



April 16, 2018

Mr. Jason Pelton
New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau D, Section B
625 Broadway
Albany, New York 12233-7015

Reference: CLEAN Contract No. N62470-16-D-9008
Contract Task Order WE13

Subject: 2018 On-Property Volatile Organic Compound (VOC), 1,4-Dioxane, and Radiological
Groundwater Investigation Work Plans, Naval Weapons Industrial Reserve Plant
(NWIRP) Bethpage, New York

Dear Mr. Pelton:

On behalf of the Department of the Navy, Tetra Tech is submitting the subject documents to the New York State Department of Environmental Conservation (NYSDEC). The following are responses to NYSDEC comments dated April 10, 2018. Also attached are the revised subject Work Plans. NYSDEC comments are provided in italic type followed by the Navy's responses in bold type.

Comment #1: The On-Property VOC and 1,4-Dioxane Groundwater Investigation work plan indicates that samples collected for 1,4-dioxane will be analyzed by SW846 8270D SIM. Samples should be analyzed by a New York State Department of Health ELAP approved laboratory and the method detection limit (MDL) for 1,4-dioxane should be no higher than 0.28 ppb. I have attached Department guidance that provides information on the analytical methods and reporting requirements for emerging contaminant sampling and analysis programs.

Response: 1,4-Dioxane samples will be analyzed via method 8270D SIM by Chemtech in Mountainside, NJ, a NY ELAP approved laboratory. 8270D SIM has a method detection limit of 0.0423 ug/L.

Comment #2: The second paragraph of the Radium and Other Radiological Materials Groundwater Investigation Letter Work Plan indicates that the radium drinking water standard was exceeded. For clarification, the NYSDOH maximum contaminant level (MCL) for combined radium is not a one-time exceedance. Instead, the exceedance of the MCL occurs when a running annual average of four quarterly samples exceeds 5 pCi/l. Although combined radium concentrations have intermittently exceeded 5 pCi/l, the running average has never exceeded the MCL.

Response: The text of the Work Plan will be revised to read:

"In 2013, a water supply well at Bethpage Water District Plant 4 was reportedly shut down due to the presence of radium. This water supply well is located to the southeast of the former NWIRP Bethpage, at annual average concentrations exceeding drinking water standards. As such, groundwater investigations upgradient of this location were initiated. To evaluate the presence and distribution of radionuclides in groundwater, samples were collected between 2013 and 2017



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from various wells in the vicinity of NWIRP Bethpage and tested for radionuclides. Samples were collected by the Navy, NG, and NYSDEC from monitoring wells, public supply wells, production wells, and recovery wells.”

Comment #3: In both work plans, monitoring wells MW08D, AOC-22-MW01 and AOC-22-MW04 are included in Table 1, but are not included on Figure 2. Conversely, AOC22-MW11 and HN- 27I are included on Figure 2, but are not included in Table 1. Are these wells included as part of the sampling program? Please provide clarification.

Response: Monitoring wells HN-08D, AOC-22-MW01 and AOC-22-MW04 were added to Figure 2 and AOC22-MW11 and HN- 27I were added to Table 1.

Comment #4: In both work plans there are inconsistencies between Table 1 and Figure 2. Specifically, Table 1 identifies MW308, FW-01, and FW-02 and Figure 2 identifies MW308S, FWMW01, and FW-MW02. Please clarify if these refer to the same sampling locations.

Response: Table 1 and Figure 2 well names have been updated for consistency.

If you have any questions please contact Mr. Brian Murray, NAVFAC Mid-LANT, at Brian.S.Murray@navy.mil or (757) 341-0491.

Sincerely

A handwritten signature in blue ink, appearing to read 'D. Brayack'.

David D. Brayack, P.E.
Project Manager

Enclosure: Final 2018 Volatile Organic Compound (VOC), 1,4-Dioxane, and Radiological Groundwater Investigation Work Plans

Distribution (email only):
NYSDEC, Don Hesler
NAVFAC Mid-Atlantic, Brian Murray
NYSDOH, Steve Karpinski
NCDOH, John Lovejoy
USEPA Region II, Lorenzo Thantu
KGS, Greg Pearman
Project File

**LETTER WORK PLAN
2018 ON-PROPERTY VOC AND 1,4-DIOXANE
GROUNDWATER INVESTIGATION
FACILITY WIDE
NWIRP BETHPAGE, NEW YORK**

Introduction

The Navy is conducting an investigation to evaluate the potential release of volatile organic compounds (VOCs) and 1,4-dioxane at the facility using the existing groundwater monitoring well network at the former Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage in Nassau County, New York (Figures 1 and 2). The existing groundwater network is currently used to evaluate the release and cleanup of select VOCs, polychlorinated biphenyls (PCBs), and/or metals in groundwater resulting from operations at former NWIRP Bethpage. This letter work plan was prepared by Tetra Tech, Inc. (Tetra Tech) under the Naval Facilities Engineering Command (NAVFAC) Atlantic Comprehensive Long-Term Environmental Action Navy (CLEAN) under Contract Number N62470-16-D-9008 Task Order WE13.

NWIRP Bethpage was a Government-Owned, Contractor-Operated facility that was operated by Northrop Grumman until 1996. As a result of Northrop Grumman's decision to terminate operations at NWIRP Bethpage, the U.S. Congress passed special legislation via Public Law (PL 105-85 Sec 2852 FY-1998) that was issued as a part of the National Defense Authorization Act of 1998, authorizing conveyance of the Navy's real property at NWIRP Bethpage to Nassau County, New York for economic redevelopment.

Plant 3 was the main manufacturing plant at NWIRP Bethpage beginning in the 1940s. Production lines at Plant 3 were used for a variety of aircraft metal treatment and finishing procedures, including chemical surface preparation, electroplating, chemical milling, alodine treatment, and process inspection. Solvents used in these operations included trichloroethene (TCE), 1,1,1-trichloroethane (TCA), and tetrachloroethene. These chemicals were also used at other facilities in the area.

Select VOCs have been identified in groundwater at the former NWIRP Bethpage facility related to the use of chlorinated and non-chlorinated solvents at the facility. These VOCs are identified under the Operable Unit (OU) 1 and OU2 Record of Decisions (RODs) (Navy, 1995 and Navy, 2003), and the Public Water Supply Contingency Plan (PWSCP) (Arcadis, 2003). However, several other VOCs have been identified in off-property areas that may or may not result from former NWIRP operations (e.g., toluene and Freon 113). In addition, 1,4-dioxane has been detected in off property groundwater, including VOC-impacted groundwater associated with the former NWIRP Bethpage. 1,4-Dioxane is most notably known for its industrial use as a stabilizer in TCA. However, it is also widely used in a variety of other residential and commercial products (including dish soaps, cosmetics, shampoos, and deodorants). As a result, the 1,4-dioxane in groundwater may not be associated with industrial activities at the facility.

This current investigation targets potential new VOCs and 1,4-dioxane in groundwater at the facility. The objectives of this study are as follows:

1. Are there additional VOCs in groundwater at the facility that should be addressed by a response action?

2. Is there environmental evidence that the 1,4-dioxane identified in off-property groundwater originated at the former NWIRP Bethpage?

To address the objectives, this investigation includes groundwater sample collection from the existing monitoring well network at the former NWIRP Bethpage and surface water sample collection from a manhole in the Recharge Basin Area. The existing monitoring well network provides upgradient and downgradient locations for the eastern portion of the facility and downgradient locations for the western portion of the facility, but lacks upgradient locations for the western portion of the facility. Therefore, if contamination is detected in the western portion of the facility, the investigation may not be able to conclude whether it originated on the former NWIRP Bethpage property. Also included in the investigation is collection of water samples from the manhole near the northeast recharge basin. A continuous flow of water from Bethpage Community Park enters the manhole from the east. In addition, water from the Northrop Grumman North Campus has been observed to enter the manhole from the north. A sample will be collected from each source.

Proposed sampling locations are presented on Figure 2. The well and sample location details, nomenclature, and analyses are summarized on Table 1. Table 2 presents the project specific analyte list. The samples will be analyzed for VOCs via analytical method SW846 8260C and 1,4-dioxane via analytical method SW846 8270D SIM.

Groundwater Sampling

Groundwater samples will be collected from all the usable monitoring wells within the existing on-property network (Figure 2). Monitoring wells will be investigated approximately two weeks before the sampling event, and if a well is determined to be damaged and cannot be readily repaired, it will not be sampled. In addition, for those monitoring wells that have not be sampled in the past 8 years (see Table 1), the well screen and casing will be purged approximately 2 weeks prior to the sampling event.

A down-hole, variable speed, submersible, centrifugal pump (e.g., Monsoon) with high-density polyethylene tubing will be used for groundwater purging and collection activities. The pump will be used in combination with a continuous flow-through cell suitable for taking water quality measurements (dissolved oxygen, oxidation-reduction potential, specific conductance, pH, temperature, and turbidity). Turbidity measurements will be made using a separate field turbidity meter specifically designated to measure turbidity only. Depending on stabilization of the groundwater parameters, two to five screen volumes will be purged prior to sample collection. The groundwater monitoring wells will be analyzed as indicated on Table 1.

Surface Water Sampling

Surface water will be collected from the manhole near the northeast recharge basin (Figure 2). Samples will be collected from the influent line prior to the water blending with other sources in the manhole. One sample will be collected from Bethpage Community Park influent water and one sample will be collected from the Northop Grumman North Campus influent water, if flow is observed. If active flow from another source is identified in the manhole, it will also be sampled. Samples will be collected with a stainless steel bailer and will be analyzed as indicated on Table 1. Water quality parameters (dissolved oxygen, oxidation-reduction potential, specific conductance,

pH, temperature, and turbidity) will be collected directly from the bailer at the time of sample collection.

Quality Control Samples

Quality assurance and quality control samples will be collected for groundwater and surface water samples. Duplicate samples will be collected at 10 percent (1 per 10 samples). Matrix spike and matrix spike duplicate (MS/MSD) samples (i.e., triple volume) will be collected at a rate of 5 percent (1 per 20 samples). MS/MSDs will receive the same sample ID as the respective parent samples, and the triple volume will be noted in the field log book and on chain-of-custody form. An equipment blank will be collected once per week that samples are collected with reusable equipment.

Equipment Decontamination

Reusable sampling equipment decontamination will consist of washing using a non-phosphate detergent followed by a rinse with deionized water provided by the laboratory.

Waste Management

Aqueous investigative-derived waste (IDW) will be generated during well sampling activities. The aqueous IDW will be containerized pending waste characterization analysis. IDW will be characterized for VOCs, semivolatile organic compounds, pesticides, Target Analyte List Metals, and reactivity. Based on the results of the waste characterization, the waste will be discharged via the local industrial wastewater discharge permit or transported offsite and appropriately disposed by the IDW subcontractor.

Reporting

The data collected will be evaluated and submitted in a Preliminary Assessment/Site Inspection Report. The evaluation will be based on direct comparison to New York State Maximum Contaminant Levels and United States Environmental Protection Agency Regional Screening Levels. Pending review of analytical results and consultation with New York State Department of Environmental Conservation, a determination will be made whether additional sampling is to be conducted. Recommendations will be made on whether to proceed with additional action (e.g. another more refined round of sampling), a remedial investigation, risk assessment, or a no action decision.

REFERENECS

Arcadis, 2003. Public Water Supply Contingency Plan, NWIRP Bethpage, Bethpage New York. Melville, New York.

Navy, 1995. Record of Decision, NWIRP Bethpage, Sites 1,2,3. Bethpage, New York. May.

Navy, 2003. Record of Decision, Operable Unit 2- Groundwater, Revision 1, NWIRP Bethpage. Bethpage, New York. April.

TABLES

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Table 1: Sample Details
2018 VOC and 1,4-Dioxane Investigation
Facility Wide NWIRP Bethpage
Bethpage, New York
Page 1 of 2

Sample ID Number/Nomenclature^{1,2}	Matrix	Depth of Screened Interval (feet bgs)	Analysis³
Monitoring Well Locations			
HN-08D-2018MMDD	Groundwater	188	VOCs /1,4-Dioxane
MW301D-2018MMDD	Groundwater	210-220	VOCs /1,4-Dioxane
MW301I-2018MMDD	Groundwater	130-140	VOCs /1,4-Dioxane
MW301S-2018MMDD	Groundwater	51-61	VOCs /1,4-Dioxane
MW302D-2018MMDD	Groundwater	203-213	VOCs /1,4-Dioxane
MW302I1-2018MMDD	Groundwater	110-120	VOCs /1,4-Dioxane
MW302I2-2018MMDD	Groundwater	140-150	VOCs /1,4-Dioxane
MW302S-2018MMDD	Groundwater	41-51	VOCs /1,4-Dioxane
MW303D-2018MMDD	Groundwater	208-218	VOCs /1,4-Dioxane
MW303I1-2018MMDD	Groundwater	95-105	VOCs /1,4-Dioxane
MW303I2-2018MMDD	Groundwater	146-156	VOCs /1,4-Dioxane
MW303S-2018MMDD	Groundwater	46-56	VOCs /1,4-Dioxane
MW304D-2018MMDD	Groundwater	180-190	VOCs /1,4-Dioxane
MW304I1-2018MMDD	Groundwater	102-112	VOCs /1,4-Dioxane
MW304I2-2018MMDD	Groundwater	140-150	VOCs /1,4-Dioxane
MW304S-2018MMDD	Groundwater	43-53	VOCs /1,4-Dioxane
MW305D-2018MMDD	Groundwater	286-296	VOCs /1,4-Dioxane
MW305I-2018MMDD	Groundwater	190-200	VOCs /1,4-Dioxane
MW305S-2018MMDD	Groundwater	40-50	VOCs /1,4-Dioxane
MW306D-2018MMDD	Groundwater	284-294	VOCs /1,4-Dioxane
MW306I-2018MMDD	Groundwater	189-199	VOCs /1,4-Dioxane
MW306S-2018MMDD	Groundwater	50-60	VOCs /1,4-Dioxane
MW307D-2018MMDD	Groundwater	276-286	VOCs /1,4-Dioxane
MW307I-2018MMDD	Groundwater	188-198	VOCs /1,4-Dioxane
MW307S-2018MMDD	Groundwater	40.5-50.5	VOCs /1,4-Dioxane
MW308D-2018MMDD	Groundwater	250-260	VOCs /1,4-Dioxane
MW308I-2018MMDD	Groundwater	156-166	VOCs /1,4-Dioxane
MW308-2018MMDD	Groundwater	54-64	VOCs /1,4-Dioxane
MW309D-2018MMDD	Groundwater	252-262	VOCs /1,4-Dioxane
MW309I-2018MMDD	Groundwater	160-170	VOCs /1,4-Dioxane
MW309S-2018MMDD	Groundwater	53-63	VOCs /1,4-Dioxane
MW310S-2018MMDD	Groundwater	57.5-67.5	VOCs /1,4-Dioxane
MW311I-2018MMDD	Groundwater	160-170	VOCs /1,4-Dioxane
MW311S-2018MMDD	Groundwater	55-65	VOCs /1,4-Dioxane
MW312I-2018MMDD	Groundwater	160-170	VOCs /1,4-Dioxane
MW312S-2018MMDD	Groundwater	53-63	VOCs /1,4-Dioxane
MW313S-2018MMDD	Groundwater	53-63	VOCs /1,4-Dioxane
MW314I-2018MMDD	Groundwater	144-154	VOCs /1,4-Dioxane
MW314S-2018MMDD	Groundwater	55-65	VOCs /1,4-Dioxane
FW-MW03-2018MMDD	Groundwater	52-67	VOCs /1,4-Dioxane

Table 1: Sample Details
2018 VOC and 1,4-Dioxane Investigation
Facility Wide NWIRP Bethpage
Bethpage, New York
Page 2 of 2

Sample ID Number/Nomenclature^{1,2}	Matrix	Depth of Screened Interval (feet bgs)	Analysis³
FW-MW01-2018MMDD	Groundwater	48.5-63.5	VOCs /1,4-Dioxane
FW-MW02-2018MMDD	Groundwater	52-67	VOCs /1,4-Dioxane
HN-24IR-2018MMDD	Groundwater	148-158	VOCs /1,4-Dioxane
HN-24S-2018MMDD	Groundwater	48.6-58.6	VOCs /1,4-Dioxane
HN-27I-2018MMDD	Groundwater	100-110	VOCs/1,4-Dioxane
HN-29D-2018MMDD	Groundwater	210-220	VOCs /1,4-Dioxane
HN-29IR-2018MMDD	Groundwater	120-130	VOCs /1,4-Dioxane
AOC-22-MW01-2018MMDD	Groundwater	48-68	VOCs /1,4-Dioxane
AOC-22-MW02-2018MMDD	Groundwater	46-66	VOCs /1,4-Dioxane
AOC-22-MW03-2018MMDD	Groundwater	45.5-65.5	VOCs /1,4-Dioxane
AOC-22-MW04-2018MMDD	Groundwater	46-66	VOCs /1,4-Dioxane
AOC-22-MW05-2018MMDD	Groundwater	47-67	VOCs /1,4-Dioxane
AOC-22-MW06-2018MMDD	Groundwater	52-62	VOCs /1,4-Dioxane
AOC-22-MW07-2018MMDD	Groundwater	52-62	VOCs /1,4-Dioxane
AOC-22-MW08-2018MMDD	Groundwater	52-62	VOCs /1,4-Dioxane
AOC-22-MW09-2018MMDD	Groundwater	52-62	VOCs /1,4-Dioxane
AOC-22-MW10-2018MMDD	Groundwater	49-59	VOCs /1,4-Dioxane
AOC-22-MW11-2018MMDD	Groundwater	53-63	VOCs /1,4-Dioxane
Surface Water			
BP-MH-SW4001-XXXX-2018MMDD	Surface Water	NA	VOCs /1,4-Dioxane
BP-MH-SW4001-XXXX-2018MMDD	Surface Water	NA	VOCs/1,4-Dioxane

Notes:

Shaded rows indicate wells that were installed prior to 2010. Wells that were installed prior to 2010, and that have not been sampled since 2010 will be subjected to an extended well screen and casing purge approximately two weeks prior to sampling.

1 MMDD is the two digit month and two digit day that the sample is collected. As an example, if BPTT-MW313S is sampled on April 10, 2018, the sample nomenclature would be BPTT-MW313S-20180410.

XXXX is the direction from which the influent is flowing into the manhole. As an example, if the sample is collected on April 10, 2018 from a source entering the manhole from the north, the sample nomenclature would be BP-MH-SW4001-NORTH-20180410.

2 Locations where field duplicates will be collected will be determined in the field by the Tetra Tech FOL.

3 Water quality parameters consisting of dissolved oxygen, oxidation reduction potential, specific conductance, pH, temperature, and turbidity will be collected at each sample location.

Table 2: Analyte List
2018 On-property VOC and 1,4-dioxane Investigation
Facility-Wide, NWIRP Bethpage
Bethpage, New York
1 of 2

Analyte	CAS Number
VOCs (microgram per liter)	
Acetone	67-64-1
Acrolein	107-02-8
Acrylonitrile	107-13-1
Benzene	71-43-2
Bromobenzene	108-86-1
Bromochloromethane	74-97-5
Bromodichloromethane	75-27-4
Bromoform	75-25-2
Bromomethane	74-83-9
n-Butylbenzene	104-51-8
sec-Butylbenzene	135-98-8
tert-Butylbenzene	98-06-6
2-Butanone	78-93-3
Carbon disulfide	75-15-0
Carbon tetrachloride	56-23-5
Chlorobenzene	108-90-7
Chlorodibromomethane	124-48-1
Chloroethane	75-00-3
Chloroform	67-66-3
Chloromethane	74-87-3
2-Chlorotoluene	95-49-8
4-Chlorotoluene	106-43-4
Cyclohexane	110-82-7
1,2-Dibromo-3-Chloropropane (Dibromochloropropane)	96-12-8
1,2-Dibromoethane	106-93-4
Dibromomethane	74-95-3
1,2-Dichlorobenzene	95-50-1
1,3-Dichlorobenzene	541-73-1
1,4-Dichlorobenzene	106-46-7
Dibromochloromethane	124-48-1
trans-1,4-Dichloro-2-butene	110-57-6
Dichlorodifluoromethane	75-71-8
1,1-Dichloroethane	75-34-3
1,2-Dichloroethane	107-06-2
1,1-Dichloroethene	75-35-4
cis-1,2-Dichloroethene	156-59-2
trans-1,2-Dichloroethene	156-60-5
1,2-Dichloropropane	78-87-5
2,2-Dichloropropane	594-20-7
1,3-Dichloropropane	142-28-9
1,1-Dichloropropene	563-58-6
cis-1,3-Dichloropropene	10061-01-5

Table 2: Analyte List
2018 On-property VOC and 1,4-dioxane Investigation
Facility-Wide, NWIRP Bethpage
Bethpage, New York
2 of 2

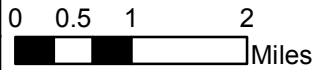
Analyte	CAS Number
trans-1,3-Dichloropropene	10061-02-6
Ethylbenzene	100-41-4
Hexachloroethane	67-72-1
Hexachlorobutadiene	87-68-3
2-Hexanone	591-78-6
Isopropylbenzene	98-82-8
p-Isopropyltoluene	99-87-8
Methyl Acetate	79-20-9
Methyl tert-butyl ether	1634-04-4
Methylcyclohexane	108-87-2
Methylene chloride	75-09-2
Methyl iodide	74-88-4
Methyl methacrylate	80-62-6
4-Methyl-2-pentanone	108-10-1
Naphthalene	91-20-3
n-Propylbenzene	103-65-1
Styrene	100-42-5
1,1,1,2-Tetrachloroethane	630-20-6
1,1,2,2-Tetrachloroethane	79-34-5
Tetrachloroethene	127-18-4
Toluene	108-88-3
1,2,4-Trichlorobenzene	120-82-1
1,2,3-Trichlorobenzene	87-61-6
1,1,1-Trichloroethane	71-55-6
1,1,2-Trichloroethane	79-00-5
Trichloroethene	79-01-6
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1
Trichlorofluoromethane	75-69-4
1,2,3-Trichloropropane	96-18-4
1,2,4-Trimethylbenzene	95-63-6
1,3,5-Trimethylbenzene	108-67-8
Vinyl chloride	75-01-4
o-Xylene	95-47-6
m+p-Xylenes	108-38-3 / 106-42-3
SVOCs (microgram per liter)	
1,4-dioxane	123-91-1

Notes:

Shaded cells indicate site specific analytes, per the PWSCP.

FIGURES

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**Former Northrop
Grumman Facility**

**Former NWIRP
Bethpage Facility**

Hempstead Tnpk

State Hwy 135

Southern State Pkwy

Sunrise Hwy

**GREAT
SOUTH BAY**

**SOUTH
OYSTER BAY**

ATLANTIC OCEAN



**GENERAL LOCATION MAP
NWIRP BETHPAGE, NEW YORK**

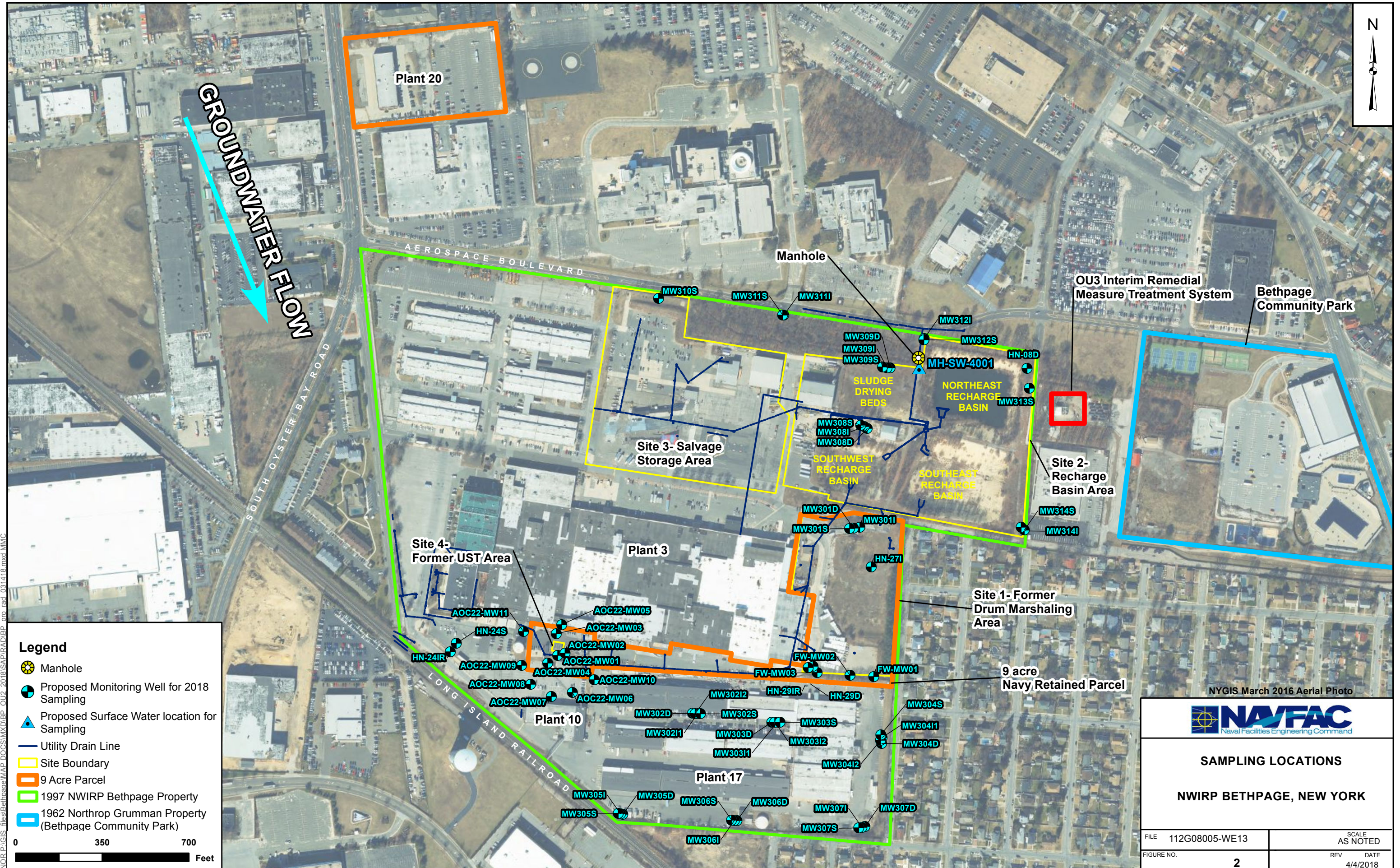
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SCALE
AS NOTED









FIGURE NO. 1

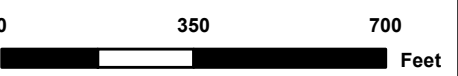
REV DATE
10/26/2017

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NOR P:\GIS_files\Bethpage\WAP_Docs\Map\BEP_OU2_2018\SA\PARAD\BEP_pro_rad_031418.mxd M/M/C

- Legend**
-  Manhole
 -  Proposed Monitoring Well for 2018 Sampling
 -  Proposed Surface Water location for Sampling
 -  Utility Drain Line
 -  Site Boundary
 -  9 Acre Parcel
 -  1997 NWIRP Bethpage Property
 -  1962 Northrop Grumman Property (Bethpage Community Park)



SAMPLING LOCATIONS
NWIRP BETHPAGE, NEW YORK

FILE	112G08005-WE13	SCALE	AS NOTED
FIGURE NO.	2	REV	DATE
			4/4/2018