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MEMORANDUM

Date: **December 05, 2014**

To: **Dev Murali, District of Columbia Department of the Environment (DDOE)**

Cc: **Richard Jackson (DDOE)**

From: **Mark Shupe (Tetra Tech) and Jeremy Travis (Tetra Tech)**

Subject: **Work Plan Addendum, Anacostia River Sediment Project Remedial Investigation (RI)**

I. Introduction

This memorandum presents an addendum to the District of Columbia Department of the Environment (DDOE) Final Anacostia River Sediment Project Remedial Investigation (RI) Work Plan dated June 16, 2014 (Tetra Tech, 2014a) (the Addendum). The Addendum covers additional environmental sampling tasks that will be performed to augment the completed sampling for the RI and will be performed as an extension of the current phase of the investigation. As such, unless otherwise noted herein, the field procedures, sampling techniques, quality assurance and quality control (QA/QC) procedures, and data evaluation processes for the additional sampling prescribed herein will be conducted in a manner consistent with the RI Work Plan Quality Assurance Project Plan (QAPP) (Tetra Tech 2014b) and the Field Sampling Plan (FSP) (Tetra Tech 2014c).

This addendum details sampling activities at a total of fifty-five (55) additional locations within the District of Columbia portion of the RI study area. These additional samples are necessary to provide data for portions of the river that DDOE understood would be sampled by various potential responsible parties (PRPs) in time to meet the schedule established by the District City Council on May 15, 2014 (Report and Recommendations of the District Council Committee on Transportation & the Environment, Recommended Subtitle for Anacostia River Toxics Remediation). This schedule calls for the District to adopt and publish a record of decision (ROD) for the remediation of contaminated sediment in the Anacostia River by June 30, 2018. However, no firm timeline for investigations is clearly established for most of the PRP river investigations.

In order to ensure that a complete data set will be available for completing the RI within a timeframe established by District City Council, the additional sample locations presented in this Addendum have been chosen to include the river adjacent to each of 13 PRPs located with the District portion of the RI study area. The sampling activities in each of the PRP areas should not be construed as complete or extensive; the intent of sampling activities documented in this Addendum are intended to supplement information obtained during the completion of the RI and to better ascertain the likelihood of contamination in the PRP areas. The DDOE can, and likely will, require additional sampling of various river-associated media by the PRPs.

II. Proposed Sample Locations

The 55 additional sampling locations are depicted on Figure 1. The location of known buried utilities and other infrastructure as well as the recent experience of the project field team's knowledge of river accessibility were considered in the identification of these locations. In addition, the U.S. Army Corps of Engineers and the National Park Service sample collection permits for the project were revised and have been approved by each agency for the collection of the additional samples.

At each location, up to four types of samples will be collected including surface sediment, subsurface sediment, surface sediment pore water, and sediment samples collected for toxicity testing and bioaccumulation tissue analysis. Table 1 (below) summarizes the number of sample locations and indicates the total number of samples proposed to be collected for each environmental medium.

TABLE 1
Summary of Additional Proposed Sampling Activities

Environmental Medium	Number of Sample Locations	Number of Planned Samples
Surface Sediment	39	39
Subsurface Sediment	55	225
Surface Sediment Pore Water	13	13
Sediment Toxicity Test	39	39
Bioaccumulation Tissue	16	16

For each of the 13 PRPs, Table 2 (pages 3-8) lists the Maryland state plane coordinates for each sampling location and shows the various media that are proposed to be sampled at each location. For each of the four sample types that will be collected, if obstructions such as boulders or debris are encountered at a specific station, the location of the station may be changed within a radius of 5 meters. Table 3 (page 9) summarizes for each medium the laboratory analyses that will be conducted.

TABLE 2
Summary of Media Specific Sample Locations

Location	Reach	Maryland 1983 State Plane Coordinates		Surface Sediment	Subsurface Sediment	Subsurface Sediment 20-ft Cores	Sediment Toxicity	Pore Water	Bio-accumulation	Location Description	Rationale	Anticipated Contaminants of Concern (COCs)
		X (ft)	Y (ft)									
R1-15	South Capitol Street Bridge to Mouth of River	1306056	429321	■	■	■	■			Firth Sterling Steel	Down Gradient from Firth Sterling Steel	PAHs, Metals
R1-16		1306265	429937	■	■	■	■	■	■	Firth Sterling Steel	Adjacent to Firth Sterling Steel	PAHs, Metals
R1-17		1307127	431778	■	■	■	■			Joint Base Anacostia Bolling	Down Gradient from Area 2 (two landfills)	SVOCs, PCBs, VOCs, TPH, Metals
R1-18		1307280	432174		■			■	■	Joint Base Anacostia Bolling	Down Gradient from Area 2 (two landfills)	SVOCs, PCBs, VOCs, TPH, Metals
R1-19		1307413	432501	■	■		■			Joint Base Anacostia Bolling	Down Gradient from Area 2 (two landfills)	SVOCs, PCBs, VOCs, TPH, Metals
R1-21		1307646	432930		■	■				Joint Base Anacostia Bolling	Down Gradient from AOC 1 (former incinerator and solid waste disposal area)	SVOCs, PCBs, Dioxins/Furans, VOCs, TPH, Metals
R1-22		1307713	433122	■	■		■			Joint Base Anacostia Bolling	Down Gradient from AOC 1 (former incinerator and solid waste disposal area)	SVOCs, PCBs, Dioxins/Furans, VOCs, TPH, Metals
R1-23		1307796	433312		■					Joint Base Anacostia Bolling	Down Gradient from AOC 1 (former incinerator and solid waste disposal area)	SVOCs, PCBs, Dioxins/Furans, VOCs, TPH, Metals

Location	Reach	Maryland 1983 State Plane Coordinates		Surface Sediment	Subsurface Sediment	Subsurface Sediment 20-ft Cores	Sediment Toxicity	Pore Water	Bio-accumulation	Location Description	Rationale	Anticipated Contaminants of Concern (COCs)
		X (ft)	Y (ft)									
Table 2, Continued												
R1-24	South Capitol Street Bridge to Mouth of River, Continued	1308484	435829		■	■				Fort McNair	Outfall F-937-544	PAHs, PCBs, Metals
R1-25		1309157	435974	■	■		■			Fort McNair	Outfall F-433-609	PAHs, PCBs, Metals
R1-26		1310363	435821		■	■				Joint Base Anacostia Bolling	Down Gradient from Site 3 Athletic Fields	SVOCs, PCBs, VOCs, TPH, Metals
R1-27		1310406	435910	■	■		■			Joint Base Anacostia Bolling	Down Gradient from Site 3 Athletic Fields	SVOCs, PCBs, VOCs, TPH, Metals
R1-28		1310187	437826	■	■	■	■			Steuart/Hess/Gulf Terminal	Adjacent to Steuart/Hess/Gulf Terminal	PAHs, BTEX, MTBE, TPH
R1-29		1310225	437871		■			■	■	Steuart/Hess/Gulf Terminal	Adjacent to Steuart/Hess/Gulf Terminal	PAHs, BTEX, MTBE, TPH
R1-30		1310260	437924	■	■	■	■			Steuart/Hess/Gulf Terminal	Adjacent to Steuart/Hess/Gulf Terminal	PAHs, BTEX, MTBE, TPH
R2-17	11th Street Bridge to South Capitol Street Bridge	1311209	439135	■	■	■	■			Southeast Federal Center	General Characterization	PAHs, PCBs, VOCs, Metals
R2-18		1311768	439196	■	■	■	■			Southeast Federal Center	Down Gradient from Historic Jut in Seawall	PAHs, PCBs, VOCs, Metals
R2-19		1312057	439238		■	■		■	■	Southeast Federal Center	Near Shore Activity Area Google Earth 1949	PAHs, PCBs, VOCs, Metals
R2-21		1312346	439261	■	■		■			Southeast Federal Center	Near Shore Activity Area Google Earth 1949	PAHs, PCBs, VOCs, Metals

Location	Reach	Maryland 1983 State Plane Coordinates		Surface Sediment	Subsurface Sediment	Subsurface Sediment 20-ft Cores	Sediment Toxicity	Pore Water	Bio-accumulation	Location Description	Rationale	Anticipated Contaminants of Concern (COCs)
		X (ft)	Y (ft)									
Table 2, Continued												
R2-22	11th Street Bridge to South Capitol Street Bridge, Continued	1312924	439145	■	■	■	■			Washington Navy Yard	WNY Outfall #9; WNY Hotspot	PAHs, VOCs, SVOCs, PCBs, Metals
R2-23		1313025	439106		■					Washington Navy Yard	WNY Outfall #9; WNY Hotspot	PAHs, VOCs, SVOCs, PCBs, Metals
R2-24		1313133	439070	■	■	■	■	■	■	Washington Navy Yard	WNY Outfall #9; WNY Hotspot	PAHs, VOCs, SVOCs, PCBs, Metals
R2-25		1313471	438958		■					Washington Navy Yard	WNY Outfall #7	PAHs, VOCs, SVOCs, PCBs, Metals
R2-26		1313698	438885	■	■		■			Washington Navy Yard	WNY Outfall #6	PAHs, VOCs, SVOCs, PCBs, Metals
R2-27		1314305	438679	■	■	■	■			Washington Navy Yard	General Characterization	PAHs, VOCs, SVOCs, PCBs, Metals
R2-28		1312838	437994	■	■		■	■	■	Poplar Point	Augment Existing RI Points	PAH, TPH, BTEX, MTBE, PCB, Metals
R2-29		1313372	437940	■	■	■	■			Poplar Point	Augment Existing RI Points	PAH, TPH, BTEX, MTBE, PCB, Metals
R2-30		1313789	437747		■					Poplar Point	Augment Existing RI Points	PAH, TPH, BTEX, MTBE, PCB, Metals
R2-31		1315201	438481	■	■	■	■			Poplar Point	Under Former 11th Street Bridge Near NPDES Outfall 06	PAHs, TPH, Metals
R3-17	CSX Bridge to 11th Street Bridge	1315337	439324	■	■	■	■			Washington Gas Light	Downgradient from WGL-02D	PAHs, Complex Cyanides, VOCs, SVOCs, Metals
R3-18		1315367	439403	■	■	■	■	■	■	Washington Gas Light	Downgradient from WGL-02D	PAHs, Complex Cyanides, VOCs, SVOCs, Metals

Location	Reach	Maryland 1983 State Plane Coordinates		Surface Sediment	Subsurface Sediment	Subsurface Sediment 20-ft Cores	Sediment Toxicity	Pore Water	Bio-accumulation	Location Description	Rationale	Anticipated Contaminants of Concern (COCs)
		X (ft)	Y (ft)									
Table 2, Continued												
R3-19	CSX Bridge to 11th Street Bridge, Continued	1316068	439903	■	■	■	■	■	■	Washington Gas Light	Downgradient from Gas Storage Tank #4 & Five Oil Storage Tanks	PAHs, Complex Cyanides, VOCs, SVOCs, Metals
R3-21		1316332	440110	■	■		■			Steuart Petroleum	Downgradient from Gas Storage Tank #4 & Five Oil Storage Tanks	PAHs, BTEX, TPH, MTBE
R3-22		1316433	440180	■	■	■	■			Steuart Petroleum	Downgradient from Gas Storage Tank #4 & Five Oil Storage Tanks	PAHs, BTEX, TPH, MTBE
R3-23		1320682	441883		■	■				CSX	CSX NPDES Outfall #1	PAHs, TPH, VOCs, PCBs, Metals
R4-06	East Capitol Street Bridge to CSX Bridge	1322453	444100						■	East bank north of Fort Dupont Creek Outfall	Control Sample for Bioaccumulation Testing to Augment Existing RI Points	Not Applicable. Not a PRP Site. No Anticipated COCs
R4-10		1320730	442122	■	■		■	■	■	CSX	CSX NPDES Outfall #1	PAHs, TPH, VOCs, PCBs, Metals
R4-11		1321654	443251	■	■	■	■			CSX	Fort Dupont Creek Outfall	PAHs, TPH, VOCs, PCBs, Metals
R4-12		1321782	443398		■	■				CSX	Fort Dupont Creek Outfall	PAHs, TPH, VOCs, PCBs, Metals
R4-13		1321795	443485	■	■		■			CSX	Fort Dupont Creek Outfall	PAHs, TPH, VOCs, PCBs, Metals
R4-14		1322502	444201		■					CSX	CSX Outfall Upstream from Fort Dupont Creek	PAHs, TPH, VOCs, PCBs, Metals

Location	Reach	Maryland 1983 State Plane Coordinates		Surface Sediment	Subsurface Sediment	Subsurface Sediment 20-ft Cores	Sediment Toxicity	Pore Water	Bio-accumulation	Location Description	Rationale	Anticipated Contaminants of Concern (COCs)
		X (ft)	Y (ft)									
Table 2, Continued												
R4-15	East Capitol Street Bridge to CSX Bridge	1322688	444550		■					CSX	Upstream from CSX Outfall Located Upstream from Fort Dupont Creek	PAHs, TPH, VOCs, PCBs, Metals
R5-06	Benning Road Bridge to East Capitol Street Bridge	1323253	447813	■	■		■			Pepco	Downstream from Pepco Benning Road South Outfall	PAHs, PCBs, Dioxins/Furans, VOCs, TPH, Metals
R6-18	Amtrak Bridge to Benning Road Bridge	1323367	448278	■	■	■	■			Pepco	Pepco Benning Road South Outfall	PAHs, PCBs, Dioxins/Furans, VOCs, TPH, Metals
R6-19		1323138	448871		■			■	■	Pepco	Verification for Pepco Location 4C	PAHs, PCBs, Dioxins/Furans, VOCs, TPH, Metals
R6-21		1323865	449673	■	■	■	■	■	■	Pepco	Pepco Outfall 013	PAHs, PCBs, Dioxins/Furans, VOCs, TPH, Metals
R6-22		1323985	450279	■	■	■	■			Kenilworth Landfills	Southern End of KPS Landfiill	PAHs, PCBs, Dioxins/Furans, Metals
R6-23		1324130	450595	■	■		■			Kenilworth Landfills	KPS Landfill	PAHs, PCBs, Dioxins/Furans, Metals
R6-24		1324446	451310	■	■		■			Kenilworth Landfills	Watts Branch Confluence	PAHs, PCBs, Dioxins/Furans, Metals
R6-25		1324637	451845		■	■				Kenilworth Landfills	Kenilworth Park Landfill North, South End	PAHs, PCBs, Dioxins/Furans, Metals

Location	Reach	Maryland 1983 State Plane Coordinates		Surface Sediment	Subsurface Sediment	Subsurface Sediment 20-ft Cores	Sediment Toxicity	Pore Water	Bio-accumulation	Location Description	Rationale	Anticipated Contaminants of Concern (COCs)
		X (ft)	Y (ft)									
Table 2, Continued												
R6-26	Amtrak Bridge to Benning Road Bridge, Continued	1324498	452107	■	■	■	■	■	■	Watts Branch	Hickey Run Confluence	PAHs, BTEX, Metals
R6-27		1324823	452269	■	■		■			Kenilworth Landfills	Kenilworth Park Landfill North	PAHs, PCBs, Dioxins/Furans, Metals
R6-28		1325124	452692	■	■		■			Kenilworth Landfills	Kenilworth Park Landfill North, North End	PAHs, PCBs, Dioxins/Furans, Metals
R7-09	Upper tidal limit to Amtrak Bridge	1329751	459567						■	Near year 2000 transect	Control Sample for Bioaccumilation Testing to Augment Existing RI Points	Not Applicable. Not a PRP Site. No Anticipated COCs
KL-08	Kingman Lake	1321720	446931						■	Mud flat north of East Capitol St. Bridge, near footbridge	Control Sample for Bioaccumilation Testing to Augment Existing RI Points	Not Applicable. Not a PRP Site. No Anticipated COCs
WC-12	Washington Channel	1306983	438339	■	■	■	■			Fort McNair	Outfall F-307-629	PAHs, Pesticides, PCBs, Metals
WC-13		1306973	436905	■	■		■			Fort McNair	Outfall F-073-094	PAHs, Pesticides, PCBs, Metals
WC-14		1306978	436663	■	■	■	■	■	■	Fort McNair	Outfall F-073-094	PAHs, Pesticides, PCBs, Metals

TABLE 3
Summary of Analysis

Media	Analysis[1]							
	VOCs[2]	SVOCs[3]	Metals	Mercury	Pesticides	PCB[4] Aroclors	Dioxins/Furans	Total Cyanide
Sediment	■	■	■	■	■	■	■	■
Pore Water		■	■	■	■	■	■	■
Toxicity Testing								
Bioaccumulation Testing		■	■	■	■	■	■	

Media	Analysis[1]							
	Alkylated PAHs[5]	PCB Congeners	PCDD/PCDF[6]	AVS/SEM[7]	Grain Size	Moisture Content/ Percent Solids	Atterburg Limits	Total Organic Carbon
Sediment	■	■	■	■	■	■	■	■
Pore Water	■		■					■
Toxicity Testing								
Bioaccumulation Testing			■					

Media	Analysis[1]							
	Dissolved Organic Carbon	Bulk Density	Specific Conductance	Oxidation Reduction Potential	pH	42-day *Hyalella azteca* direct exposure test	10-day *Chironomus dilutus* direct exposure test	28-day *Lumbriculus variegatus* bioaccumulation test[8]
Sediment		■		■	■			
Pore Water	■		■	■	■			
Toxicity Testing						■	■	
Bioaccumulation Testing								■

Table 3 Notes:

1. Analyses methods (sediment and water):
    - VOCs by EPA Method 8260C
    - SVOCs by EPA Method 8270D LL
    - metals by EPA Method 6020A
    - mercury by EPA Method 7471B
    - pesticides by EPA Method 8081B LL
    - PCB Aroclors by EPA Method 8082A LL
    - dioxins and furans by EPA Method 1613B
    - total cyanide by EPA Method 9014
    - alkylated PAHs by EPA Method 8270M
    - PCB congeners by EPA Method 1668A
    - total organic carbon by EPA Method 5310C (water); Lloyd Kahn (sediment)
    - AVS/SEM by EPA Method AVS/SEM.
2. VOCs (volatile organic compounds).
3. SVOCs (semi-volatile organic compounds).
4. PCBs (polychlorinated biphenyls).
5. PAHs (polycyclic aromatic hydrocarbons).
6. PCDD/PCDF (polychlorinated dibenzodioxins/polychlorinated dibenzofurans).
7. AVS/SEM (Acid volatile sulfides/simultaneously extracted metals).
8. 28-day bioaccumilation test also includes tissue analysis for lipids and percent moisture.

III. Sediment Characterization

Surface Sediment. Surface sediment samples will be collected from the sediment surface at approximately 39 locations within the project area to laterally characterize the nature and extent of contamination in the vicinity of the 13 PRP sites (Figure 1A). Surface grab samples will be collected using a petite Ponar or Vanveen dredge-type sampler from the top 0.5 foot of sediment in accordance with FSP Section 5.2. The collection and logging of surface sediment samples will be documented via electronic version of the Sediment Sample Collection Form (Form 1, FSP Appendix A). Each of the 39 sediment samples will be analyzed for the constituents shown in Table 3.

Subsurface Sediment. Subsurface sediment coring will be performed at the 55 proposed locations (Figure 1B). The coring will be conducted in accordance with the procedures detailed in FSP Section 5.6. Core collection, logging, and sampling will be documented via the electronic version of the Subsurface Sediment Lithologic Log (Form 2) as amended during the initial field effort as three subsidiary forms: Form 2A to be completed during the vibracoring process (Subsurface Sediment Sample Collection Data Sheet), Form 2B-1 to be completed during core logging (Subsurface Sediment Lithologic Description Data Sheet), and Form 2B-2 to be completed during core sampling (Subsurface Sediment Sampling Data Sheet). Sediment cores will be collected to a depth of 10 or 20 feet (Figure 1B). Thirty of the locations will have been selected for coring to 20 feet while coring to a depth of 10 feet will be performed at the remaining 25 locations. Coring may be conducted at additional locations based on conditions observed in the field.

Based on field screening, up to three sediment horizons for the 10 foot cores and up to five sediment horizons for 20-foot cores will be selected from each core for sampling. It is estimated that up to 225 discrete interval subsurface sediment samples will be collected for laboratory analysis. All sediment samples will be collected and submitted for the chemical analyses detailed in Table 3.

IV. Sediment Sampling for Toxicity testing and for Bioaccumulation

Toxicity Testing Samples. Sediment samples for toxicity testing will be collected from the sediment surface at approximately 39 locations within the project area. Sediment toxicity sample points were selected to achieve two goals: (1) biased to include locations in the vicinity of the potentially contaminated sites; and (2) biased toward shallower waters away from people, closer to vegetated habitat where animals might be more likely to forage at low tide. Toxicity testing will include the 10-day *Chironomus dilutes* and 42-day *Hyalella azteca* direct exposure tests. Sediment toxicity sampling locations are shown in Figure 2. In accordance with the procedures presented in Section 5.4 of the FSP, surface grab samples will be collected using a petite Ponar or Vanveen dredge sampler from the top 0.5 foot of sediment at each sampling location. Sample collection will be documented using the electronic version of Form 5 (Benthic Invertebrate Sample Collection Data Sheet). After collection, surface sediment samples for toxicity testing will be sent to the Tetra Tech-Biological Research Facility (BRF) laboratory in Owings Mills, Maryland.

Bioaccumulation Samples. Sediment samples for laboratory-based benthic invertebrate bioaccumulation tests will be collected at 13 of the 55 proposed sampling locations (Table 2, Figure 3). For comparison, sediment samples for bioaccumulation testing will also be collected at three additional locations in non-PRP portions of the river characterized during the initial sampling for the RI. Bioaccumulation tests provide information regarding whether chemicals in sediment are bioaccumulated by benthic organisms and provide estimates of body burdens, or chemical concentrations in invertebrate tissues for use in the ecological risk assessment. The RI Work Plan envisioned estimating invertebrate tissue body burden by collecting benthic invertebrate samples for tissue analysis if organisms were present in sufficient numbers, as determined through field judgment. However, benthic body burden remains a data gap since benthic invertebrates were largely absent in sufficient numbers for sampling (only one location was encountered where sufficient numbers were present) thus necessitating sampling for laboratory-based bioaccumulation testing.

Laboratory-based bioaccumulation testing is a new testing activity not covered in the RI Work Plan. The bioaccumulation testing will be conducted using the oligochaete *Lumbriculus variegatus* for 28 day bioaccumulation tests following the EPA guidance “Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates” (EPA 2000). The SOP for the bioaccumulation tests is included in Appendix A to this Addendum. Field documentation of the collection of the sediment for bioaccumulation testing will be via Form 5 (noted above for toxicity testing sampling).

Prior to the initiation of the 28-day bioaccumulation tests, an initial 96-hour sediment toxicity test for each location will be performed using *L. variegatus*. The purpose of the 96-hour test is to assess the viability of the 28-day test. Specifically, if mortality is observed after 96 hours, the 28-day test will be aborted. After surface sediment sample collection for bioaccumulation testing, the samples will be sent to the Tetra Tech-BRF laboratory in Owings Mills, Maryland for bioaccumulation testing using *L. variegatus*. At the completion of the 28 day test the Tetra Tech-BRF laboratory will harvest the *L. variegatus* organisms from the testing equipment, place the organisms into the appropriate sample containers, and ship the organisms to TestAmerica for processing and analysis. All samples will be labeled, documented, packaged, and shipped in accordance with the QAPP.

V. Sediment Pore Water Sampling

Sediment pore water will be sampled at 13 locations to a depth of 0-0.5 feet below the sediment surface (Figure 3, Table 2). Sample locations were selected to provide supplemental spatial coverage in the vicinity of the potentially contaminated sites within the study area. Pore water collection locations

will be co-located at selected surface sediment locations. All pore water samples will be collected for ex situ laboratory-based extraction and will be submitted for the chemical analyses detailed in Table 3. Pore water sampling will be performed in accordance with the procedures detailed in Section 5.3 of the FSP and will be documented using the electronic version of Form 3 (Pore Water Sample Data Collection Sheet).

VI. Quality Control

Field and laboratory quality control procedures regarding laboratory QC sampling requirements; field equipment calibration, maintenance and operation; inspection and acceptance of consumables; and documentation and record keeping will be consistent with the requirements specified in the QAPP. The QAPP QA/QC sampling requirements are summarized below.

- Field replicate or duplicate, matrix spike, matrix spike replicate or duplicate, field blank: collected and analyzed for all constituents analyzed in the associated field samples at the frequency of one every 20 field samples.
- Equipment blank: collected once for each medium sampled and then at the rate of one for every 20 field samples for each sampled medium.
- Trip blank: one trip blank will be present in the field during the collection of VOC samples and one trip blank will be placed in each cooler containing VOC samples that is shipped to the laboratory.

The Tetra Tech field coordinator will track and ensure that each sampling team collects the above noted field QC samples at the required frequencies.

VII. Schedule

This section provides a summary of the schedule for the sampling that will be performed for this Addendum. The field work is expected to require approximately four to five weeks and will use two sampling vessels. One of the vessels will be dedicated to surface sediment characterization activities including the collection of surface sediment, pore water, sediment toxicity samples, and sediment bioaccumulation samples. This sampling will be performed first. The second vessel will be tasked with collecting the subsurface sediment cores which will be initiated during the final week of the surface sediment characterization activities.

Table 4 lists the major milestones for the project and the due dates relative to the sequence of tasks.

TABLE 4
Schedule of Deliverables for the RI Including Additional Proposed Sampling Activities

Task	Due Date or Duration*
Begin Remedial Investigation Field Work	21 days after receiving authorization to proceed from DDOE**
Remedial Investigation Data Report	60 days after receipt of laboratory analyses results from the field investigation
Draft Remedial Investigation Report	90 days after approval of the RI Data Report
Final Remedial Investigation Report	45 days after receipt of comments on the Draft RI Report

* Schedule assumes comments received can be addressed in the allotted time.
** Assumes that requisite environmental permits can be obtained and project funding is in place.

VIII. References:

ASTM E1688-10, Standard Guide for Determination of the Bioaccumulation of Sediment-Associated Contaminants by Benthic Invertebrates, ASTM International, West Conshohocken, PA, 2010, www.astm.org.

EPA. 2000. "Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates". Second Edition Office of Research and Development, Office of Science and Technology, and Office of Water. EPA 600/R-99/064. March.

Tetra Tech, 2014a. Remedial Investigation Work Plan: Anacostia River Sediment Project, Washington, DC, prepared for the District Department of the Environment, June 2014.

Tetra Tech, 2014b. Field Sampling Plan for Remedial Investigation: Anacostia River Sediment Project, Washington, DC, prepared for the District Department of the Environment, June 2014.

Tetra Tech, 2014c. Quality Assurance Project Plan for Remedial Investigation: Anacostia River Sediment Project, Washington, DC, prepared for the District Department of the Environment, June 2014.

Kenilworth Park Landfill North

PEPCO

Kenilworth Park Landfill South

Washington Navy Yard

Washington Gas

Southeast Federal Center

Former Hess Oil Corporation and Gulf Oil Corporation Bulk Oil Facilities

Fort McNair

Steuart Petroleum

CSX

CSX

Poplar Point

Joint Base Anacostia-Bolling

Firth-Sterling Steel

R6-28
R6-27
R6-26
R6-24
R6-23
R6-22
R6-21
R6-18
R5-06
R4-13
R4-11
R4-10
R3-22
R3-21
R3-19
R3-18
R3-17
R2-31
R2-29
R2-28
R2-27
R2-26
R2-24
R2-22
R2-21
R2-18
R2-17
R1-30
R1-28
R1-27
R1-25
R1-22
R1-19
R1-17
R1-16
R1-15
WC-12
WC-13
WC-14

Note: The Cleanup Site Boundaries (Land Based Portion) for the Washington Navy Yard are reflective of its historic extent.

Legend

- SHALLOW SURFACE SEDIMENT SAMPLE
- COMPLETED SHALLOW SURFACE SEDIMENT SAMPLE
- CLEANUP SITE BOUNDARY (LAND BASED PORTION)
- SEDIMENT STUDY AREA
- WASHINGTON DC BOUNDARY

SOURCE: MODIFIED FROM CH2MHILL, 2011, AND DCGIS, 2012.

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0 1,500 3,000
Feet

ANACOSTIA RIVER SEDIMENT PROJECT

FIGURE 1A
LOCATIONS OF SHALLOW SEDIMENT SAMPLES (0-0.5 FT)

TETRA TECH

Date Saved: 11/10/2014 1:39:49 PM User: joel.peters Path: S:\CADD\S\2592\mxd\PRP IA\Figure 1A Anacostia 22x34 RP SAMPLING LOCATIONS SEDIMENT 110714.mxd

Kenilworth Park Landfill North

PEPCO

Kenilworth Park Landfill South

CSX

CSX

Steuart Petroleum

Poplar Point

Joint Base Anacostia-Bolling

Firth-Sterling Steel

Washington Navy Yard

Washington Gas

Southeast Federal Center

Former Hess Oil Corporation and Gulf Oil Corporation Bulk Oil Facilities

Fort McNair

Note: The Cleanup Site Boundaries (Land Based Portion) for the Washington Navy Yard are reflective of its historic extent.

Legend

- SUBSURFACE SAMPLE CORE TO A DEPTH OF 10-FT
- SUBSURFACE SAMPLE CORE TO A DEPTH OF 20-FT
- COMPLETED SHALLOW/DEEP SEDIMENT SAMPLE
- CLEANUP SITE BOUNDARY (LAND BASED PORTION)
- SEDIMENT STUDY AREA
- WASHINGTON DC BOUNDARY

SOURCE: MODIFIED FROM CH2MHILL, 2011, AND DCGIS, 2012.

N W E S

0 1,500 3,000 Feet

ANACOSTIA RIVER SEDIMENT PROJECT

FIGURE 1B LOCATIONS OF SEDIMENT CORES

TETRA TECH

Date Saved: 11/10/2014 1:49:30 PM User: joel.peters Path: S:\CADDS\2592\mxd\PRP IA\Figure 1B Anacostia 22x34 RP SAMPLING LOCATIONS SEDIMENT SUBSURFACE 110714.mxd

Kenilworth Park Landfill North

Kenilworth Park Landfill South

PEPCO

CSX

CSX

Steuart Petroleum

Poplar Point

Joint Base Anacostia-Bolling

Firth-Sterling Steel

Fort McNair

Former Hess Oil Corporation and Gulf Oil Corporation Bulk Oil Facilities

Southeast Federal Center

Washington Navy Yard

Washington Gas

R6-28
R6-27
R6-26
R6-24
R6-23
R6-22
R6-21
R6-18
R5-06
R4-13
R4-11
R4-10
R3-22
R3-21
R3-19
R3-18
R3-17
R2-31
R2-29
R2-28
R2-27
R2-26
R2-24
R2-22
R2-21
R2-18
R2-17
R1-30
R1-28
R1-27
R1-25
R1-22
R1-19
R1-17
R1-16
R1-15
WC-12
WC-13
WC-14

Note: The Cleanup Site Boundaries (Land Based Portion) for the Washington Navy Yard are reflective of its historic extent.

Legend

- SEDIMENT TOXICITY SAMPLE LOCATION
- COMPLETED BENTHIC EXPOSURE SAMPLE LOCATION
- CLEANUP SITE BOUNDARY (LAND BASED PORTION)
- SEDIMENT STUDY AREA
- WASHINGTON DC BOUNDARY

SOURCE: MODIFIED FROM CH2MHILL, 2011, AND DCGIS, 2012.

N
W E
S

0 1,500 3,000
Feet

ANACOSTIA RIVER SEDIMENT PROJECT

FIGURE 2
LOCATIONS OF SEDIMENT TOXICITY SAMPLES

TETRA TECH

Date Saved: 11/7/2014 1:52:11 PM User: joel.peters Path: S:\CADD\S\2692\mxd\PRP_IA\Figure_2_Anacostia_22x34_RP_SAMPLING_LOCATIONS_SEDIMENT_TOXICITY_110714.mxd

R7-09
R6-26
R6-21
R6-19
KL-08
R4-06
R4-10
R3-19
R3-18
R2-19
R2-24
R2-28
R1-29
WC-14
R1-18
R1-16
Kenilworth Park Landfill North
PEPCO
Kenilworth Park Landfill South
CSX
CSX
Steuart Petroleum
Poplar Point
Joint Base Anacostia-Bolling
Firth-Sterling Steel
Fort McNair
Former Hess Oil Corporation and Gulf Oil Corporation Bulk Oil Facilities
Southeast Federal Center
Washington Navy Yard
Washington Gas

Note: The Cleanup Site Boundaries (Land Based Portion) for the Washington Navy Yard are reflective of its historic extent.

Legend

- BIOACCUMULATION SEDIMENT SAMPLE ONLY
- BIOACCUMULATION AND PORE WATER SAMPLE
- COMPLETED PORE WATER SAMPLE LOCATION
- CLEANUP SITE BOUNDARY (LAND BASED PORTION)
- SEDIMENT STUDY AREA
- WASHINGTON DC BOUNDARY

SOURCE: MODIFIED FROM CH2MHILL, 2011, AND DCGIS, 2012.

N
W E
S

0 1,500 3,000
Feet

ANACOSTIA RIVER SEDIMENT PROJECT

FIGURE 3
LOCATIONS OF POREWATER AND BIOACCUMULATION SAMPLES

TETRA TECH

Date Saved: 11/7/2014 3:19:14 PM User: joel.peters Path: S:\CADDS\2592\mxd\FRP IA\Figure 3 Anacostia 22x34 RP SAMPLING LOCATIONS POREWATER 110714.mxd