ANNUAL REPORT FOR 2006
(Year 3)

Spring Valley Park Stream Restoration Site
Greensboro, North Carolina
EEP Project No. 354

Submitted to:

NCDENR EEP
1619 Mail Service Center
Raleigh, NC 27699-1619

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Table of Contents

List of Figures

List of Tables

APPENDICES

1.0 EXECUTIVE SUMMARY

The following report summarizes the monitoring activities that have occurred in the past year at the Spring Valley Park Stream Mitigation Site. This site was constructed in 2004. Monitoring activities in 2006 represent the third year of monitoring following construction. NCDOT performed stream repairs in 2006. The site must demonstrate a stable channel condition for a minimum of five years or until the project is deemed successful.

Spring Valley does not include any groundwater gauges, rain gauge, cross section monuments, or vegetation plots. The site is monitored using a visual assessment and six permanent photo points. Overall, the project has a number of stability issues. A number of rock structures appear to be functioning properly, but in some cases noted in plan view, header rocks were improperly placed causing scouring or allowing water to flow beneath the header rock. Unstable banks are present due to lack of rooted vegetation and coir matting failure. These problem areas need to be monitored and if the problems worsen over time, then a remedial plan needs to be developed. Repairs are not recommended for the eroding banks and failing structures at this time.

2.0 INTRODUCTION

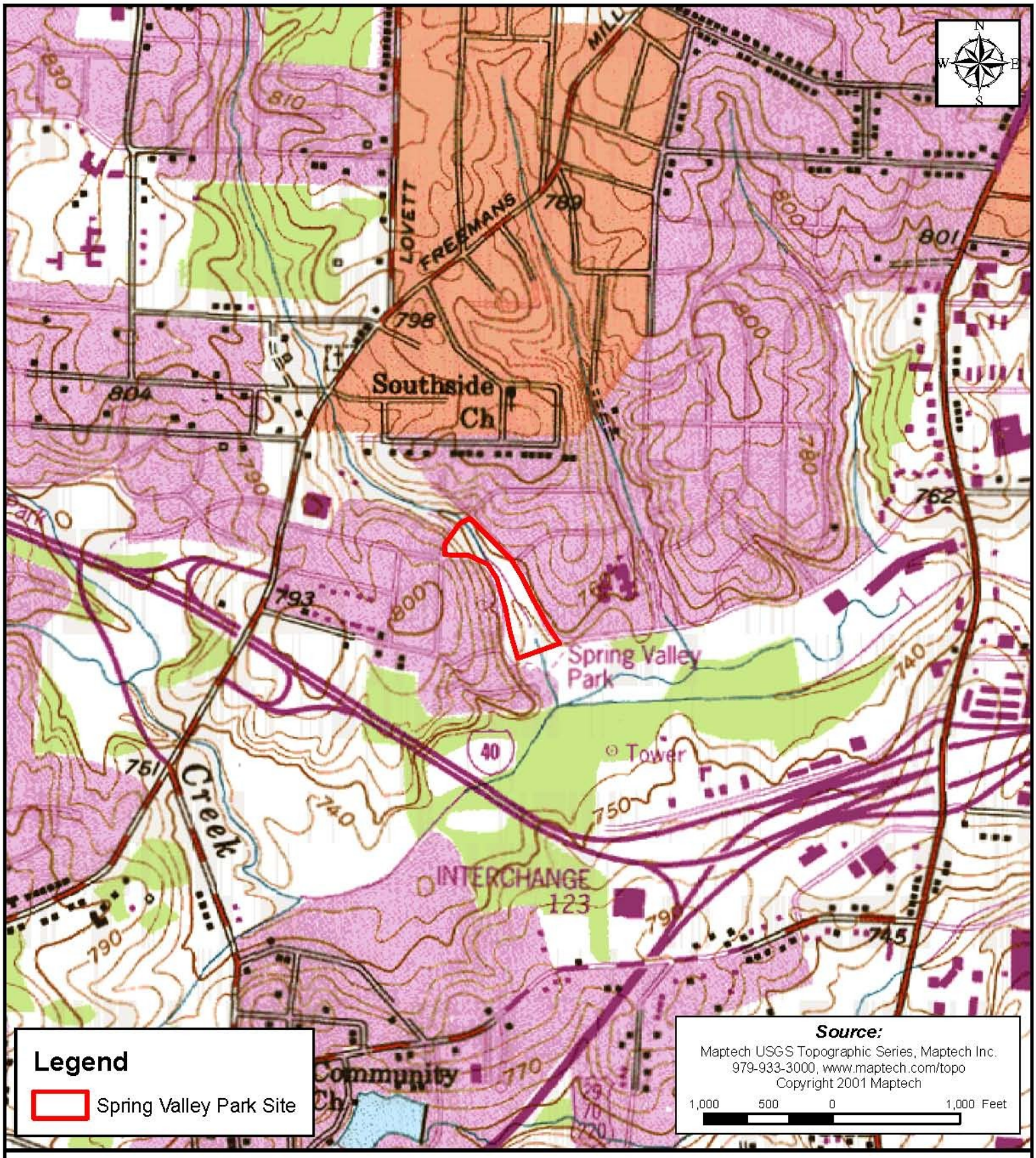
2.1 Project Description

The site is located along Piedmont Creek, a tributary to Buffalo Creek, in the Haw River Drainage Sub-basin of the Cape Fear River Basin (Hydrologic Unit 03030002). The drainage area for this project is approximately 550 acres (0.86 square miles). The drainage area is highly developed (>20% impervious) and surrounding landscape is urban. The site is surrounded by single family and multifamily homes. The project lies completely within the park boundaries.

The Spring Valley Park Stream Restoration Site includes 1,409 linear feet of Piedmont Creek. The site is located in the City of Greensboro, North Carolina near the intersection of Interstate 40 and Freeman Mill Road (Figure 1). The mitigation site is in its third year of monitoring. To access the site, take exit 218B (Freeman Mill Road) off of I-40 near Greensboro. Travel north on Freeman Mill Road to Meadowview Road. Turn right onto Meadowview Road and follow to Spring Valley Park.

2.2 Project Objectives

Based on the 2005 Annual Monitoring Report and a draft Mitigation Plan of this project, the objectives of this project are stated to restore the altered stream corridor, including the adjacent riparian zones to a referenced, stable condition. The long term objective of this project is to increase long-term stability and create a more functional riparian community. Vegetated buffers were designed to match local natural riparian communities. The design also addresses the needs of local agencies, public safety, and physical constraints within Spring Valley Park. Table I describes further the project mitigation structure and objectives. Table II discusses project history and activities. Table III summarizes project contacts and Table IV summarizes project background.



Ecosystem Enhancement PROGRAM

FIGURE 01
VICINITY MAP

Spring Valley Park Stream Restoration Site
Greensboro, North Carolina
Guilford County

Table I. Project Mitigation Structure and Objectives					
Project Segment	Mitigation Type	Approach	Linear Footage or Acreage	Stationing	Comment
Reach 1	R	PII	619	10+00 to 16+19	
Reach 2	R	PI	790	16+19 to 24+9	

R=Restoration
El=Enhancement I
Ell=Enhancement II
S=Stabilization
PI=Priority I
PII—Priority II
PIII=Priority III
SS-Stream Bank Stabilization

Table II. Project Activity and Reporting History			
Activity or Report	**Scheduled Completion**	**Data Collection Complete**	**Actual Completion or Delivery**
Restoration Plan	October 2001 (Draft)	Unknown	Unknown
Final Design-90%	Unknown	Unknown	Oct-02
Construction	Unknown	Unknown	2004
Temporary S&E mix	Unknown	Unknown	Unknown
Containerized and B&B plantings for each reach/segment	Unknown	Unknown	Unknown
Mitigation Plan/As-built (Year 0 Monitoring-baseline)	Unknown	Unknown	Unknown
Structural maintenance	Unknown	Unknown	2006
Year 1 Monitoring	Unknown	12/7/2004	12/7/2004
Year 2 Monitoring	Fall 2005	Nov-05	Dec-05
Year 3 Monitoring	Fall 2006	Sep-06	Dec-06
Year 4 Monitoring	Fall 2007		
Year 5 Monitoring	Fall 2008		

Table III. Project Contact Table	
Designer	Kimley-Horn & Associates Raleigh, North Carolina
Primary project design POC	Unknown
Construction Contractor	Unknown
Construction Contractor POC	Unknown
Planting Contractor	Unknown
Planting Contractor POC	Unknown
Seeding Contractor	Unknown
Seeding Contractor POC	Unknown
Seed Mix Sources	Unknown
Nursery Stock Suppliers	Unknown
Monitoring Performers-2004	NCDOT Roadside Environmental Unit 1425 Rock Quarry Road Raleigh, NC 27610 M. Green and J. Wait
Monitoring Performers-2005	Earth Tech of North Carolina 701 Corporate Center Drive, Suite 475 Raleigh, NC 27607 Mr. Ron Johnson (919) 854-6210
Monitoring Performers-2006	WK Dickson and Co., Inc. 3101 John Humphries Wynd. Raleigh, NC 27612 Mr. Daniel Ingram (919) 782-0495
Vegetation Monitoring POC	N/A
Wetland Monitoring POC	N/A

Table IV. Project Background Table	
Project County	Guilford
Drainage Area	523 acres
Drainage impervious cover estimate (%)	> 20%
Stream order	2nd order
Physiographic region	Piedmont
Ecoregion	Southern Outer Piedmont (45b)
Rosgen classification of As-built	C
Cowardin classification	N/A
Dominant soil types	Chewacla loam Mecklenburg-Urban land complex
Reference site ID	Piedmont Creek (~200 feet upstream from project site) Reddicks Creek
USGS HUC for Project	Deep River - HUC 03030003
NCDWQ sub-basin for project and reference	16-11-14-2
NCDWQ classification for project and reference	C, NSW
Any portion of project segment upstream of a 303(d) listed segment?	No
Reasons for 303d listing or stressor	N/A
% of project easement fenced	None – in City park

Activities in 2006 represent the third year of monitoring following construction. Included in this report are the results of the visual assessment and photographic documentation of the channel. Appendix B contains an Integrated Project Problem Areas Plan View.

3.0 CHANNEL STABILITY

3.1 Success Criteria

Per the draft planning document dated September 2001, photographs taken throughout the monitoring period will be used to subjectively evaluate channel aggradation or degradation, bank erosion, growth of riparian vegetation and the effectiveness of erosion control measures. Longitudinal photos taken will indicate the absences of developing bars within the channel or an excessive increase in channel depth.

No documentation of cross-sections, profiles or vegetation stem counts were required or performed for this annual monitoring report or for the 2005 annual monitoring report.

3.2 Results of Stream Assessment

WK Dickson personnel completed the initial assessment of the Spring Valley stream restoration site in Guilford County (EEP Project Number 354) on March 8, 2006. All pertinent project features were located, including in-stream structures. The site was visited again on August 21, 2006 at which time photographs were taken at all permanent photo points and problem areas were

downstream. Potential problem areas identified were photographed. Appendix A contains photographs of the annual photo points. Appendix B contains problem areas photographs.

Overall, the project has problems with piping around structures and areas of severe erosion. At this time piping around structures is not creating any loss of grade or headcutting but has the potential over time to create failure in these structures. The following problem areas were observed:

Table V 2006 Spring Valley Problem Areas

	Station Numbers	Suspected Cause	Photo Number
Coir matting failure	11+00-12+00	Improper installation, unstable banks due to lack of rooted vegetation (50-100 foot sections in all cases)	PA #1
	13+20		
	14+40		PA #2
Headers on cross vanes are set too high	15+40	Improper installation, the header rock is set too high and water is flowing underneath	PA #4
	15+71		
Headers on cross vanes are set too high	16+80	Improper installation, the header rock is set too high and water is flowing underneath	PA #5
Left bank erosion	17+10	Unstable banks due to lack of rooted vegetation	PA #6
Header rock moved downstream from cross vane	17+15	Improper installation, header rock not set during construction	PA #7
Bank washed out behind root wad	17+40	Unstable banks due to lack of rooted vegetation	PA #8
Coir matting failure	17+50	Improper installation, unstable banks due to lack of rooted vegetation, erosion occurring from rootwad to cross vane	PA #9
Undercutting bank	17+80	High flow events, unstable banks due to lack of rooted vegetation	PA #10
Left bank erosion	18+40	Unstable banks due to lack of rooted vegetation, eroding downstream of cross vane	PA #11
Right bank erosion	18+60	Unstable banks due to lack of rooted vegetation, bank washed out behind rootwad (STA 19+50)	PA #12
	19+20		PA #13
	20+50		PA #14
Left bank erosion	20+70	Unstable banks due to lack of rooted vegetation, mid-channel bars forming	PA #15
Scour behind vane arm	20+80	Improper installation, bank washing out behind vane arm, piping occurring around structure	PA #16
Scour at end of vane arm		Improper installation, vane arm set at too high an elevation	PA #17

At this time, repairs are not recommended for structures failing due to piping (STA 18+40, 19+20, and 20+70) and for bank erosion behind the rootwad at station 19+50. Vegetation observed on the upper banks and floodplain is typically good. Vegetation on the lower banks is sparse along portions of the reach and woody vegetation is nearly absent at many of the problem areas. Bank erosion accounts for approximately 10% of the whole reach (approximately 280 feet). Although there are localized erosional issues, systemic bank instability is not a concern at this time. Bedform in these areas is still variable and it does not appear that the additional sediment deposition caused by bank erosion is affecting the diversity. Riffles are present along the reach but in some instances there appear to be some fines found in areas where there is a significant amount of bank erosion. These problem areas need to be monitored; if the problems worsen over time, a remedial plan should be developed.

No gage data or reference reach data was available to complete Table VI. However, high water wrack lines were observed out of bank along the reach when the visual assessment was performed on August 21, 2006.

Table VI. Verification of Bankfull Events

Date of Data Collection	Date of Occurence	Method	Photo # (if available)
August 21, 2006	Unknown	Wrack lines	SV 1, SV2, SV3

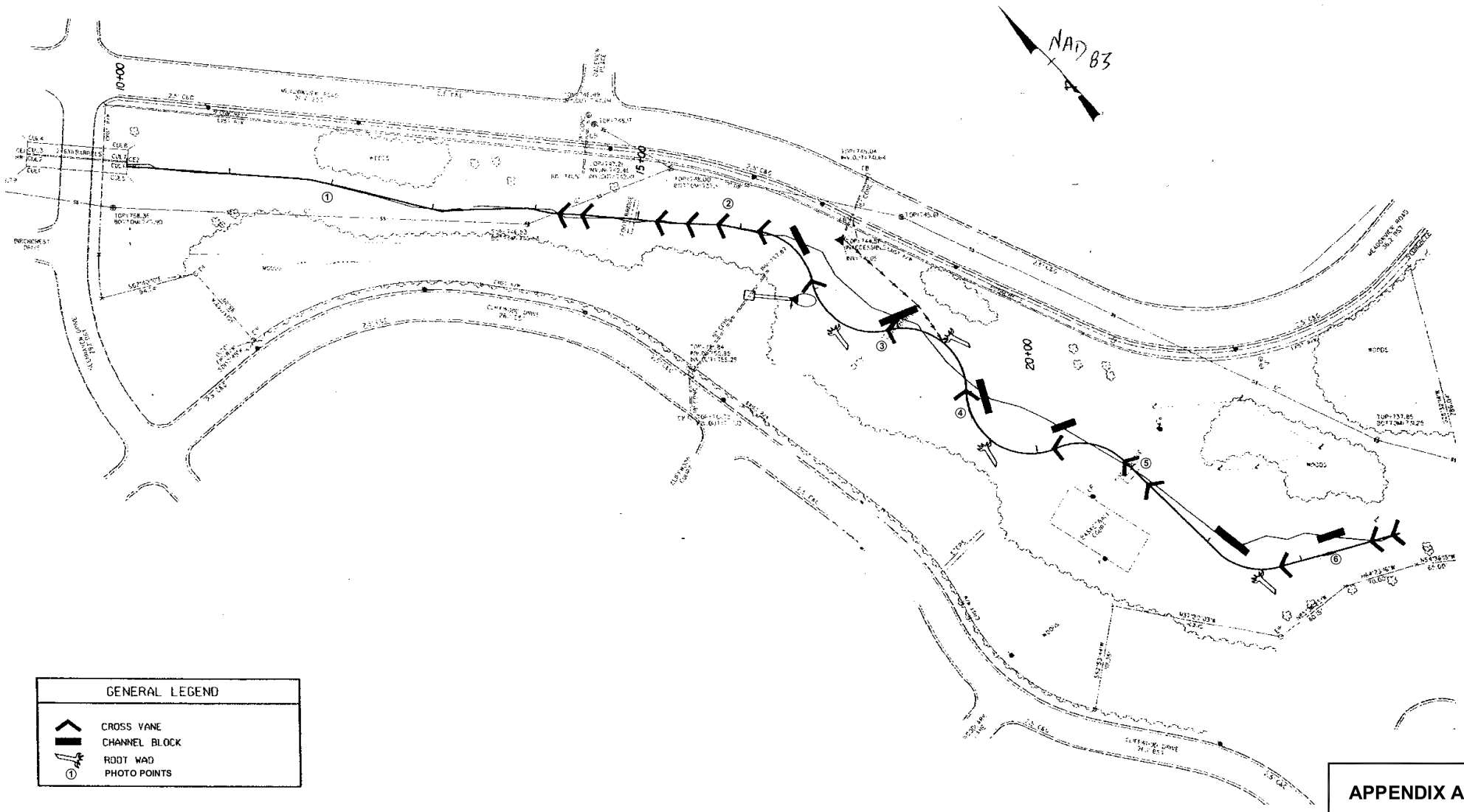
4.0 OVERALL CONCLUSIONS AND RECOMMENDATIONS

Overall, the project has a number of stability issues. A number of rock structures appear to be functioning properly, but in some cases header rocks were improperly placed causing scouring or allowing water to flow beneath the header rock. The improper placement has not created any loss of grade or headcutting but could potentially be an issue over the course of many years. Unstable banks are present due to lack of rooted vegetation and coir matting failure. These problem areas need to be monitored and if the problems worsen over time, then a remedial plan needs to be developed. Further details of present conditions of the site are summarized below.

- This is the third monitoring year since supplemental planting at the site.
- Channel stability monitoring indicated that a number of problems exist throughout the restored reach. Several areas where coir fiber matting has failed (constituting approximately 15% of the reach), erosion exists but does not present a significant impact to the project.
- Short segments with erosional problems, such as piping or bank erosion, exist for approximately 10% of the reach.
- Although sediment deposition has occurred, bedform diversity is still present and riffles consist primarily of coarse gravel material.
- A number of rock structures (approximately 75%) appear to be functioning properly, but in some cases noted in plan view, header rocks were improperly placed causing scouring or water to flow beneath the header rock.
- High out-of-bank flows have occurred through the project reach as confirmed by the wrack lines found along the reach.
- Bare banks are present due to lack of rooted vegetation and coir matting failure.
- At this time, no repairs are recommended. The aforementioned problem areas discussed in Table V need to be monitored and if the problems worsen over time, then a remedial plan needs to be developed.

APPENDIX A

Site Photos



APPENDIX A

PROJECT MANAGER	DPI
DRAWN BY	TRS
APPROVED BY	
PROJECT NUMBER	5045700RA
DRAWING SCALE	1"=100'
SURVEY DATE	
MAP DATE	

WK DICKSON
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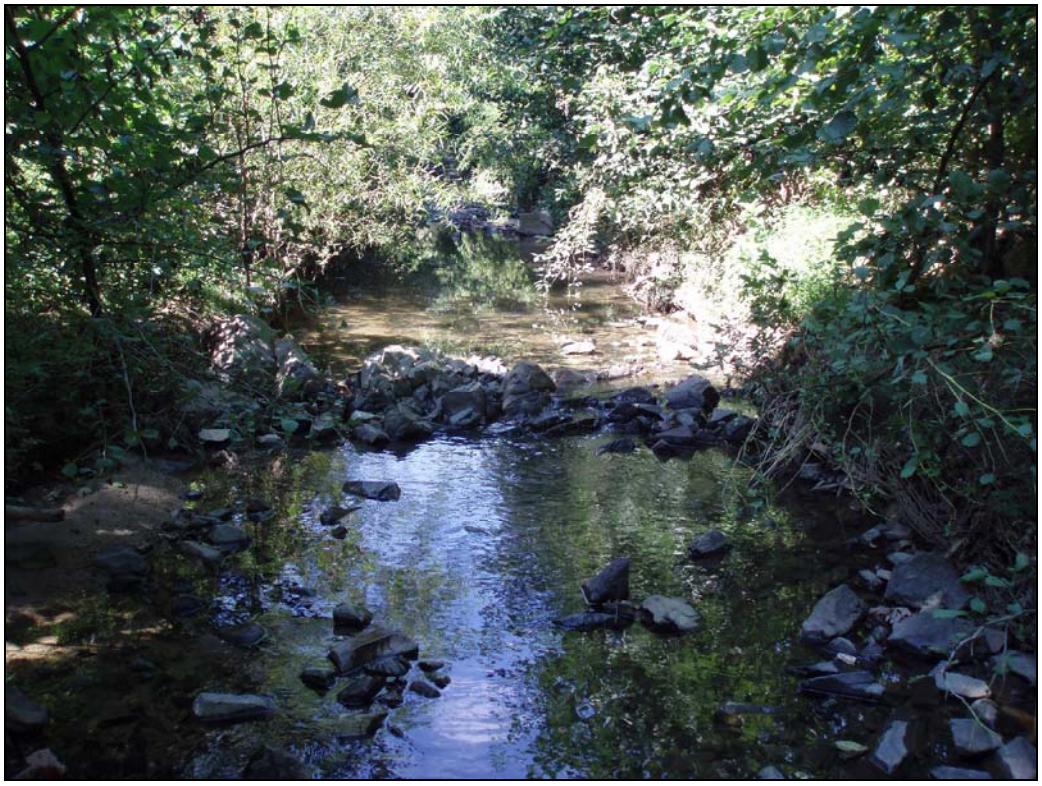
PREPARED FOR:

NORTH CAROLINA
ECOSYSTEM ENHANCEMENT PROGRAM

TITLE:

PHOTO POINTS
2006 (YEAR 3) PLAN VIEW
SPRING VALLEY
GREENSBORO, NORTH CAROLINA

Spring Valley 2006, Problem Area 1



Spring Valley 2006, Photo Point 1 - Downstream

Spring Valley 2006, Photo Point 2 - Upstream

Spring Valley 2006, Photo Point 2 - Downstream

Spring Valley 2006, Photo Point 3 - Upstream

Spring Valley 2006, Photo Point 4 - Downstream

Spring Valley 2006, Photo Point 4 - Upstream

Spring Valley 2006, Photo Point 4 - Downstream

Spring Valley 2006, Photo Point 5 - Upstream

Spring Valley 2006, Photo Point 5 - Downstream

Spring Valley 2006, Photo Point 6 - Upstream

Spring Valley 2006, Photo Point 6 - Downstream

APPENDIX B

Integrated Project Problem Areas Plan View

Table B Spring Valley Problem Areas			
Feature Issue	**Station Numbers**	**Suspected Cause**	**Photo Number**
Coir matting failure	11+00-12+00	Improper installation, unstable banks due to lack of rooted vegetation (50-100 foot sections in all cases)	PA #1
	13+20		PA #2
	14+40		
Exposed sewer line	15+15	Down cutting due to downstream structure failure	PA #3
Headers on cross vanes are set too high	15+40	Improper installation, the header rock is set too high and water is flowing underneath	PA #4
	15+71		
Headers on cross vanes are set too high	16+80	Improper installation, the header rock is set too high and water is flowing underneath	PA #5
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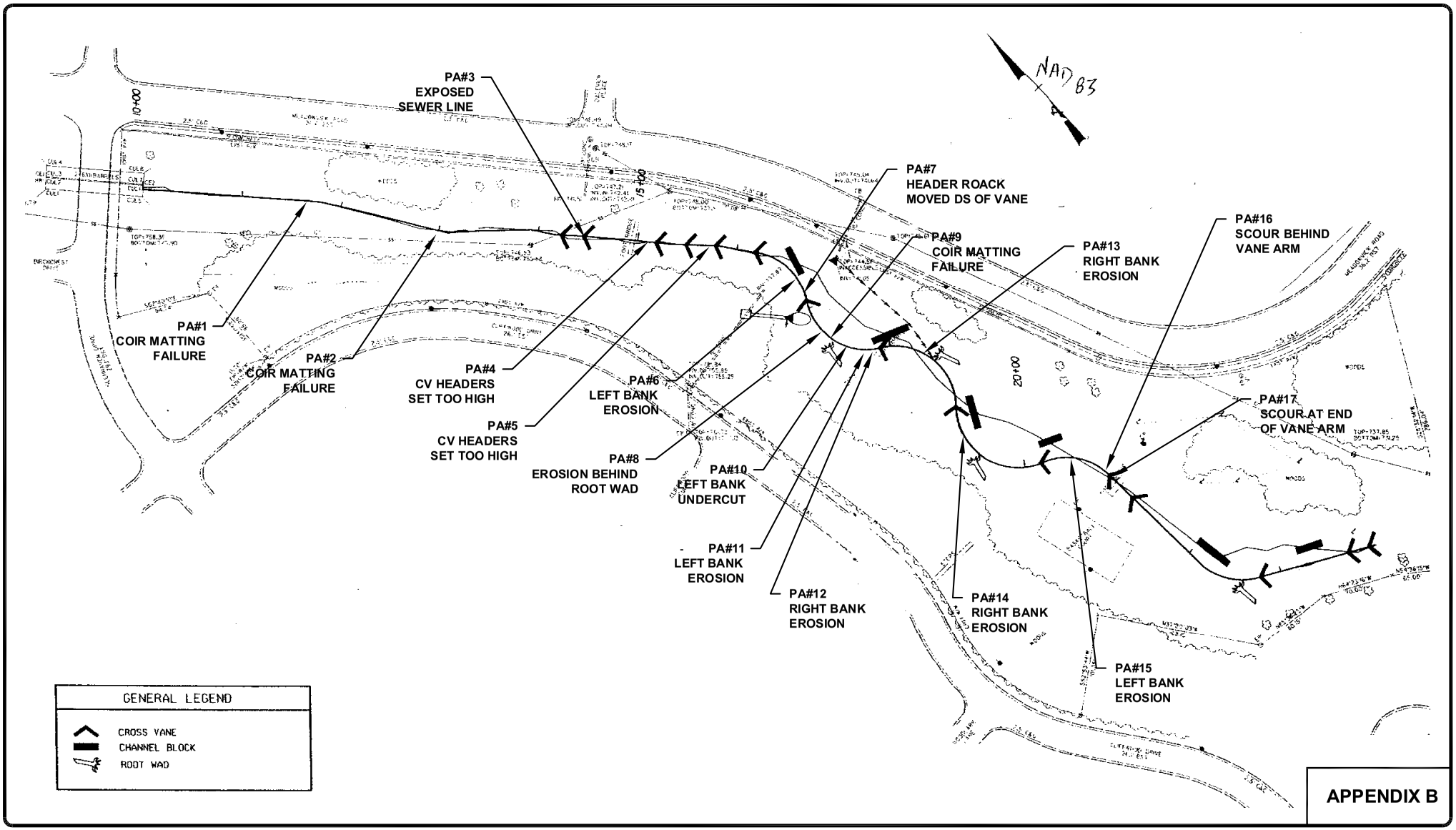

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TITLE: INTEGRATED PROJECT PROBLEM AREAS
2006 (YEAR 3) PLAN VIEW
SPRING VALLEY
GREENSBORO, NORTH CAROLINA

Spring Valley 2006 - Problem Area 1

Spring Valley 2006 - Problem Area 2

Spring Valley 2006 - Problem Area 3

Spring Valley 2006 - Problem Area 4

Spring Valley 2006 - Problem Area 5

Spring Valley 2006 - Problem Area 6

Spring Valley 2006 - Problem Area 7

Spring Valley 2006 - Problem Area 8

Spring Valley 2006 - Problem Area 9

Spring Valley 2006 - Problem Area 10

Spring Valley 2006 - Problem Area 11

Spring Valley 2006 - Problem Area 12

Spring Valley 2006 - Problem Area 13

Spring Valley 2006 - Problem Area 14

Spring Valley 2006 - Problem Area 15

Spring Valley 2006 - Problem Area 16

Spring Valley 2006 - Problem Area 17