

# Quality Assurance Project Plan

## District Stream Trash Monitoring Grant # RFA 2016-1605-SWMD

Prepared for:

District Department of Energy & Environment  
Stormwater Management Division

Approved  Date 8/12/16

Project Manager: Matt Gallagher

Quality Assurance Project Plan Prepared by: Matt Gallagher

Approved  Date 7/24/16



Department of Environmental Programs  
Metropolitan Washington Council of Governments

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## Table of Contents

Table of Contents .....	i
Distribution List .....	ii
1.0 Project Management .....	1
1.1 Project Task/Organization .....	1
1.2 Problem Assessment and Purpose .....	1
1.3 Project/Task Description .....	2
1.4 Quality Objectives and Criteria .....	2
1.5 Special Training/Certification .....	2
1.6 Documents and Records .....	2
2.0 Data Generation and Aquisition Elements .....	6
2.1 Sampling Process Design (Experimental Design) .....	6
2.2 Quality Control .....	6
2.3 Sample Handling and Custody .....	6
2.4 Instrument/Equipment Testing, Inspection and Maintenance .....	7
2.5 Inspection/Acceptance of Supplies and Consumables .....	7
2.6 Data Management .....	7
2.7 Non-direct Measurements .....	7
3.0 Assessment and Oversight .....	8
3.1 Assessments and Response Actions .....	8
3.2 Report Preparation and Submission .....	8
4.0 Data Validation and Usability .....	9
4.1 Data Review, Verification and Validation .....	9
4.2 Verification and Validation Methods .....	9
4.3 Reconciliation and User Requirements .....	9
Appendix .....	10

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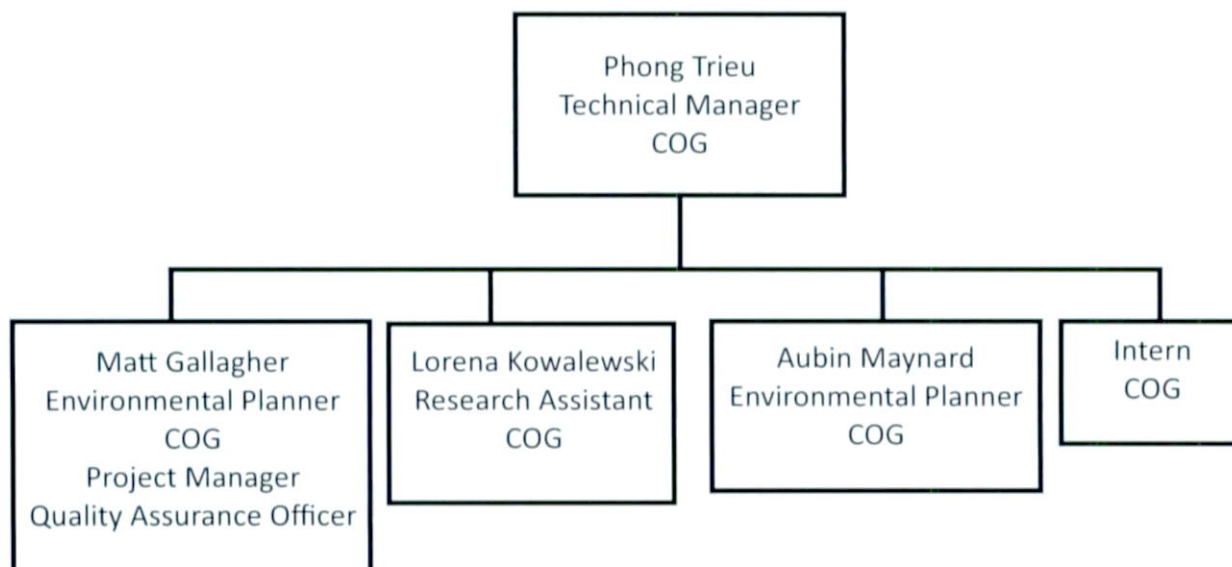
Lorena Kowalewski - 1 copy

Matthew Robinson - 3 copies + electronic

# 1.0 Project Management

## 1.1 Project Task/Organization

The District of Columbia Department of Energy & Environment (DOEE) has awarded a grant to the Metropolitan Washington Council of Governments (COG) to monitor District streams for trash levels. Mr. Phong Trieu is the COG Technical Manager in the Department of Environmental Programs and will ensure staff has met all project obligations. Mr. Trieu will be consulted and involved with all major project decisions. Mr. Matt Gallagher is the COG Environmental Planner in the Department of Environmental Programs and the Project Manager for this grant. Mr. Gallagher will also serve as the official Quality Assurance Officer. Ms. Lorena Kowalewski will assist Mr. Gallagher with field work, data entry, data quality assurance, and the preparation of reports. Mr. Aubin Maynard will assist with field work. A COG intern will assist with field work and data entry.



## 1.2 Problem Assessment and Purpose

Per the approved September 2010 Anacostia Watershed Trash Total Maximum Daily Load (TMDL), the District is required to remove or prevent 103,188 pounds of trash from entering its tributaries to the Anacostia River each year by 2017. In 2011, the U.S. Environmental Protection Agency (EPA) listed trash as a priority pollutant in the District's MS4 permit, and it is expected to be included in the new 2016 permit; the permit requires the District to conduct trash monitoring and to report results in its annual MS4 report.

In September 2015, COG reconvened the Anacostia Trash Reduction Workgroup (ATRW) in order to address concerns raised by the Natural Resources Defense Council and other stakeholder groups regarding the trash TMDL and how the jurisdictions were implementing, tracking and reporting on their trash reduction programs. COG has been conducting the Anacostia trash TMDL-driven stream monitoring for Prince George's and Montgomery Counties since 2011, and COG is expecting to continue that monitoring for at least the next 5 years. Implementing the same monitoring methodology in the District would complement the ATRW's goal of achieving consistency within the Anacostia watershed jurisdictions in their trash TMDL programs.

The proposed District monitoring is critical for assessing the effectiveness of both trash removal and pollution prevention measures and for documenting trends in specific trash items of interest (e.g., plastic bags, polystyrene, etc.). More specifically, the project will provide a quantification of trash loads in 12 stream and one river shoreline areas. In addition, the approximate trash loading rates in 6 of those streams within the District will be determined.



### **1.3 Project/Task Description**

Trash is listed as a priority pollutant in the District's MS4 permit; the permit requires the District to conduct monitoring and report results in the annual MS4 report. In order to fulfill the obligations of this grant, COG will conduct instream trash monitoring in 12 stream and one river shoreline areas that follows the similar protocol that COG has been conducting in Prince George's and Montgomery Counties' portions of the Anacostia Watershed since 2011. The data collected for this grant will be provided to DOEE to be reported in the District's annual MS4 reports to EPA.

### **1.4 Quality Objectives and Criteria**

In conjunction with DOEE staff, 12 stream and one river shoreline areas were identified for biannual trash monitoring (Figures 1 and 2; Appendix Table 1 and Figures 3-14). The proposed protocol includes walking in the wetted perimeter to count and collect trash items, so only wadeable sites that can be physically traversed on foot were selected. Each site was given a unique identifying site ID. The proposed protocols are consistent with the stream trash monitoring surveys that COG has been employing in Montgomery and Prince George's Counties since 2011, and are discussed in more detail in section 2.1. Briefly, each monitoring site is 500 feet long and will undergo a *count survey*, where every trash item within the bankfull width will be identified and recorded on the data sheet into one of the categories of trash approved by DOEE. In addition, 6 of those sites (all of the Anacostia watershed sites) will undergo an additional level of observation known as *pick surveys*, where every item in the upstream 250 foot portion of the 500 foot length will be collected, sorted into the categories of trash approved by DOEE, and each category will be weighed in aggregate. Note: the monitoring transects may not overlap exactly with the stream channels in the maps due to inaccuracies in current stream channel layers.

The instream baseline surveys will occur twice per year (i.e., late spring/summer and late fall prior to leaf-off conditions). Monitoring will occur only on days that have not had significant (greater than 0.2 inches) precipitation within the previous 48 hours, as clear, baseflow conditions are crucial for allowing surveyors to see and identify all trash items in the stream. Photographic documentation of representative conditions (e.g. general stream channel condition, number of trash "strainers", storm drain outfalls present, etc.) will occur at every survey.

The downstream end (0 feet), mid-point (250 feet), and upstream end (500 feet) will be recorded using a hand-held GPS unit. In addition, each of those points will be flagged to aid in finding the sites for each of the surveys.

### **1.5 Special Training/Certification**

There is no specialized training necessary for surveying the streams for trash. Currently, all COG staff that will be involved in these surveys have already conducted these protocols in Montgomery and Prince George's counties. Current staff assisted in the development and refinement of the Anacostia stream trash survey. If new staff are brought on to assist with the project, at least one COG staff member identified in Section 1.1 (pg. 1) will be present to make sure proper sampling protocols are followed.

### **1.6 Documents and Records**

This QAPP was developed by Environmental Planner (and the Project Manager for this grant) Matt Gallagher and reviewed by Technical Manager Phong Trieu. Upon review and when necessary revisions are completed, it will be submitted to DOEE for review. Amendments to the original QAPP will be completed by Mr. Gallagher and reviewed by Mr. Trieu, who will sign the amended version.

A sample data sheet is included in the Appendix (Figure 1). The data will be transferred from the paper data sheets into an electronic database. Paper sheets will be cataloged in a binder and held at COG's office. Typically, data entry is completed by an intern and Quality Assurance and Quality Control (QA/QC) measures are administered by Research Assistant I, Lorena Kowalewski. In the event that either of these staff are unavailable, the Project Manager, Matt Gallagher, will conduct the QA/QC for data entry. Tables and Figures to

be used in progress, annual and final reports will be reviewed for accuracy by Matt Gallagher prior to use in the reports.

Electronic copies of all reports to DOEE will be retained by COG under the terms of the Grant Award Notice. DOEE will be provided electronic copies of all reports; hard copies will be provided upon special request. Quarterly progress reports will include the general grant award information, a brief summary of progress, a brief summary of any barriers the project has faced, and the current status of the project's budget. Annual reports will include, at a minimum, a summary of data collected during the previous year, statistical analyses of data, a written summary of findings, and an Excel database that includes all data collected to date. The final technical memorandum will include data analyses and written summaries that follow the annual report template but for all 3 years of sampling (6 complete surveys over 3 years). In addition, the final report will include recommendations for future monitoring and/or trash reduction strategies and will also be accompanied by the complete Excel database of all data collected over the 3 year period. COG and DOEE will retain all data reports in perpetuity.

The Pesola scales used to weigh samples will be calibrated with a known Ohaus precision weights prior to each survey. Precipitation data will be collected from the Washington/Reagan National Airport rain gauge.

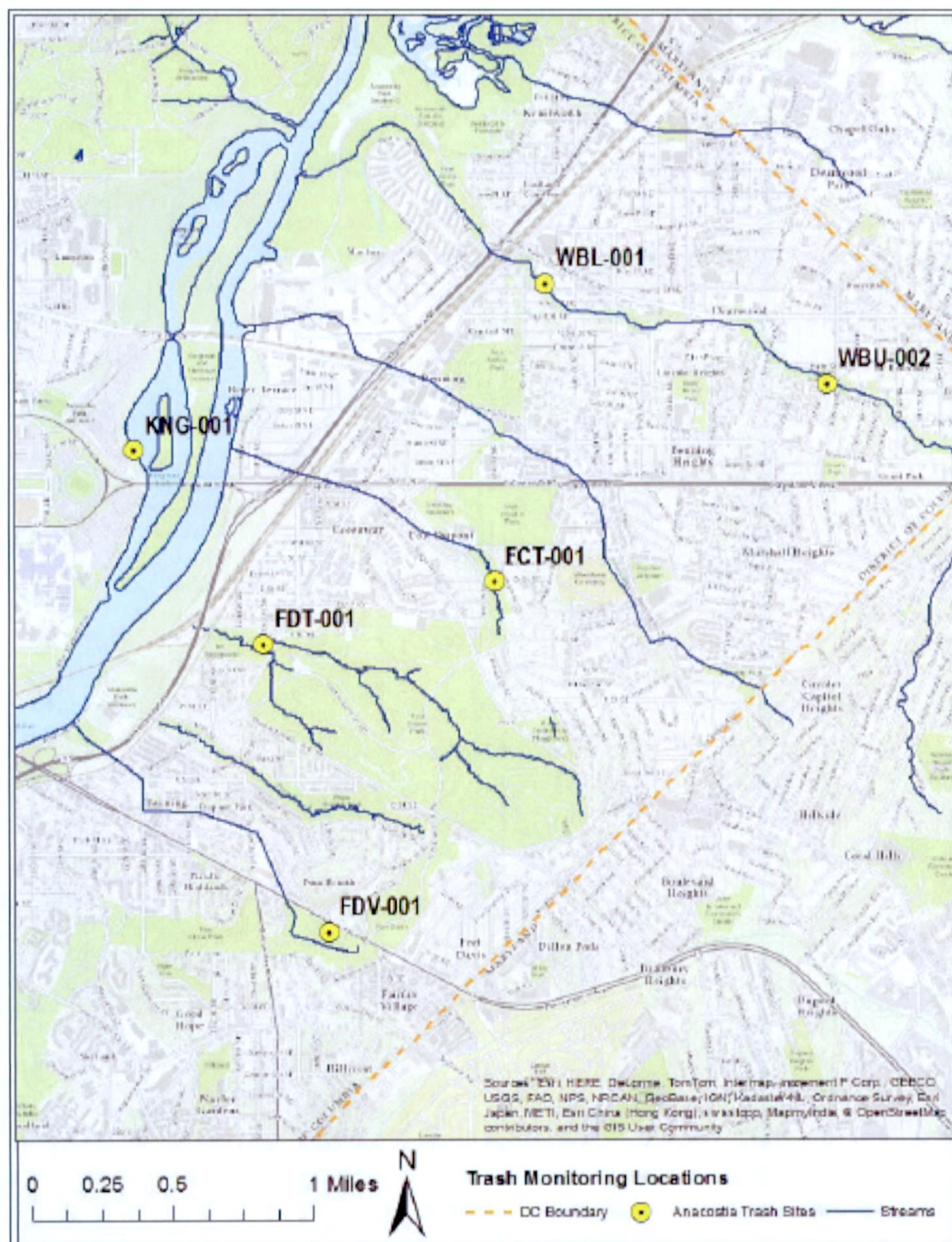


Figure 1. Potomac and Rock Creek Watershed Stream Trash Monitoring Sites (7, Total)





Figure 2. Anacostia Watershed Monitoring Sites (6, Total)





## 2.0 Data Generation and Acquisition Elements

### 2.1. Sampling Process Design (Experimental Design)

The purpose of the project is to conduct trash monitoring for compliance with the District's MS4 permit. COG's survey methodology has been approved by the Maryland Department of the Environment for trash monitoring in the Anacostia watershed portion of Montgomery and Prince George's Counties. DOEE has received approval from EPA Region III to use this monitoring approach to meet MS4 permit requirements.

The instream baseline trash surveys for all 13 sites will be performed twice per year. Each complete biannual monitoring round will consist of both *count surveys* and *pick surveys*. All monitoring sites were chosen in collaboration with DOEE. See Section 1.4 for the information on all 13 monitoring sites.

*Count surveys* will occur at all 13 sites. For safety concerns, there will always be at least 2 surveyors present, with a minimum of 1 surveyor for every 10 feet of stream channel width. Each count survey will begin at the downstream end. Surveyors will walk upstream, and every trash item within the bankfull width for the entire 500 foot length will be identified and recorded on the data sheet into one of the 22 trash categories. (The original TMDL sorted trash into 20 categories, but due to recent legislation in the Anacostia jurisdictions, COG now separates out "carry out bags" and "expanded polystyrene".)

*Pick surveys* will occur at the 6 Anacostia watershed sites and will occur after the count survey has been conducted for that site. Beginning at the midway point of the site's designated 500 foot length, COG staff will walk upstream and pick up every visible trash item within the bankfull width for that upstream 250 foot length. Upon completion, every item will be sorted into the 22 categories and a total weight and total number of items for each category will be calculated and recorded on a second data sheet. No large or heavy items (i.e., tires, bricks, concrete, appliances etc.) are collected for the pick surveys (they are recorded for the *count surveys*, however). The focus is on "floatables" and other items that can freely travel through the MS4 pipes. After enumeration, all collected trash items will be removed and properly disposed. The protocol will enable COG to develop a reasonable estimate of general instream trash accumulation/loading rates at these pick sites.

### 2.2 Analytical methods

The trash that is found in streams is often laden with water and/or sediment. As part of the *pick surveys*, bottles and cans will be emptied of water and sediment when possible. COG staff do not empty containers that appear to contain questionable or hazardous materials; these "full" containers are included in the weight calculations. In addition, organic material such as leaf litter, twigs, and grass are removed from items prior to weighing. Once the items are sorted into the 22 categories, an aggregate weight for each category is determined using Pesola 20kg, 1000g, and 100g scales. There is no "drying period" prior to weighing items; all aggregate weights are wet weights that are determined on site.

### 2.3 Quality Control

The sampling methodology requires that at least two surveyors are present for each survey. For the *count surveys*, one person is responsible for recording trash items on the data sheet while the other surveyor(s) calls out each item he or she sees. When more than one person is calling out items, the surveyors will establish their particular areas of the stream channel (i.e., left or right half) to

ensure no items are counted twice. For the *pick surveys*, it is less important to define areas, as all items will be collected within the bankfull width of that 250 foot length. One surveyor is responsible for walking the 250 foot length to ensure all items have been collected.

Field quality control checks are performed by rotating the roles of the personnel.

## **2.4 Sample Handling and Custody**

The sampling methodology does not require processing any samples off-site. No custody procedures are needed.

## **2.5 Instrument/Equipment Testing, Inspection, and Maintenance**

A hand-held GPS will be used to define the start point, midpoint, and endpoints of the 500 foot surveys. The GPS is a Trimble GeoXH. The scales are Pesola 20 kg, 1000 g, and 100 g, and they are calibrated with known weights before each monitoring season. In order to weigh heavier/larger items, a 5 gallon bucket's weight is tared on the 20 kg scale, so any additional weights added to the bucket (trash items) start at a zero. COG always has 2 sets of scales available, should there be any malfunctions.

## **2.5 Inspection/Acceptance of Supplies and Consumables**

The project does not require any laboratory consumables.

## **2.6 Data Management**

For *count surveys*, the number of trash items will be compiled on paper data sheets during the sampling events. For *pick surveys*, a separate data sheet will be filled out. The information on the data sheets will be transferred to a Microsoft Access database, and the paper sheets will be catalogued in a binder that will be kept at COG's office. Copies of the data sheets and/or the electronic database will be provided to DOEE upon request. A sample data sheet is included in the Appendix.

## **2.7 Non-direct Measurements**

Weather observation data, including precipitation, will be taken from the Reagan National Airport online database. Prior to each stream survey, COG staff will consult the precipitation record to ensure there has not been more than 0.2 inches of rainfall in the previous 48 hours.



## **3.0 Assessment and Oversight**

### **3.1 Assessments and Response Actions**

Data collection will always be collected a minimum of 48 hours after a rain event. The data will be reviewed and inspected by Matt Gallagher, the grant's Project Manager. Mr. Gallagher will also arrange for meetings with DOEE, should any changes in procedures or site locations be required to fulfill the deliverables of the grant.

### **3.2 Report Preparation and Submission**

Mr. Gallagher or another approved COG staff will review all data entry, analysis, and preparation of associated tables and figures. COG will submit progress reports to DOEE on a quarterly basis. In addition, more comprehensive annual reports will be prepared and submitted to DOEE. A final technical memorandum will be completed and submitted to DOEE at the end of the grant period, summarizing all results from the grant project. COG staff will consult with DOEE on any significant modifications that may affect the grant's deliverables and/or schedule.

## 4.0 Data Validation and Usability

### 4.1 Data Review, Verification and Validation

Data collection on trash levels is a new field and questions still remain regarding the most accurate ways to capture trash levels in streams. The protocols described here have been approved by MDE for monitoring in Montgomery and Prince George's Counties and have been helpful in determining trash hot spots and estimating trash accumulation over time at *pick sites*. Significant outliers in data points are unlikely, but COG staff will investigate potential reasons (e.g. major strainers) prior to incorporation in reports.

### 4.2 Verification and Validation Methods

A data collection sheet is attached. No samples will be transported to any laboratory; therefore no chain of custody form is needed.

### 4.3 Reconciliation with User Requirements

All data that has undergone QA/QC measures will be sent to DOEE on an annual basis. Impacts of precipitation and strainers blocking stream flow will be discussed. Results of stream trash surveys and possible methodology modifications to improve the quality of the data will be reviewed.



# Appendix

Figure 1. Stream Trash Monitoring data sheet.

## ANACOSTIA WATERSHED TRASH SURVEY – MDE 8 Digit Watershed Code - 02140205

DATE: \_\_\_\_\_ START TIME: \_\_\_\_\_  
 CREW: \_\_\_\_\_ END TIME: \_\_\_\_\_

SUBWATERSHED:									
STATION NUMBER:									
STATION NAME:									
STARTING COORD. (DDMMSS):	Lat:	Long:							
END COORD. (DDMMSS):	Lat:	Long:							
<b>SURVEY TYPE</b> (check applicable)									
<b>1. Stream</b>		<b>Length (ft):</b>							
		<b>No. of Trash "Strainers":</b>							
		<b>Riparian Buffer Conditions:</b>							
<b>2. Trash Netting System</b>		<b>Net Number and Total Weight (lbs)</b>							
Total Number of Nets/ Nets Surveyed		1	2	3	4	5	6	7	8
<b>3. Road Right of Way</b>		300' long and 5' wide on either side of curb gutter per side							
<b>4. Stormwater Management Pond</b>									
<b>5. Storm Drain Outfall (Trash Fence)</b>		DA (Acres/mi <sup>2</sup> )=							
GENERAL LAND USES (check all applicable)									
• Low Density Residential (large lot, single family)									
• Medium Density Residential (small lot, single family, and/or townhouses)									
• High Density Residential (apartments)									
• Commercial									
• Industrial									
• Institutional (libraries, schools, religious)									
• Recreational Area (developed)									
• Forest									
• Agriculture									
GENERAL STATION DESCRIPTION:									
PHOTO NUMBERS:									
TOTAL NO. OF OBSERVED ITEMS:									
TOP THREE ITEMS AND ASSOCIATED SUB-TOTALS:									
TOTAL WEIGHT (OPTIONAL):		(lbs)							



Figure 2. Stream trash monitoring data sheet (continued).

**ANACOSTIA WATERSHED TRASH SURVEY (Cont'd)**

STATION NO. : \_\_\_\_\_

Total Weight: \_\_\_\_\_ (Check if applicable)

DATE : \_\_\_\_\_

Less Container Weight: \_\_\_\_\_ (Check if applicable)

	Trash Item	Field Count		Number of Items (Sub-total)	Optional Weight ( )
		Carry Out	Other		
1	Plastic Bags				
2	Plastic Bottles				
3	Glass Bottles				
4	Aluminum Cans				
5	Styrofoam (cups, packaging, etc.) 10 peanuts = 1	Expanded Polystyrene	Other		
6	Paper (newspapers, magazines, etc.)				
7	Cardboard				
8	Cloth/Clothing/Carpeting				
9	Food Packaging				
10	Auto :				
	Oil Quart Containers				
	Oil Filters				
	Antifreeze Containers				
	Body Parts: Large >1 ft <sup>2</sup>				
	Small <1 ft <sup>2</sup>				
11	Car Batteries				
12	Tires (cars, trucks)				
13	Construction Debris :				
	Bricks (>1/2 brick)				
	Concrete				
	Lumber				
	Misc. (e.g. drywall, etc.)				
14	Appliance(s)				
15	Wooden Pallets				
16	Metal (Drums, Cans, Pipes)				
17	Shopping Carts				
18	Toiletries/Drug Containers				
19	Sports Equipment/Toys				
20	Miscellaneous				
TRASH TOTAL					
DEBRIS SUBTOTAL				Total	
TOTAL WEIGHT					

Container Weight =

# of Strainers =

Table 1. Coordinates of each stream trash monitoring site. A middle coordinate is provided for the Anacostia watershed sites, as those 6 sites are “pick sites”, where the middle coordinate delineates where the pick survey begins.

Watershed	Site	Location	Longitude	Latitude
Potomac	BKG-001	Lower	-77.10039	38.91993
		Upper	-77.09908	38.92066
	FDB-001	Lower	-77.07967	38.93689
		Upper	-77.07946	38.93809
Rock Creek	BGD-001	Lower	-77.04942	38.94320
		Upper	-77.04794	38.94282
	PNB-001	Lower	-77.04704	38.93542
		Upper	-77.04532	38.93626
	LZD-001	Lower	-77.04198	38.96094
		Upper	-77.04138	38.96190
	STC-001	Lower	-77.05132	38.94549
		Upper	-77.05264	38.94540
Anacostia	FDV-001	Lower	-76.95676	38.86736
		Middle	-76.95619	38.86704
		Upper	-76.95545	38.86677
	FDT-001	Lower	-76.96119	38.88162
		Middle	-76.96035	38.88161
		Upper	-76.95974	38.88157
	FCT-001	Lower	-76.94504	38.88598
		Middle	-76.94479	38.88546
		Upper	-76.94444	38.88483
	WBL-001	Lower	-76.94203	38.90067
		Middle	-76.94155	38.90036
		Upper	-76.94109	38.90009
	WBU-002	Lower	-76.92447	38.89572
		Middle	-76.92337	38.89552
		Upper	-76.92248	38.89496
	KNG-001	Lower	-76.92447	38.89572
		Middle	-76.96784	38.89118
		Upper	-76.96754	38.89053



Figure 3. Battery Kemble (BKG-001) stream trash monitoring site.

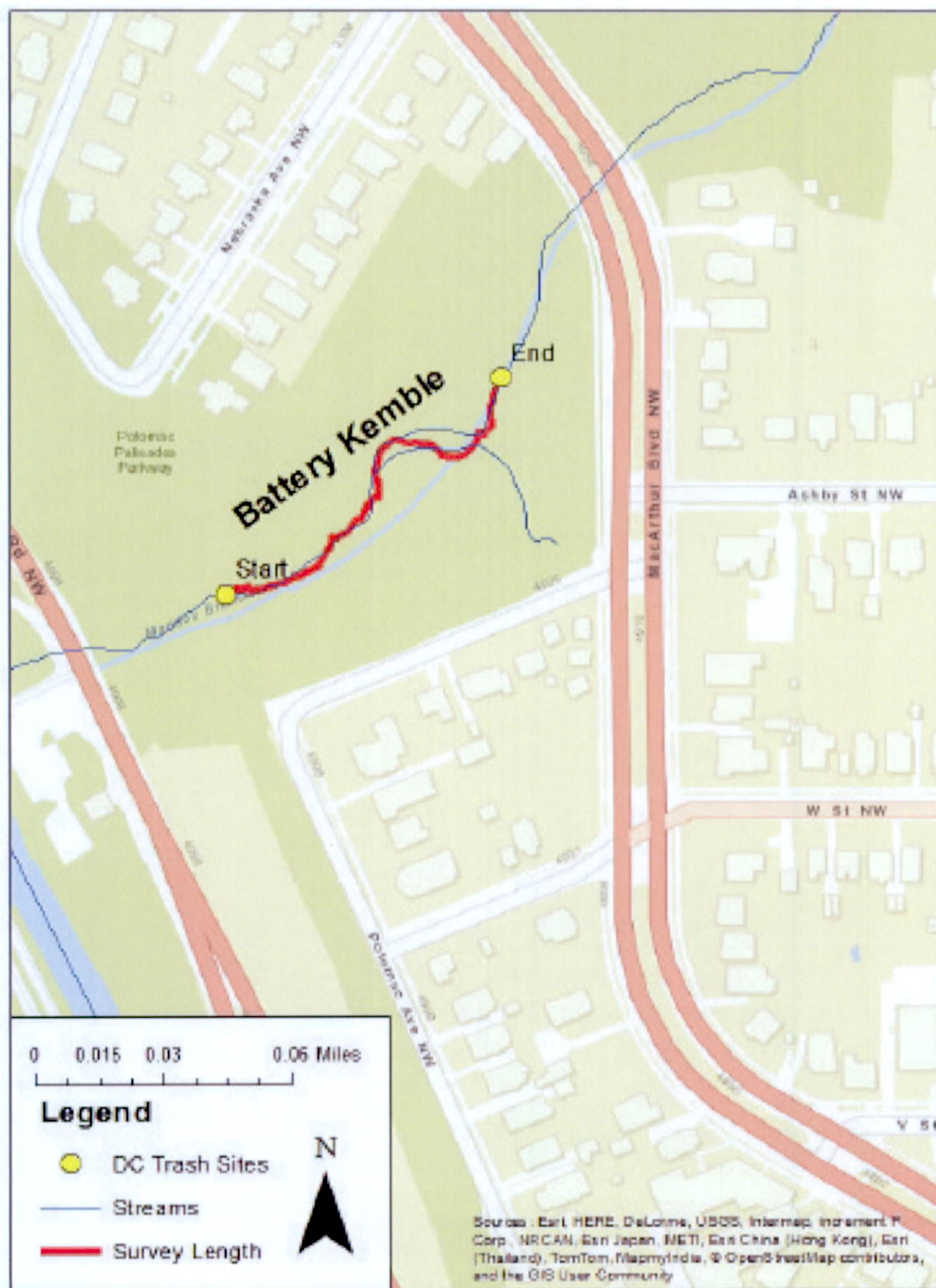


Figure 4. Foundry Branch (FDB-001) stream trash monitoring site.

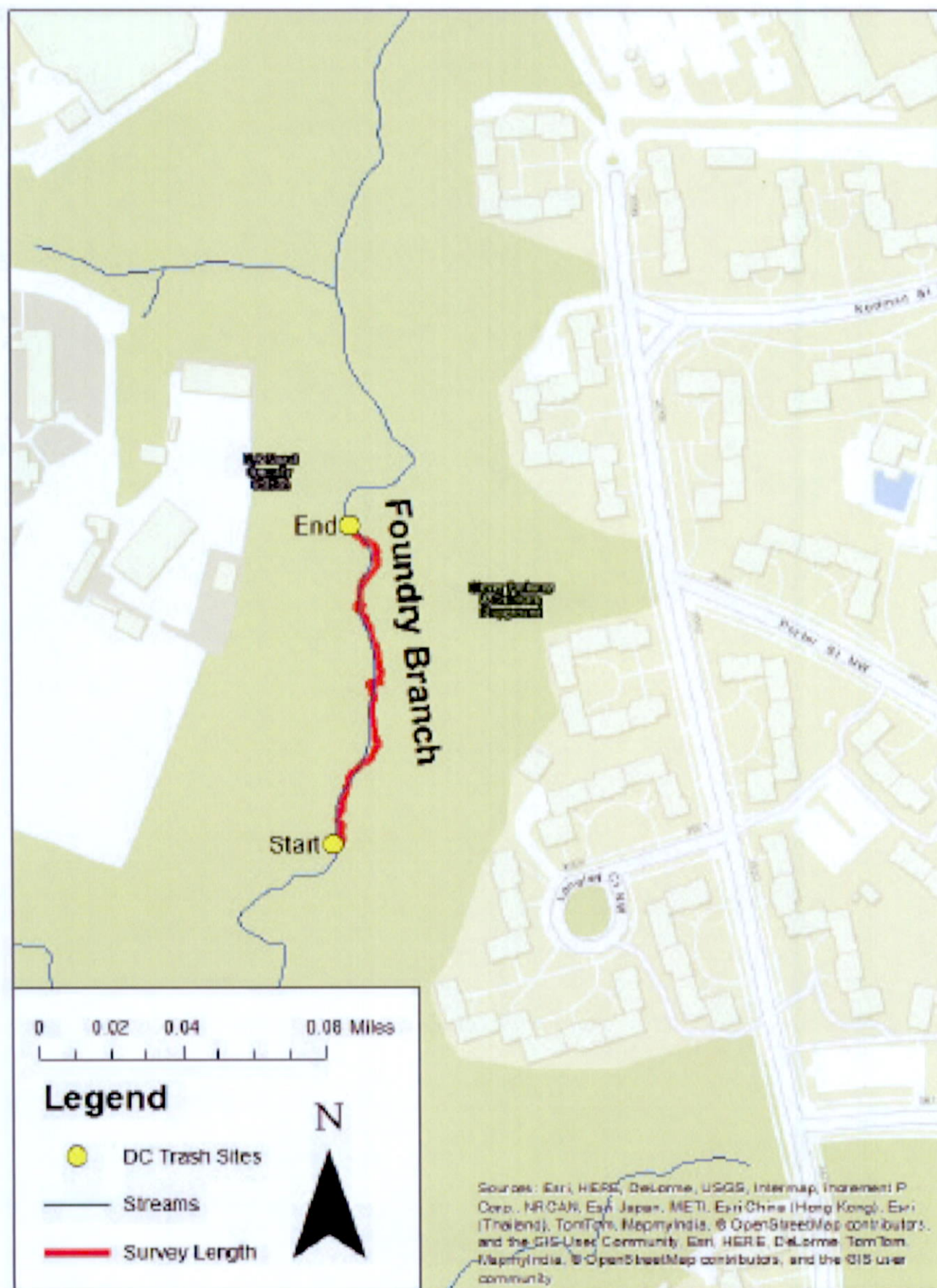




Figure 5. Blagden Run (BGD-001) stream trash monitoring site.



Figure 6. Piney Branch (PNB-001) stream trash monitoring site.

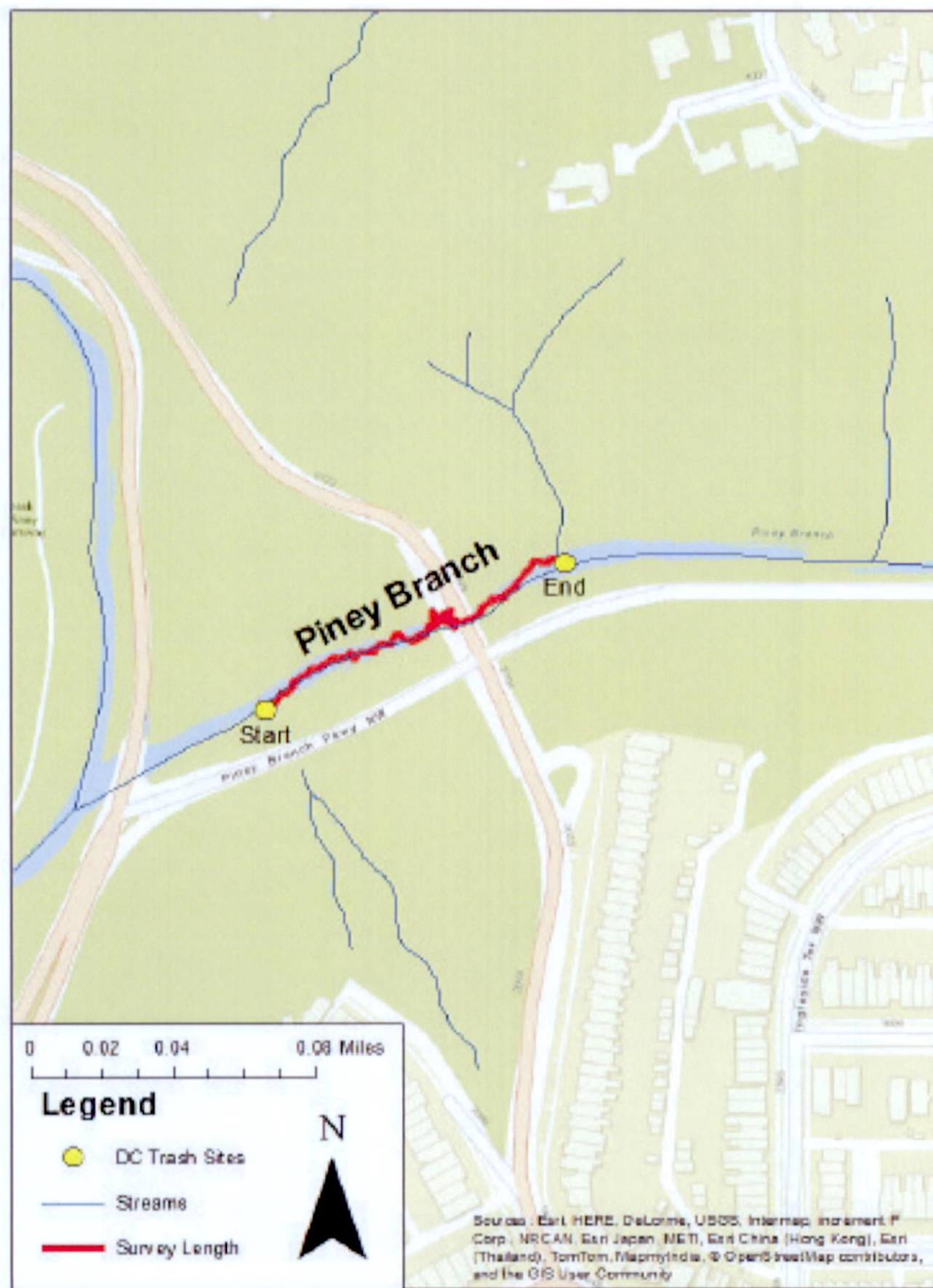




Figure 7. Luzon Branch (LZD-001) stream trash monitoring site.





Figure 8. Soapstone Creek (STC-001) and Broad Branch (BRB-001) stream trash monitoring sites.

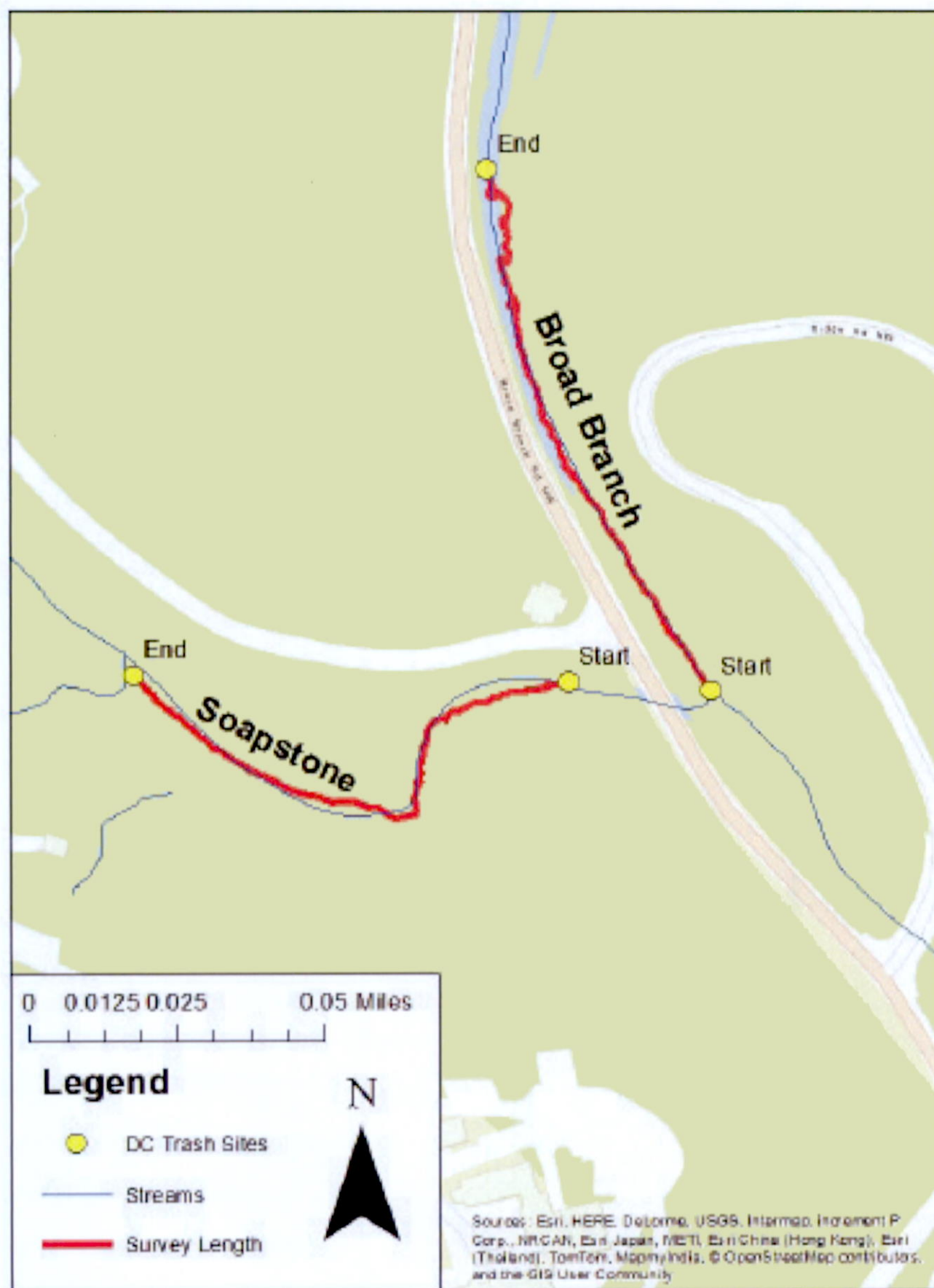


Figure 9. Fort Davis Tributary (FDV-001) stream trash monitoring site.

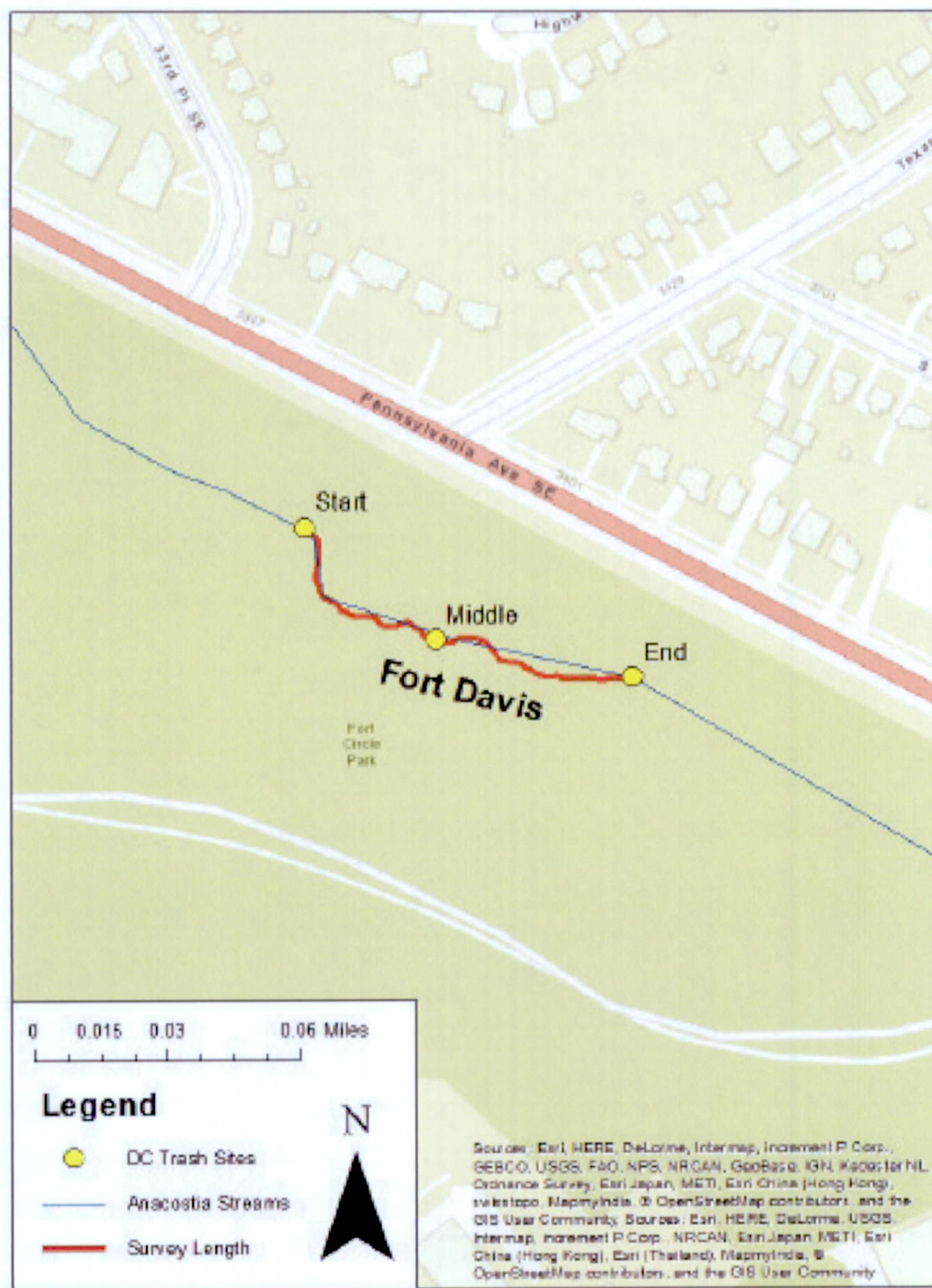




Figure 10. Fort Dupont Tributary (FDT-001) stream trash monitoring site.

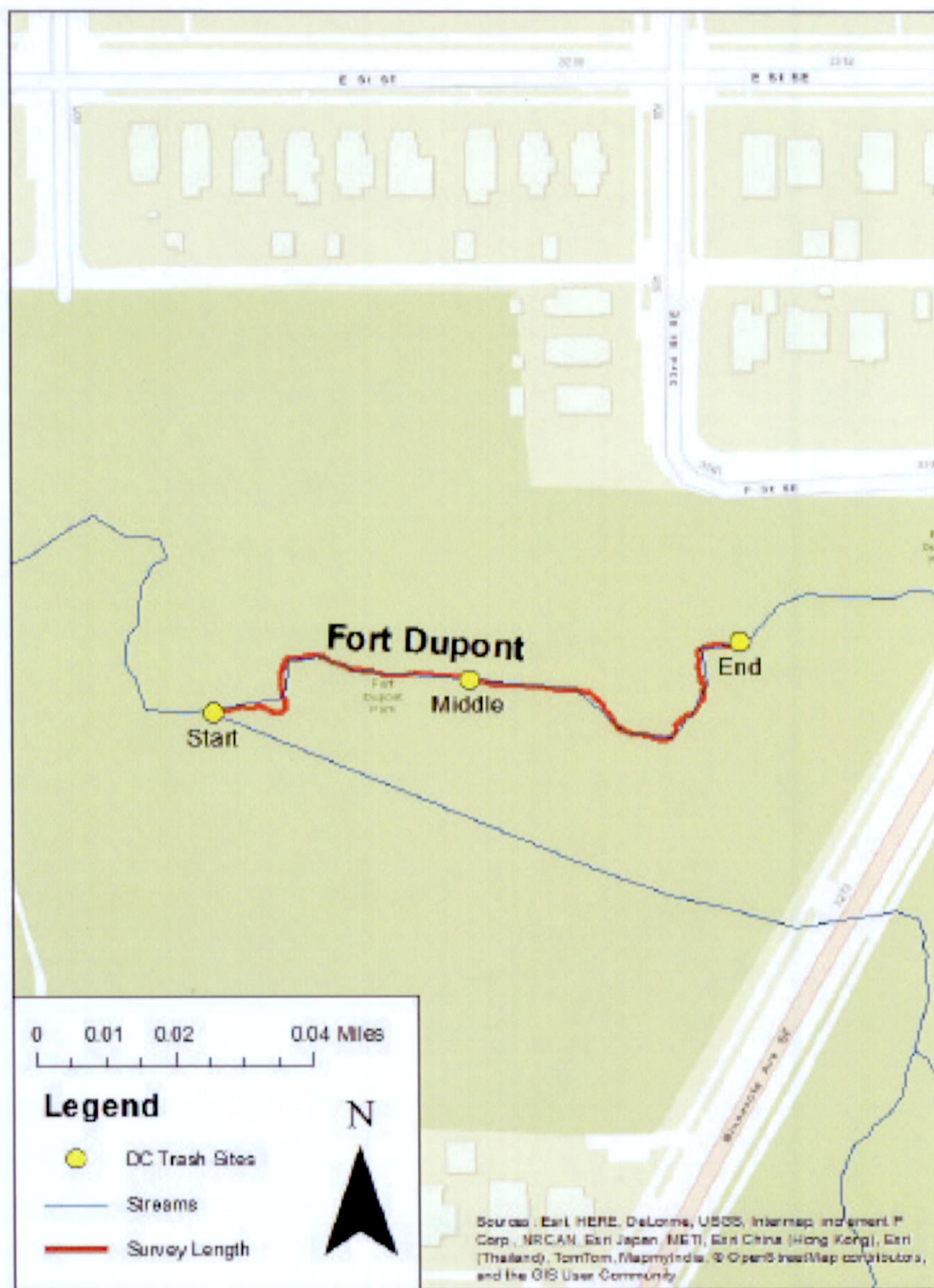




Figure 11. Fort Chaplain Tributary (FCT-001) stream trash monitoring site.



Figure 12. Watts Branch Upper (WBU-001) stream trash monitoring site.

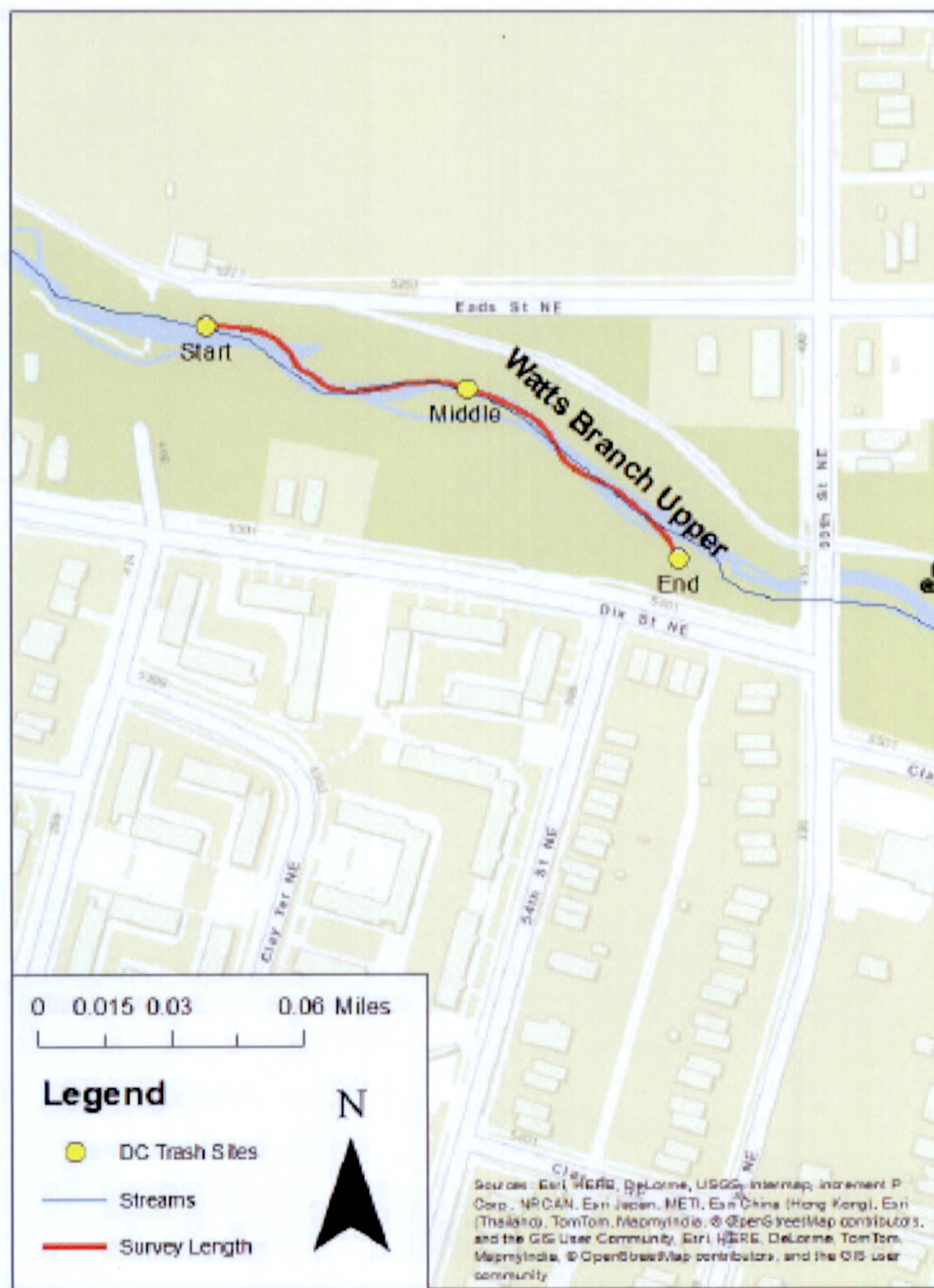




Figure 13. Watts Branch Lower (WBL-001) stream trash monitoring site.

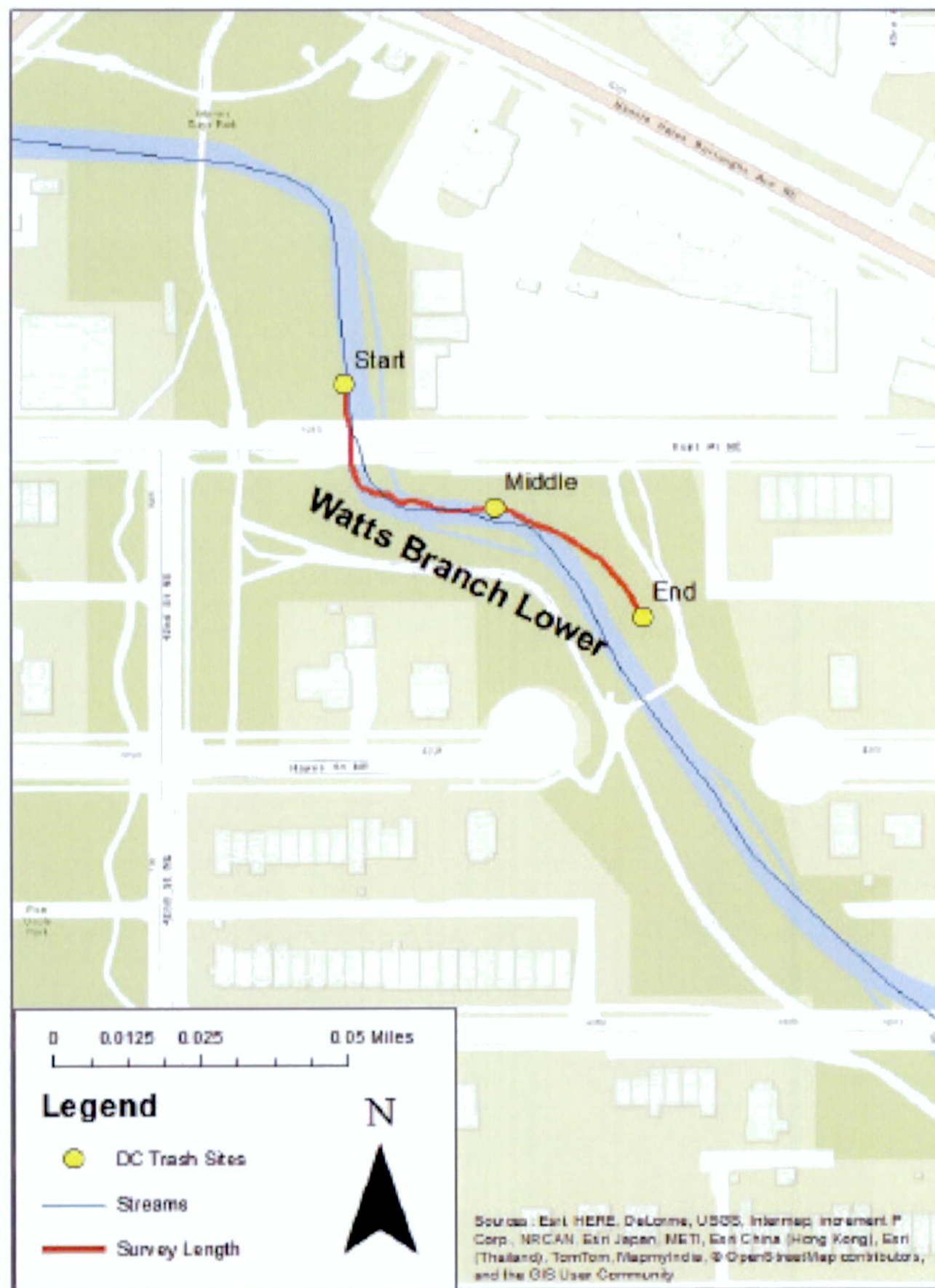




Figure 14. Kingman Lake (KNG-001) stream trash monitoring site.

