Pre-Design Investigation – Scope of Work

HDR Work Assignments D007625-52 Northrop Grumman-Bethpage Facility/Naval Weapons Industrial Reserve Plant

New York State Department of Environmental Conservation's (NYSDEC) Division of Environmental Remediation (DER) has issued the above referenced assignment under contract D007625 for the Northrop Grumman-Bethpage Facility/Naval Weapons Industrial Reserve Plant (NYSDEC Site #130003A/130003B) in Bethpage, Town of Oyster Bay, Nassau County, NY. NYSDEC is currently finalizing agreements with the responsible parties for the implementation of portions of the selected remedy as outlined in the December 2019 Amended Record of Decision (AROD). For those portions of the plume where the responsible parties have declined to implement further action, NYSDEC will perform the remedy implementation. The previously approved scope of work for Work Assignment #52 includes pre-design investigations (PDI) to refine the limits of the groundwater contamination under Tasks 3 and 4 and to provide the details necessary to support a remedial design program.

Pre-Design Investigation

A PDI will be completed to collect additional groundwater quality and subsurface geology data needed to support the future Remedial Design. The PDI will be focused on defining the nature and extent of site contaminants (i.e., toluene) near the DECHC-05 extraction well location as shown on AROD Figures 12 and 13. As shown on Figure 1 of this Work Plan, initially three vertical profile borings (VPBs) will be installed. The data collected from these three VPBs, combined with data collected from a nearby Navy VPB (RW8), will be used to determine if additional VPBs are needed in this area to support the remedial design.

The PDI activities as described will require approximately six to eight months to complete.

Preparations for Site Field Work – HDR will complete the necessary steps to initiate the drilling and sampling activities associated with this PDI. This includes assisting NYSDEC and the drilling contractor in securing the necessary permits, access, approvals, and public notifications for the work. A HDR subcontractor will pre-clear the selected drilling locations using precision utility locating equipment to clear each location for subsurface utilities and obstructions. It is expected that the NYSDEC will hand deliver drilling notices to residents near each of the proposed drilling locations.

Vertical Profile Borings – A drilling contractor (Delta Well & Pump) will be utilized to complete up to three VPBs (Figure 1) to the Raritan Clay to an estimated depth of 1,000 feet bgs. Mud rotary drilling techniques will be used to advance the borings and discrete groundwater sampling will be conducted at 20-ft intervals beginning at 600 feet bgs. The groundwater samples will be

analyzed for volatile organic compounds (VOCs) with quick-turn-around (Table 1) so the preliminary results can be used to guide the VPB drilling program. Soil cuttings recovered in the drilling mud will be logged by the onsite HDR representative, and split spoon soil samples will be collected at various depths to examine and log the aquifer materials. A select number of soil samples from within potential extraction well screen zones will be retained and turned over to the NYSDEC for future grain size analysis in the event the location is selected for an extraction well.

Other activities that will be completed as part of the VPB drilling program include:

- Upwind and downwind community air monitoring during intrusive activities.
- A HDR subcontractor will perform downhole gamma logging of each VPB to supplement the soil sampling and to assist in placement of the permanent monitoring well screens.
- A HDR subcontractor will manage, transport and dispose of IDW (drilling cuttings, drilling mud, development water).

Approximately 90 working days in the field are anticipated to drill each VPB, install the associated monitoring well, and complete the monitoring well development (described below).

Monitoring Well Installation & Sampling – Following evaluation of results from the VPB groundwater samples, HDR will instruct the drilling contractor to install a single permanent groundwater monitoring well at each of the VPB locations. Each of the three wells will be installed with the screen interval being placed at the highest toluene concentration detected in the respective VPB (for costing purposes the 3 monitoring wells are assumed to be 900 feet deep). In boreholes where a monitoring well would be installed at a shallower depth than the boring completion depth, clean sand will be used to backfill the borehole to the desired depth. Each well will be constructed with 20-feet of Schedule 120 PVC well screen (20 slot) and sufficient Schedule 120 PVC riser to reach the ground surface. The screen will be surrounded by an appropriately sized sand pack from the bottom of the borehole to approximately 20 feet above the top of the screen. A bentonite seal (10-feet) will be placed on top of the sand pack to create a seal and to prevent the grout from penetrating the sand pack. The remainder of the borehole annulus will be filled with neat cement grout. Once the monitoring wells are completed and allowed to stand for a minimum of 48 hours the well will be developed using pump and surge techniques until residual sediments are removed and the monitoring well produces water of acceptable turbidity.

HDR personnel will conduct one groundwater sampling round for the 3 new monitoring wells (Figure 1). Groundwater samples designated for VOC analysis will be collected via low-flow purge and sample collection methodology. All groundwater samples will be analyzed for VOCs, 1,4-dioxane and PFAS related compounds (Table 1). A standard turn-around time of 30 days is assumed. The HDR Standby Laboratory will conduct the laboratory analysis. A DUSR will be completed by an HDR data validation subcontractor. The groundwater sampling for the three

monitoring wells is anticipated to require one day in the field to complete and will be scheduled to be contemporaneous with the routine sampling in the area conducted by the responsible parties.

Pre-Design Document Preparation- HDR will prepare a Pre-Design Investigation Letter Report to summarize the results of data obtained from the activities described above to inform the remedial design. These data will include vertical profile boring results and logs. The previously completed permit matrix will also be included as attachments to the report. HDR will also prepare electronic data deliverables (EDDs) that conform to the NYSDEC required formats for the groundwater data obtained, EQuIS 5 will be used to create the EDDs.

NEW YORK STATE OF OPPORTUNITY
Department of Environmental Conservation

PROPOSED VERTICAL PROFILE BORING, EXTRACTION WELL AND DISCHARGE LOCATIONS

NYSDEC SITE # 130003

FIGURE 1

PATH: \\MAHPI-FILE01\ACTIVEPROJECTS\4492\10054840\7.0_GIS_MODELS\7.2_WORK_IN_PROGRESS\MAP_DOCS\DRAFT\HC05-PDI\FIGURE 1 - POTENTIAL VPBS EXTRACTION WELLS AND DISCHARGE LOCATIONS HC05.MXD - USER: CMILLS - DATE: 3/19/2021

TABLE 1 (Page 1 of 1)

ANALYTICAL SUMMARY TABLE

Grumman RD - PDI

Activity*	MATRIX	NUMBER OF SAMPLES	ANALYSIS	TAT	PROTOCOL	METHOD	Validation
Vertical Profile Borings	GW	30	TCL VOCs	48 Hours	NYSDEC ASP	8260C	Y
	GW	30	TCL VOCs	24 Hours	NYSDEC ASP	8260C	Y
Monitoring Wells	GW	3	TCL VOCs	Standard	NYSDEC ASP	8260C	Y
	GW	3	1,4- dioxane	Standard	NYSDEC ASP	8270D SIM	Y
	GW	3	PFAS NYSDEC 21 Analytes	Standard	NYSDEC ASP	537.1	Y
Investigation Derived Wastes	Water	3	TCL VOCs	1 Week	NYSDEC ASP	8260C	N
	Water	3	TCL SVOC	1 Week	NYSDEC ASP	8270C	N
	Water	3	TAL Metals	1 Week	NYSDEC ASP	6010D	N
	Water	3	pH	1 Week	NYSDEC ASP	150.1	N
	Water	3	Corrosivity	1 Week	NYSDEC ASP	1110	N
	Soils	3	TCL VOCs	1 Week	NYSDEC ASP	8260C	N
	Soils	3	TCL SVOC	1 Week	NYSDEC ASP	8270C	N
	Soils	3	TAL Metals	1 Week	NYSDEC ASP	6010D	N
	Soils	3	pH	1 Week	NYSDEC ASP	150.1	N
	Soils	3	Corrosivity	1 Week	NYSDEC ASP	1110	N
	Soils	3	Ignitablity	1 Week	NYSDEC ASP	1030	N
	Soils	3	Reactivitiy	1 Week	NYSDEC ASP	9010/9030	N

*** Attachment A provides standardized location naming and sample identification conventions**

QA/QC SUMMARY TABLE

SUBTASK		MATRIX	NUMBER OF SAMPLES	ANALYSIS	PROTOCOL	METHOD
Vertical Profile Borings						
	Equipment Blank	GW	3	TCL VOCs	NYSDEC ASP	8260C
	MS/MSD	GW	3	TCL VOCs	NYSDEC ASP	8260C
	Blind Duplicate	GW	3	TCL VOCs	NYSDEC ASP	8260C
	Trip Blank	GW	20	TCL VOCs	NYSDEC ASP	8260C
Monitoring Wells						
	Equipment Blank	GW	1	TCL VOCs, 1,4-D, PFAS	NYSDEC ASP	8260C, 8270C SIM, 537.1
	MS/MSD	GW	1	TCL VOCs, 1,4-D, PFAS	NYSDEC ASP	8260C, 8270C SIM, 537.1
	Blind duplicate	GW	1	TCL VOCs, 1,4-D, PFAS	NYSDEC ASP	8260C, 8270C SIM, 537.1
	Trip Blank	GW	1	TCL VOCs	NYSDEC ASP	8260C
Investigation Derived Wastes		Water	-	No QA/QC Samples Required	-	-
		Soils	-	No QA/QC Samples Required	-	-

Attachment A- Standardized Location Naming and Sample Identification Convention

Location Identifiers

Should be as short as possible. Field crews should cross through 0's to avoid confusion with the letter O when filling out COCs.

For this project, location identifiers must contain a site/investigation area component based on the local extraction well that the sub/secondary component is in support of (Example – PDI VPB locations or permanent monitor wells around a potential extraction well).

Examples:

DECHC05	Primary Extraction Well around which other locations have been installed.
DECHC05-VPB01	VPB in the DECHC05 PDI investigation area. VPB # increased as needed.
DECHC05-MW01D1	Monitor well with depth identifier included (D1 should be the shallowest well).
DECHC05-MW01D2	Monitor well with a second deeper depth.

Sample Identification

Sample IDs for field collected samples should always include the primary and secondary identifiers. Other components are added as needed depending on the type of sample. Each component is separated by a hyphen, otherwise extra hyphens should not be used (example: DEC-HC-05 contains 2 unwanted hyphens). Not all components are used in every ID in order to limit the length of an ID. Note the use of slashed zeroes to differentiate between O and 0.

Potential Sample ID Components

Part	Example	Description
[Primary ID]	DECHC05	Site/Investigation Area identifier.
[Secondary ID]	VPB01	VPB or MW or other location type identifier
[Media]	GW	Short matrix code – SO (soil) /GW (groundwater) /EB (equipment blank)
[Top]	080	Top depth of sampling interval (in ft bgs)
[Bottom]	082	Bottom depth of sampling interval (in ft bgs)
[Date]	20210324	Sample date in YYYYMMDD format.
[Sample Type]	0	-0 (normal) or -1 (field dup)

Examples of Sample IDs for Different Sample Types

Sample Type	Example ID	Description
VPB Groundwater	DECHC05-VPB01-GW-080-082-0	Depths in the ID make it easier to track. Since VPBs aren't repeatedly sampled, date isn't as important.
Monitor Well	DECHC05-MW02D1-20210324-0	Date needed to keep ID unique in database. Depth is included in the "D1" portion of the MW identifier.
Extraction Well	DECHC05-INF-20210324-0	Like monitor wells but include an identifier for the location of the sample from the treatment train. Examples: INF = Influent, EFF = Effluent, DEV = development water

Note: Depths should include padding zeroes for sorting and consistency reasons. If depths are expected to be 0 to 999 ft. use three digits. Use 4 if going deeper than 1,000 ft.