Mr. Jason Pelton
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Remedial Bureau D
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Subject:
Second Quarter 2018 Progress Report
Northrop Grumman Systems Corporation
Operable Unit 2, NYSDEC Site ID # 1-30-003A,
Bethpage, New York

ENVIRONMENT

Date:
July 10, 2018

Contact:
David E. Stern
Phone:
631.391.5284
Email:
david.stern@arcadis.com

Our ref:
NY001496.22TM.LARA5

Dear Jason:

In accordance with Appendix "A", Section XIII of Administrative Order on Consent (AOC) Index # W1-118-14-12, this letter reports Operable Unit 2 (OU2) activities performed by Northrop Grumman Systems Corporation (Northrop Grumman) during the Second Quarter of 2018 (April through June 2018). Activities planned for Third Quarter of 2018 (July through September 2018) are also described.

This progress report provides data that have been received as final and/or validated from the current period that are not included in other routine reporting for OU2 (e.g., quarterly reports as specified in the Groundwater Monitoring Plan).

As this is an ongoing remediation project, Northrop Grumman has transitioned the frequency of these progress reports from monthly to quarterly. Therefore, the next report will be submitted following the close of September 2018.

## OU2 ACTIVITIES CONDUCTED DURING SECOND QUARTER 2018

### OU2 On-Site Containment (ONCT) System

- Continued Operation, Maintenance, and Monitoring (OM&M) of the OU2 ONCT system, including preparation for maintenance of South Basins and West Basins (southernmost)
- Significant shutdown instances this period are summarized below. In each instance the system was fully restored following shutdown.
    - Tower 96, of the ONCT System, was shut down for one workday in April 2018 to perform a carbon change out at the lead supplemental carbon bed
    - Tower 102, of the ONCT System, was shut down for approximately two workdays in April 2018 to perform a regenerative vapor phase carbon change out at both beds
    - Tower 102, of the ONCT System, was shut down for part of a day in June 2018 to obtain measurements for replacement duct work
    - Tower 102, of the ONCT System, was shut down for part of a day in June 2018 due to PSEGLI scheduled service to the site electrical switchgear
- Completed Second Quarter 2018 ONCT system sampling
- Data not routinely reported are provided for the current period as follows:
    - Analytical data associated with Tower 96 Effluent and monthly sampling of ONCT Tower 96 system Remedial Wells 1 and 3R are provided in Table 1. Locations of wells are shown on Figure 1.

### Regional Groundwater Monitoring & Outpost Well Monitoring

- Continued supplemental (quarterly) VOC sampling at Monitoring Wells GM-21D2, GM-33D2, GM-75D2 and GM-20D located just south of the ONCT remedial wells to monitor ONCT system hydraulic effectiveness following 2017 ONCT South Basins maintenance activities
- Completed Second Quarter 2018 routine OU2 groundwater monitoring activities (as of July 6, 2018)
- Completed water level collection from wells in Northrop Grumman's routine monitoring program
- As requested by NYSDEC (correspondence dated April 10, 2018), prepared work plan for 1,4-dioxane and Per- and Polyfluoroalkyl Substances (PFAS) sampling at select monitoring wells as a single event. The May 7, 2018 work

plan was subsequently approved by NYSDEC (correspondence dated June 8, 2018). Also prepared the wells for PFAS sampling by removing dedicated sampling equipment not compatible with PFAS sampling from the wells.

- Data not routinely reported are provided for the current period as follows:
    - Analytical data associated with discharge sample for compliance with local POTW are provided in Table 1
- Prepared and submitted First Quarter 2018 sampling event data (Form 1 packages) to NYSDEC
- Began preparation and submittal of Second Quarter 2018 sampling event data (Form 1 packages) to NYSDEC

### Northrop Grumman Cooperation with Navy

- Coordinated with Navy and completed Second Quarter 2018 sampling of additional outpost wells and plume monitoring wells. Completed water level collection from wells in Navy's routine monitoring program
- Prepared and submitted First Quarter 2018 sampling event data for Navy owned wells (Form 1 packages) to Navy for distribution
- Continued groundwater modeling support for design of Navy's IRM recovery well associated with the RE-108 off-site area

### Other

- Prepared and submitted the First Quarter 2018 OU2 Operation, Maintenance, and Monitoring Report
- Prepared and submitted the First Quarter 2018 AOC quarterly progress report

## OU2 ACTIVITIES SCHEDULED FOR THIRD QUARTER 2018

### OU2 On-Site Containment (ONCT) System

- Continue OM&M of OU2 ONCT system, including preparation and performance of maintenance of South Basins in early third quarter, dependent on weather, and performance of maintenance of the West Basins (southernmost) in early third quarter
- Conduct single event sampling for 1,4-dioxane and PFAS at select monitoring well locations, using temporary PFC-compatible sampling equipment, per NYSDEC-approved work plan

## Regional Groundwater Monitoring & Outpost Well Monitoring

- Conduct Third Quarter 2018 sampling from wells in Northrop Grumman's routine monitoring program (BPOW2 well cluster)
- Continue supplemental (quarterly) VOC sampling at Monitoring Wells GM-21D2, GM-33D2, GM-75D2 and GM-20D

## Northrop Grumman Cooperation with Navy

- Conduct Third Quarter 2018 sampling from additional outpost wells

## Other

- Prepare and submit the Second Quarter 2018 AOC quarterly progress report on July 10, 2018
- Prepare and submit the Second Quarter 2018 Annual OU2 Operation, Maintenance, and Monitoring Report on August 30, 2018

Sincerely,

Arcadis of New York, Inc.

David E. Stern
Senior Hydrogeologist/Associate Project Manager

Enclosures

Copies:
Steven Karpinski, NYSDOH
Steven Scharf – NYSDEC
Donald Hesler, NYSDEC
Andrew Guglielmi, NYSDEC
Edward J. Hannon, Northrop Grumman
Jill Palmer, Esq., Northrop Grumman
Daniel Riesel, Esq., Sive, Paget & Riesel, P.C.
Mark A. Chertok, Esq., Sive, Paget & Riesel, P.C.
Brian S. Murray, NAVFAC Mid-Atlantic Environmental
Lora Fly, NAVFAC Mid-Atlantic Environmental
Bethpage Public Library – Public Repository
Carlo San Giovanni, Arcadis
Mike Wolfert, Arcadis
File, Arcadis

# TABLES

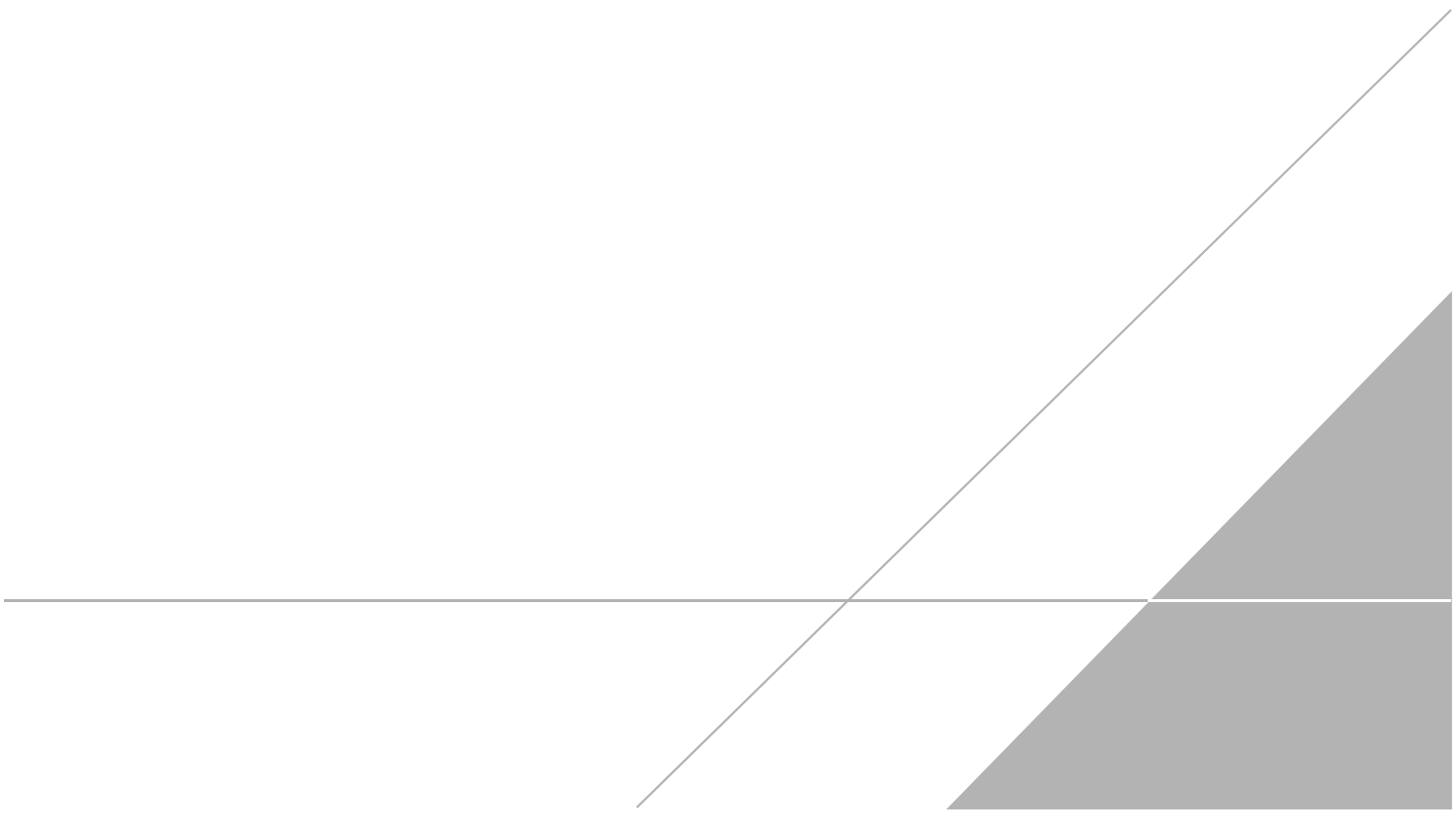

**Table 1.**
**Concentrations of Volatile Organic Compounds**
**Operable Unit 2, Northrop Grumman Systems Corporation**
**Bethpage, New York**

ARCADIS Design & Consultancy for natural and built assets

| Location ID: / Sample ID: / Constituents (units in µg/L) / Date: | DISCHARGE[2] DISCHARGE_022618 2/26/2018 | QAQC TB022618PP1 2/26/2018 | WELL 1 WELL 1_20180316 3/16/2018 | WELL 3R WELL 3R_20180316 3/16/2018 |
|---|---|---|---|---|
| **Volatile Organic Compounds** [1] | | | | |
| 1,1,1-Trichloroethane | < 1.0 | < 0.50 | **0.27 J** | **0.61** |
| 1,1,2,2-Tetrachloroethane | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| 1,1,2-trichloro-1,2,2-trifluoroethane | < 2.0 | < 1.0 | **4.2** | **3.3** |
| 1,1,2-Trichloroethane | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| 1,1-Dichloroethane | < 1.0 | < 0.50 | **0.71 J** | **1.4** |
| 1,1-Dichloroethene | < 1.0 | < 0.50 | **2.6** | **4.0** |
| 1,2-Dichloroethane | < 1.0 | < 0.50 | <1.0 | <1.0 |
| 1,2-Dichloropropane | < 1.0 | < 0.50 | **4.4** | < 1.0 |
| 2-Butanone (MEK) | < 5.0 | < 5.0 | < 10 | < 10 |
| 4-Methyl-2-Pentanone | < 5.0 | < 2.0 | < 5.0 | < 5.0 |
| Acetone | < 5.0 | < 5.0 | < 10 | < 10 |
| Benzene | < 1.0 | < 0.50 | < 0.50 | < 0.50 |
| Bromodichloromethane | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| Bromoform | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| Bromomethane | < 1.0 | < 0.50 | < 2.0 | < 2.0 |
| Carbon Disulfide | < 1.0 | < 0.50 | < 2.0 | < 2.0 |
| Carbon Tetrachloride | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| CFC-11 | < 2.0 | -- | -- | -- |
| CFC-12 | < 2.0 | -- | -- | -- |
| Chlorobenzene | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| Chlorodibromomethane | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| Chloroethane | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| Chloroform | < 1.0 | < 0.50 | **0.38** | < 0.50 |
| Chloromethane | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| cis-1,2-Dichloroethene | < 1.0 | < 0.50 | **5.2** | **3.9** |
| cis-1,3-Dichloropropene | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| Dichloromethane | < 1.0 | < 0.50 | < 2.0 | < 2.0 |
| Ethylbenzene | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| m&p-Xylenes | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| Methyl N-Butyl Ketone (2-Hexanone) | < 5.0 | < 2.0 | < 5.0 | < 5.0 |
| Methyl-tert-butylether | < 1.0 | -- | -- | -- |
| o-Xylene | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| Styrene (Monomer) | < 2.0 | < 0.50 | < 1.0 | < 1.0 |
| Tetrachloroethene | < 1.0 | < 0.50 | **20.2** | **28.8** |
| Toluene | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| trans-1,2-Dichloroethene | < 1.0 | < 0.50 | < 0.50 | < 0.50 |
| trans-1,3-Dichloropropene | < 1.0 | < 0.50 | < 1.0 | < 1.0 |
| Trichloroethene | **1.4** | < 0.50 | **545** | **337** |
| Vinyl chloride | < 1.0 | < 0.50 | < 1.0 | **2.0** |
| **Total VOCs**[3] | **1.4** | 0 | **580** | **380** |

Notes and Abbreviations on last page.

**Table 1.**
**Concentrations of Volatile Organic Compounds**
**Operable Unit 2, Northrop Grumman Systems Corporation**
**Bethpage, New York**

ARCADIS Design & Consultancy for natural and built assets

| Constituents (units in µg/L) | Location ID: / Sample ID: / Date: | 96 EFFLUENT / T96 EFFLUENT (GW) 20180316 / 3/16/2018 | QAQC / TB-03162018 / 3/16/2018 | WELL 1 / WELL 1_20180413 / 4/13/2018 | WELL 3R / WELL 3R_20180413 / 4/13/2018 |
|---|---|---|---|---|---|
| **Volatile Organic Compounds** [1] | | | | | |
| 1,1,1-Trichloroethane | | < 0.50 | < 0.50 | **0.31 J** | **0.63** |
| 1,1,2,2-Tetrachloroethane | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,1,2-trichloro-1,2,2-trifluoroethane | | < 0.50 | < 0.50 | **3.9** | **3.3** |
| 1,1,2-Trichloroethane | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| 1,1-Dichloroethane | | < 1.0 | < 1.0 | **0.77 J** | **1.4** |
| 1,1-Dichloroethene | | < 0.50 | < 0.50 | **2.7** | **4.2** |
| 1,2-Dichloroethane | | < 1.0 | < 1.0 | 0.30 J | 0.23 J |
| 1,2-Dichloropropane | | < 1.0 | < 1.0 | **4.0** | < 1.0 |
| 2-Butanone (MEK) | | < 10 | < 10 | < 10 | < 10 |
| 4-Methyl-2-Pentanone | | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Acetone | | < 10 | < 10 | < 10 | < 10 |
| Benzene | | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| Bromodichloromethane | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Bromoform | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Bromomethane | | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| Carbon Disulfide | | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| Carbon Tetrachloride | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| CFC-11 | | -- | -- | -- | -- |
| CFC-12 | | -- | -- | -- | -- |
| Chlorobenzene | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Chlorodibromomethane | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Chloroethane | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Chloroform | | < 0.50 | < 0.50 | **0.42 J** | < 0.50 |
| Chloromethane | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| cis-1,2-Dichloroethene | | < 0.50 | < 0.50 | **6.0** | **4.3** |
| cis-1,3-Dichloropropene | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Dichloromethane | | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| Ethylbenzene | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| m&p-Xylenes | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Methyl N-Butyl Ketone (2-Hexanone) | | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Methyl-tert-butylether | | -- | -- | -- | -- |
| o-Xylene | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Styrene (Monomer) | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Tetrachloroethene | | < 0.50 | < 0.50 | **21.5** | **30.0** |
| Toluene | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| trans-1,2-Dichloroethene | | < 0.50 | < 0.50 | < 0.50 | < 0.50 |
| trans-1,3-Dichloropropene | | < 1.0 | < 1.0 | < 1.0 | < 1.0 |
| Trichloroethene | | < 0.50 | < 0.50 | **575** | **313** |
| Vinyl chloride | | < 0.50 | < 0.50 | < 0.50 | **2.2** |
| **Total VOCs**[3] | | 0 | 0 | **620** | **360** |

Notes and Abbreviations on last page.

**Table 1.**
**Concentrations of Volatile Organic Compounds**
**Operable Unit 2, Northrop Grumman Systems Corporation**
**Bethpage, New York**

| Constituents (units in µg/L) | Location ID: / Sample ID: / Date: | 96 EFFLUENT[2] / T96 EFFLUENT (GW) 20180413 / 4/13/2018 | QAQC[2] / TB-04132018 / 4/13/2018 |
|---|---|---|---|
| **Volatile Organic Compounds** [1] | | | |
| 1,1,1-Trichloroethane | | < 0.50 | < 0.50 |
| 1,1,2,2-Tetrachloroethane | | < 1.0 | < 1.0 |
| 1,1,2-trichloro-1,2,2-trifluoroethane | | < 0.50 | < 0.50 |
| 1,1,2-Trichloroethane | | < 1.0 | < 1.0 |
| 1,1-Dichloroethane | | < 1.0 | < 1.0 |
| 1,1-Dichloroethene | | < 0.50 | < 0.50 |
| 1,2-Dichloroethane | | < 1.0 | < 1.0 |
| 1,2-Dichloropropane | | < 1.0 | < 1.0 |
| 2-Butanone (MEK) | | < 5.0 | < 5.0 |
| 4-Methyl-2-Pentanone | | < 5.0 | < 5.0 |
| Acetone | | < 5.0 | < 5.0 |
| Benzene | | < 1.0 | < 1.0 |
| Bromodichloromethane | | < 1.0 | < 1.0 |
| Bromoform | | < 1.0 | < 1.0 |
| Bromomethane | | < 1.0 | < 1.0 |
| Carbon Disulfide | | < 1.0 | < 1.0 |
| Carbon Tetrachloride | | < 1.0 | < 1.0 |
| CFC-11 | | -- | -- |
| CFC-12 | | -- | -- |
| Chlorobenzene | | < 1.0 | < 1.0 |
| Chlorodibromomethane | | < 1.0 | < 1.0 |
| Chloroethane | | < 1.0 | < 1.0 |
| Chloroform | | < 0.50 | < 0.50 |
| Chloromethane | | < 1.0 | < 1.0 |
| cis-1,2-Dichloroethene | | < 0.50 | < 0.50 |
| cis-1,3-Dichloropropene | | < 1.0 | < 1.0 |
| Dichloromethane | | < 0.50 | < 0.50 |
| Ethylbenzene | | < 1.0 | < 1.0 |
| m&p-Xylenes | | < 1.0 | < 1.0 |
| Methyl N-Butyl Ketone (2-Hexanone) | | < 5.0 | < 5.0 |
| Methyl-tert-butylether | | -- | -- |
| o-Xylene | | < 1.0 | < 1.0 |
| Styrene (Monomer) | | < 2.0 | < 2.0 |
| Tetrachloroethene | | < 0.50 | < 0.50 |
| Toluene | | < 1.0 | < 1.0 |
| trans-1,2-Dichloroethene | | < 0.50 | < 0.50 |
| trans-1,3-Dichloropropene | | < 1.0 | < 1.0 |
| Trichloroethene | | < 0.50 | < 0.50 |
| Vinyl chloride | | < 0.50 | < 0.50 |
| **Total VOCs**[3] | | 0 | 0 |

Notes and Abbreviations on last page.

**Table 1.**
**Concentrations of Volatile Organic Compounds**
**Operable Unit 2, Northrop Grumman Systems Corporation**
**Bethpage, New York**

**Notes and Abbreviations:**

(1) Sample analysis by VOC Method 8260C unless otherwise noted.
(2) Sample analysis by VOC Method 624.
(3) Results rounded to two significant figures.
Results validated following protocols specified in OU2 Groundwater Monitoring Plan (ARCADIS 2016), or as received as final from the laboratory as of the end of the AOC reporting period.

| | |
|---|---|
| -- | Not Analyzed |
| **4.2** | Bold value indicates a detection |
| µg/L | Micrograms per liter |
| <1.0 | Constituent not detected above its laboratory quantification limit. |
| OU2 | Operable Unit 2 |
| J | Value is estimated concentration |
| QAQC | Quality Assurance/Quality Control sample |
| TB | Trip Blank |
| VOC | Volatile Organic Compound |

# FIGURES

CITY:(Reqd) DIV/GROUP:(Reqd) DB:(Reqd) LD:(Opt) PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\NY001496\1414\GWMI4\149614141414F01.dwg LAYOUT: 1 SAVED: 3/31/2016 10:05 AM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 3/31/2016 2:50 PM BY: SANCHEZ, ADRIAN
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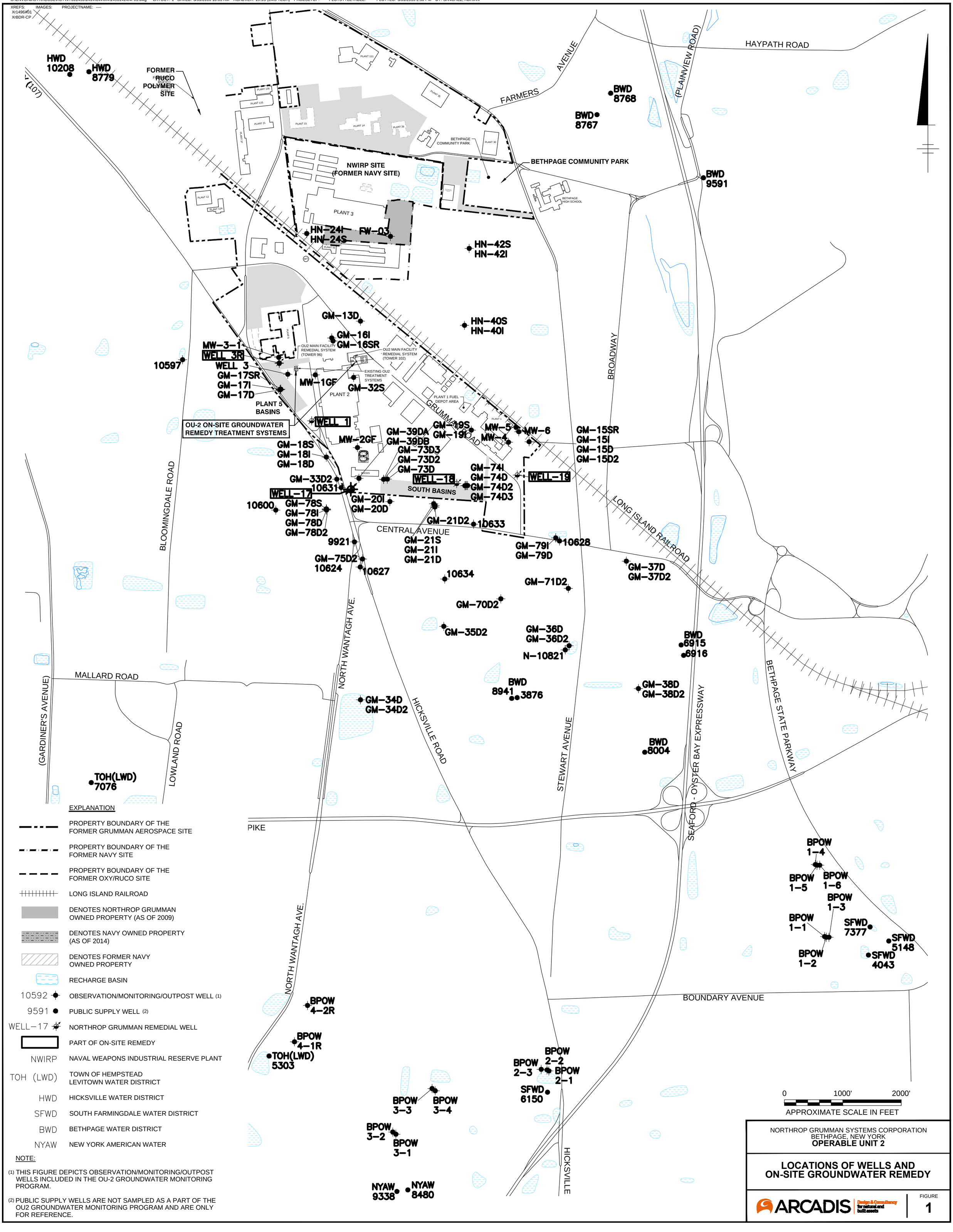
XrBDR-CP




EXPLANATION

- PROPERTY BOUNDARY OF THE FORMER GRUMMAN AEROSPACE SITE
- PROPERTY BOUNDARY OF THE FORMER NAVY SITE
- PROPERTY BOUNDARY OF THE FORMER OXY/RUCO SITE
- LONG ISLAND RAILROAD
- DENOTES NORTHROP GRUMMAN OWNED PROPERTY (AS OF 2009)
- DENOTES NAVY OWNED PROPERTY (AS OF 2014)
- DENOTES FORMER NAVY OWNED PROPERTY
- RECHARGE BASIN
- 10592 OBSERVATION/MONITORING/OUTPOST WELL (1)
- 9591 PUBLIC SUPPLY WELL (2)
- WELL-17 NORTHROP GRUMMAN REMEDIAL WELL
- PART OF ON-SITE REMEDY
- NWIRP NAVAL WEAPONS INDUSTRIAL RESERVE PLANT
- TOH (LWD) TOWN OF HEMPSTEAD LEVITOWN WATER DISTRICT
- HWD HICKSVILLE WATER DISTRICT
- SFWD SOUTH FARMINGDALE WATER DISTRICT
- BWD BETHPAGE WATER DISTRICT
- NYAW NEW YORK AMERICAN WATER

NOTE:

(1) THIS FIGURE DEPICTS OBSERVATION/MONITORING/OUTPOST WELLS INCLUDED IN THE OU-2 GROUNDWATER MONITORING PROGRAM.

(2) PUBLIC SUPPLY WELLS ARE NOT SAMPLED AS A PART OF THE OU2 GROUNDWATER MONITORING PROGRAM AND ARE ONLY FOR REFERENCE.

NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
**OPERABLE UNIT 2**

# LOCATIONS OF WELLS AND ON-SITE GROUNDWATER REMEDY

ARCADIS Design & Consultancy for natural and built assets

FIGURE 1