THE RESOURCE PROTECTION GROUP, INC.

REQUEST FOR PROPOSALS

December 5, 2019

RFP #01 – Mussel Introduction into an Urban Stream Environment

WSSI #50000.05-B

Due Date/Time: February 14, 2020; 5:00 PM

Location: **U.S. Mail/Messenger/Fed Ex/UPS**

Resource Protection Group, Inc.
c/o Wetland Studies and Solutions, Inc.
5300 Wellington Branch Drive, Suite 100
Gainesville, Virginia 20155
ATTN: Michael S. Rolband, P.E., P.W.S., P.W.D

CONTENTS

		PAGE
I.	**Background**	1
II.	**Research Topic**	1
	A. The Basic Issue	1
	B. Initial Testing	2
	C. Objective of this RFP	2
	D. Scope of Work	2
III.	**Submission of Proposals**	3
	A. Deadline and Delivery	3
	B. Questions	3
	C. Registration of Proposers	4
IV.	**Program Funding**	4
V.	**Steps for Proposal Review Process**	5
VI.	**Subcontractors**	5
VII.	**Review Criteria**	5
VIII.	**Submission Requirements**	6
	A. Solicitation Offer and Award Form	6
	B. Table of Contents	6
	C. Executive Summary	6
	D. Project Team	6
	E. Project Description	6
	F. Scope of Work	7
	G. Budget	7
	H. Budget Details	7
	I. Proprietary Information	8
	J. Organizational Chart	8
	K. Curriculum Vitae (CV)	8
	L. Research Schedule	8
IX.	**Payment and Reporting Requirements**	8
	A. Reporting Requirements	8
	B. Payment Requirements	9
X.	**Budget Sheet**	10
XI.	**Solicitation Offer and Award Form (SOAF)**	13

Attachments:

A. Solicitation Offer and Award Form

I. Background

The Resource Protection Group, Inc. (RGP) is a non-profit 501(c)3 organization whose mission is to protect, restore, enhance and increase public awareness and understanding of our natural and cultural resources, including urban systems where many of us reside. The protection, restoration and enhancement of aquatic resources needs to include the adjacent stream valleys, upland buffers and contributing stormwater systems as much as possible in order to maximize aquatic and cultural resource functions and values.

The streams in the Northern Virginia Stream Restoration Bank (NVSRB) will be platforms used to develop methods to improve the function and/or condition of urban stream restoration and evaluate those methods using physical, chemical, and biological metrics. The goals of this particular research initiative are to (a) identify practices that provide physical and measurable increases in functions and values to urban streams, and (b) to develop design practices, supported by data, that the Norfolk District Interagency Review Team (IRT) agencies can implement in other stream restoration projects and in future Mitigation Banking Instruments (MBI).

This research project will focus on two (2) restored streams in Reston, Virginia – Snakeden and the Glade (part of NVSRB). Each stream is ±20,000 linear feet and has a maximum drainage area of approximately one (1) square mile. Implementation guidelines for this first phase of research will focus on creating a baseline data set, which includes the introduction of freshwater mussels in Snakeden and The Glade reaches.

This Request for Proposal (RFP) is issued to public and private universities accredited by the Commonwealth of Virginia, as well as federal, state, and local governmental agencies operating in Virginia, which possess established programs related to the research topic.

II. Research Topic

A. The Basic Issue

Water quality within urban streams is often poor, resulting from various factors throughout the watershed such as enhanced runoff due to impervious cover, road salting, and the absence of effective stormwater controls. Reston, Virginia, a 1960's planned community, was developed prior to the enactment of strict stormwater management laws. Thus, runoff from adjacent land uses flows directly into streams within the community resulting in severe stream channel and bank erosion, downstream sediment deposition, degraded water quality, and water temperature spikes. Over the past 15 years, Wetland Studies and Solutions, Inc. (WSSI) has restored streams within the Snakeden, Glade and Colvin Run watersheds (collectively known as NVSRB) in Reston (Exhibit 1) to reconnect the streams with their floodplains, reduce extensive stream erosion to decrease downstream sedimentation and associated nutrient export, and improve the riparian corridors that are so heavily utilized by the community.

It is widely recognized that freshwater mussels have the ability to filter water at a prodigious rate, improving the water quality, and thereby keeping streams, rivers, and estuaries cleaner. Within urban systems such as Reston, the possibility of utilizing mussels to improve water quality is quite intriguing.

The basic issue and associated research question for this RFP is whether or not freshwater mussels are able to survive in these urban streams prior to deploying a large-scale effort that also measures water quality effects.

B. Initial Testing

To determine if freshwater mussels can survive in the Snakeden and Glade watersheds, WSSI proposes introducing freshwater mussels into two restored reaches within each watershed. Design Reach Location Maps for Snakeden and The Glade are included within Exhibit 2. Exhibit 3 contains representative photos of Snakeden during the post restoration monitoring Year 7. Exhibit 4 contains representative photos of The Glade during post restoration monitoring Year 7.

C. Objectives of this RFP

1. To determine and document the feasibility of restoring a freshwater mussel population into a restored urban stream.

2. To develop and implement a limited pilot study to place freshwater mussels into a restored urban stream.

3. To analyze and report the condition of the freshwater mussels derived from the Objective #2 sampling/analyses.

4. To recommend whether or not the results from this initial research program support the full-scale reintroduction of freshwater mussels into these two watersheds.

D. Scope of Work

The successful applicant will submit a proposal that includes a detailed scope of work to accomplish the four objectives provided above. Particular attention should be placed upon:

1. Documenting and synthesizing existing freshwater mussel research efforts, reports and published literature to determine which specie(s) is most suitable for introduction into an urban stream.

2. Recommend how many individuals, of each species, would be needed for the pilot study, where should they be placed, and where they could be obtained.

3. Provide a detailed methodology of selecting location of proposed sampling sites.

4. Document that the subject streams have been assessed in the field to determine preliminary locations for placing the study placement locations.

5. Describe the methodology necessary for local mussel habitat creation and mussel establishment.

6. Propose a detailed methodology for survivability, growth, mortality analysis and other essential metrics.

III. Submission of Proposals

A. Deadline and Delivery

The proposal application must be received by **5:00 PM on February 14, 2020**. Each proposal should be submitted as four (4) bound paper copies and an electronic copy in PDF format on a USB Flash Drive. Send proposal applications to the following address:

Michael S. Rolband, P.E., P.W.S., P.W.D., President
Resource Protection Group, Inc.
c/o Wetland Studies and Solutions, Inc.
5300 Wellington Branch Drive, Suite 100
Gainesville, Virginia 20155

Telephone: 703 679 5602
E-mail: mrolband@wetlands.com

Please note that misdirected proposal applications will be deemed late and returned to the applicant. All proposal applications must be complete at the time of submission. Later changes or addenda will not be accepted.

FAXED OR E-MAILED APPLICATIONS WILL NOT BE ACCEPTED

B. Questions

Questions that arise during the proposal preparation should be directed by e-mail or U.S. Mail or overnight service[2] to:

[2] Telephone calls are not preferred, as all registered proposers must be informed of all questions, answers, and clarifications.

Jennifer Van Houten, PWS, PWD, Vice President
Resource Protection Group, Inc.
c/o Wetland Studies and Solutions, Inc.
5300 Wellington Branch Drive, Suite 100
Gainesville, Virginia 20155

Telephone: 703 679 5641
E-mail: jvanhouten@wetlands.com

All responses and related responses shall be distributed to all registered proposers.

C. Registration of Proposers

If you desire to be informed of all questions and answers addressed during the proposal preparation process, as well as any RFP amendments, you must notify (via e-mail or U.S. mail) the following for registration:

Jennifer Van Houten, PWS, PWD, Vice President
Resource Protection Group, Inc.
c/o Wetland Studies and Solutions, Inc.
5300 Wellington Branch Drive, Suite 100
Gainesville, Virginia 20155

Telephone: 703 679 5641
E-mail: jvanhouten@wetlands.com

IV. Program Funding

A. The RPG shall fund 100% of the accepted proposal's budget pursuant to an agreed upon payment schedule based upon research progress.

B. Applicants are ***not*** expected to provide any cost-share towards the research budget. However, cost-share or matching funds are encouraged and will improve the scoring of your proposal.

C. The Indirect Cost rate shall be limited to 35% of Total Direct Costs. This is a maximum rate; proposers may offer a lower rate. Matching funds may be used to offset higher Indirect Cost rates. If this is a problem, please notify us in writing as soon as possible to explain and propose an alternative.

D. Tuition for graduate students ***is allowable*** as a Direct Cost on a proportionate basis to the percentage of their research time dedicated to the proposed work.

E. The estimated total cost range for this project is $50,000 to $150,000, with a 15 to 21-month duration (12 months with mussels in the water). If you do not expect this budget or timeframe to be adequate to perform the work, please notify us in writing as

soon as possible during your preparation of the proposal so we can consider an amendment.

V. Steps for Proposal Review Process

A. Submission of Response to the Resource Protection Group, Inc. in care of WSSI.

B. RPG shall provide a recommendation to Virginia's IRT for an award.

C. The IRT Chair shall have ten (10) days to (based upon IRT comments) to: (i) concur with the RFP Award Recommendation, (ii) select an alternative proposal, or (iii) reject all proposals. The IRT Chair shall provide one (1) signed original "Solicitation Offer and Award" form confirming its decision to RPG.

D. ***More than one (1) response may be selected*** if the reviewers determine that significantly different research approaches are proposed that separately have the strong possibility of yielding a different, yet practicable, solution.

E. Timing: We expect the review process to take 30-60 days.

VI. Subcontractors

The prime research contractor must designate a Principal Investigator (PI) as both the point of contact and the party responsible for performing the work. Other entities may be subcontractors to the prime research contractor subject to the following conditions:

A. The prime research contractor cannot apply any indirect rate markup to the subcontractor's total cost except if that subcontractor's indirect rate is lower than that allowed for the prime. In such case, the prime contractor may charge the difference. In no case can the subcontractor charge more than the indirect rate allowed by the prime.

B. No more than 49% of the work (measured in dollars of Direct Cost) shall be undertaken by academic personnel from a non-Virginian academic institution or non-government entity.

VII. Review Criteria

The proposals will be reviewed and scored based upon the following criteria, with the weighting noted below showing the likely value of each criterion in the award decision:

	Criteria	**Weight**
1.	Level of interest, experience, and expertise of the Principal Investigator(s) in the research topic	45%
2.	Overall proposal quality, innovation, and viability	10%

3.	Statistical support for proposed sampling effort	10%
4.	Cost	10%
5.	Matching funds / University or Agency contributions	25%

The reviewers and ultimate decision makers reserve the right to modify, at any time during the review process, the relative weighting of these criteria or simply make a unilateral decision to not follow said weighting in the extraordinary circumstance that the weighting does not result in a practicable outcome. For example, if one proposal was triple the cost of all others, even if it was deemed superior in every other manner, we may determine that it is not an economically viable approach and not select that proposal. Alternatively, we may contact the proposer to discuss a modification to its proposal to address the cost issue.

VIII. Submission Requirements

Your response to this RFP must not exceed five (5) single-spaced, typed pages[3], using a 12-point font and one-inch margins (all sides) and include the following sections:

A. Solicitation Offer and Award Form (referenced in Section XII and provided in Appendix A): You must complete all sections on this form and obtain signatures of the appropriate officials.

B. Table of Contents: Please include major sections and the corresponding page numbers.

C. Executive Summary (limit to one page single-spaced): Explain what you plan to do, why your team should be selected, and what your proposed budget is.

D. Project Team: Describe the entities and, specifically, the key personnel who will be involved (and to what degree) in this project. Explain why this team is best suited for this project. Clearly indicate who the lead Principal Investigator will be and any other important division of execution and reporting responsibilities.

E. Project Description:

1. Objectives: List the specific objectives of the project.

2. Preliminary Studies (if applicable): Describe any precursor research you have conducted or are aware of that applies to the project topic and what was determined from those preliminary results.

3. Experimental Procedures/Methodologies: Describe any laboratory or field testing to be performed referencing analytical methods proposed for us, and how the

[3] Text Section (i.e., does not include resumes, budgets, cash flow projection, schedules, or SOAF)

study sites will be selected, and how the mussels will be placed to minimize stream disturbance.

4. Describe the source of mussels to be moved to the project sites, and document that you have permission for said relocation.

5. Detail how many mussels, of which species, and in how many locations are proposed.

6. Literature Cited: List all sources used.

F. Scope of Work:

1. Issue Identification: Identify and briefly describe the issue this project is addressing.

2. Work Tasks: Break the project into specific work tasks and describe each work task individually.

3. Time Allocation: Describe how much time (by months) is to be allotted for each work task and when each task is to begin and end.

4. Resource Allocation: For each work task, list the personnel who will be working on that task and specifically what each person will be doing.

5. Quality Assurance/Quality Control: List measures planned to ensure that reliable high quality results are achieved, such as descriptions of statistics to be used to evaluate data and to compare data to controls; field and lab QA/QC, data handling and security, and how to deal with the potential that graduate student tenures may not coincide with the research schedule.

6. Determination of Goals: Identify the means to be used to determine that project goals are met.

G. Budget for requested funding summarizes the entire scope and costs into one lump sum total cost using a format similar to the one provided in Section X.

H. Budget Details: The budget may include salaries, travel, equipment, materials, and services ***not including fees or profit***. It is imperative that you specify any Indirect Costs or fringe benefits rates, as well as which budget categories are affected by those rates. (For example, Indirect Costs defined as "Facilities and Administration" = 25% of Total Direct Cost less tuition and equipment). In addition, salaries must include personnel descriptions (i.e., faculty, graduate student, hourly worker, etc.), the number of hours expended on the project, and the hourly rate (or as a % of FTE where one FTE = 2050 hours). Supplies must be listed in general terms (i.e., field supplies, general office supplies, etc.). Travel must include a description (trips to

field site, conference, etc.), estimated number of hours for travel, and estimated cost per trip. In addition, for travel to conferences, estimate proposed expenses in the budget. For travel to conferences, specific information on conference title, dates of conference, and purpose in attending (i.e., presenting paper, poster session, etc.) must be supplied to WSSI for approval prior to travel. Other Direct Costs must include a general description (i.e., contractual analyses) and include units and unit cost. As stated in Section IV. C., Indirect Costs are fixed at 35% of Total Direct Costs. No cost-share funding is required.

Major pieces of equipment (>$2,000 with lifetime >2 years) are not eligible for purchase with funding from this program unless (i) they are clearly essential to the conduct of the proposed work, (ii) their documented use will be primarily for the proposed work, and (iii) they will be made available for use by future RPG consortium research programs after the funding program is completed.

I. Proprietary Information: No information provided in proposals responding to this RFP shall be deemed proprietary. All information in each proposal could be subject to public disclosure or disclosed to other parties.

J. Organizational Chart: Provide an organizational chart depicting the structure of your team.

K. Curriculum Vitae (CV): Provide CV for each senior investigator involved in the proposed project. Resumes should be no more than two pages with an attachment listing all relevant publications within the past 20 years (limit to two pages). Senior investigators include the principal investigator and any other faculty or senior-level personnel involved in the project. CV of lower level researchers may be included at your option.

L. Research Schedule: Provide a projected schedule for your research activities. This schedule should be logically related to the budget's cash flow projections.

IX. Payment and Reporting Requirements

A. Reporting Requirements Shall Include:

a. Quarterly (i.e., March 31, June 30, September 30, December 31) Progress Reports with reports submitted within thirty (30) days after the end of the quarter describing (one or two paragraphs) your progress relative to the Proposal Schedule, Budget, and Scope of Work tasks.

b. An invoice for each payment milestone when achieved.

c. Summary of monitoring results.

d. Draft Report for RPG review.

e. Final Report incorporating RPG comments.

f. One short article for WSSI newsletter, Virginia Municipal Stormwater Association, Inc. (VAMSA) newsletter, and Stormwater Magazine.

g. Assuming appropriate results are obtained, one peer reviewed publication article shall be prepared and submitted to an appropriate journal.

h. One seminar at WSSI's office which will be open to the Virginia Association of Wetland Professionals (VAWP) and academics, as well as the consulting and regulatory community at large.

B. Payment Requirements

a. RPG and/or IRT representatives may inspect research facilities and discuss progress with researchers to verify invoice amounts and research progress at their discretion.

b. Undisputed Invoices shall be paid by RPG within thirty (30) days of tender ***if and only if*** they are submitted in the mandated manner and schedule described above. Invoices submitted later than prescribed above shall be delayed for processing until all reporting submissions are made timely in the next quarter.

c. Payments shall be made 30 days after completion and invoicing of the following tasks in accordance with the percentage specified below:

Task	Desired Time Period	% Paid
Start	N/A	0%
Map and data supporting selected mussel study locations	End of 1st month	5%
Mussel Placement	End of 3rd month	40%
Halfway point summary	End of 9th month	5%
Completion of monitoring period	End of 15th month	5%
Summary of monitoring results	End of 16th month	10%
Draft Report submission	End of 17th month	20%
Articles approved by RPG and submitted to[1]:		
a) WSSI Newsletter		5%
b) VAMSA Newsletter		5%
c) Peer Reviewed Journal		5%
d) Stormwater Magazine		5%
Final Report submission	End of 18th month	20%
One seminar at VAMSA meeting	End of 21th month	5%

[1] RPG will release payment once articles have been submitted as we understand approval may take months or be refused.

X. Budget Sheet

Your proposed budget shall be submitted in a spreadsheet in a format similar to the description depicted below (to assist you in completing this form, a sample is provided):

Budget Sheet

Project Title: _____

Principal Investigator: _____

Organization: _____

Requested Duration in Months: _____

Item	**Unit Rate**[4] (A)	**Units**[5] (B)	**Quantity** (C)	**Cost** (D = A x C)
Salaries (list each person or position separately)				
Benefits (list each benefits rate per person / position)				
Tuition				
Supplies[6]				
Equipment[7]				
Subcontracts (provide breakdown of salary, benefits, tuition, supplies, equipment, etc. unless it is a lump sum less than $5,000)				
Travel				
Other Direct Cost				
Total Direct Cost				
Indirect Cost	35%[8]	N/A	N/A	
Total Cost	N/A	N/A	N/A	

[4] i.e., $/hr; ¢/mile; $/month
[5] i.e., LS = lump sum; hr = hours; % of effort
[6] Items costing <$2,000.00 with a useful life <2 years
[7] Items costing ≥$2,000.00 with a useful life ≥2 years
[8] This is the maximum rate. Proposer may offer a lower rate.

SAMPLE

Budget Sheet

Project Title:	**Water Budget Modeling**
Principal Investigator:	**Sam Jones, Ph.D.**
Organization:	**University of Wetlands**
Requested Duration in Months:	**18 Months**

Item	**Unit Rate**[9] (A)	**Units**[10] (B)	**Quantity** (C)	**Cost** (D = A x C)
Salaries				
Sam Jones, P.I.	8,000/month	N/A	9[11]	72,000.00
Jane Waters, Research Associate	3,000/month	N/A	18	54,000.00
Benefits				
P.I.	20%	N/A	N/A	14,400.00
R.A.	16.5%	N/A	N/A	8,910.00
Tuition	5,000 / semester	semester	3	15,000.00
Supplies	10,000	L.S.	1	10,000.00
Equipment	5,000	L.S.	1	5,000.00
Subcontracts				
Computer Lab	3,000	L.S.	1	3,000.00
Geek Squad	2,000	L.S.	1	2,000.00
Travel	.50/mile	Miles	5,000	2,500.00
Other Direct Cost	N/A	N/A	N/A	N/A
Total Direct Cost	N/A	N/A	N/A	186,810.00
Indirect Cost	35%	N/A	N/A	65,383.50
Total Cost	N/A	N/A	N/A	252,193.50

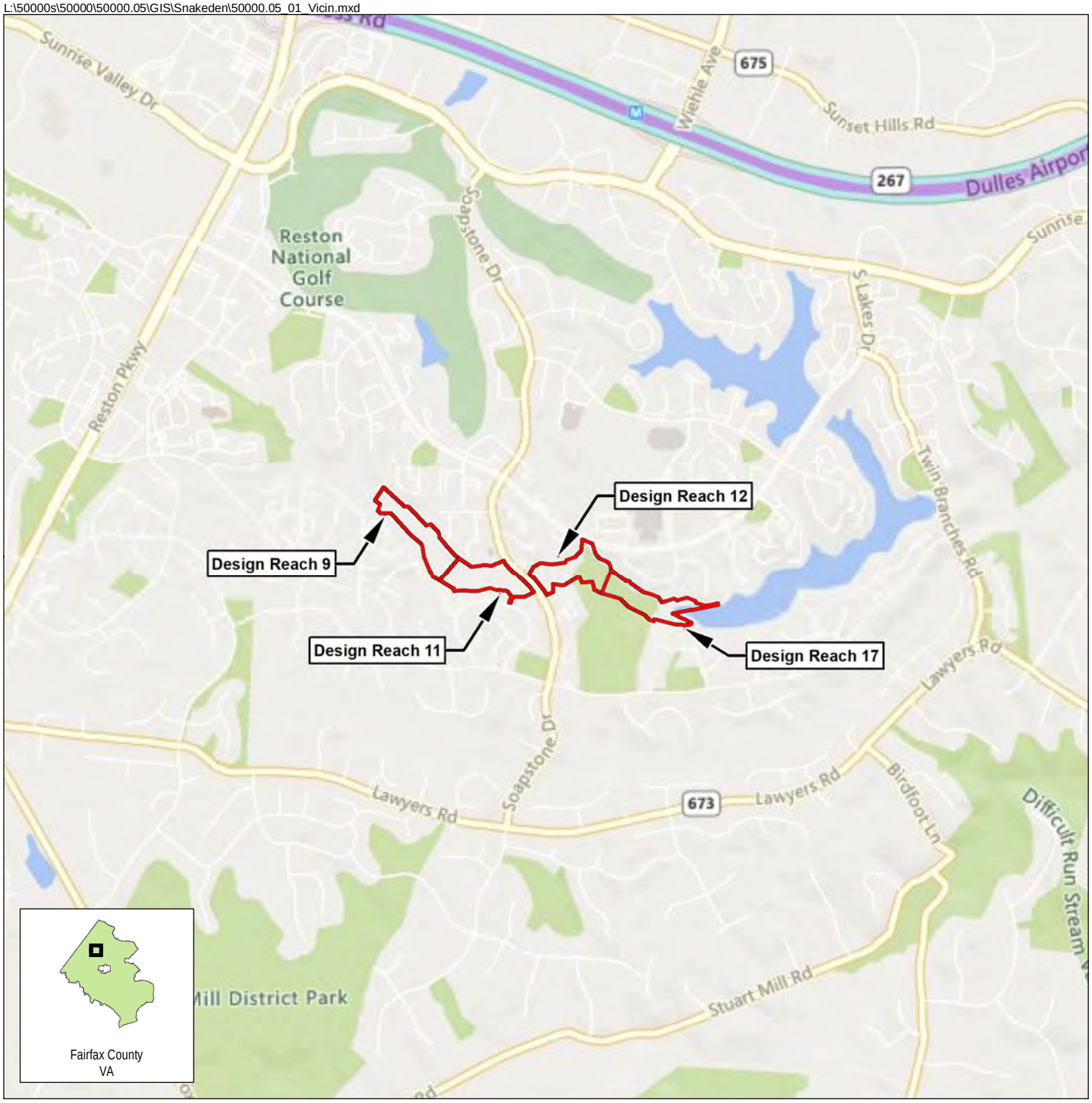
[9] i.e., $/hr; ¢/mile
[10] i.e., LS = lump sum; hr=hours; % of effort
[11] 50% of 18 months

XI. Solicitation Offer and Award Form (SOAF)

Include one (1) original of the SOAF, signed by the Principal Investigator and Organization's Certifying Representative, with each of the four (4) hard copy submissions, and a PDF of said signed document on a USB Flash Drive containing your proposal.

See Attachment A: Solicitation Offer and Award Form.

L:\50000s\50000\50000.05\GIS\Snakeden\50000.05_01_Vicin.mxd



Project Area

Vicinity Map
Snakeden Branch
WSSI #50000.05

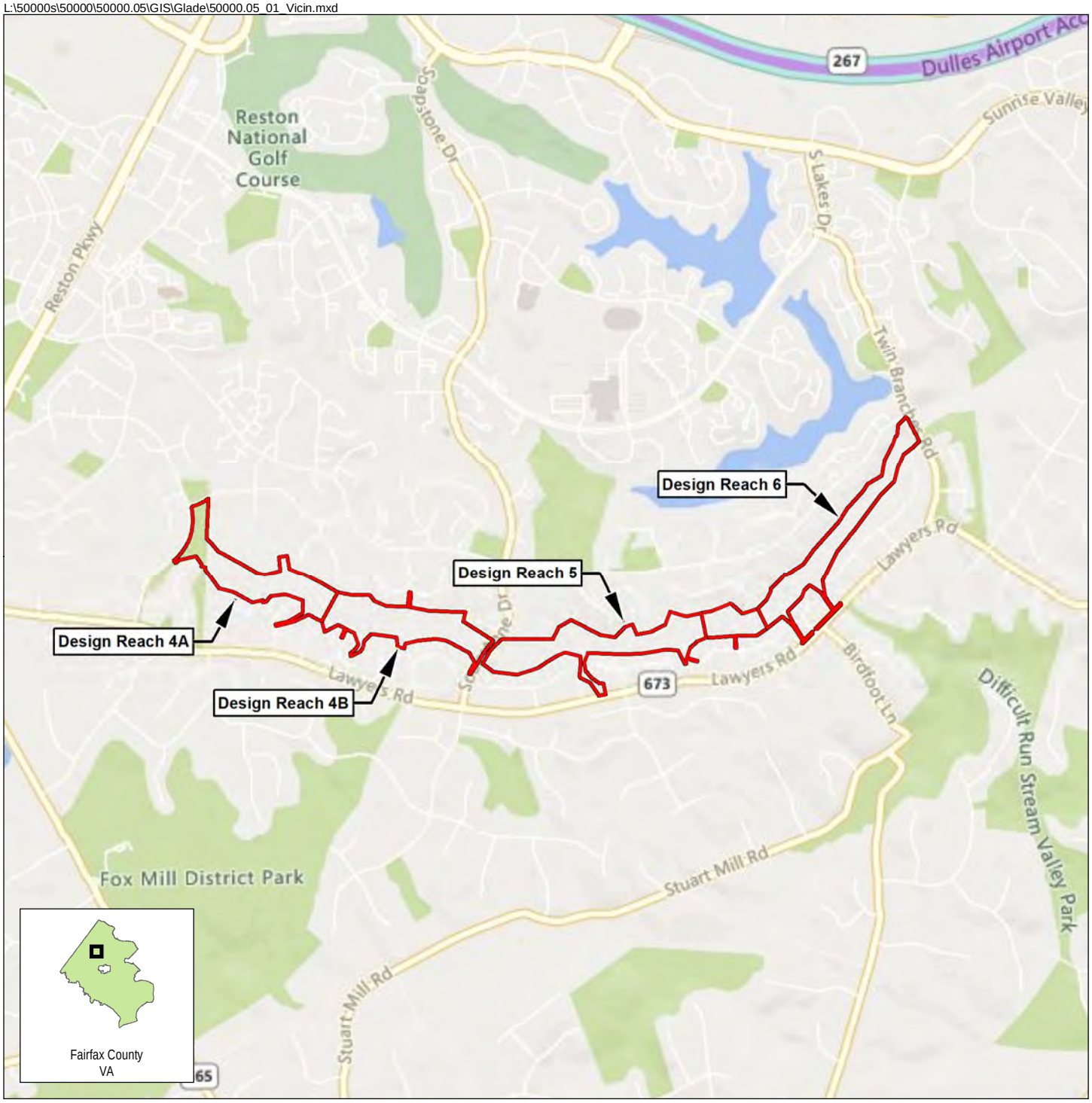
NORTH
0 2,000
Feet
Original Scale:
1 " = 2,000 '

Source: Bing Maps Road - © 2017 HERE © 2017 Microsoft Corporation

Wetland Studies and Solutions, Inc.
a DAVEY company

Exhibit 1

L:\50000s\50000\50000.05\GIS\Glade\50000.05_01_Vicin.mxd



Project Area

Vicinity Map
The Glade
WSSI #50000.05

NORTH
0 2,000
Feet
Original Scale:
1 " = 2,000 '

Source: Bing Maps Road - © 2017 HERE © 2017 Microsoft Corporation

Wetland Studies and Solutions, Inc.
a DAVEY company

Exhibit 1

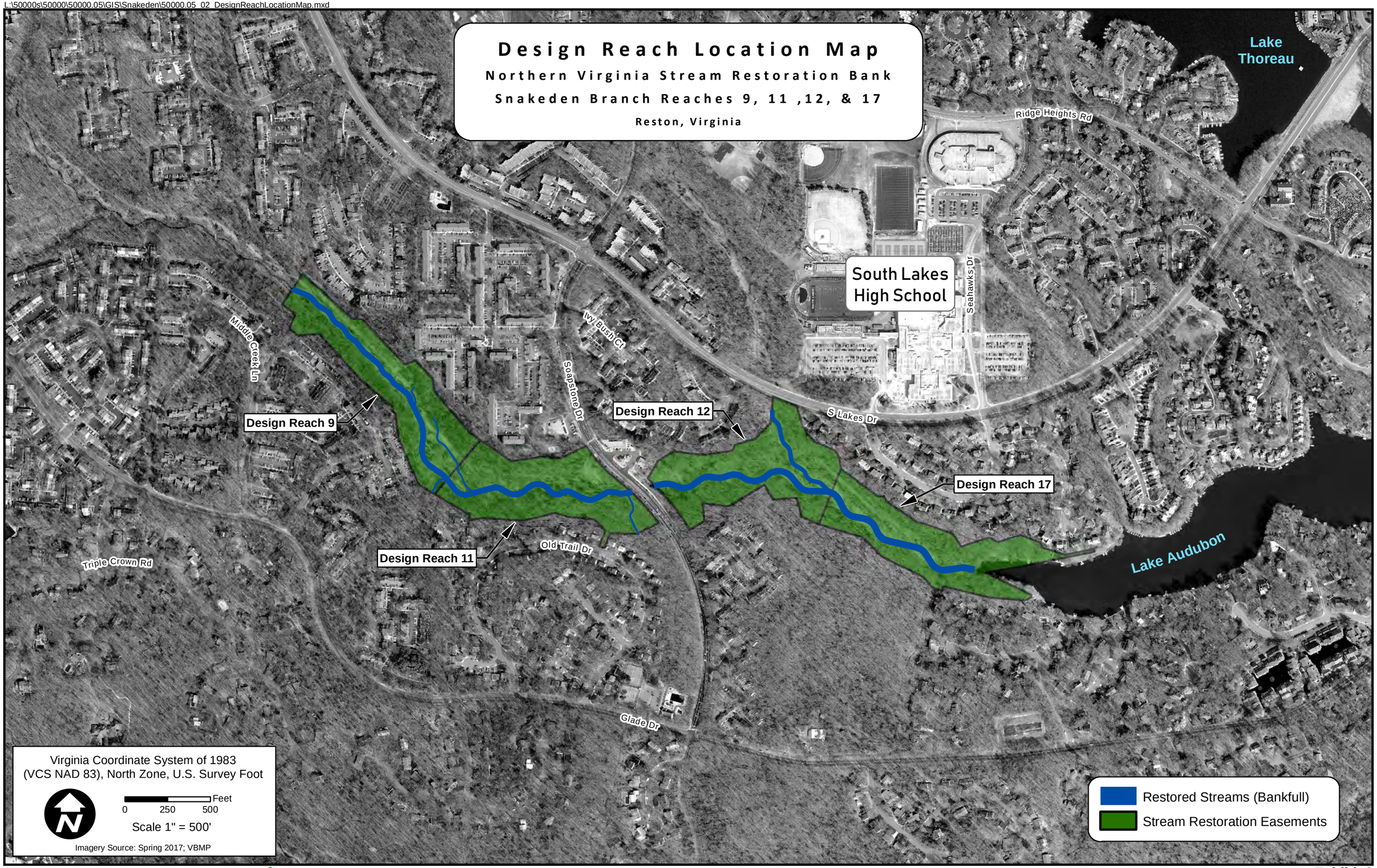
L:\50000s\50000\50000.05\GIS\Snakeden\50000.05_02_DesignReachLocationMap.mxd

Design Reach Location Map

Northern Virginia Stream Restoration Bank

Snakeden Branch Reaches 9, 11 ,12, & 17

Reston, Virginia



Wetland Studies and Solutions, a DAVEY company

Exhibit 2

L:\50000s\50000\50000.05\GIS\Glade\50000.05_02_DesignReachLocationMap.mxd

Design Reach Location Map

Northern Virginia Stream Restoration Bank

The Glade Reaches 4A, 4B, 5 & 6

Reston, Virginia

Design Reach 4A

Design Reach 4B

Design Reach 5

Design Reach 6

Lake Audubon

Colts Neck Rd

Steeplechase Dr

Triple Crown Rd

Old Trail Dr

Glade Dr

Twin Branches Rd

Riders Ln

Blue Spruce Rd

Foxclove Rd

Soapstone Dr

Lawyers Rd

Handlebar Rd

Running Cedar Rd

Stuart Mill Rd

Virginia Coordinate System of 1983
(VCS NAD 83), North Zone, U.S. Survey Foot

0 400 800 Feet

Scale 1" = 800'

Imagery Source: Spring 2017; VBMP

Beaver Save Area

Restored Streams (Bankfull)

Stream Restoration Easements

EXHIBIT 3
SNAKEDEN – REACHES 9, 11, 12, 17
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

1. **Structure 9-2 (Winter 2015).**

2. **Structure 9-2 (Summer 2015).**

EXHIBIT 3
SNAKEDEN – REACHES 9, 11, 12, 17
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

3. Structure 9-5 (Winter 2015).

4. Structure 9-5 (Summer 2015).

EXHIBIT 3
SNAKEDEN – REACHES 9, 11, 12, 17
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

5. Structure 9-6 (Winter 2015).

6. Structure 9-6 (Summer 2015).

EXHIBIT 3
SNAKEDEN – REACHES 9, 11, 12, 17
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

7. Structure 11-3 (Winter 2015).

8. Structure 11-3 (Summer 2015).

EXHIBIT 3
SNAKEDEN – REACHES 9, 11, 12, 17
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

9. Structure 11-4 (Winter 2015).

10. Structure 11-4 (Summer 2015).

EXHIBIT 3
SNAKEDEN – REACHES 9, 11, 12, 17
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

11.Structure 11-6 (Winter 2015).

12.Structure 11-6 (Summer 2015).

EXHIBIT 3
SNAKEDEN – REACHES 9, 11, 12, 17
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

13. Structure 12-1 (Winter 2015).

14. Structure 12-1 (Summer 2015).

EXHIBIT 3
SNAKEDEN – REACHES 9, 11, 12, 17
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

15. Structure 12-3 (Winter 2015).

16. Structure 12-3 (Summer 2015).

EXHIBIT 3
SNAKEDEN – REACHES 9, 11, 12, 17
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

17. Structure 12-5 (Winter 2015).

18. Structure 12-5 (Summer 2015).

EXHIBIT 3
SNAKEDEN – REACHES 9, 11, 12, 17
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

19. Structure 12-8 (Winter 2015).

20. Structure 12-8 (Summer 2015).

EXHIBIT 3
SNAKEDEN – REACHES 9, 11, 12, 17
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

21. Structure 17-1 (Winter 2015).

22. Structure 17-1 (Summer 2015).

EXHIBIT 3
SNAKEDEN – REACHES 9, 11, 12, 17
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

23. Structure 17-4 (Winter 2015).

24. Structure 17-4 (Summer 2015).

EXHIBIT 3
SNAKEDEN – REACHES 9, 11, 12, 17
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

25. Structure 17-6 (Winter 2015).

26. Structure 17-6 (Summer 2015).

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

1. **Reach 4A, Structure 5 (Winter 2015)**

2. **Reach 4A, Structure 5 (Summer 2016)**

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

3. **Reach 4A, Structure 12 (Winter 2015)**

4. **Reach 4A, Structure 12 (Summer 2016)**

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

5. **Reach 4A, Structure 17 (Winter 2015)**

6. **Reach 4A, Structure 17 (Summer 2016)**

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

7. **Reach 4A, Structure 30 (Winter 2015)**

8. **Reach 4A, Structure 30 (Summer 2016)**

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

9. Reach 4B, Structure 3 (Winter 2015)

10. Reach 4B, Structure 3 (Summer 2016)

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

11. Reach 4B, Structure 7 (Winter 2015)

12. Reach 4B, Structure 7 (Summer 2016)

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

13. Reach 4B, Structure 13 (Winter 2015)

14. Reach 4B, Structure 13 (Summer 2016)

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

15. Reach 4B, Structure 19 (Winter 2015)

16. Reach 4B, Structure 19 (Summer 2016)

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

17. Reach 4B, Structure 23 (Winter 2015)

18. Reach 4B, Structure 23 (Summer 2016)

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

19. Reach 5, Structure 6 (Winter, 2017)

20. Reach 5, Structure 6 (Summer, 2017)

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

21. Reach 5, Structure 13 (Winter, 2017)

22. Reach 5, Structure 13 (Summer, 2017)

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

23. Reach 5, Structure 22 (Winter, 2017)

24. Reach 5, Structure 22 (Summer, 2017)

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

25. Reach 5, Structure 30 (Winter, 2017)

26. Reach 5, Structure 30 (Summer, 2017)

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

27. Reach 5, Structure 35 (Winter, 2017)

28. Reach 5, Structure 35 (Summer, 2017)

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

29. Reach 6, Structure 1 (Winter, 2017)

30. Reach 6, Structure 1 (Summer, 2017)

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

31. Reach 6, Structure 4 (Winter, 2017)

32. Reach 6, Structure 4 (Summer, 2017)

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

33. Reach 6, Structure 15 (Winter, 2017)

34. Reach 6, Structure 15 (Summer, 2017)

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

35. Reach 6, Structure 19 (Winter, 2017)

36. Reach 6, Structure 19 (Summer, 2017)

EXHIBIT 4
THE GLADE – REACHES 4A, 4B, 5, & 6
REPRESENTATIVE STRUCTURE PHOTOGRAPHS

37. Reach 6, Structure 28 (Winter, 2017)

38. Reach 6, Structure 28 (Summer, 2017)