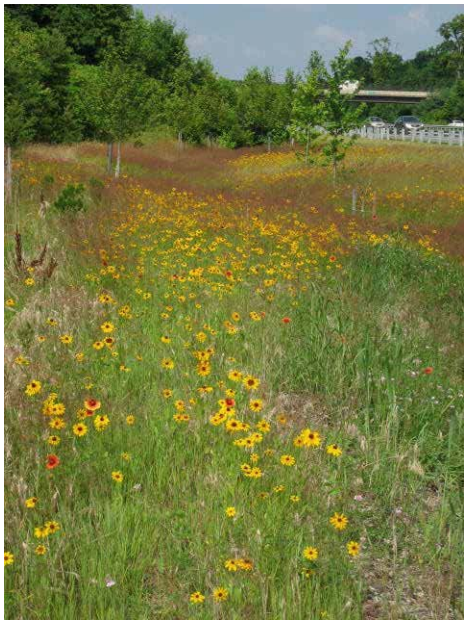
MARYLAND DEPARTMENT OF TRANSPORTATION

STATE HIGHWAY ADMINISTRATION

Swan Creek Watershed Sediment TMDL Implementation Plan

September 29, 2017



MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

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Boyd K. Rutherford
Lt. Governor
Pete K. Rahn
Secretary
Gregory Slater
Administrator

September 29, 2017

Mr. Raymond Bahr
Sediment, Stormwater and Dam Safety Program
Water and Science Administration
Maryland Department of the Environment
1800 Washington Boulevard, Suite 440
Baltimore, MD 21230

Dear Mr. Bahr:

The Maryland Department of Transportation State Highway Administration (MDOT SHA) is pleased to submit this Sediment TMDL Implementation Plan for the Swan Creek Watershed addressing conditions under the MDOT SHA NPDES MS4 permit (11-DP-3313 MD 0068276) which took effect on October 9, 2015. This submittal covers the permit requirement to submit a coordinated TMDL implementation plan for any subsequent stormwater WLAs within one year of EPA approval.

The EPA approved the TMDL of sediment in the Swan Creek Watershed, Harford County Maryland on September 30, 2016. MDOT SHA is a member of the regulated urban stormwater sector and was assigned an aggregated WLA for this TMDL. The public comment period for this Sediment TMDL Implementation Plan was held from August 25, 2017 to September 25, 2017. Notices were posted in the classified section of *The Baltimore Sun* and *The Washington Post* on August 25, 2017. The notices provided the website, http://www.roads.maryland.gov/Index.aspx?PageId=362, where the plan could be viewed and how to comment should the reader so choose. No comments were received during the public comment period. Please find enclosed documentation confirming the posting of these notices.

If you have any questions or need additional information regarding this delivery, please contact Mr. Travis Vance at 410-545-8623 (or via email at tvance@sha.state.md.us) or me at 410-545-8407 (or via email at kcoffman@sha.state.md.us).

Sincerely,

Karen Coffman, Chief
MDOT SHA OED Water Programs Division

Enclosures: MDOT SHA Swan Creek Watershed Sediment TMDL Implementation Plan
The Baltimore Sun, Legal Notices, 25 Aug. 2017, p. 7.
Washington Post Media Classified Ad Proof

Cc: Mr. Brian Cooper, MDE WSA SSDSP
Ms. Sonal Ram, Director, MDOT SHA OED
Mr. Robert Shreeve, Deputy Director, MDOT SHA OED
Mr. Travis Vance, MDOT SHA OED WPD

Announcer uses more 'shtick' at track

RODMAN, *From page 1*

funnel cake. At Laurel or Pimlico, with their hardened railbirds, I have to be more professional. But here, amid the cotton candy, I can use more shtick and let it all hang out. I'll say, "As they pass the Ferris wheel" instead of the quarter-pole. Or, "They're nearing the Swifty Swine [pig] Races." The calls are just as accurate, but those nuances that I throw in help make it a fair atmosphere. I used to pick a "fan-of-the-day" from the grandstand. In 2010, Justin Bieber played a concert in the infield, so I said, 'Congratulations to so-and-so! Come to the press box and pick up your Justin Bieber lunchbox!' It was a joke, of course.

What's the best thing about working Timonium?

The relaxed atmosphere and the feeling that you're back in the 1950s, or even the 1940s. There's a lot less stress than the everyday race call. It's almost like a mini-vacation, going from 14 horses at Laurel to seven or eight at a bull ring [small track]. Also, from time to time, people will bring corn dogs up to the press box.

Have the track and the fair ever clashed?

Once, in the 1990s, I heard that the horses wouldn't go to the starting gate because there was a caged lion behind the 6½-furlong chute at the fair. So they moved the lion.

Many of the horses' names are new to you. Is that a problem?

I check the entries beforehand and yellow-line those I have questions about. Once in a while, after a race, an owner will call and say, "I want my horse's name pronounced this way," even though, technically, it's wrong. But I go with what the owners want. You're not going to get a super-name horse at The Big T [Timonium], but there are surprises. Eight or nine years ago, [seven-time Eclipse Award Trainer of the Year] Todd Pletcher won a stakes race here.

Do children enjoy their time at the track?

They come to the paddock where, between races, our outriders put the ponies' heads over the fence so kids can feed them peppermints and pet their noses. Some may have never touched a horse. I can only imagine that, somewhere in that crowd, there's a young me.

So that's how you broke into the sport?

Back in Louisiana, where I was born, my dad would sneak me in to Jefferson Downs, a bread-and-butter track like Timonium. He'd give me $10 and say, "Pick a horse." That's what reeled me in. There's nothing like a winner to get you hooked.

What other memories do you have of your time at Timonium?

The camaraderie in the press box. At Pimlico and Laurel, I'm isolated, but here, we're all "one big happy." A few years back, one of our regulars in the press box put together a "Pick 4" ticket at Saratoga that paid $14,000. After our last race at Timonium, we watched the final race at that track. I'll tell you, we were jumping up and down and the whole building was shaking. We must have caused a 1.2 on the Richter scale.

Do you bet on the races yourself?

I can place bets but, as a rule, I don't — though a lot of people beg to disagree. They'll say, "I know you bet on that horse because of the way you called the race." But that's in their imagination.

You're 58 and have been calling races since 1981. How long will you continue?

As long as it's fun, and my eyesight and memory will let me. I do wear contacts while working; luckily, my eyes have been pretty steady.

mike.klingaman@baltsun.com
twitter.com/MikeKlingaman

STATE FAIR RACE DATES

The Maryland State Fair opens today and the Maryland Jockey Club will hold a 10-day horse racing meet:
- Today-Sunday, 1:05 p.m. post time
- Sept. 1-4, 1:05 p.m. post time

LEGAL NOTICES

Baltimore City

Sharon Mary Jones, Proper Person
3012 Chesley Ave
Baltimore, MD 21234
Notice of Appointment Notice to Creditors
Notice to Unknown Heirs to all Persons Interested in the
Estate of (139688) Richard S. Andrews

Notice is given that SHARON MARY JONES, 3012 Chesley Ave, Baltimore, MD 21234 was on August 8, 2017 appointed personal representative(s) of the estate of Richard S. Andrews who died on April 23, 2017 with a will.

Further information can be obtained by reviewing the estate file in the office of the Register of Wills or by contacting the personal representative(s) or the attorney.

All persons having any objection to the appointment or to the probate of the decedent's will shall file their objections with the Register of Wills on or before the 8th day of February, 2018.

Any person having a claim against the decedent must present the claim to the undersigned personal representative(s) or file it with the Register of Wills with a copy to the undersigned on or before the earlier of the following dates:

(1) Six months from the date of the decedent's death, except if the decedent died before October 1, 1992, nine months from the date of the decedent's death, or

(2) Two months after the personal representative mails or otherwise delivers to the creditor a copy of this published notice or other written notice, notifying the creditor that the claim will be barred unless the creditor presents the claims within two months from the mailing or other delivery of the notice. A claim not presented or filed on or before that date, or any extension provided by law, is unenforceable thereafter. Claim forms may be obtained from the Register of Wills.

SHARON MARY JONES, Personal.
True Test--Copy: **BELINDA K. CONAWAY**,
Register of Wills for Baltimore City,
111 N. Calvert Street, Baltimore, Maryland 21202
8/11, 8/18, 8/25/17

SAK Construction, LLC

is seeking Minority Business Enterprises (MBE) and Woman Business Enterprises (WBE) for a Maryland project: Baltimore, MD - SC-962 – Improvements to the SS in the South East Area.

The project bids on August 30th at 11:00 AM local time. All negotiations must be completed by August 29th.

Subcontracting opportunities include but are not limited to: Critical Path Method Scheduling, Surveyors, Excavating Contractors, Sewer & Pipeline Cleaner and Rehab, Sewer Contractors, Cured –in-Place-Pipe (CIPP), Bypass Pumping of Existing Sanitary Sewer Flows, Reactivation/Reconnection of Existing Laterals, Sewer Water Main Utilities, Traffic Control Systems and Devices, Underground Utility and Leak Detection, Restoration, and related work.

Please advise if your firm is interested in seeking this opportunity. Bid documents are available at the Abel Wolman Municipal Building 200 N. Holliday Street, Baltimore, MD 21202. Documents can also be viewed at SAKs office at 1405 Benson Court, Arbutus, MD 21227 and for subscribers to Bluebook at BB Bid. http://www.bbbid.com/#2.

Please contact Lawrence Smith at (443) 297-1935 or by fax at (443) 297-1901 to discuss this subcontracting opportunity.

CITY OF BALTIMORE
DEPARTMENT OF GENERAL SERVICES
NOTICE OF LETTING

Sealed Bids or Proposals, in duplicate, addressed to the Board of Estimates of the Mayor and City Council of Baltimore and marked for **GS 16815 – Mitchell Courthouse Jury Assembly Room 320 Renovations** will be received at the Office of the Comptroller, Room 204, City Hall, Baltimore, Maryland until 11:00 A.M. on **Wednesday, October 4, 2017**. Positively no bids will be received after 11:00 A.M. The bids will be publicly opened by the Board of Estimates in Room 215, City Hall at Noon.

The Contract Documents may be examined, without charge, in Room 6 located on the first floor of the Abel Wolman Municipal Building, 200 Holliday Street, Baltimore, Maryland 21202 as of **Friday, August 25, 2017** and copies may be purchased for a non-refundable cost of **$100.00.**

Conditions and requirements of the Bid are found in the bid package.

All contractors bidding on this Contract must first be pre-qualified by the City of Baltimore Contractors Qualification Committee. Interested contractors should call 410 396-6883 or contact the Committee at 4 South Frederick Street, 4th Floor, Baltimore, MD 21202. **If a bid is submitted by a Joint Venture ("JV"), then in that event, the documents that establish the JV shall be submitted with the bid for verification purposes.** The Prequalification Category required for bidding on this project is **E13004 – Rehabilitation of Structures.**

The Cost Qualification Range for this work shall be **$100,000.01 to $500,000.00**

A" Pre-Bidding information" session will be conducted at **The Site: 100 North Calvert St., Baltimore MD 21202** on **Tuesday, September 5, 2017 at 10:00 A.M.**

Principal Items of work for this project are:
1. Finishes
2. HVAC
The MBE goal is **32%**
The WBE goal is **6%**

CONTRACT NO. GS 16815

APPROVED:
Bernice H. Taylor
Clerk, Board of Estimates

APPROVED:
Steve Sharkey
Director, Department of General Services

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

OPPORTUNITY FOR PUBLIC REVIEW AND COMMENT
***DRAFT IMPLEMENTATION PLAN FOR THE TOTAL MAXIMUM DAILY LOAD (TMDL) OF SEDIMENT IN THE SWAN CREEK WATERSHED, HARFORD COUNTY,* MARYLAND**

The Maryland Department of Transportation State Highway Administration (MDOT SHA) was issued a National Pollutant Discharge Elimination System Municipal Separate Storm Sewer System (MS4) Permit, (Permit No. 11-DP-3313), by the Maryland Department of the Environment (MDE) on October 9, 2015. This permit covers stormwater discharges from the storm drain system owned or operated by MDOT SHA within Anne Arundel, Baltimore, Carroll, Cecil, Charles, Fredrick, Harford, Howard, Montgomery, Prince George's, and Washington Counties. The permit requires MDOT SHA to submit an implementation plan to MDE that addresses Environmental Protection Agency (EPA)-approved stormwater waste load allocations (WLAs) within one year of EPA approval.

EPA approved the ***Total Maximum Daily Load of Sediment in the Swan Creek Watershed, Harford County, Maryland*** on September 30, 2016. The MDOT SHA Office of Environmental Design (OED) is soliciting comments on its draft Implementation Plan to meet this WLA as required under the MS4 Permit. A 30-day public comment period will take place from August 25, 2017 to September 25, 2017. The draft Implementation Plan is available on MDOT SHA's website at http://www.roads.maryland.gov/Index.aspx?PageId=362.

Comments should be submitted to MDOT SHA on or before September 25, 2017 by emailing to wpd@sha.state.md.us, faxing to (410) 209-5003, or mailing to:
Maryland Department of TransportationState Highway Administration
Office of Environmental Design, C-303
707 N. Calvert Street
Baltimore, MD 21202

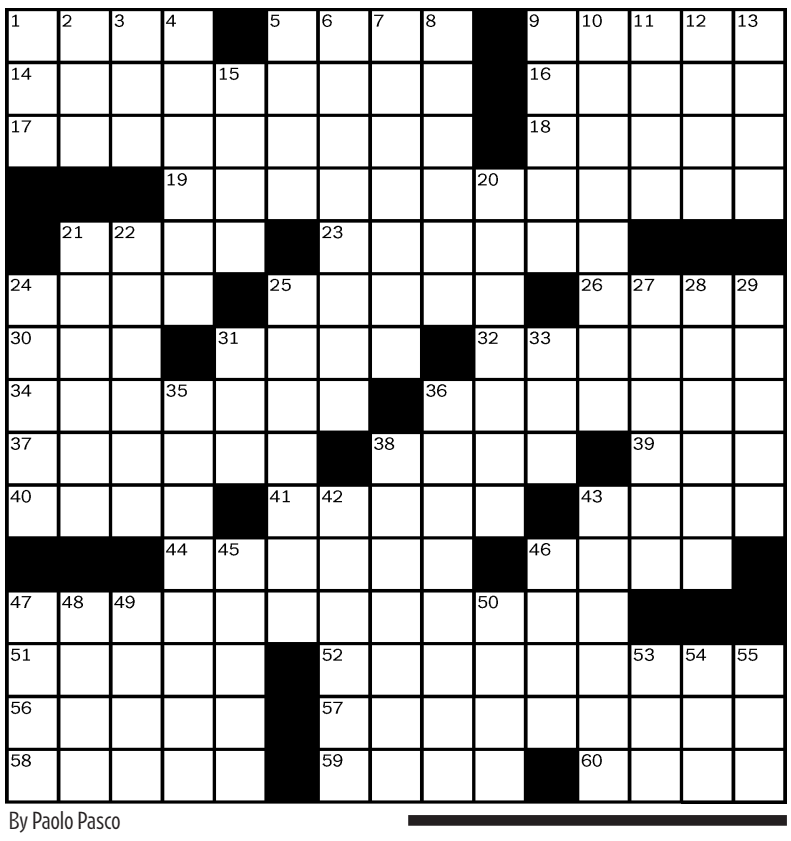
Please note that comments should include the name and address of the person submitting the comments. Responses to comments will not be provided directly, but material comments received during the comment period will be considered and the draft Implementation Plan will be revised as appropriate prior to submittal to MDE. A summary of comments received will be included in the MDOT SHA MS4 annual report submitted to MDE annually on October 9 and posted to this website: http://www.roads.maryland.gov/Index.aspx?pageid=336.

the new york times crossword

no. 0721

ACROSS
1 Many consultants, for short
5 Flash
9 Wayne's friend in "Wayne's World"
14 Waterway whose construction began in Rome
16 Word repeated before "to you and you and you," in a show tune
17 Emphatic parental turndown
18 "Ciao"
19 Words from one about to break into tears
21 Master of ___
23 Cards
24 "Ain't that the worst!"
25 Add oil to, maybe
26 Sleep phenomena
30 "___-Ami" (Guy de Maupassant novel)
31 Jessica of "The Texas Chainsaw Massacre"
32 Frequent fodder for crossword clues
34 Believer in spirits
36 Trapped
37 Bit of finger food
38 Stirs
39 Lady Gaga's "___ It Happens to You"
40 Place for barnacles
41 Dispense
43 ___ Martin, French firm since 1724
44 Formally approve, as a document, old-style
46 No worries
47 "Mo Money Mo Problems" rapper
51 Early Indus Valley settler
52 Devotee of Mötley Crüe or Megadeth
56 Spike who directed "Being John Malkovich"
57 Player of a drug kingpin on "The Wire"
58 Puts money on the table, say
59 One-named singer with the 2016 #1 hit "Pillowtalk"
60 Plan, for short

DOWN
1 Dudes
2 Dude
3 Quarterback's asset
4 Involved with
5 "___ the Virgin" (CW show)
6 Behind closed doors
7 DraftKings competitor
8 They might be wished for at fountains
9 Polka forerunner
10 1949 Hepburn/Tracy courtroom film
11 Initiation practice
12 This puzzle's constructor, for one
13 What words can do, in an admonishment
15 Christmas decoration
20 Is forbidden to
21 Faddish dance move done to the 2015 hit "Watch Me"
22 Facebook Chat status denoted by a green dot
24 Arizona ballplayer, casually
25 Nationalism, per Einstein
27 Modern requests for participation
28 Dr. Evil's sidekick in Austin Powers movies
29 "Sorry to say ..."
31 Marcel Marceau persona
33 Dorm V.I.P.s
35 Topic in feminist film criticism
36 Something prohibited by the Ten Commandments
38 Island in San Francisco Bay
42 "Do You Hear the People Sing?" musical, to fans
43 Outbreaks of eczema, e.g.
45 Great scores in Olympic diving
46 Lawful ends?
47 State bordering California, informally
48 Press
49 Peer ___
50 Reclined
53 They're game
54 Half a Hamilton
55 Pop



By Paolo Pasco

ANSWER TO YESTERDAY'S PUZZLE

R	E	B	E	C	C	A	■	I	N	F	L	A	T	E
E	X	E	D	O	U	T	■	S	P	O	O	L	E	D
W	A	T	T	S	T	H	E	P	R	O	B	L	E	M
A	C	T	■	A	T	O	M	S	■	T	A	S	T	E
R	T	E	S	■	O	S	U	■	B	E	R	T	I	E
M	A	R	L	A	■	■	■	M	A	D	■	A	M	S
■	■	■	O	P	I	A	T	E	S	■	T	R	E	E
■	H	O	W	E	S	B	U	S	I	N	E	S	S	■
S	O	N	S	■	A	L	B	A	N	I	A	■	■	■
O	N	O	■	C	A	Y	■	■	■	T	R	Y	S	T
C	O	N	T	A	C	■	A	M	I	■	S	A	P	S
K	L	E	I	N	■	E	C	O	L	E	■	H	O	E
H	U	L	E	T	T	H	E	D	O	G	S	O	U	T
O	L	E	O	O	I	L	■	E	N	G	R	O	S	S
P	U	G	N	O	S	E	■	M	A	Y	I	S	E	E

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8/25/17

Bridge Play Frank Stewart

"My partner claims to have one of those -- what do you call them? -- photostatic memories," a club player told me, "but I don't believe him. In this deal he went down at a cold slam."

At six spades, South discarded a diamond on dummy's ace of clubs and drew trumps. He took the A-K of hearts and ruffed a heart, and the Q-J fell from East.

"My partner ruffed dummy's last club and threw a diamond from dummy on his ten of hearts," North said, "but then he led the ace and a low diamond. He lost two diamonds to East. Anybody with a working short-term memory would make the contract."

South dealer
N-S vulnerable

NORTH
♠ A J 9 7 2
♡ A 4
◇ Q 8 4 2
♣ A 3

WEST
♠ 6
♡ 9 8 5 2
◇ 10
♣ K Q J 9 7 6 2

EAST
♠ 8 4
♡ Q J 3
◇ K J 9 5
♣ 10 8 5 4

SOUTH
♠ K Q 10 5 3
♡ K 10 7 6
◇ A 7 6 3
♣ None

South	West	North	East
1 ♠	4 ♣	5 ♣	Pass
5 ◇	Pass	5 ♡	Pass
6 ♠	All Pass		

Opening lead — ♣ K

After declarer took the ten of hearts, he knew West had at least seven clubs for his preempt, four hearts and one trump. Since West could have one diamond at most, South would probably go down by cashing the ace.

South must instead play a low diamond from both hands. If West wins, he must concede a ruff-sluff. If East wins, he must return a diamond from the king or concede a ruff-sluff.

DAILY QUESTION

You hold: ♠A J 9 7 2 ♥A 4 ♦Q 8 4 2 ♣A 3. Your partner opens one heart, you bid one spade and he jumps to three hearts. What do you say?

ANSWER: Partner's jump-rebid in his suit promises about 16 high-card points with a good six-card suit or (rarely) a seven-card suit. Slam is almost certain. If he holds K Q, K Q J 10 7 6, A 3, 8 7 6, you can make 7NT. A leap to six hearts would be reasonable. If you prefer to probe for a grand slam, bid four clubs.

—Tribune Media Services

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Classified Ad Proof

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Ad Number 12125628

BP Name MD DEPT OF TRANSP/STATE HWY ADMIN ATTN: LANNETTE PARSON

Advertiser # 1010061228

Purchase/Insertion Order #

Advertiser Name MD DEPT OF TRANSP/STATE HWY AD ATTN: LANNETTE PARSON

Start Date Aug 25, 2017

End Date Aug 25, 2017

Number of Insertions 1

Ad Size 2 CO **X** 3.644 "

Keyword OPPORTUNITY FOR PUBLIC REVIEW AND COMME

100 LINES

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Content Component and Description

825

Bids & Proposals

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Date Ad Proof is Generated Aug 21, 2017

System Message

Special Instructions

Preview For Order # 12125628

OPPORTUNITY FOR PUBLIC REVIEW AND COMMENT

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SWAN CREEK WATERSHED SEDIMENT TMDL IMPLEMENTATION PLAN

A. WATER QUALITY STANDARDS AND DESIGNATED USES

TMDLs focus on offsetting the impacts of pollutants to waterway designated uses. The Federal Clean Water Act (CWA) established requirements for each State to develop programs to address water pollution including:

- Establishment of water quality standards (WQSs);
- Implementation of water quality monitoring programs;
- Identification and reporting of impaired waters; and
- Development of maximum allowable pollutant loads that when met and not exceeded will restore WQSs to impaired waters, called TMDL documents.

WQSs are based on the concept of designating and maintaining specifically defined uses for each waterbody. **Table 1** lists the designated uses for waterways in Maryland. TMDLs are based on these uses.

One means for the EPA to enforce these standards is through the NPDES program, which regulates discharges from point sources. MDE is the delegated authority to issue NPDES discharge permits within Maryland and to develop WQSs for Maryland including the water quality criteria that define the parameters to ensure designated uses are met.

Table 1: Designated Uses in Maryland

	Use Classes							
Designated Uses	**I**	**I-P**	**II**	**II-P**	**III**	**III-P**	**IV**	**IV-P**
Growth and Propagation of Fish (not trout), other aquatic life and wildlife	✓	✓	✓	✓	✓	✓	✓	✓
Water Contact Sports	✓	✓	✓	✓	✓	✓	✓	✓
Leisure activities involving direct contact with surface water	✓	✓	✓	✓	✓	✓	✓	✓
Fishing	✓	✓	✓	✓	✓	✓	✓	✓
Agricultural Water Supply	✓	✓	✓	✓	✓	✓	✓	✓
Industrial Water Supply	✓	✓	✓	✓	✓	✓	✓	✓
Propagation and Harvesting of Shellfish			✓	✓				
Seasonal Migratory Fish Spawning and Nursery Use			✓	✓				
Seasonal Shallow-water Submerged Aquatic Vegetation Use			✓	✓				
Open-Water Fish and Shellfish Use			✓	✓				
Seasonal Deep-Water Fish and Shellfish Use			✓	✓				
Seasonal Deep-Channel Refuge Use			✓	✓				
Growth and Propagation of Trout					✓	✓		
Capable of Supporting Adult Trout for a Put and Take Fishery							✓	✓
Public Water Supply		✓		✓		✓		✓

Source: http://www.mde.maryland.gov/programs/water/TMDL/WaterQualityStandards/Pages/wqs_designated_uses.aspx

MS4 Permit Requirements

The MDOT SHA MS4 Permit requires coordination with county MS4 jurisdictions concerning watershed assessments and development of a coordinated TMDL implementation plan for each watershed that MDOT SHA has a WLA. Requirements from the MDOT SHA MS4 Permit specific to watershed assessments and coordinated TMDL implementation plans include *Part IV.E.1.* and *Part IV.E.2.b*., copied below.

Watershed Assessments (Permit Part IV.E.1.)

SHA shall coordinate watershed assessments with surrounding jurisdictions, which shall include, but not be limited to the evaluation of available State and county watershed assessments, SHA data, visual watershed inspections targeting SHA rights-of-way and facilities, and approved stormwater WLAs to:

- *Determine current water quality conditions;*
- *Include the results of visual inspections targeting SHA rights-of-way and facilities conducted in areas identified as priority for restoration;*
- *Identify and rank water quality problems for restoration associated with SHA rights-of-way and facilities;*
- *Using the watershed assessments established under section a. above to achieve water quality goals by identifying all structural and nonstructural water quality improvement projects to be implemented; and*
- *Specify pollutant load reduction benchmarks and deadlines that demonstrate progress toward meeting all applicable stormwater WLAs.*

Coordinated TMDL Implementation Plans (Permit Part IV.E.2.b.)

Within one year of permit issuance, a coordinated TMDL implementation plan shall be submitted to MDE for approval that addresses all EPA approved stormwater WLAs (prior to the effective date of the permit) and requirements of Part VI.A., Chesapeake Bay Restoration by 2025 for SHA's storm sewer system. Both specific WLAs and aggregate WLAs which SHA is a part of shall be addressed in the TMDL implementation plans. Any subsequent stormwater WLAs for SHA's storm sewer system shall be addressed by the coordinated TMDL implementation plan within one year of EPA approval. Upon approval by MDE, this implementation plan will be enforceable under this permit. As part of the coordinated TMDL implementation plan, SHA shall:

- *Include the final date for meeting applicable WLAs and a detailed schedule for implementing all structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives necessary for meeting applicable WLAs;*
- *Provide detailed cost estimates for individual projects, programs, controls, and plan implementation;*
- *Evaluate and track the implementation of the coordinated implementation plan through monitoring or modeling to document the progress toward meeting established benchmarks, deadlines, and stormwater WLAs; and*
- *Develop an ongoing, iterative process that continuously implements structural and nonstructural restoration projects, program enhancements, new and additional programs, and alternative BMPs where EPA approved TMDL stormwater WLAs are not being met according to the benchmarks and*

deadlines established as part of the SHA's watershed assessments.

B. WATERSHED ASSESSMENT COORDINATION

According to the USGS (2016):

> *A watershed is an area of land where all water that falls on it and drains off it flows to a common outlet. A watershed is an area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel. The word watershed is sometimes used interchangeably with drainage basin or catchment. The watershed consists of surface water--lakes, streams, reservoirs, and wetlands--and all the underlying ground water. Larger watersheds contain many smaller watersheds. Watersheds are important because the streamflow and the water quality of a river are affected by things, human-induced or not, happening in the land area "above" the river-outflow point.*

The 8-digit scale is the most common management scale for watersheds across the State, and therefore is the scale at which most of Maryland's local TMDLs are developed.

County Watershed Assessments

Each MS4 county is required to perform detailed assessments of local watersheds as a part of its MS4 permit requirements. These assessments determine current water quality conditions and include visual inspections; the identification and ranking of water quality problems for restoration; the prioritization and ranking of structural and non-structural improvement projects; and the setting of pollutant reduction benchmarks and deadlines that demonstrate progress toward meeting applicable WQSs. MDOT SHA is not required to duplicate this effort, but is required to coordinate with the MS4 jurisdictions to obtain and review watershed assessments. Relying on assessments performed by other jurisdictions avoids redundant analysis and places the responsibility for developing the assessments with the jurisdictions that have close connection to local communities and watershed groups.

Watershed assessment evaluations conducted by MDOT SHA focus on issues that MDOT SHA can improve through practices targeting MDOT SHA right-of-way (ROW) or infrastructure. This information is used to determine priority areas for BMP implementation and to identify potential project sites or partnership project opportunities. Summaries of these evaluations are included in this Plan under **Section F**. MDOT SHA watershed assessment evaluations focus on the following:

- Impacts to MDOT SHA infrastructure such as failing outfalls and downstream channels;
- Older developed areas with little SWM and available opportunities to install retrofits;
- Degraded streams;
- Priority watershed issues such as improvements within a drinking water reservoir, special protection areas, or Tier II catchments;
- Identification of areas most in need of restoration;
- Description of preferred structural and non-structural BMPs to use within the watershed;
- Potential project sites for BMPs; and
- In watersheds with PCB TMDLs, identifying locations of any known PCB sources.

In addition to using information from the county watershed assessments, MDOT SHA also undertakes other activities to identify potential project sites and prioritize BMP implementation including:

- On-going coordination meetings with each of the MS4 counties to discuss potential partnerships with the mutual goal of improving water quality;
- Perform visual watershed inspections as described below;
- Model MDOT SHA load reductions within the watershed based on MDOT SHA land uses and ROW; and
- Maximize existing impervious treatment within new roadway projects (practical design initiative).

C. VISUAL INSPECTIONS TARGETING MDOT SHA ROW

MDOT SHA has recently developed a process to methodically review each watershed for potential restoration projects within MDOT SHA ROW to meet the load reductions for current pollutant WLAs. Although these watersheds have previously been reviewed for all practice types, this new process adds a grid system to coordinate and track efforts of many teams systematically to ensure each watershed is thoroughly assessed. This method is used to search for new stormwater control structure sites and tree sites. The watershed review process includes two phases to visually inspect each watershed and identify all structural and non-structural water quality improvement projects to be implemented.

Desktop Evaluation

Phase one is a desktop evaluation of the watershed using available county watershed assessments and MDOT SHA data. MDOT SHA has created a grid system of 1.5 mile square cells to track the progress of the visual watershed inspections, allowing prioritized areas to be targeted first. With this grid system, many spatial data sets are reviewed to determine the most effective use of each potential restoration site. The sites are documented geographically and stored in GIS. Viable sites are prioritized and those located within watersheds with the most pollutant reduction needs move forward to the second phase, which is to perform field investigations. Data reviewed includes:

- Aerial imagery;
- Street view mapping;
- Environmental features delineations such as critical area boundary, wetlands buffers, floodplain limits;
- County data such as utilities, storm drain systems, contour and topographic mapping;
- MDOT SHA ROW boundaries;
- Current MDOT SHA stormwater control and restoration practice locations; and
- Drainage area boundaries.

Figure 5 illustrates the 1.5 mile grid system for the Swan Creek watershed.

Field Investigations

Phase two is a field investigation of each viable site resulting from the watershed desktop evaluation. MDOT SHA inspects and assesses each site in the field to identify and document existing site conditions, water quality problems, and constraints. This information is used to determine potential restoration BMP types as well as estimated restoration credit quantities.

MDOT SHA will continue to prioritize visual inspections in the highest need watersheds. **Figure 1** is an example field investigation summary map that documents observations from the field analysis. A standardized field inspection form is used.

D. BENCHMARKS AND DETAILED COSTS

Benchmarks and deadlines demonstrating progress toward meeting all applicable stormwater WLAs are provided in the watershed discussion in **Section F**. It contains generalized cost information that includes an overall estimated cost to implement the proposed practices. Detailed costs for specific construction projects are available on MDOT SHA's website (www.roads.maryland.gov) under the Contractors Information Center.

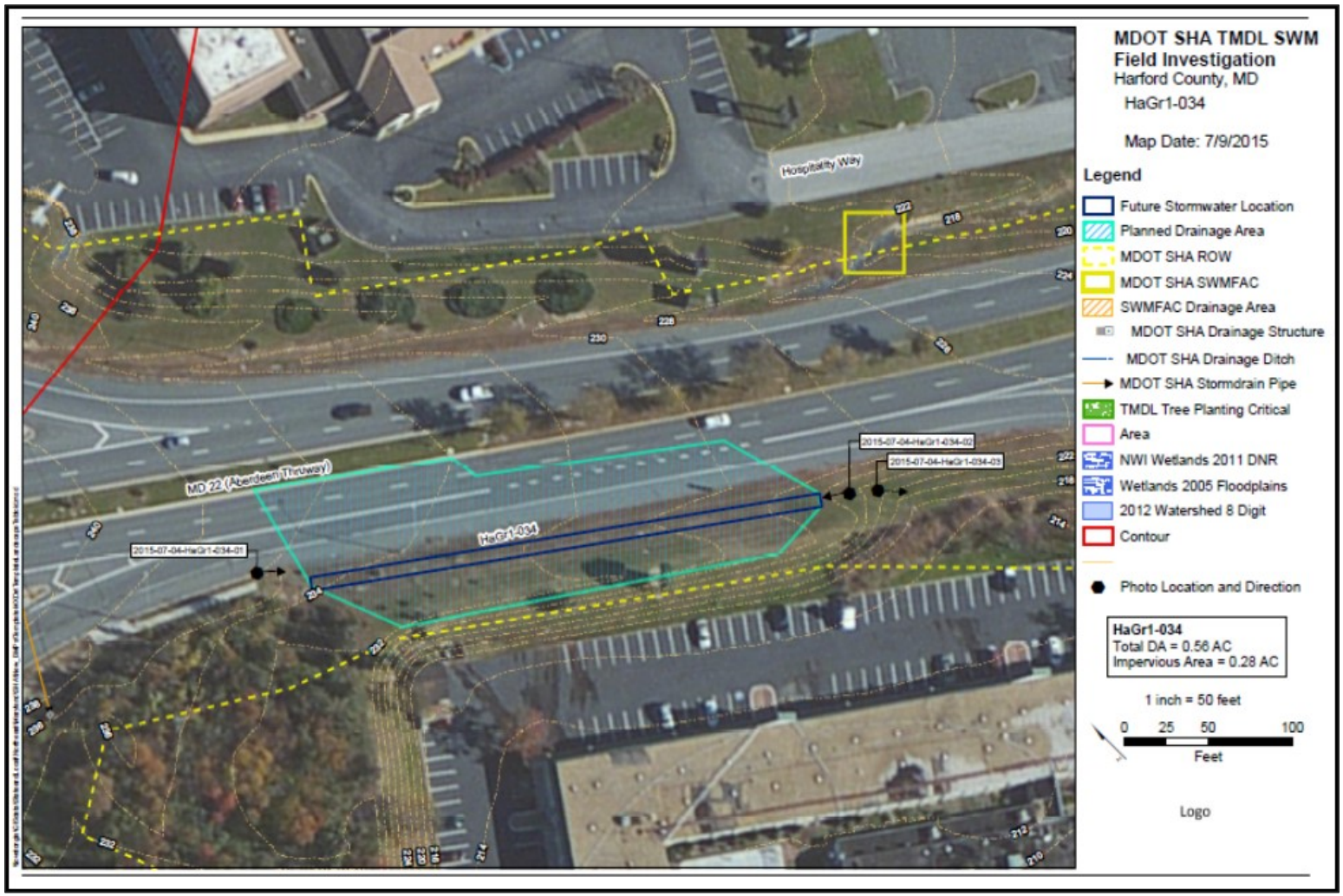

Figure 1: Example Field Investigation Summary Map

E. POLLUTION REDUCTION STRATEGIES

E.1. MDOT SHA TMDL Responsibilities

TMDLs define the maximum pollutant loading that can be discharged to a waterbody and still meet water quality criteria for maintaining designated uses. **Figure 2** illustrates the concept of maximum loading. The green area on the bar depicts the maximum load that maintains a healthy water environment for the pollutant under consideration. When this load is exceeded, the waterway is considered impaired as illustrated by the red portion of the bar. The example waterway needs restoration through implementation of practices to reduce the pollutant loading to or below the TMDL.

Generally, the formula for a TMDL is:

$$TMDL = \sum WLA + \sum LA + MOS$$

Where:

TMDL = total maximum daily load
WLA = wasteload allocation for point sources;
LA = load allocation for non-point sources; and
MOS = margin of safety.

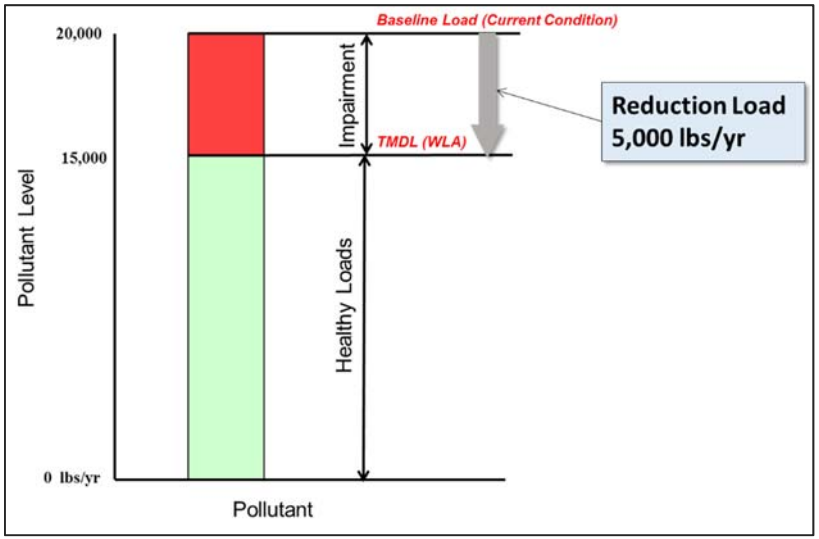

Figure 2: Example TMDL and Reduction Requirement

Pollutants for MDOT SHA Focus

Upon issuance of the MS4 Permit, MDOT SHA was named in TMDLs for five different pollutants within the MS4 coverage area including

- Bacteria;
- PCBs;
- Phosphorus;
- Sediment; and
- Trash.

The MDOT SHA MS4 Permit covers eleven Maryland counties that cross 84 8-digit watersheds representing larger rivers or streams. There are 43 EPA-approved TMDL documents that assign MDOT SHA to either an individual WLA or an aggregate WLA. Each watershed may be covered by one or more TMDL documents, so there is not a direct correlation between the number of TMDL documents and the number of watersheds affected.

Figure 3 shows a map of MDOT SHA TMDL responsibilities by watershed. **Table 2** on the following page summarizes MDOT SHA's sediment reduction requirement and projected progress in meeting the pollution reduction wasteload target within the Swan Creek watershed by the listed end date. There are instances where the projected modeled percent reduction does not equal the target percent reduction by the end date listed. In these cases, discussion is added to the reduction strategy (**Section E**) to analyze the conditions that preclude MDOT SHA from meeting the target reductions with currently available modeling methods, loading, reduction efficiencies, or practices.

Lists of proposed practices and costs to achieve the required reductions are included in **Section F**.

Modeling Parameters

MDE requires that pollutant modeling follow the guidance in the MDE (2014a) document and if other methods are employed, they must be approved by MDE. MDOT SHA developed a restoration modeling protocol that describes the methods used for modeling pollutant load reductions for local TMDLs with MDOT SHA responsibility. This protocol was submitted to MDE as an appendix with the MDOT SHA MS4 2016 Annual Report. Once approved, this protocol will be available on the MDOT SHA website.

Different modeling methods are used depending upon the pollutants and current reduction practices in use. Brief descriptions of modeling methods are included in the following section, but the MDOT SHA restoration modeling protocol should be consulted for a more detailed explanation.

Aggregated Loads

WLAs may be assigned to each MS4 jurisdiction separately or as an aggregated WLA for all urban stormwater MS4 permittees that combines them into one required allocation and reduction target. The modeling approach developed by MDOT SHA uses MDOT SHA data (both impervious and pervious land as well as BMPs built before the TMDL baseline year, also known as baseline BMPs) to calculate baseline loads and calibrated reduction targets. Following this approach, disaggregation is done for each TMDL.

Available Reduction Practices

MDOT SHA reserves the right to implement new BMPs, activities, and other practices that are not currently available to achieve local TMDL load reduction requirements. In the future, expert panels may be convened to study the effectiveness of new or modified BMPs on pollutants. MDOT SHA will modify reduction strategies as necessary based on new, approved treatment guidance, and will include revised strategies in updates to this implementation plan.

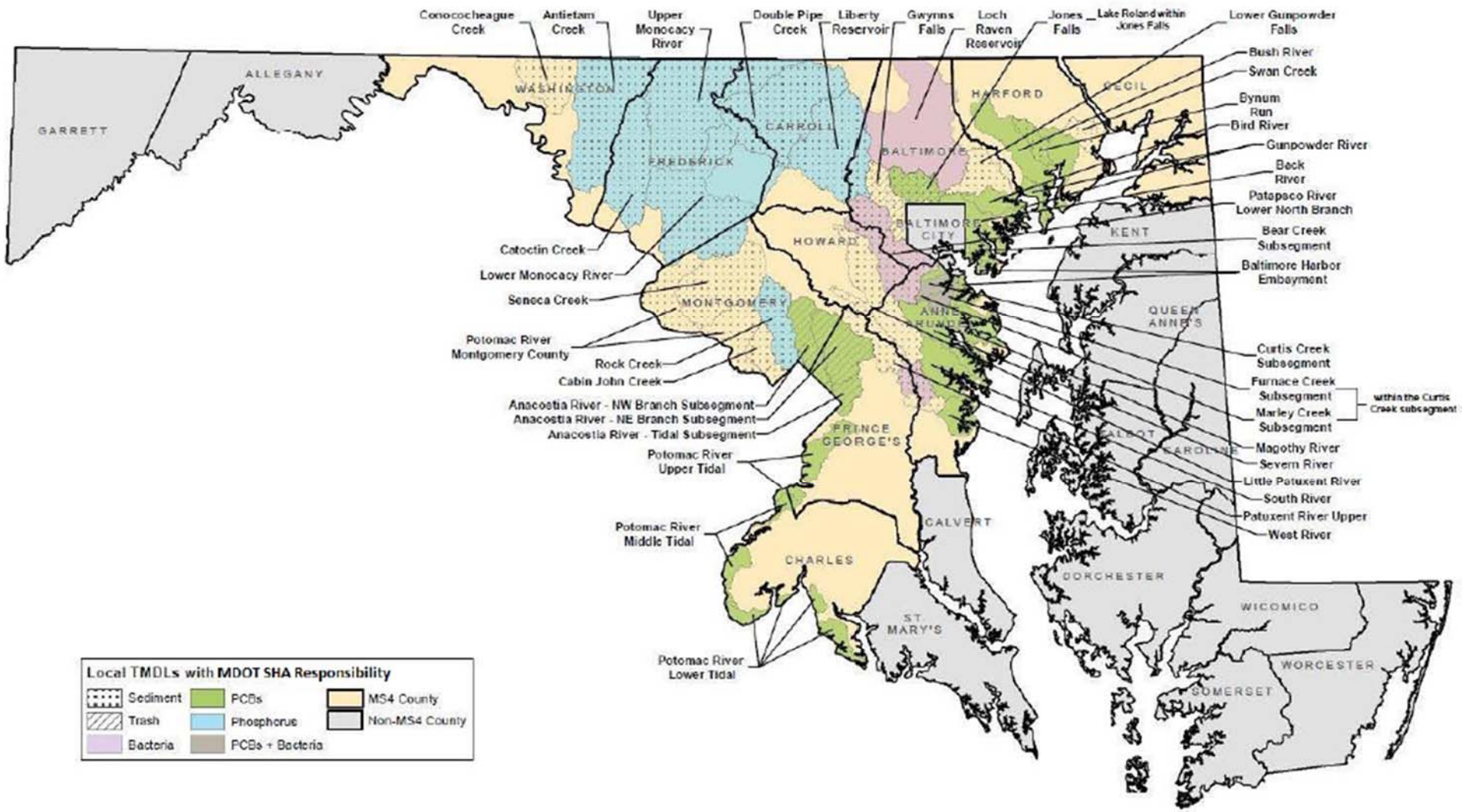

Figure 3: MDOT SHA TMDL Responsibilities in Local Watersheds

Table 2: MDOT SHA Swan Creek Watershed Sediment Modeling Results

Watershed Name	Watershed Number	County	Pollutant	EPA Approval Date	WLA Type	Baseline Year	Unit	MDOT SHA Baseline Load	MDOT SHA % Reduction Target	MDOT SHA Reduction Target	MDOT SHA WLA	Projected Reduction to be Achieved	Projected Reduction to be Achieved as a % of Baseline Load	Target Year
Swan Creek	02130706	HA	Sediment	09/30/2016	Aggregate by County	2010	Lbs./yr.	60,575	13.0%	7,875	52,701	6,785.0	11.2	2030

E.2. Sediment Pollution Reduction Strategy

E.2.a. Sediment TMDLs Affecting MDOT SHA

There are 17 EPA-approved sediment TMDLs with MDOT SHA responsibility that MDOT SHA has previously addressed in earlier implementation plans. The following is a list of TMDL documents for sediment with MDOT SHA responsibility that are addressed in this plan:

- *Total Maximum Daily Load of Sediment in the Swan Creek Watershed, Harford County, Maryland, approved by EPA on September 30, 2016*

In **Table 2,** the MDOT SHA reduction target for the Swan Creek sediment TMDL is 13 percent, or 7,875 lbs./yr. The watershed can safely receive 52,701 pounds of sediment by MDOT SHA on a yearly basis without being considered impaired. Currently, it is calculated that MDOT SHA is responsible for introducing 60,575 pounds per year of sediment into the watershed per the MDE TMDL document (MDE, 2016b) as a MS4 permittee. Thus, according to the definition of the TMDL, MDOT SHA has to reduce its load by 7,875 pounds to meet its healthy load, WLA, of 52,701 pounds per year. MDOT SHA's reduction target is found by multiplying the MDOT SHA baseline load by the MDOT SHA reduction target percent. The MDOT SHA WLA is found by subtracting the MDOT SHA baseline load by the MDOT SHA target load. The projected reduction achieved is found by modeling the sediment load reduction that will be experienced by the construction of current and future BMPs in the Swan Creek watershed. These BMPs are either currently under construction or are planned to be constructed in the future. It is estimated that these future BMPs will reduce sediment loading by 6,785 pounds to the watershed. The reduction to be achieved expressed as a percent is found by dividing the projected reduction to be achieved by the MDOT SHA baseline load.

Three dates are shown: the EPA approval date, the baseline year set by MDE, and the Target Year. The baseline year published on the MDE Data Center will be used for MDOT SHA's implementation planning. This usually correlates to the time-period when monitoring data was collected for MDE's TMDL analysis. The Target Year is the year MDOT SHA proposes to meet the WLA.

E.2.b. Sediment Sources

Discussions in the TMDL concerning sediment sources focus on types of land use with information derived from the Chesapeake Bay Watershed Model (CBWM). Cropland and regulated urban lands tend to be the most significant sources, followed by other agricultural uses and wastewater sources. Specific sources of each pollutant that could be useful for targeting controls are not included in the TMDL, but MDOT

SHA researched a number of other references and determined sources beyond land uses that are summarized in **Table 3**. Sources of sediment include surface erosion from construction sites and cropland as well as stream erosion from high flows during storm events.

Table 3: Sediment Sources from Various References

Land Use	Nutrient Sources	Sediment Sources
Agriculture	Chemical Fertilizer Manure	Soil Erosion
Urban	Pet Waste Lawn Fertilizer Parking Lot, Roof, and Street Runoff	Construction Erosion Parking Lot, Roof, and Street Runoff
Wastewater	Municipal Industrial Failed Septic Systems CSO/ SSO Leaking Sewers	
Natural	Atmospheric Deposition	Stream Erosion Shoreline Erosion

References used to develop this table are MDE, 2014b; EPA, 2010b; Hoos et al., 2000; and Schueler, 2011.

MDOT SHA Loading Sources

MDOT SHA-owned land is a small portion of each of the TMDL watersheds and it consists of relatively uniform land uses including roadways and roadside vegetation. In urbanized areas, the MDOT SHA ROW may extend to include sidewalks and portions of driveways. There are also parking areas associated with MDOT SHA land such as park and ride facilities, office complexes, and maintenance facilities.

Of the land uses in **Table 3**, MDOT SHA is a contributor of sediments mostly through urban and natural sources. MDOT SHA has no responsibility for agriculture and wastewater sources, other than a few septic systems at outlying facilities. Street and parking lot runoff concentrates pollutants from adjacent land and from atmospheric deposition attributed to both the airshed and vehicles. Deteriorating streets themselves can be a source of sediment. Construction erosion, even with well-maintained erosion and sediment control (ESC), is a source of sediment in urban areas. Stream erosion downstream of MDOT SHA facilities, particularly older areas without SWM, is a potential source of sediment.

E.2.c. MDOT SHA Sediment Modeling Methods

Sediment TMDLs were developed using the CBWM with edge of stream (EOS) loading rates. Throughout the years, different versions of the Bay model have been used (as indicated in **Table 4**) depending upon which version was active at the time the TMDL was written. The Bay model combines a suite of individual models, including a watershed model that calculates pollutant loads from point sources and runoff, an air deposition model, and an estuary model that estimates pollutant concentrations based on loading, hydrodynamics of the estuary, and pollutant transformations in the Bay.

To effectively model sediment reduction at the EOS condition, MDOT SHA developed the Automated Modeling Tool (AMT) that uses scripts within a Geographic Information System (GIS) to extract BMP treatment data from multiple sources and then applies algorithms derived from MAST and MDE guidance documents to calculate loads and load reductions.

Baseline Loading for Sediments

The baseline load for sediment in Swan Creek represents the approximate quantity of sediment that was being discharged by a given entity at the time the TMDL monitoring began in the watershed. If the baseline load exceeds the WLA, the waterway is considered impaired and the baseline loads must be reduced to or below the WLA in order to restore the designated uses for the waterway (see **Table 1**).

For MDOT SHA modeling, baseline loads have been calculated in two steps: first, to model the untreated load, and next, to apply treatment as of the baseline year for each TMDL. Untreated baseline loads were modeled by multiplying MDOT SHA pervious and impervious acres in each land-river segment using MDOT SHA spatial data with loading rates calculated at the land-river segment scale from a no-BMP scenario in MAST. Loading rates are described in further detail below. Load reductions from baseline BMPs were calculated from MDOT SHA database information, then applied to the untreated load to determine treated baseline load.

Table 4: Sediment TMDL Watersheds and Bay Model Versions

TMDL Watershed	Pollutant	TMDL Model
Antietam Creek	Sediment	CBP P5
Bynum Run	Sediment	CBP P5.2
Cabin John Creek	Sediment	CBP P5.2
Catoctin Creek	Sediment	CBP P5
Conococheague Creek	Sediment	CBP P5
Gwynns Falls	Sediment	CBP P5
Jones Falls	Sediment	CBP P5
Liberty Reservoir	Sediment	Refined version of the CBP P5.3.2 watershed model, with CE-QUAL-W2 model of the reservoir
Little Patuxent River	Sediment	CBP P5
Patapsco LN Branch	Sediment	CBP P5
Patuxent River Upper	Sediment	CBP P5.2
Potomac River MO County	Sediment	CBP P5.2
Rock Creek	Sediment	CBP P5.2
Seneca Creek	Sediment	CBP P5.2
Swan Creek	Sediment	CBP P5.3.2

Sediment Pollutant Loading Rates by Land Use

Loading rates for sediment have been calculated at the most detailed level feasible: the land-river segments from the Chesapeake Bay model / MAST v5.3.2. Untreated loads and acres, per land-river segment, were derived from a no-BMP scenario in MAST at the Maryland statewide geographic scale using 2010 to correspond with MDOT SHA's as-of date for land use.

Sediment Reduction Requirements

The model uses a percent reduction target for MDOT SHA published in the TMDL document (MDE, 2016b). The percent reduction target is compared to the projected reduction to be achieved modeled from the implementation of restoration BMPs. This method assumes sediment is a conservative pollutant, and that loads exported from the watershed will approximate the loads in the waterbody without significant loss or degradation in transport.

Pollutant Reduction Planning Scenarios

For planning and reporting purposes, MDOT SHA needs to be able to track implementation status against the permit and TMDL goals. Status is based on progress in planning, design, and construction of structural, ESD, and alternative BMPs, including operational practices such as inlet cleaning. This information is stored in databases with the project development status identified as completed, under construction, or in-design for each restoration BMP. This allows MDOT SHA to assess

pollutant reduction progress in near real time and plan BMPs needed to meet the remaining reduction goal. The database queries status and built dates allowing MDOT SHA to group the amount of unit treatment based on project phase:

- Completed BMPs: Queries TMDL geospatial database using statuses that depict a functioning, built site.
- Under Construction or Design: Queries TMDL geospatial database using statuses that depict sites currently in design and construction phases.
- Future BMPs: Determined through a query that evaluates the delta between existing and programmed BMP projects compared to estimates for planned projects derived from the non-spatial Task Management Access database, which would prevent over counting.

Sediment Reduction Modeling

The outcome/output of the automated modeling process is the creation of a series of data tables which are imported into Excel workbooks. The output is essentially a list of every BMP within MDOT SHA's databases and the summary of total reductions (nutrients and sediments) for each individual BMP generated on demand. The amount of pollutant removal attributed to each BMP type is calculated within the AMT based on the procedures described below.

For each BMP facility where impervious/pervious loading rates are used, pollutant reduction is calculated by determining the removal in pounds per unit. The logic uses lookup tables to multiply loading rate by BMP efficiency and area of treatment:

Step 1: Calculate Load Removed for Each BMP and Land Use

1A. Look up specific land use (impervious/pervious) loading rates for TN EOS/DEL, TP EOS/DEL, and TSS EOS/DEL from "Loading Rate Lookup" table

1B. Derive or look up BMP efficiency rates for each BMP based on each individual BMP type

1C. Multiply loading rates by BMP efficiency rates to find removal in lb./unit of each BMP within the specific county or watershed

Step 2: Calculate Pollutant Pounds Removed by Each BMP

2A. Multiply removal lb./unit calculated in Step 1C. by the BMP impervious/pervious area treated

For load reduction BMPs such as streams, outfall stabilizations, inlet cleaning, and street sweeping, the model uses project specific data when available, and rates provided by MDE (2014a) for planning level data.

Step 3: Extract Data for Filtering Results

3A. Extract Built Date, Status, county, and other MDOT SHA operational fields

The AMT will be used to plan reduction scenarios and to track progress. Although this is a custom model, it draws on BMP efficiencies, loading rates, and delivery factors from MDE (2014a); Maryland Assessment Scenario Tool (MAST); and published CBP BMP protocols. It is also based on CBP loading rates by land-river segment for EOS loads and can calculate reductions from different practices using the removal rates from Table 6 in the MDE (2014a) document.

E.2.d. Sediment Reduction Strategies

To date, MDOT SHA has used a variety of structural, non-structural, and alternative BMPs in an effort to reduce sediment in the watersheds that have a corresponding TMDL. However, we have not limited our load reduction activities to just BMP implementation. The use of nutrient credit trading will also be explored as a tool in reaching load reduction targets. When MDOT SHA partners on projects with other MS4 jurisdictions, load splitting can be used as a means to achieve WLA reductions.

BMP Implementation

As a requirement under the MS4 permit, MDOT SHA must complete the implementation of restoration efforts for 20 percent of its impervious surface area. MDOT SHA has an extensive program to plan, design, and construct BMPs that offset untreated impervious surfaces in MDOT SHA ROW.

MDOT SHA intends to build these BMPs used for impervious restoration in watersheds that have a TMDL where possible. The AMT is then used to model the load reduction from implementation of currently constructed BMPs and BMPs planned in the future. The AMT also assesses the impact that these BMPs will have on meeting TMDL load reductions as a percent achieved.

One of the major challenges with using a strategy of building BMPs to meet WLAs is that there can be a lack of feasible ROW for BMP placement opportunities. There are instances where MDOT SHA roadway encompasses a majority of the area in the ROW leaving very little land to construct BMPs. The visual watershed inspection process has indicated areas where BMP placement is possible and where it is not feasible due to utility relocation, land purchases, site access problems, and a host of other issues. Therefore, MDOT SHA is continually seeking new opportunities and partnerships to install BMPs.

Nutrient Credit Trading

In an effort to meet the MDOT SHA WLA in watersheds with a high difficulty of BMP placement, MDOT SHA is exploring the possibility of nutrient credit trading. It is expected that MS4 jurisdictions will have the ability to purchase pounds of phosphorus, nitrogen, and sediment in a quantity that will allow them to reach their intended WLA. Once the trading program, regulations, and guidance are finalized and approved by EPA, MDOT SHA intends to utilize this program as another practice to meet TMDL requirements.

Load Splitting

MDOT SHA is partnering with other willing NPDES permittees to complete programs or projects that will reduce sediment. The goal is to produce projects that will have a WLA reduction and move each permittee closer to meeting its load reduction requirement. An agreement on how the credit pounds of sediment is split will be project specific.

TMDL End Date

Currently, MDOT SHA models BMP implementation using the AMT and notes the progress towards reduction targets in **Table 2**. In this model, MDOT SHA considers the possible restoration practices that can be placed in the watershed based on the visual watershed inspection process. For Swan Creek, MDOT SHA believes that it will be able to reach a MDOT SHA Percent Reduction Target of 11.2 percent by 2030. The required MDOT SHA Percent Reduction Target is 13.0 percent. Thus, MDOT SHA will have to explore the possibility of nutrient credit trading or load splitting efforts, which cannot be modeled at this time. MDOT SHA will review any future changes to current BMP removal rates or efficiencies presented in the MDE (2014a) document and determine what effect a change will have on the Swan Creek watershed TMDL end date.

F. SWAN CREEK WATERSHED IMPLEMENTATION PLAN

F.1. Watershed Description

The Swan Creek watershed encompasses 26 square miles solely within Harford County, and is comprised of both non-tidal and tidal waters. The watershed drains into Swan Creek, which is located approximately four miles south of where the Susquehanna River drains into the Chesapeake Bay. The lower portion of Swan Creek is a small, shallow tidal embayment that drains into the Chesapeake Bay. While predominantly situated within Maryland's Piedmont geologic province, the lower portion of the Swan Creek watershed extends slightly into the Coastal Plain province. Major tributary creeks and streams of the Swan Creek watershed include Gasheys Creek, Swan Creek, and Carsins Run.

There are 29 centerline miles of MDOT SHA roadway located within the Swan Creek watershed. The associated ROW encompasses 252 acres, of which 142 acres are impervious. There is one MDOT SHA park and ride facility located within the Swan Creek watershed. See **Figure 4** for a map of MDOT SHA facilities within the Swan Creek watershed.

F.2. MDOT SHA TMDLs within Swan Creek Watershed

MDOT SHA is included in the sediment TMDL (MDE, 2016b) and has a reduction requirement of 13 percent within Harford County, as shown in **Table 2**. This TMDL only applies to the non-tidal portion of the Swan Creek watershed.

F.3. MDOT SHA Visual Inventory of ROW

The MS4 permit requires MDOT SHA to perform visual assessments. **Section C** describes the MDOT SHA visual assessment process. The implementation teams are currently evaluating grids in the watershed and will continue to do so until all are completed and accepted. The grid-tracking tool was developed to help teams efficiently search each watershed on a 1.5 x 1.5-square-mile system as shown in **Figure 5**. Planning efforts will continue and will be centered on areas with local TMDL needs that have been identified using the site search grid-tracking tool.

Many of the grids awaiting review have little potential for additional restoration due to minimal ROW along residential and wooded areas, which limits the ability to purchase ROW for the construction of a new BMP. Additionally, many MDOT SHA impervious areas within these grids are already treated by MDOT SHA BMPs. The current results of this ongoing grid search are as follows:

19 Total Grids:

- 19 partially reviewed.

The new stormwater site search resulted in a pool of potential sites comprised of the following:

- 245 locations identified as possible candidates for new stormwater BMPs;
- 225 facilities have been recommended for restoration after the completion of a preliminary desktop assessment; and
- 20 facilities remain on hold for roadway construction projects.

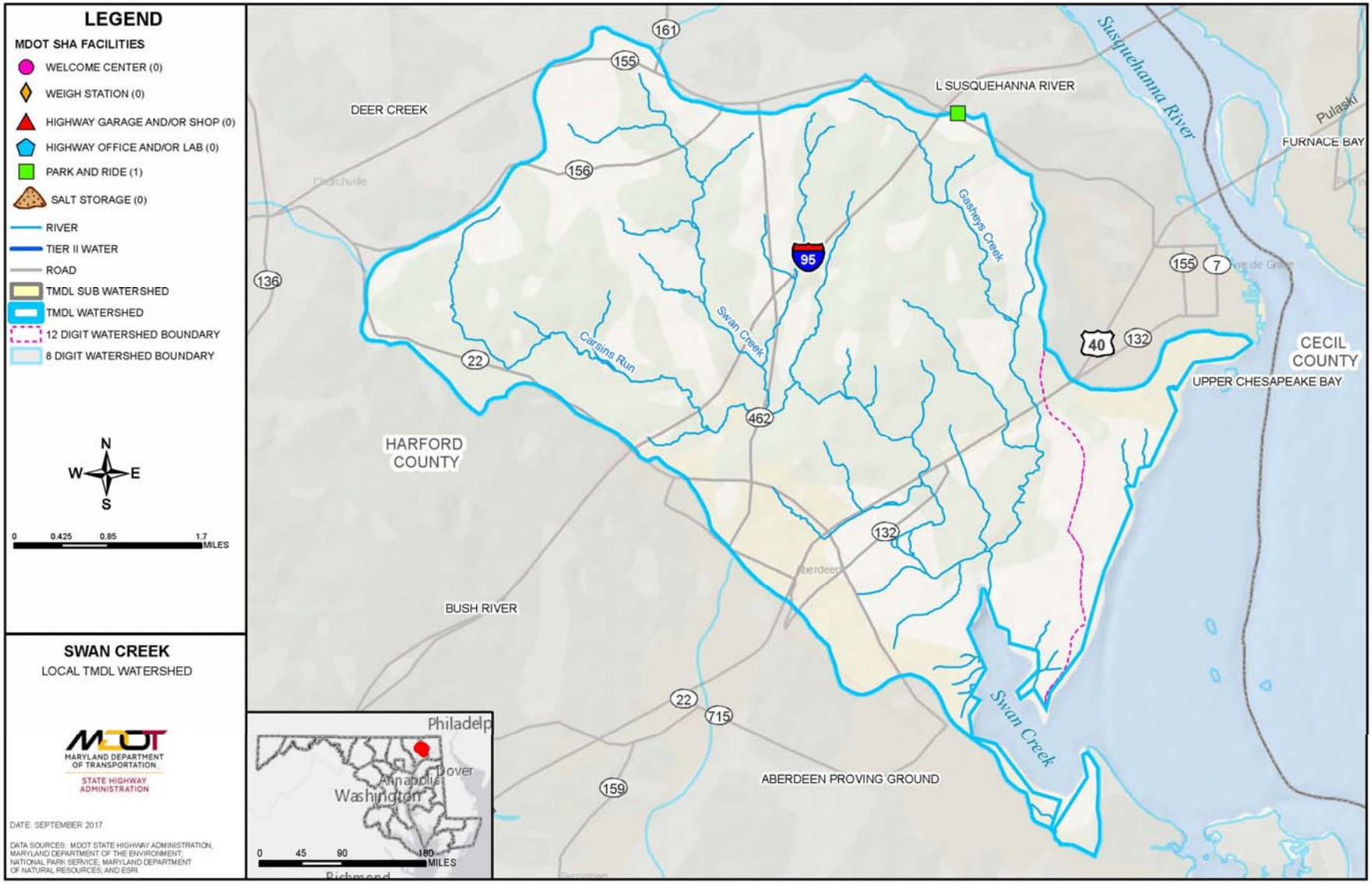

Figure 4: Swan Creek Watershed

The tree planting site search teams investigated 273 acres of MDOT SHA-owned pervious area. The ongoing site search resulted in a pool of potential sites comprised of the following:

- Four acres of pervious area identified as potential for future restoration after the completion of a preliminary desktop assessment; and
- Eight acres are in design concept for future planting.

The stream restoration site search teams investigated 1,509 linear feet of stream channel for restoration opportunities. The site search resulted in the following:

- Zero linear feet are recommended for future restoration potential; and
- 280 linear feet have been completed for restoration.

Teams will continue to pursue the most viable and cost-effective BMPs that are currently within the existing pool of sites based on site feasibility.

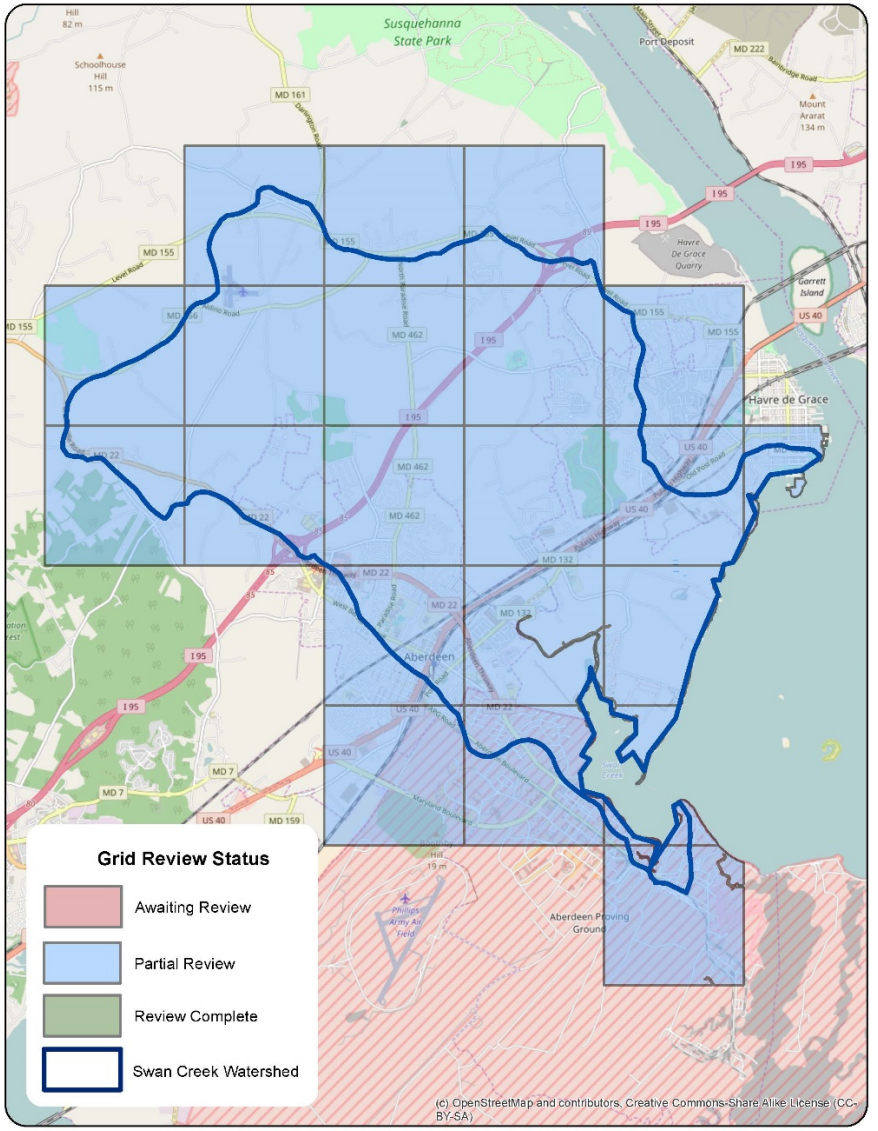

Figure 5: Swan Creek Watershed Site Search Grids

F.4. Summary of County Assessment Review

The designated use of the non-tidal portion of Swan Creek (8-digit Basin Code: 02130706) is Use I – Water Contact Recreation and Protection of Aquatic Life (MDE, 2016b). Waters within the Swan Creek watershed are subject to the following impairments as noted on MDE's 303(d) List:

- Nitrogen (Total);
- Phosphorus (Total); and
- TSS.

Prepared by the Maryland Department of Natural Resources (DNR) in partnership with Harford County, the 2002 *Bush River Watershed Characterization* (hereinafter referred to as the "Characterization Report") serves as Harford County's assessment of the Swan Creek watershed (DNR, 2002a). The Characterization Report was created to support Harford County's Watershed Restoration Action Strategy (WRAS) for its Bush River Project Area. While the Swan Creek watershed does not directly drain into the Bush River, it is included within the larger Bush River Basin (6-digit Basin Code: 021307) along with the Bynum Run, Atkisson Reservoir, Lower Winters Run, and Bush River watersheds. Accordingly, the Swan Creek watershed, although not specifically included within Harford County's Bush River WRAS initiative, was assessed in the Characterization Report to allow comparison of watersheds across the entire Bush River Basin (DNR, 2002a).

On the outset, the Characterization Report cites the 1998 *Maryland Clean Water Action Plan* (CWAPTW, 1998), which identified the Swan Creek watershed as a "Category 1 Priority" (highest State priority for restoration) based on indicators of water quality, landscape, and living resources that were developed for all watersheds in Maryland. The Characterization Report discussed problems within the Swan Creek watershed based on these three indicators.

First, with respect to water quality, the Swan Creek watershed was shown to be transporting large amounts of nitrogen and phosphorus to the Chesapeake Bay when compared to other Maryland watersheds that drain into the Bay. Water quality was also being affected by high soil erodibility and an insufficiency of riparian buffers around streams in the watershed. More specifically, the Swan Creek watershed was found to have an average soil erodibility factor (K) of 0.33, suggesting that control of soil erosion is particularly important; a K value greater than 0.275 was considered a likely factor for water quality problems. Approximately 28 percent of streams in the watershed lacked a riparian buffer.

The landscape indicator included the percent of impervious surface. Impervious surfaces were found to cover 14.2 percent of the Swan Creek watershed; this percentage indicated that average watershed conditions measured by impervious coverage in the Swan Creek watershed are worse than the statewide benchmark. The Characterization Report also indicated that a quarter of the Swan Creek watershed was listed as a "Priority Funding Area" under Maryland's Smart Growth program, where State funding for infrastructure may be available to support development and redevelopment. Further development in the Swan Creek watershed is expected to increase impervious surface coverage.

The living resources indicator focused on the importance of habitat for sensitive species and fish movement within the Swan Creek watershed. The Characterization Report indicated that 44 acres of Wetlands of Special State Concern (WSSC) were located in the Swan Creek watershed. WSSC are wetlands identified as having sensitive species habitat in or near the wetland. Both the Swan and Gasheys Creek streams as well the Chesapeake Bay shore area are within the vicinity of the 44 acres. Likewise, the Oakington Road and Swan Harbor Farm Park communities are also within the vicinity of the Swan Creek watershed's 44 acres of WSSC. Gasheys Creek is of particular importance as it was declared critical habitat for the federally endangered Maryland darter (*Etheostoma sellare*) in 1984. The Characterization Report also discusses how blockages in the

watershed's streams can interfere with or prevent some fish species from moving upstream to otherwise viable habitat. The structural components of lakes, farm ponds, or drainage ditches can cause blockages (DNR, 2002a).

The DNR Fish Passage Program identified fish blockages at seven sampling stations in the Swan Creek watershed (See **Table 5**). Mitigation or removal of blockages to fish movement is recommended as many fish species need the ability to move between stream segments to maintain healthy, resilient populations (DNR, 2002a).

Table 5: County Identified Fish Blockages / Removal Opportunities in the Swan Creek Watershed

Station	Stream	Name/Location
CW010	Gasheys Creek	0.2 mile below Chapel Road
CW011	Gasheys Creek	Chapel Road
CW030	Swan Creek	0.1 mile above Rt. 40
CW031	Swan Creek	100 ft. above Oak Street
CW032	Swan Creek	130 yards above Oak Street
CW063	Unnamed Tributary to Gasheys Creek	0.33 mile below Chapel Road
CW064	Unnamed Tributary to Gasheys Creek	Chapel Road

Source: DNR (2002a)

Overall, Harford County and DNR suggested several BMPs for the Bush River Basin in the Characterization Report; however, no recommendations specific to the Swan Creek watershed were made except for the aforementioned fish blockage removal opportunities listed in **Table 5**. General recommendations included incorporating "Green Infrastructure" (areas of natural vegetation and habitat that have statewide or regional importance as defined by criteria developed by DNR) and the habitat needs of sensitive forest interior dwelling species into local land use planning and management; encouraging the use of agricultural BMPs and conservation programs; and conducting stream buffer and wetland restorations (DNR, 2002a).

F.5. MDOT SHA Pollutant Reduction Strategies

Proposed practices to meet the sediment reduction in the Swan Creek watershed are shown in **Table 6**. Projected sediment reductions using these practices are described in **Section E** and shown in **Table 2**. Three timeframes are included in the table below:

- BMPs built before the TMDL baseline. In this case, the baseline is 2010;
- BMPs built after the baseline through fiscal year 2017; and
- BMPs built after fiscal year 2017 through 2030, the projected target date. MDOT SHA will accomplish the projected reduction to be achieved as a percent of the baseline load presented in **Table 2**. As discussed in **Section E.2.d.**, this reduction is not expected to meet MDE's 13 percent load reduction requirement.

Estimated capital budget costs to design and construct practices within the Swan Creek watershed total $5,910,000. These projected costs are based on an average cost per impervious acre treated that is derived from cost history for a group of completed projects for each BMP category.

Figure 6 shows a map of MDOT SHA's restoration practices in the watershed and includes those that are under design or construction. Inlet cleaning is not reflected on this map.

Table 6: Swan Creek Sediment BMP Implementation					
BMP	**Unit**	**Baseline (Before 2010)**	**Restoration BMPs**		**Cost**
			Progress (2010 – FY17)	**Future (After FY17)**	
New Stormwater	drainage area acres	12.4		30.5	$5,542,000
Tree Planting	acres of tree planting		1.3	8.1	$339,500
Inlet Cleaning[1]	tons			5.0	$28,500
[1] *Inlet cleaning is an annual practice.*					

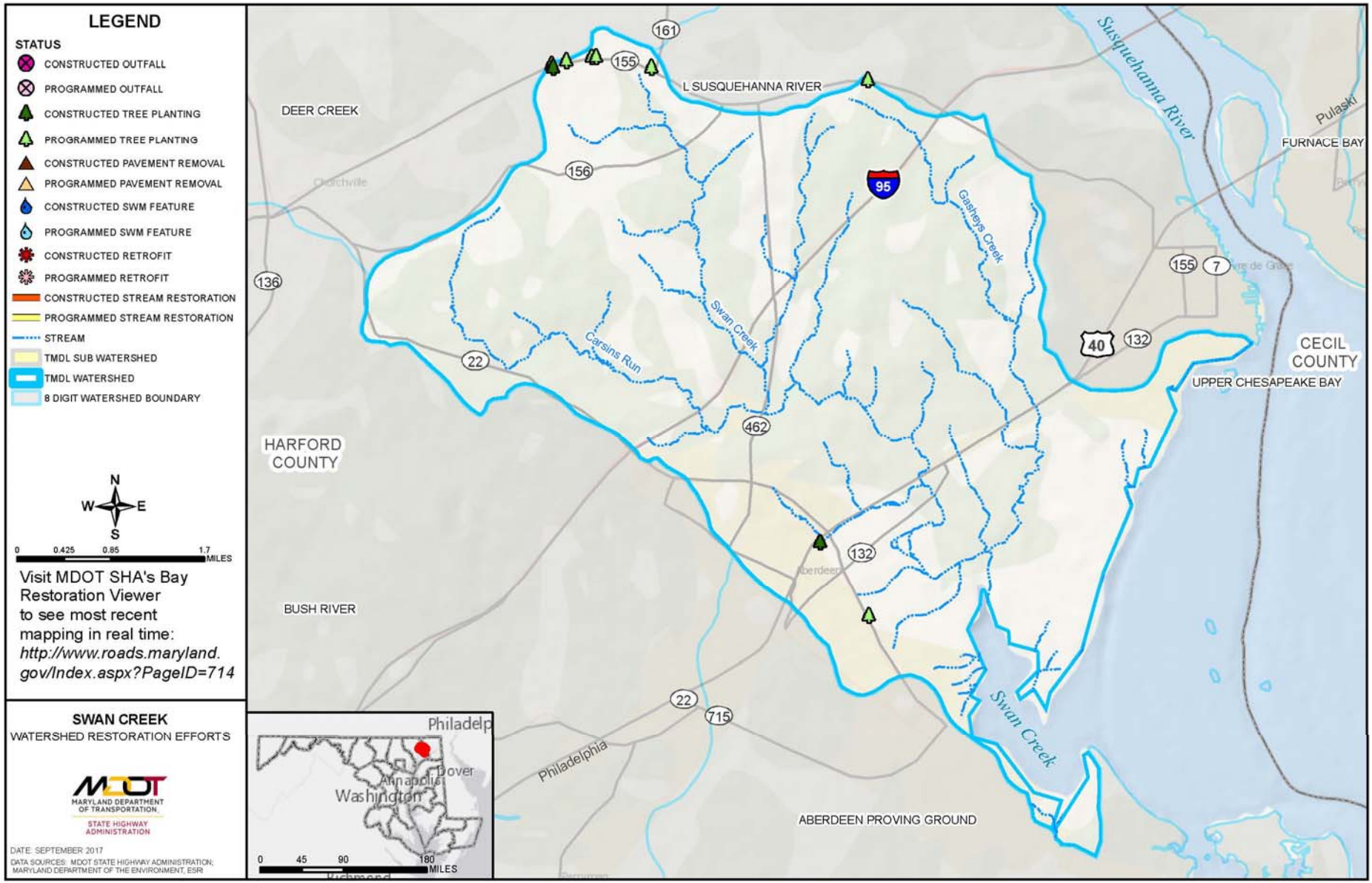

Figure 6: MDOT SHA Restoration Strategies within the Swan Creek Watershed

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ABBREVIATIONS

AA	Anne Arundel (County)
AA-DPW	Anne Arundel County, Department of Public Works
AAH	Adopt-A-Highway
AASHTO	American Association of State Highway and Transportation Officials
ac	Acre
AFB	Air Force Base
Alt	Alternative
AMT	Automated Modeling Tool
AMT, Inc.	A. Morton Thomas and Associates, Inc.
ATV	All-terrain vehicle
BA	Baltimore (County)
BARC	Beltsville Agriculture Research Center
Bay	Chesapeake Bay
BBO	Beaverdam Run, Baisman Run, and Oregon Branch Subwatersheds of the Loch Raven Reservoir Watershed
BC-DEPRM	Baltimore County, Department of Environmental Protection and Resource Management
BC-DEPS	Baltimore County, Department of Environmental Protection and Sustainability
BIBI	Benthic Index of Biotic Integrity
BMP	Best Management Practice
BOD	Biochemical Oxygen Demand
BSID	Biological Stressor Identification
BST	Bacterial Source Tracking
CAFO	Concentrated Animal Feeding Operation
CBP	Chesapeake Bay Program
CBWM	Chesapeake Bay Watershed Model
CC	Charles (County)
CC-BRM	Carroll County, Bureau of Resource Management
CC-DPGM	Charles County, Department of Planning & Growth
CCMS	Customer Care Management System
CFR	Code of Federal Regulations
CIP	Capital Improvement Project
CL	Carroll (County)
CRP	Community Reforestation Program
CSN	Chesapeake Stormwater Network
CSO	Combined Sewer Overflow
CTP	Consolidated Transportation Program
CWA	Clean Water Act
CWAPTW	Clean Water Action Plan Technical Workgroup
CWP	Center for Watershed Protection
DC	District of Columbia
DO	Dissolved Oxygen
DEL	Delivered Loads
DMCF	Dredged Material Containment Facilities
DNR	Maryland Department of Natural Resources
DRMO	Defense Reutilization and Marketing Office
ECD	Environmental Compliance Division (MDOT SHA)
E. coli	*Escherichia coli*
ED	Extended Detention
EMC	Event Mean Concentration
EMS	Environmental Management System
EOS	Edge of Stream

EPA	United States Environmental Protection Agency
EPD	Environmental Programs Division
ESC	Erosion and Sediment Control
ESD	Environmental Site Design
FC	Fecal Coliform
FC-DPW	Frederick County, Division of Public Works
FEMA	Federal Emergency Management Administration
FIB	Fecal Indicator Bacteria
FIBI	Fish Index of Biotic Integrity
FMD	Facility Maintenance Division (MDOT SHA)
FR	Frederick (County)
FY	Fiscal Year
GIS	Geographic Information System
HA	Harford (County)
HC-DPW	Harford County, Department of Public Works
HO	Howard (County)
HUC	Hydrologic Unit Code
HWG	Horsley Witten Group, Inc.
ICPRB	Interstate Commission on the Potomac River Basin
IDDE	Illicit Discharge Detection and Elimination
ISWBMPDB	International Stormwater BMP Database
LA	Load Allocations
lbs	Pounds (weight)
LF	Linear Feet
LN	Lower North
LNB	Lower North Branch
LRE	Loch Raven East subwatershed
LJF	Lower Jones Falls (Watershed)
LU	Land Use
MAA	Maryland Aviation Administration
MAST	Maryland Assessment Scenario Tool
MC-DEP	Montgomery County, Department of Environmental Protection
MD	Maryland
MDA	Maryland Department of Agriculture
MDE	Maryland Department of the Environment
MDOT	Maryland Department of Transportation
MDP	Maryland Department of Planning
MEP	Maximum Extent Practicable
MEPA	Maryland Environmental Policy Act
MGF	Middle Gwynns Falls (Watershed)
MO	Montgomery (County)
MOS	Margin of Safety
MPR	Maximum Practicable Reduction
MS4	Municipal Separate Storm Sewer System
NBOD	Nitrogenous Biochemical Oxygen Demand
NEPA	National Environmental Policy Act
NFHL	National Flood Hazard Layer
NJF	Northeastern Jones Falls (Watershed)
NPDES	National Pollutant Discharge Elimination System
NSQD	National Stormwater Quality Database
OCRI	Office of Customer Relations and Information (MDOT SHA)
OED	Office of Environmental Design
OOM	Office of Maintenance (MDOT SHA)
OP	Orthophosphate

OPPE	Office of Preliminary Planning and Engineering
PACD	Pennsylvania Association of Conservation Districts
PB	Parsons Brinckerhoff
PCB	Polychlorinated Biphenyl
P_E	Rainfall Target Used To Size ESD Practices
PERC	Perchloroethylene
PG	Prince George's (County)
PGC-DoE	Prince George's County, Department of the Environment
RBP	Rapid Bioassessment Protocol
RGP	Regional General Permit
ROW	Rights-Of-Way
Reqd	Required
RR	Runoff Reduction
RSPSC	Regenerative Step Pool System Conveyance
SAH	Sponsor-A-Highway
SB	Spring Branch subwatershed
SCA	Stream Corridor Assessment
SFEI	San Francisco Estuary Institute
SGW	Submerged Gravel Wetlands
SHA	State Highway Administration
SPR	State Planning and Research
SSO	Sanitary Sewer Overflow
ST	Stormwater Treatment
SW	Stormwater
SWAP	Small Watershed Action Plan
SWM	Stormwater Management
SWS	Subwatershed
SW-WLA	Stormwater Wasteload Allocation
TBD	To Be Determined
TBR	Tidal Back River (Watershed)
TBS	To Be Specified
TCWG	Toxic Contaminants Work Group
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
tPCB	Total Polychlorinated Biphenyl
TSS	Total Suspended Solids
TWGCB	Toxics Work Group Chesapeake Bay Partnership
UBR	Upper Back River (Watershed)
UGF	Upper Gwynns Falls (Watershed)
UJF	Upper Jones Falls (Watershed)
US	United States
USACE	United States Army Corps of Engineers
USDA-NRCS	United States Department of Agriculture, Natural Resources Conservation Service
USGS	United States Geological Survey
USWG	Urban Stormwater Work Group
WA	Washington (County)
WC-DPW	Washington County, Division of Public Works
WCSCD	Washington County Soil Conservation District
WIP	Watershed Implementation Plan
WLA	Wasteload Allocation
WPD	Water Programs Division
WQLS	Water Quality Limited Segment
WQSs	Water Quality Standards

WQv	Water Quality Volume
WQGIT	Water Quality Goal Implementation Team
WRAS	Watershed Restoration Action Strategy
WTM	Watershed Treatment Model
WTWG	Watershed Technical Work Group
WWTP	Waste Water Treatment Plant
yr	Year
12-SW	Maryland General Permit for Discharges from Stormwater Associated with Industrial Activities

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