4. Article Two, B.5- Water Quality Monitoring ("WQM") Plan – Report on whether any of the semi-annual (or annual) WQM required under Article Two, B.5, was conducted during the quarter, and if so, in which sewer basins, and report the results of that monitoring (both BST and fecal coliform) for each such sewer basin.

The 2016 annual round of water quality monitoring was conducted on March 23, 2016. All 26 of the sewer basins were sampled (semi-annual and annual). Human source fecal bacteria were identified by library-based Polymerase Chain Reaction (PCR) testing in one or more samples from eleven sewer basins. Using an independent verification test, discussed below, human sources were confirmed in two of these basins.

As part of continuing re-evaluation of the Water Quality Monitoring Plan and of the methodologies used, the Virginia Tech laboratory that provides the bacterial source tracking (BST) testing services now conducts a verification test for human bacterial sources using a library-independent analytical method (Human Bacteroides HF183) on all samples. These results of that verification are presented below.

The 2016 semi-annual round of water quality sampling is planned for September, and results will be reported in the Fourth Quarter of 2016.

Basins Subject to Semi-Annual Monitoring and Reporting Requirements:

a. Broad CreekBST Results: (Enterococcus CFU/100ml)

Human Bacteroides HF183: Negative
BOX-PCR Source Determination:
Human – 0%
Avian – 39%
Canine – 7%

 $\begin{array}{l} Deer-7\% \\ Horse-0\% \end{array}$

	Misc. Wildlife – 26%	
	Non-human Unknown – 21%	
	Human Bacteroides HF183: Negative	
	BOX-PCR Source Determination:	
	Human – 0%	
BRC002 – upstream (Henson Creek)	Avian – 38%	
	Canine – 9%	27
	Deer – 6%	
	Horse – 0%	
	Misc. Wildlife – 24%	
	Non-human Unknown – 23%	

b. Cabin John-

Fecal Bacteria Results:

BST Results:

(Enterococcus CFU/100ml)

	Human Bacteroides HF183:	
CBJ001 – downstream	Too few bacteria for HF183	
	(Too few bacteria for HF183)	<10 (<10)
	BOX-PCR Source Determination:	
	Too few bacteria for BOX-PCR	
	(Too few bacteria for BOX-PCR)	
	Human Bacteroides HF183:	
CBJ002 – upstream	Too few bacteria for HF183	<10
	BOX-PCR Source Determination:	<10
	Too few bacteria for BOX-PCR	

Note: Values in parentheses for station CBJ001 are for field duplicate sample.

c. Horsepen-

Fecal Bacteria Results:

BST Results:

(Enterococcus CFU/100ml)

	Human Bacteroides HF183: Negative	
HSP001 – downstream HSP002 – upstream	BOX-PCR Source Determination:	72
	Human – 5%	
	Avian – 30%	
	Canine – 5%	
	Deer – 10%	
	Horse – 9%	
	Misc. Wildlife – 18%	
	Non-human Unknown – 23%	
	Human Bacteroides HF183: Negative	
	BOX-PCR Source Determination:	
	Human – 0%	
	Avian – 32%	17
	Canine – 7%	1 /
	Deer – 8%	
	Horse – 11%	
	Misc. Wildlife – 21%	

Non-human Unknown – 21%	

d. **Indian Creek-**

Fecal Bacteria Results:

maian creek		I ccui Du	ctella itesales.	'
	BST Results:	(Enteroco	occus CFU/100	ml)
	Human Bacteroides HF183: Ne	gative		
INC001 – downstream	(Negative)			
	BOX-PCR Source Determination	on:		
	Human – 6 (6)%			
	Avian – 28 (29)%		57 (55)	
	Canine – 9 (9)%		57 (55)	
	Deer – 7 (8)%			
	Horse – 13 (13)%			
	Misc. Wildlife – 17 (16)%			
	Non-human Unknown – 20 (1	19)%		
	Human Bacteroides HF183:			
INC002 – upstream	Too few bacteria for HF183		<10	
	BOX-PCR Source Determination	on:	<10	
	Too few bacteria for BOX-PO	CR		

Note: Values in parentheses for station INC001 are for field duplicate sample.

e. Little Falls-

Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 3% Avian – 38% Canine – 7% Deer – 6% Horse – 0% Misc. Wildlife – 22% Non-human Unknown – 24% Human Bacteroides HF183: Negative	Little I uiis	nam n	/ Cour Du	
BOX-PCR Source Determination: Human - 3%		BST Results:	(Enteroce	<i>occus</i> CFU/100ml)
Human - 3%		Human Bacteroides HF183: No	egative	
Avian - 38% 25 Deer - 6% Horse - 0% Non-human Unknown - 24% Human Bacteroides HF183: Negative		BOX-PCR Source Determinati	ion:	
LFS001 – downstream Canine – 7% 25 Deer – 6% Horse – 0% Misc. Wildlife – 22% Non-human Unknown – 24% Human Bacteroides HF183: Negative		Human – 3%		
Deer – 6% Horse – 0% Misc. Wildlife – 22% Non-human Unknown – 24% Human Bacteroides HF183: Negative	!	Avian – 38%		
Horse – 0% Misc. Wildlife – 22% Non-human Unknown – 24% Human Bacteroides HF183: Negative	LFS001 – downstream	Canine – 7%		25
Misc. Wildlife – 22% Non-human Unknown – 24% Human Bacteroides HF183: Negative		Deer – 6%		
Non-human Unknown – 24% Human Bacteroides HF183: Negative		Horse – 0%		
Human Bacteroides HF183: Negative		Misc. Wildlife – 22%		
		Non-human Unknown – 24%	, D	
		Human Bacteroides HF183: No	egative	
BOX-PCR Source Determination:		BOX-PCR Source Determinati	ion:	
Human – 5%		Human – 5%		
Avian – 33%	LFS002 – upstream	Avian – 33%		
LFS002 – upstream Canine – 8% 33		Canine – 8%		33
Deer – 9%		Deer – 9%		
Horse – 0%		Horse – 0%		
Misc. Wildlife – 25%		Misc. Wildlife – 25%		
Non-human Unknown – 20%		Non-human Unknown – 20%	, O	

f. Lower Anacostia-

Fecal Bacteria Results:

BST Results:	(Enterococcus CFU/100ml)
_ 10	(

	Human Bacteroides HF183: Negative	
	BOX-PCR Source Determination:	
	Human – 3%	
	Avian – 36%	
ANA001 – downstream	Canine – 11%	32
	Deer – 0%	
	Horse – 0%	
	Misc. Wildlife – 24%	
	Non-human Unknown – 26%	
	Human Bacteroides HF183:	
ANA002 – upstream	Too few bacteria for HF183	<10
	BOX-PCR Source Determination:	<10
	Too few bacteria for BOX-PCR	

g. Lower Beaverdam Creek-

Fecal Bacteria Results:

BST Results:

(Enterococcus CFU/100ml)

	_ = = = = = = = = = = (= : : :	
	Human Bacteroides HF183:	
LBD001 – downstream	Too few bacteria for HF183	
	(Too few bacteria for HF183)	<10 (<10)
	BOX-PCR Source Determination:	<10 (<10)
	Too few bacteria for BOX-PCR	
	(Too few bacteria for BOX-PCR)	
	Human Bacteroides HF183:	
LBD002 – upstream	Too few bacteria for HF183	<10
	BOX-PCR Source Determination:	<10
	Too few bacteria for BOX-PCR	

Note: Values in parentheses for station LBD001 are for field duplicate sample.

h. Muddy Branch-

Fecal Bacteria Results:

BST Results: (*Enterococcus* CFU/100ml)

	Human Bacteroides HF183: Negative	
	BOX-PCR Source Determination:	
	Human – 0%	
	Avian – 24%	
MDB001 – downstream	Canine – 7%	36
	Deer – 13%	
	Horse – 0%	
	Misc. Wildlife – 30%	
	Non-human Unknown – 26%	
	Human Bacteroides HF183: Negative	
MDB002 – upstream	BOX-PCR Source Determination:	17
	Human – 0%	17
	Avian – 34%	

Canine – 4%	
Deer – 5%	
Horse - 0%	
Misc. Wildlife – 26%	
Non-human Unknown – 31%	

i. Northeast Branch-

Fecal Bacteria Results:

BST Results:	(Enterococcus CFU/100ml)
DOI ILEBUIES.	(Either dedectils et er 100mm)

	(occus of con
	Human Bacteroides HF183: Negative	
	BOX-PCR Source Determination:	
	Human – 0%	
	Avian – 29%	
NEB001 – upstream	Canine – 6%	40
_	Deer – 9%	
	Horse – 0%	
	Misc. Wildlife – 27%	
	Non-human Unknown – 29%	
	Human Bacteroides HF183: Negative	
	BOX-PCR Source Determination:	
	Human – 0%	
NEB002 – downstream	Avian – 30%	
	Canine – 7%	17
	Deer – 7%	
	Horse – 0%	
	Misc. Wildlife – 24%	
	Non-human Unknown – 32%	

j. Northwest Branch-

Fecal Bacteria Results:

BST Results: (Enterococcus CFU/100ml)

	Human Bacteroides HF183:	
NWA001 – downstream	Too few bacteria for HF183	<10
	BOX-PCR Source Determination:	10
	Too few bacteria for BOX-PCR	
	Human Bacteroides HF183: Negative	
	BOX-PCR Source Determination:	
	Human – 0%	
	Avian – 31%	
NWA002 – upstream	Canine – 6%	42
	Deer – 8%	
	Horse – 0%	
	Misc. Wildlife – 25%	
	Non-human Unknown – 30%	

k. Oxon Run BST Results: (Enterococcus CFU/100ml)

	251 110541051	occus of official
	Human Bacteroides HF183:	
OXN001 – downstream (Oxon Run)	Too few bacteria for HF183	<10
	BOX-PCR Source Determination:	<10
	Too few bacteria for BOX-PCR	
OXN002 – upstream (Watts Branch, tributary to Anacostia River)	Human Bacteroides HF183: Negative	
	BOX-PCR Source Determination:	
	Human – 6%	
	Avian – 36%	
	Canine – 11%	25
	Deer – 9%	
	Horse – 0%	
	Misc. Wildlife – 21%	
	Non-human Unknown – 17%	

l. Paint Branch- Fecal Bacteria Results:

BST Results: (Enterococcus CFU/100ml)

	Doi Results. (Linerot	Occus C1 0/1001
	Human Bacteroides HF183: Negative	
	BOX-PCR Source Determination:	
	Human – 0%	
	Avian – 30%	
PNT001 – downstream	Canine – 11%	20
	Deer – 9%	
	Horse – 0%	
	Misc. Wildlife – 23%	
	Non-human Unknown – 27%	
	Human Bacteroides HF183: Negative	
	BOX-PCR Source Determination:	
	Human – 4%	
	Avian – 29%	
PNT002 – upstream	Canine – 10%	27
	Deer – 7%	
	Horse – 0%	
	Misc. Wildlife – 21%	
	Non-human Unknown – 29%	

m. Parkway- Fecal Bacteria Results:

BST Results: (Enterococcus CFU/100ml)

Human Bacteroides HF183: Negative
BOX-PCR Source Determination:

Human - 2%
Avian - 29%
Canine - 9%
Deer - 7%

	Horse – 0%	
	Misc. Wildlife – 28%	
	Non-human Unknown – 25%	
	Human Bacteroides HF183: Negative	
PKY002 – upstream (Walker Branch)	BOX-PCR Source Determination:	
	Human – 0%	
	Avian – 31%	
	Canine – 7%	25
	Deer – 10%	
	Horse – 0%	
	Misc. Wildlife – 29%	
	Non-human Unknown – 23%	

n. Piscataway-

Fecal Bacteria Results:

BST Results: (Enterococcus CFU/100ml)

	Dot Results. (Emero)	coccus Cro/10011
	Human Bacteroides HF183: Negative	
	BOX-PCR Source Determination:	
	Human – 0%	
	Avian – 34%	
PSW001 – downstream	Canine – 11%	20
	Deer – 8%	
	Horse – 0%	
	Misc. Wildlife – 22%	
	Non-human Unknown – 25%	
PSW002 – upstream	Human Bacteroides HF183:	
	Too few bacteria for HF183	<10
	BOX-PCR Source Determination:	<10
	Too few bacteria for BOX-PCR	

o. Rock Creek-

	BST Results:	(Enterococcus CFU/100ml)
	Human Bacteroides HF183:	
RKC001 – downstream	Too few bacteria for HF183	. <10
	BOX-PCR Source Determination	ion:
	Too few bacteria for BOX-P	CR
	Human Bacteroides HF183:	
RKC002 – upstream	Too few bacteria for HF183	. <10
	BOX-PCR Source Determinate	ion:
	Too few bacteria for BOX-P	CR

p. Seneca Creek-

Fecal Bacteria Results:

(Enterococcus	CFU/100ml)
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	BST Results: (Enterococcus CFU/100n
	Human Bacteroides HF183: Neg	gative
	BOX-PCR Source Determination	n:
	Human – 4%	
CNC001 description	Avian – 28%	
SNC001 – downstream	Canine – 7%	31
(Seneca Creek)	Deer – 6%	
	Horse – 0%	
	Misc. Wildlife – 25%	
	Non-human Unknown – 30%	
	Human Bacteroides HF183: Neg	gative
	(Negative)	
	BOX-PCR Source Determination	n:
	Human – 13 (14)%	
SNC002 – upstream	Avian – 25 (25)%	60 (63)
(Dry Seneca Creek)	Canine – 8 (7)%	60 (63)
	Deer – 9 (10)%	
	Horse – 0 (0)%	
	Misc. Wildlife – 21 (22)%	
	Non-human Unknown – 24 (22	2)%

Note: Values in parentheses for station SNC002 are for field duplicate sample.

Sligo Creekq.

BST Results:	(Enterococcus CFU/100ml)
Human Bacteroides	HF183:
Too few bacteria fo	or HF183

SLC001 – downstream	Human Bacteroides HF183:	
	Too few bacteria for HF183	<10
	BOX-PCR Source Determination:	<10
	Too few bacteria for BOX-PCR	
	Human Bacteroides HF183: Negative	
	BOX-PCR Source Determination:	
	Human – 2%	
	Avian – 33%	
SLC002 – upstream	Canine – 8%	16
	Deer – 6%	
	Horse – 0%	
	Misc. Wildlife – 27%	
	Non-human Unknown – 24%	

r. Upper Beaverdam Creek-

Fecal Bacteria Results:

BST Results:	(Enterococcus CFU/100ml)
II D / '1 IID	102 NI

	<i>50000</i> C1 C 7 1001.
Human Bacteroides HF183: Negative	
BOX-PCR Source Determination:	
Human – 6%	
Avian – 32%	
Canine – 5%	55
Deer – 12%	
Horse – 0%	
Misc. Wildlife – 19%	
Non-human Unknown – 26%	
Human Bacteroides HF183: Positive	
BOX-PCR Source Determination:	
Human – 14%	
Avian – 28%	
Canine – 4%	145
Deer – 8%	
Horse – 0%	
Misc. Wildlife – 21%	
Non-human Unknown – 25%	
	Human Bacteroides HF183: Negative BOX-PCR Source Determination: Human – 6% Avian – 32% Canine – 5% Deer – 12% Horse – 0% Misc. Wildlife – 19% Non-human Unknown – 26% Human Bacteroides HF183: Positive BOX-PCR Source Determination: Human – 14% Avian – 28% Canine – 4% Deer – 8% Horse – 0% Misc. Wildlife – 21%

s. Watts Branch-

Fecal Bacteria Results: (*Enterococcus* CFU/100ml)

THE DIGITAL		
	BST Results:	(Enterococcus CFU/100m
	Human Bacteroides HF183: N	egative
	BOX-PCR Source Determination	on:
	Human – 0%	
WTD001 downstroom	Avian – 31%	
WTB001 – downstream	Canine – 8%	20
(Watts Branch)	Deer – 9%	
	Horse – 0%	
	Misc. Wildlife – 25%	
	Non-human Unknown – 27%	
	Human Bacteroides HF183: N	egative
	BOX-PCR Source Determination	on:
	Human – 0%	
W/TD002 unstraam	Avian – 34%	
WTB002 – upstream (Sandy Branch)	Canine – 6%	27
	Deer – 7%	
	Horse – 0%	
	Misc. Wildlife – 22%	
	Non-human Unknown – 31%	

t. Western Branch- Fecal Bacteria Results: (Enterococcus CFU/100ml)

	· · · · · · · · · · · · · · · · · · ·	
WNB001 – downstream	Human Bacteroides HF183:	
	Too few bacteria for HF183	را د
	BOX-PCR Source Determination:	<10
	Too few bacteria for BOX-PCR	
WNB002 – upstream	Human Bacteroides HF183:	
	Too few bacteria for HF183	<10
	BOX-PCR Source Determination:	<10
	Too few bacteria for BOX-PCR	

Basins Subject to Annual Monitoring and Reporting Requirements-

a. Dulles Interceptor- Fecal Bacteria Results:

	BST Results:	(Enteroce	occus CFU/100ml)
	Human Bacteroides HF183:		
DSI001	Too few bacteria for HF183		<10
DS1001	BOX-PCR Source Determinat	ion:	<10
	Too few bacteria for BOX-P	PCR	

b. Mattawoman- Fecal Bacteria Results: (Enterococcus CFU/100ml)

		1
	Human Bacteroides HF183:	
	Too few bacteria for HF183	
MTWO01	(Too few bacteria for HF183)	(10 (10)
MTW001	BOX-PCR Source Determination:	<10 (<10)
	Too few bacteria for BOX-PCR	
	(Too few bacteria for BOX-PCR)	

Note: Values in parentheses for station MTW001 are for field duplicate sample.

c. Monocacy- Fecal Bacteria Results:

Monocacy-		recar Dacteria Results.
	BST Results:	(Enterococcus CFU/100ml)
	Human Bacteroides HF183:	
MCY001	Too few bacteria for HF183	<10
	BOX-PCR Source Determination	on:
	Too few bacteria for BOX-PO	CR

d. Patuxent Center- Fecal Bacteria Results: (Enterococcus CFU/100ml)

	Human Bacteroides HF183:	
PTC001	Too few bacteria for HF183	-10
(Mill Branch)	BOX-PCR Source Determination:	<10
	Too few bacteria for BOX-PCR	

e. Patuxent North-

Fecal Bacteria Results: (Enterococcus CFU/100ml)

	BST Results:	(Enteroco	ccus CFU/100ml)
PTN001 (Hawlings River)	Human Bacteroides HF183: P BOX-PCR Source Determinat Human – 13% Avian – 28% Canine – 12% Deer – 10% Horse – 0% Misc. Wildlife – 19%	cositive cion:	108
	Non-human Unknown – 189	0	

f. Rock Run-

	BST Results:	(Enterococcus CFU/100ml)
	Human Bacteroides HF183: I	Negative
	BOX-PCR Source Determina	ation:
	Human – 0%	
	Avian – 31%	
RCM001	Canine – 11%	15
	Deer – 6%	
	Horse – 0%	
	Misc. Wildlife – 24%	
	Non-human Unknown – 28	9%