City of Annapolis
Design-Build-Operate-Maintain Services for Water Quality Best Management Practices

WATERWAYS CABINET MEETING

JULY 31, 2019

GreenVest
VISION • PERFORMANCE • RESULTS

PRESENTATION OUTLINE

- Introductions
- Permit Requirements
- Back Creek
- Questions on Back Creek
- Spa Creek
- Questions on Spa Creek
- Other Questions

INTRODUCTIONS

GreenVest
VISION • PERFORMANCE • RESULTS

Arundel Rivers
FEDERATION

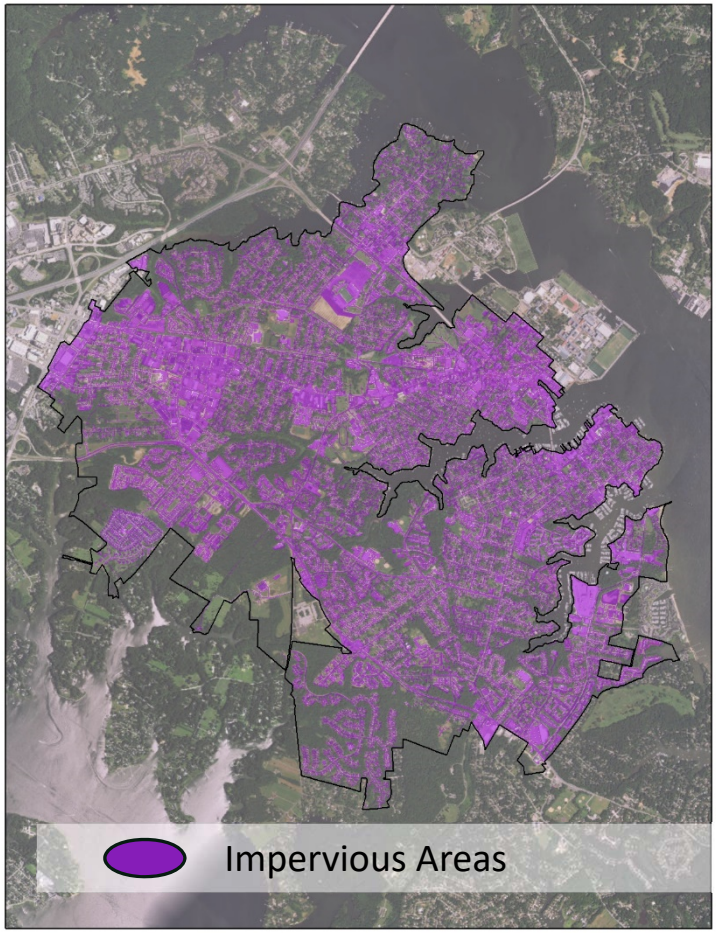
Biohabitats

EQR
ENVIRONMENTAL
QUALITY RESOURCES

pH Princeton Hydro

HANNON
ARMSTRONG
FINANCING THE FUTURE OF ENERGY℠

WHY ARE WE HERE?



City Must Satisfy its MS4* Permit Requirements

- Phase II MS4 permit issued in 2017
- Requires treatment of 20% of the 2002 baseline impervious area in the City
- Total 2002 Baseline Impervious Surface Area 1,529.30 acres.
- 20% = 305.86 acres

* Municipal Separate Storm Sewer System

How Do We Get There?

20% Impervious Area Treatment Calculation	If All Existing BMPs Fully Functional	If No Existing BMPs are Functional
2002 Impervious Surface Area (Acres)	1,529.30	
Treated Area with 2002-2005 BMPs	31.50	0.00
Revised Baseline	1,497.80	1,529.30
20% of Baseline	299.56	305.86
BMPs since 2006	32.70	0.00
Remaining Restoration Requirement	**266.86**	**305.86**
Potential Credits from Recent Restoration Projects by NGOs	175.07	
Revised Restoration Requirement	**91.79**	**130.79**

GreenVest Team will assess each known BMP and Restoration Project within the City over the next 3 years to determine functional capacity and credit generation.

EXAMPLE COSTS PER ACRE TREATMENT

Stormwater BMP	Total Initial Costs[1]
Impervious Urban Surface Reduction	$96,250
Wet Ponds and Wetlands (Retrofit)	$63,998
Dry Extended Detention Ponds (Retrofit)	$67,500
Infiltration Practices w/ Sand, Veg. (New)	$61,250
Bioretention (Retrofit - Highly Urban)	$183,750
Permeable Pavement w/ Sand, Veg. (New)	$335,412
Urban Stream Restoration	$64,500

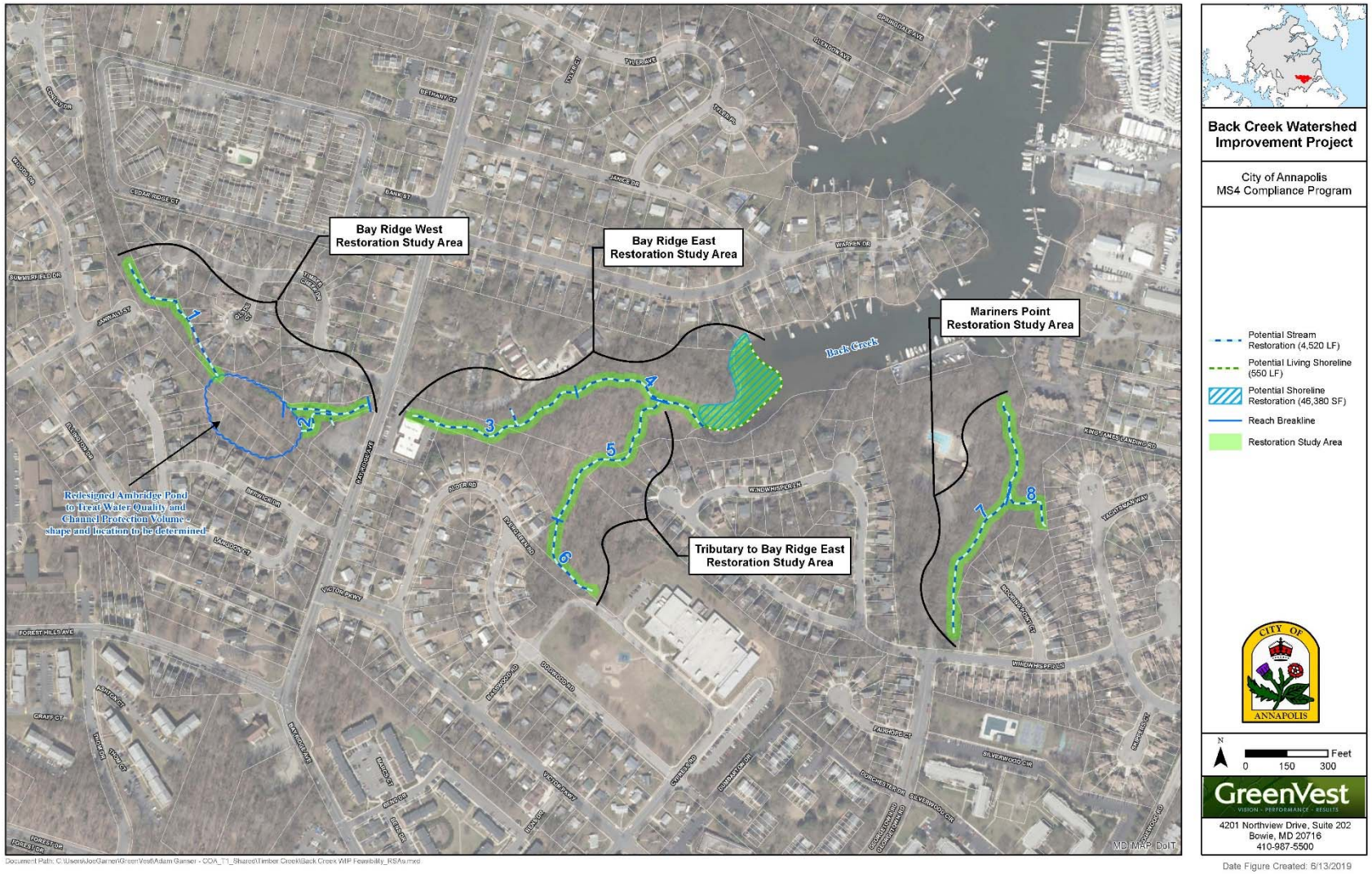
[1] King and Hagan 2011

WATERSHED IMPROVEMENT PROJECTS

Two Feasibility Assessments

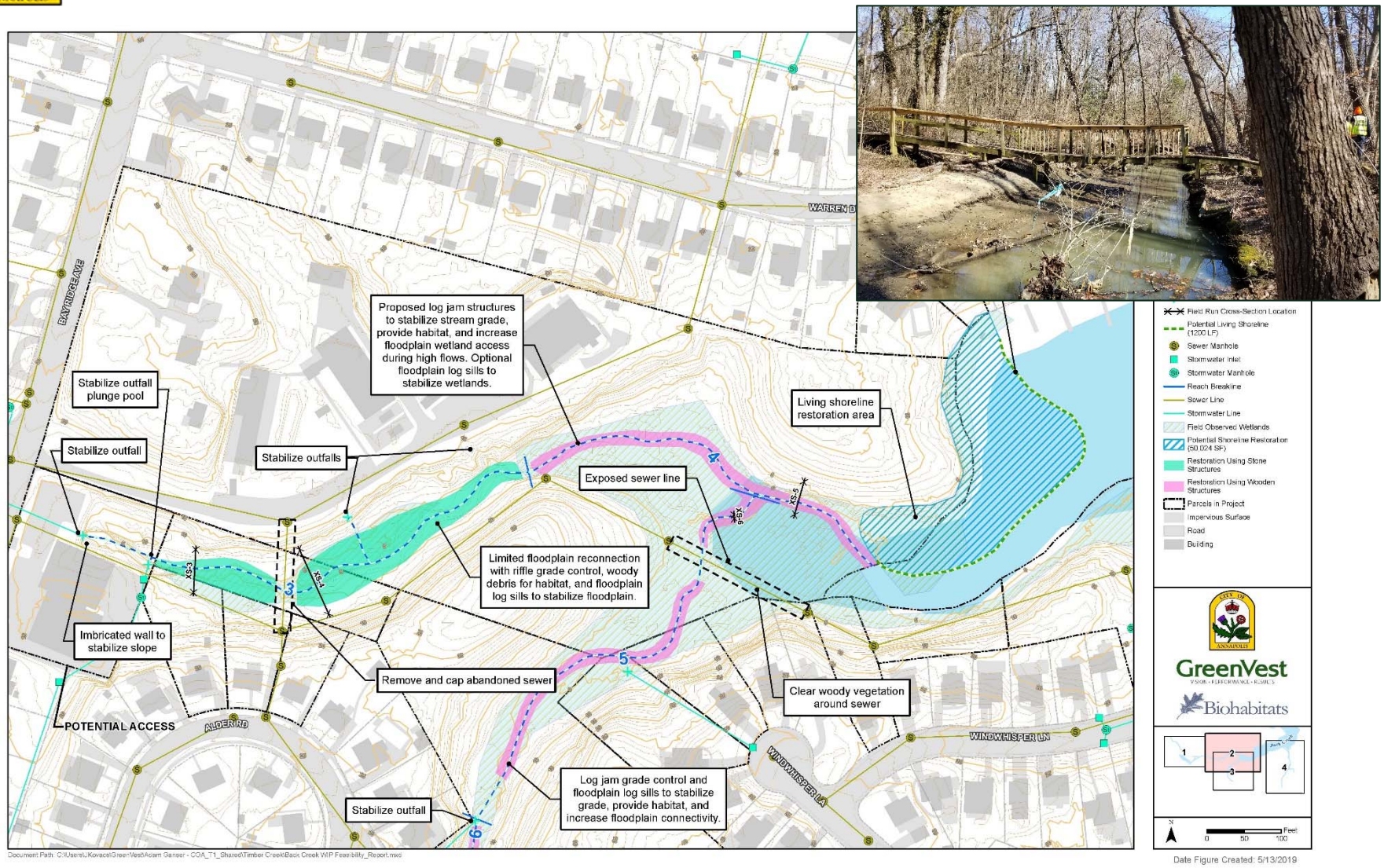
- Back Creek Watershed
  - Flooding and Erosion
  - Ambridge Pond – Active Project Area
  - SPCA – Active Project Area
- Spa Creek Watershed
  - Flooding and Erosion
  - Connection between Recent Restoration Projects

BACK CREEK WATERSHED

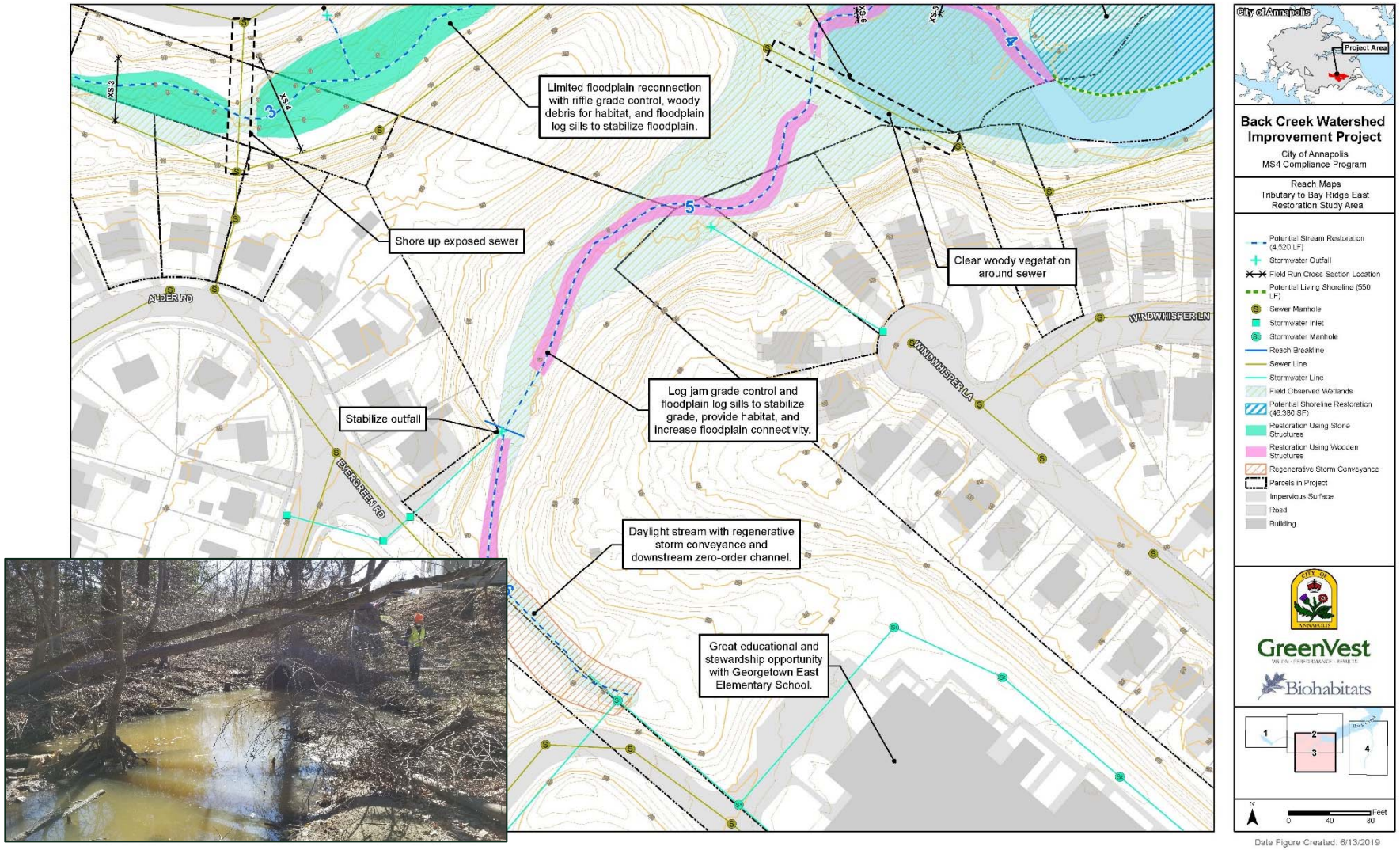


BACK CREEK: WEST OF BAY RIDGE

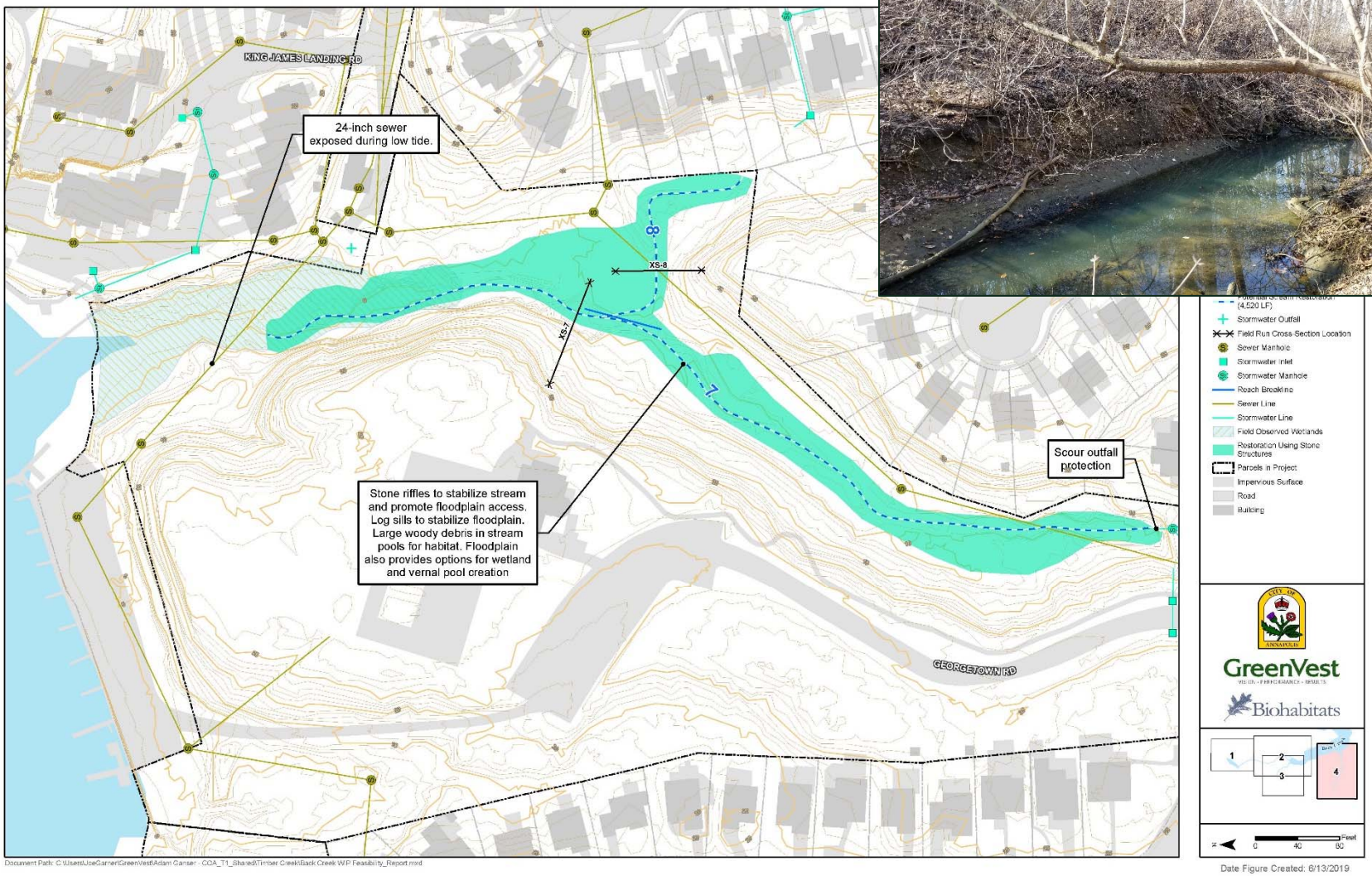
BACK CREEK: EAST OF BAY RIDGE 1



BACK CREEK: EAST OF BAY RIDGE 2



BACK CREEK: MARINERS POINT



Past Project Examples

Streambank Stabilization and Grade Control

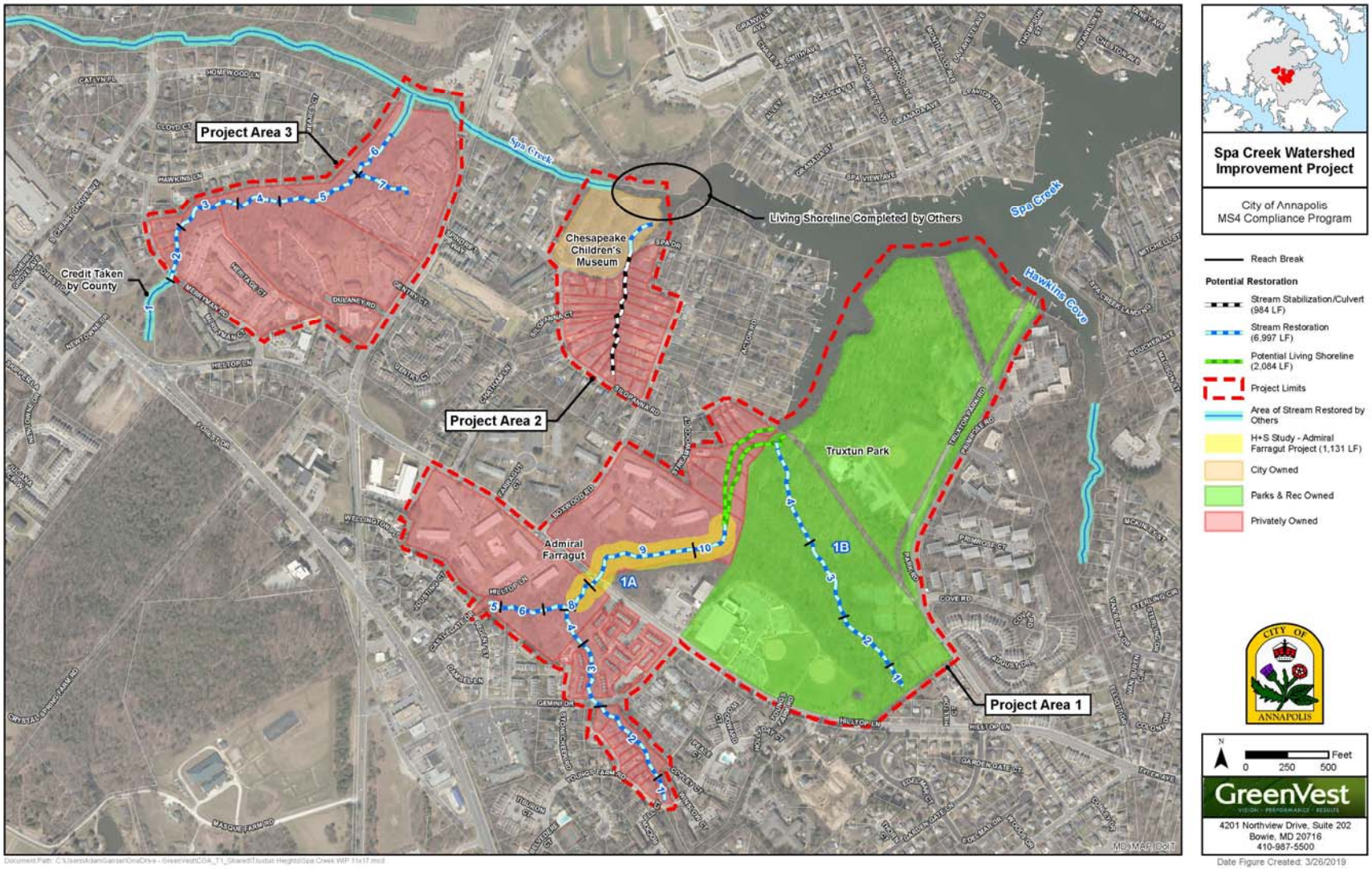
Rock Riffles with Pools

south river federation

EQR ENVIRONMENTAL QUALITY RESOURCES

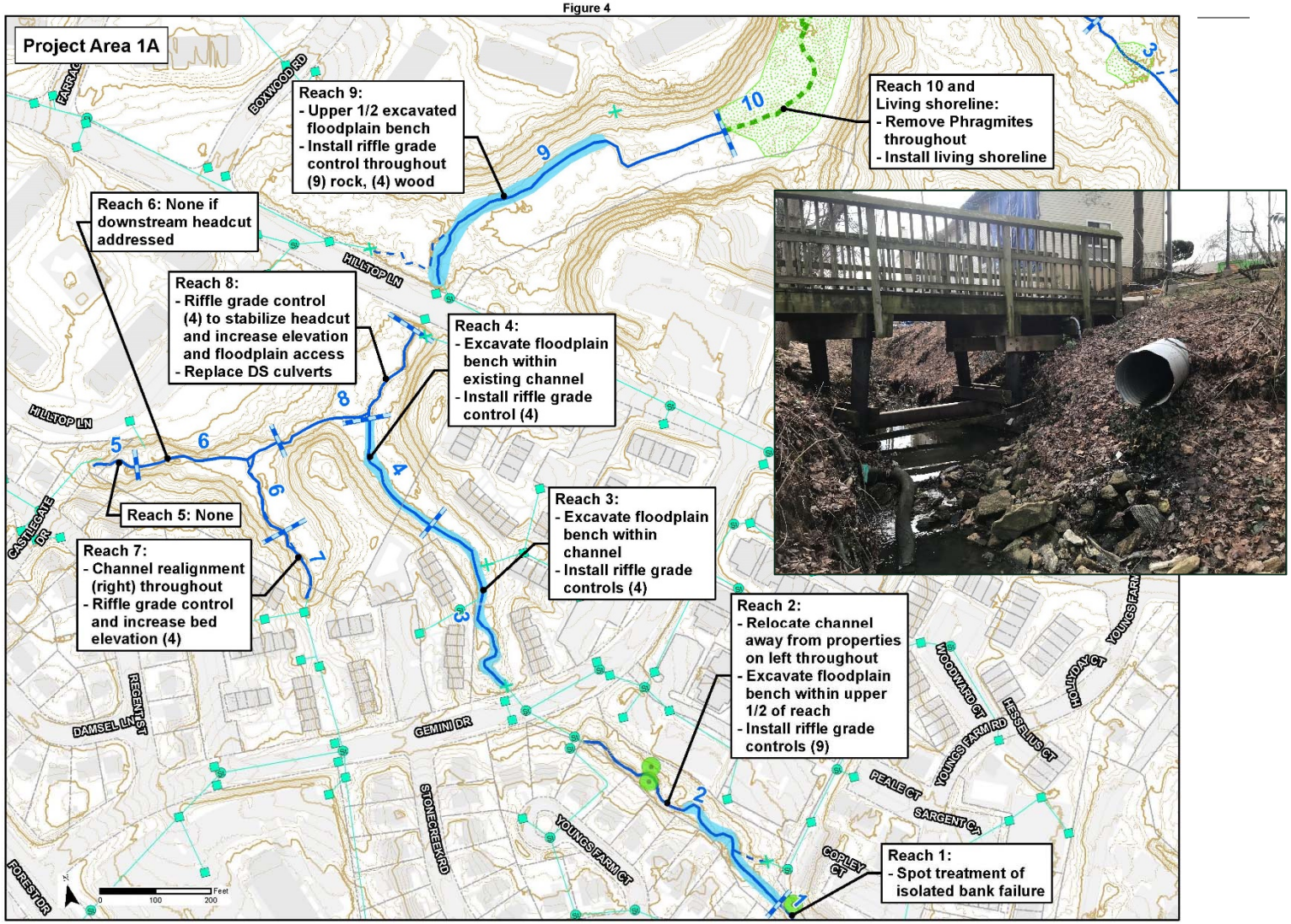
Bywater Stream Restoration

SPA CREEK WATERSHED



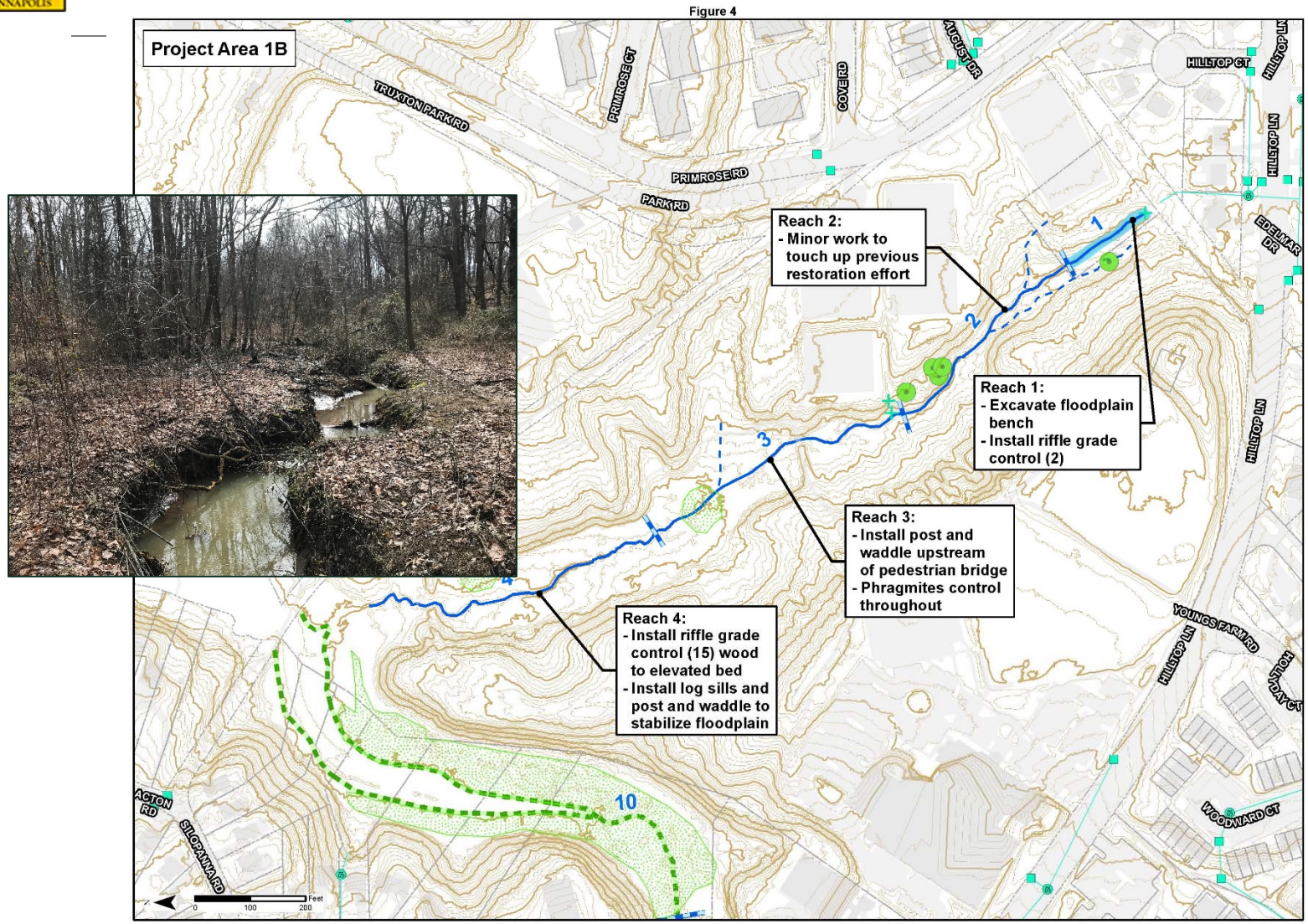
SPA CREEK: 1A HILLTOP

Figure 4



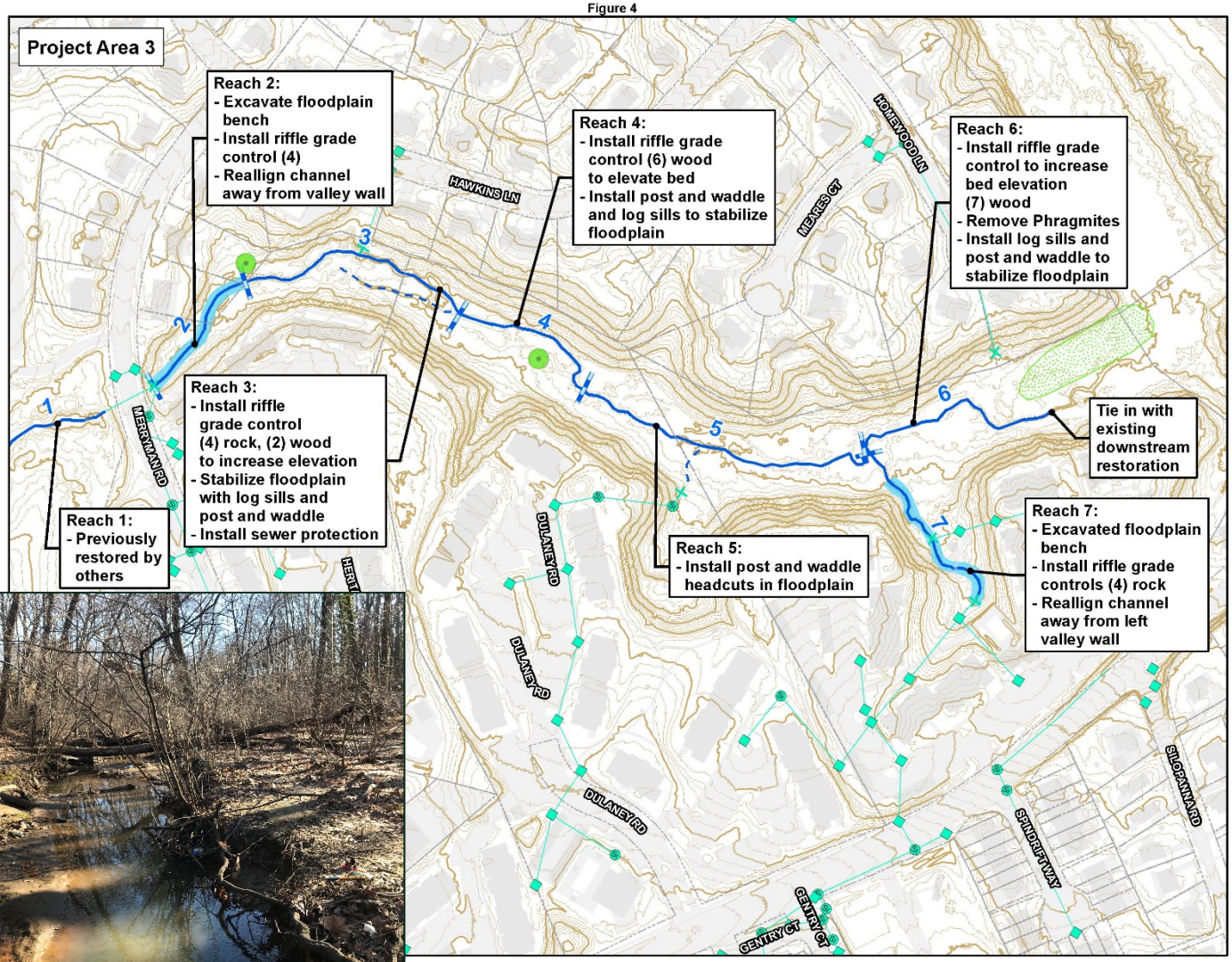
SPA CREEK: 1B TRUXTUN PARK

Figure 4



SPA CREEK: 3 MERRYMAN TO SPA

Figure 4



IAT Credit Generation

Project	Total Credits Generated
Back Creek	127.95 – 167.7
Spa Creek	153.33 – 223.30

Revised Restoration Requirement	**91.79**	**130.79**

THANK YOU