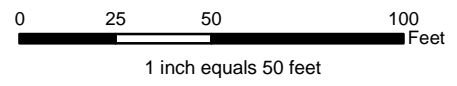
POOL

POOL

ALTERNATIVE 2
FILL DITCH WITH POROUS MEDIA
TO CREATE BIORETENTION



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



SUGARBERRY RD

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