

Lockheed Martin Corporation
6801 Rockledge Drive MP: CCT-246
Bethesda, MD 20817
Telephone (240) 328-0905



June 19, 2020

Mr. Brian Dietz
Program Administrator Land Restoration Program
Land and Material Administration
Maryland Department of the Environment
1800 Washington Road, Suite 625
Baltimore, Maryland 21230

Subject: Addendum No. 1 to the 2020 Groundwater, Surface Water Monitoring Work Plan, Martin State Airport, Middle River, Maryland

Dear Mr. Dietz:

Tetra Tech has prepared this work plan addendum (Addendum 1) presenting the scope of work for additional characterization of per- and polyfluoroalkyl substances (PFAS) at Martin State Airport (MSA). This addendum to the *2020 Groundwater and Surface Water Monitoring Work Plan* (March 2020 work plan) has been prepared to add a second round of PFAS sampling to be completed in June/July 2020.

Background

A PFAS investigation of groundwater and surface water in the Dump Road Area (DRA) and in Greater Strawberry Point (GSP) was undertaken in February and March 2020. This investigation involved sampling and testing of groundwater from existing monitoring wells in the DRA and GSP and testing of surface water features in both areas. That scope included 28 groundwater sample locations in total, including 11 upper-surficial aquifer wells, 7 intermediate-surficial aquifer wells and 2 lower-surficial aquifer wells in the DRA (20 total), and 5 upper-surficial aquifer wells and 3 intermediate-surficial aquifer wells (8 total) in GSP. The four surface water sample locations included one sample in each of Ponds 1 and 2 in the DRA and two samples in the drainage channel adjacent to the Lockheed Martin corporate hangar in GSP.

Sampling Objectives

Conduct a second round of surface water and groundwater sampling and analysis for PFAS to compare to PFAS concentrations from the February/March 2020 event, to verify any concentrations relative to PFAS criteria and to provide delineation of any exceedances of PFAS criteria.

Field Work

Sampling procedures, laboratory analytical methods, and quality assurance/quality control (QA/QC) procedures are included for the following eight PFAS compounds, which are the same PFAS compounds tested for in February/March 2020:

- Perfluorooctane sulfonate (PFOS)
- Perfluorooctanoic acid (PFOA)
- Perfluorononanoic acid (PFNA)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorohexanesulfonic acid (PFHxS)
- Perfluorobutanesulfonic acid (PFBS)
- 6:2 Fluorotelomer sulfonate
- 8:2 Fluorotelomer sulfonate

The Standard Operating Procedures (SOP) for groundwater and surface water sampling will be identical to the 2020 Round 1 PFAS Sampling Work Plan. Specific monitoring well locations, and sampling information are presented below:

- Table 1 lists the 28 sampling locations in the DRA and GSP proposed for the eight PFAS compounds listed above. Please refer to Figures 1 and 2 attached for sampling locations. In the DRA, groundwater samples will be collected from 16 monitoring wells total, including 12 upper-surficial aquifer wells and 4 intermediate-surficial aquifer wells. The wells have been selected to verify prior PFAS detections in groundwater and to help delineate the detected PFAS. In the DRA, 7 of the monitoring wells tested in Round 1 are being retested, while 9 other monitoring wells have been added for delineation purposes. Eleven of the DRA monitoring wells tested in Round 1 are not being retested.

- In GSP, groundwater samples will be collected from 12 monitoring wells total, including 11 upper-surficial aquifer wells and 1 intermediate-surficial aquifer well. In GSP, 3 of the monitoring wells tested in Round 1 are being retested, while 9 other monitoring wells have been added for delineation purposes. Five of the GSP monitoring wells tested in Round 1 are not being retested.
- Table 2 lists the 5 surface water sampling locations for the DRA and GSP. In the DRA, surface water samples will be collected from Pond 1 and Pond 2 to verify the first-round results. In GSP, surface water samples will be collected from three locations, two of which replicate the locations sampled in the first-round investigation, to verify those results. The third sample location is in the same stream channel but downstream of the Strawberry Point Road culvert.

Laboratory Analysis

The analytical method will be a laboratory-specific modified version of USEPA Method 537, as was used during the February/March event. The site-specific 8-compound PFAS analyte list is as follows:

- Perfluorooctane sulfonate (PFOS)
- Perfluorooctanoic acid (PFOA)
- Perfluorononanoic acid (PFNA)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorohexanesulfonic acid (PFHxS)
- Perfluorobutanesulfonic acid (PFBS)
- 6:2 Fluorotelomer sulfonate
- 8:2 Fluorotelomer sulfonate

The analytes for surface water will be the same as those used for groundwater. The exceptions are for the three surface water samples to be collected in the GSP where, in addition to the above site-specific list of 8 analytes, the samples shall also be tested for the following 4 PFAS compounds:

- Perfluorobutanoic acid (PFBA)
- Perfluoropentanoic acid (PFPeA)
- Perfluorohexanoic acid (PFHxA)
- Perfluorodecanoic acid (PFDA)

These four additional PFAS compounds for the GSP surface water samples are known constituents of the aqueous film-forming foam (AFFF) fire suppressant stored at the nearby Lockheed Martin hangar. The laboratory-specific modified version of USEPA Method 537 method will meet the required PFAS detection limits of 1 to 2 nanograms per liter. All analytical results will be thoroughly checked for quality and usability by a qualified chemist. Once the analytical data have been obtained from the laboratory, the data will undergo 100% validation in accordance with USEPA Region 3 Level M2 protocols.

QA/QC samples will be collected according to the following schedule to evaluate the accuracy of the analytical results, and to examine any potential PFAS contamination that may have been introduced in the field or laboratory:

- Field reagent blanks will be collected at the rate of one per day per team - approximately 8 samples;
- Equipment blanks will be collected one each per piece of equipment, per field event - approximately 2 samples total for the groundwater and surface water events, for the following equipment:
 - Water level meter
 - HDPE tubing utilized during sampling
- Field duplicate samples will be collected at a 10 percent frequency (5 samples)
- Matrix spike/matrix duplicate (MS/MSD) samples will be collected on at 1:20 basis (3 samples).

Oversight of the laboratory QA/QC will be as proactive as possible to ensure valid data are produced during the sampling event. Tetra Tech will evaluate the methodology, method compliance, and any corrective actions, and the results of data usability reviews will be provided to Lockheed Martin as they are received. All samples will be analyzed on a standard 21-day turnaround time.

Reporting

Tetra Tech will prepare a report detailing the Round 2 PFAS sampling and analysis activities. A description of field procedures, analytical results and data validation will be included.

We respectfully request to receive Maryland Department of the Environment's approval of this Work Plan Addendum No. 1 by June 26, 2020. If you have any questions regarding this work, please feel free to contact me at (301) 548-2227.

Sincerely,



Charles Trione
Project Lead, Environmental Remediation
Lockheed Martin Corporation.

enclosures: Figures 1 and 2
 Tables 1 and 2

cc: (via email without enclosure)
Anuradha Mohanty, MDE
Christine Kline, Lockheed Martin
Norm Varney, Lockheed Martin
Michael Martin, Tetra Tech
Peter Shilland, CDM Smith

cc: (via mail with CD enclosure)
Pete Lekas, EA Environmental

cc: (via shipping courier; with enclosures)
Mark Williams, MAA
Al Pollard, Martin State Airport

cc: (via Secure Information Exchange)
Jann Richardson, Lockheed Martin

TABLES

Table 1

**Proposed Groundwater Wells to be Sampled during the 2020 Per- and Polyfluoroalkyl Substances (PFAS)
Investigation
Martin State Aripport, Middle River, Maryland**

Dump Road Area		Greater Strawberry Point Area	
Upper surficial aquifer	Intermediate surficial aquifer	Upper surficial aquifer	Intermediate surficial aquifer
DMW-04S	MW-5I	MW-07	MW-023I
DMW-05S	MW-34I	MW-09	
DMW-06S	MW-40I	MW-10	
DMW-07S	MW-48I	MW-11	
MW-34S		MW-12	
MW-35S		MW-13	
MW-40S		MW-14	
MW-44S		MW-15	
MW-46S		MW-16	
MW-49S		MW-19	
MW-50S		MW-20	
MW-51S			
12	4	11	1
		TOTAL:	28

Table 2

**Proposed Surface Water Locations to be Sampled during the
2020 Per- and Polyfluoroalkyl Substances (PFAS) Investigation
Martin State Airport, Middle River, Maryland**

Dump Road Area	Greater Strawberry Point Area
Pond #1	SWSD-C1
Pond #2	SWSD-C2
	SWSD-C3
2	3
TOTAL:	5

Notes:

GSP samples to be tested for original 8 PFAS compounds plus perfluorobutanoic acid (PFBA), perfluoropentanoic acid (PFPeA), perfluorohexanoic acid (PFHxA) and perfluorodecanoic acid (PFDA)

FIGURES



FIGURE 1

**2020 ROUND 2 PFAS GROUNDWATER AND
SURFACE WATER SAMPLING LOCATIONS
DUMP ROAD AREA**

LEGEND

- GROUNDWATER MONITORING WELL
- SURFACE WATER SAMPLE LOCATION
- MARYLAND AIR NATIONAL GUARD BOUNDARY

2017 aerial photograph provided by the State of Maryland.

**Lockheed Martin, Martin State Airport
Middle River, Maryland**

0 75 150 Feet

N

DATE MODIFIED: 06/19/20 CREATED BY: JEE





FIGURE 2

**2020 ROUND 2 PFAS GROUNDWATER AND
SURFACE WATER SAMPLING LOCATIONS,
GREATER STRAWBERRY POINT**

LEGEND

- GROUNDWATER MONITORING WELL
- SURFACE WATER SAMPLE LOCATION

2017 aerial photograph provided by the State of Maryland.

**Lockheed Martin, Martin State Airport
Middle River, Maryland**

0 100 200 Feet

N

DATE MODIFIED: 06/19/20

CREATED BY: JEE

