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Revised Letter Work Plan for
Rockland County Fire Training Center
35 Firemen's Memorial Drive
Pomona, New York, Rockland County
Colliers Engineering & Design Project No.: 19000442G1

Dear Brittany,

Colliers Engineering & Design CT, P.C. (DBA Maser Consulting Engineering & Land Surveying) is pleased to submit this letter work plan to perform the NYSDEC-requested work at the Rockland County Fire Training Center (RCFTC). The work plan was developed based on, correspondences from Brittany O'Brien/NYSDEC to Rockland County dated May 2, September 12 and November 17, 2022.

Scope of Work

TASK 1.0: PRE-WORK SITE INSPECTION MEETING WITH RCFTC REPRESENTATIVES AND CAMP DEVELOPMENT

Prior to the start of field work, CED proposes a site inspection and meeting with facility managers at the Fire Training Center. The purpose of the meeting will be to determine locations of the proposed new groundwater monitoring wells to ensure they are located in areas that will not interfere with training activities and which will not conflict with RCFTC plans for new building construction.

As part of the scope, CED will also assess Outfall #1 and its downgradient environs for any logistical issues that would hinder the collection of downstream surface water and sediment samples as requested by NYSDEC in its May 2, 2022 correspondence. While on site, CED will also monitor and inspect the existing monitoring wells to ensure they are properly prepared for future sampling as described under Task 4 of this work plan. CED will also screen the well head space for signs of volatile organic compounds with the aid of a photo-ionization detector. In addition, we will collect a round of synoptic water levels measurement at the existing water table wells.

CED notes that under Task 2, three (3) bedrock wells are to be installed. Since the drilling method proposed is different than that utilized for the water table wells during the initial site investigation, a Community Air Monitoring Plan (CAMP) will be prepared. The CAMP will meet the requirements of Appendix 1A of DER-10 and will be designed to monitor the presence of potential volatile organic compounds and dust particulates during the drilling of the bedrock monitoring wells.

The results of the CAMP monitoring will be reported to NYSDEC and NYSDOH project managers on a daily basis. If any exceedances for volatile organic compounds and/or dusts are identified during the intrusive work, mitigative measures will be immediately employed. Such measures may include but not be limited to the addition of PFAS-free water at the well head to enhance dust and vapor suppression.

Updates to the Health & Safety Plan to accommodate the new work tasks will also be incorporated into this Task.

TASK 2.0: INSTALLATION OF THREE (3) BEDROCK MONITORING WELLS

As requested by NYSDEC, three (3) bedrock groundwater monitoring wells will be installed. The objective of these wells is to determine whether contamination in the shallow water table aquifer identified during the previous site characterization work, has migrated vertically into the bedrock aquifer. In order to prevent the mixing of PFAS-contaminated groundwater from the water table aquifer into the bedrock aquifer, the wells will be required to be double-cased. The procedure for bedrock well installation by a NYSDEC and Rockland County-approved well driller is described as follows:

- Drill will utilize an air rotary rig to drill a 10-inch diameter borehole into the shallow bedrock aquifer.
- 10-inch steel casing will be driven into the top of rock-estimated to be between 20 and 25 feet below grade level. This outer casing will prevent any mixing of the water table aquifer with the shallow bedrock aquifer. It is expected that casing will be installed ten (10) feet into bedrock and grouted in-place.
- After a minimum 24-hour period to allow curing of the grout, a borehole will be advanced through the 10-inch casing to an estimated depth of 35 feet below grade. A secondary 6-inch steel casing will be installed at that depth and then grouted in place.
- After a minimum 24-hour period to allow curing of the grout, an open rock borehole will be drilled to approximately 50 feet below grade. It is noted that the final well depth will be determined by field conditions and the volume of water within the bedrock wellbore. It is expected that all bedrock wells will be completed at generally the same depth and in the same water bearing strata or fracture zone.
- After the wells are sampled, sampling results will help determine whether the well can remain as an open rock hole to 50 feet below grade, whether the open borehole should be extended deeper into the bedrock or whether a 2-inch PVC well should be set into the well bore. -upon completion, the wells will be developed with the use of a submersible pump flowing at an estimate rate of 3 to 5 gallons per minute. The wells will be developed for one hour or until clear, sediment free water is produced.

During well development, water quality parameters will be collected at regular 5-minute intervals. Water quality parameters will consist of turbidity, dissolved oxygen, specific conductance, redox potential, pH and temperature. All investigation derived wastes (i.e., drill cuttings and well development water) will be segregated and containerized for characterization and potential off-site disposal.

The proposed locations of the three (3) bedrock wells are shown in Figure 1. Actual well locations will be subject to NYSDEC-approval and any logistical interferences identified in the Pre-Work Site Inspection performed under Task 1. It is noted that any water to be used in the well drilling process (if any) will come from PFAS-free sources.

The well bore locations will be cleared of underground obstructions, obstacles and utilities prior to mobilization.

As noted under Task 1, CED will implement a Community Air Monitoring Plan to monitor potential releases of volatile organic compounds and dusts during the drilling of the bedrock monitoring well.

Following installation, the new wells will be surveyed for horizontal and vertical control.

It is noted that NYSDEC also requested that standard borehole geophysics be considered to identify transmissive zones, fracture depths and orientation during this phase of the work. Geophysical methods will be considered following the collection and analysis of groundwater samples—as describe under Task 4 of this work plan.

TASK 3.0: REVIEW OF REGIONAL GEOLOGY AND PRIVATE WELL CONSTRUCTION INFORMATION

As requested by NYSDEC, regional geology and private well construction information should be reviewed. As a work element to complete this task, CED will submit Freedom of Information requests to the local, County and State agencies with jurisdiction over this information.

Requests for private well data including well locations, depths, screen intervals, geological strata, pumping data and water quality data will be sought. Upon receipt of this material—and depending on the volume and complexity of the material received, CED will provide a summary review of the material and provide recommendations for additional tasks to support the NYSDEC request.

TASK 4.0: REINSTALL GROUNDWATER MONITORING WELL MW-1

As noted in the CED Site Characterization Report, groundwater monitoring well MW-1 was inadvertently destroyed in March 2020 during the demolition of one of the former fire training buildings. As part of this scope of work, MW-1 will be replaced. MW-1 will be generally located in the vicinity of the original well and have similar dimensions with a depth of twenty (20) feet and fifteen (15) of well screen. MW-1 will serve as an upgradient well to the PFAS plume in the water table aquifer in the lower training field. The location for replacement well MW-1 is shown in Figure 1- subject to NYSDEC-approval and any logistical concerns identified during the pre-work site inspection.

As part of this Task 4 scope of work, CED will also conduct at least one round of synoptic water level measurements. The data collected will be used to generate conceptual site groundwater flow maps for both the water table and the bedrock aquifers.

TASK 5.0: COMPREHENSIVE ROUND OF GROUNDWATER SAMPLES

Upon completion and development of three bedrock wells and replacement well MW-1, CED will perform one round of comprehensive well sampling. Only PFAS-free sampling pumps and components will be utilized for well purging and sampling—identical to the processed used to sample wells during the previous site characterization investigation.

A total of nine (9) wells will be sampled for PFAS compounds. Three (3) wells will be bedrock wells; six (6) wells will be water table wells. Analysis for PFAS-only will be performed by Test America/Eurofins laboratories under standard laboratory turn-around times.

The well sampling will take place at least two weeks after the newly installed wells have been developed—to allow time for the wells to equilibrate with the aquifer. For the water table monitoring well MW-1, well development water and well purge water will be handled in accordance with the procedures outlined in the approved site characterization work plan. For the bedrock monitoring wells, well development water and well purge water will be containerized for waste disposal characteristics. It is noted that well cuttings, well development water and well purge water will be segregated based on origin (i.e., investigation-derived waste (IDW) from replacement well MW-1 will be segregated from IDW generated during the installation, development and purging of the bedrock monitoring wells).

Sampling of the wells will follow the identical procedures as those employed during the original site characterization investigation.

Well sampling will follow the same low-flow purge procedures as previously employed for the Site Characterization Investigation. The criteria for well sampling will be the stabilization (three consecutive readings at five-minute intervals- within 10%) of the following water quality characteristics: turbidity, dissolved oxygen and specific conductance---or two hours of low flow purging, whichever comes first. CED will record this data on the Well Sampling Logs for each well.

TASK 6.0: COLLECT CO-LOCATED SURFACE WATER & SEDIMENT SAMPLES OUTFALL#1

To determine whether surface water and sediment contamination in Outfall #1 has migrated downstream into the adjacent wetland, CED will collect a series of co-located surface water and sediment samples. The locations of these samples is subject to approval by NYSDEC and any logistical or access constraints identified in Task 0 above. CED will collect three (3) co-located sediment and surface water samples in the wetland at locations that are approximately 50, 100 and 150 feet downstream of Outfall #1. Samples will be analyzed for PFAS only. Sampling procedures, equipment and protocols will be identical to those used for Surface Water and Sediment (Debris) sampling for the original Site Characterization Investigation.

A Sampling & Analytical Plan (SAP) (Attachment 1) has been developed for this work plan. The SAP describes the number of samples to be collected per matrix—as well as quality control and quality assurance samples including trip blanks, field blanks, duplicates, matrix spike, matrix spike duplicate and equipment blanks.

TASK 7.0; REPORTING

Following the receipt of analytical data from laboratory (Category B reports) and a data usability summary report (DUSR) from an independent third-party validator (who will upload the DUSR into NYSDEC's EQUIS Database).

CED will generate a report that will include but not be limited to the following elements: materials and methods for the investigation, sampling location map, well locations, well construction logs, analytical data tables, data review and interpretation, photo-documentation, conceptual groundwater flow diagrams, report finding, conclusions and recommendations.

If you have any questions or comments regarding this revised letter work plan, please do not hesitate to call.

Sincerely,

Colliers Engineering & Design CT, P.C.
(DBA Maser Consulting Engineering & Land Surveying)



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