

# **2021 Annual Operations Report**

## **Groundwater Treatment Plant GM-38 Area Groundwater Remediation Naval Weapons Industrial Reserve Plant Bethpage, New York**

**Contract No. N40085-16-D-2288  
Contract Task Order No. 0005**

February 2022

Prepared for:



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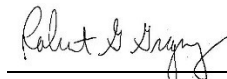


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## Acronyms and Abbreviations

%	percent
AOP	Advanced Oxidation Process
ARAR	Applicable or Relevant and Appropriate Requirement
AS	air stripper
ASE	air stripper effluent
BFE	bag filter effluent
bgs	below ground surface
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
DAR	Division of Air Resources
DCA	dichloroethane
DCE	dichloroethene
DMR	Discharge Monitoring Report
DO	dissolved oxygen
DoD	Department of Defense
DTW	depth to water
EB	equipment blank
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Accreditation Program
EQ	equalization
GOCO	Government Owned Contractor Operated
gpm	gallon per minute
GWTP	groundwater treatment plant
KGS	KOMAN Government Solutions, LLC
HMI	human-machine interface
IRP	Installation Restoration Program
L	liter
lb	pound
LGAC	liquid-phase granular activated carbon
MS/MSD	matrix spike/matrix spike duplicate
NAVFAC	Naval Facilities Engineering Systems Command
Navy	United States Department of the Navy
NELAC	National Environmental Laboratory Accreditation Conference
NG	Northrop Grumman

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NWIRP	Naval Weapons Industrial Reserve Plant
NYSDEC	New York State Department of Environmental Conservation
O&M	Operation and Maintenance
ORP	oxidation-reduction potential
OU	operable unit
PCE	tetrachloroethene
PLC	programmable logic controller
QA/QC	quality assurance/quality control
ROD	Record of Decision
RPD	relative percent difference
SC	specific conductivity
scfm	standard cubic feet per minute
SIM	selective ion monitoring
SPDES	State Pollution Discharge Elimination System
TB	trip blank
TCE	trichloroethene
TE	treated effluent
Tetra Tech	Tetra Tech, Inc.
TICs	tentatively identified compounds
TtEC	Tetra Tech EC, Inc.
TSS	total suspended solids
µg/L	micrograms per liter
USEPA	United States Environmental Protection Agency
UV	ultraviolet
VC	vinyl chloride
VFD	variable frequency drive
VGAC	vapor-phase granular activated carbon
VOC	volatile organic compound

## 1.0 INTRODUCTION

KOMAN Government Solutions, LLC (KGS) has prepared this Annual Operations Report for the GM-38 Area Groundwater Treatment Plant (GWTP) at the Naval Weapons Industrial Reserve Plant (NWIRP) in Bethpage, New York. This report has been prepared for the United States Department of the Navy (Navy), Naval Facilities Engineering Systems Command (NAVFAC), Mid-Atlantic, under Contract No. N40085-16-D-2288, Contract Task Order No. 0005. This 2021 Annual Operations Report summarizes activities that occurred during 2021, and details activities that occurred during the Fourth Quarter 2021 (October through December 2021). Data were collected and operational activities were performed by KGS in accordance with the following documents:

- *Final Operation, Maintenance & Monitoring Plan for Groundwater Treatment Plant GM-38 Area Groundwater Remediation, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by Tetra Tech EC, Inc. (TtEC) in 2010, hereafter referred to as the “O&M Manual.”
- *Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan), UFP-SAP for Operations, Maintenance, and Monitoring of the Groundwater Treatment Plant, GM-38 Area, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by TtEC in 2010.

The following quarterly reports, along with data collected during the Fourth Quarter (October through December), are used as a basis for this 2021 Annual Operations Report:

- *Quarterly Operations Report, First Quarter 2021, Groundwater Treatment Plant, GM-38 Area Groundwater Remediation, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by KGS in May 2021.
- *Quarterly Operations Report, Second Quarter 2021, Groundwater Treatment Plant, GM-38 Area Groundwater Remediation, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by KGS in October 2021.
- *Quarterly Operations Report, Third Quarter 2021, Groundwater Treatment Plant, GM-38 Area Groundwater Remediation, Naval Weapons Industrial Reserve Plant, Bethpage, New York* prepared by KGS in January 2021.

### 1.1 Background

NWIRP Bethpage is located in east central Nassau County, Long Island, New York, approximately 30 miles east of New York City (**Figure 1**) and is currently listed by New York State Department of Environmental Conservation (NYSDEC) as an “inactive hazardous waste site” (#1-30-003B). In the late 1990s, the Navy’s property totaled approximately 109.5 acres and was a Government Owned Contractor Operated (GOCO) facility that was operated by Northrop Grumman (NG) until September 1998. NWIRP Bethpage was bordered on the north, west, and south by property owned, or formerly owned, by NG that covered approximately 550 acres, and on the east by a residential neighborhood.

The GM-38 Area refers to a cluster of monitoring wells installed in the 1990s by NG. The GM-38 Area is approximately 8,500 feet south, southeast and hydraulically downgradient of NWIRP Bethpage. The GWTP is located within a utility easement with a street address of 100 Broadway, Bethpage, NY.

The “hot spot” cleanup remedy for the GM-38 Area groundwater was originally set forth in Record of Decision (ROD) documents for Operable Unit (OU) 2. Groundwater for the NG and NWIRP Sites (New York State Registry Site Numbers 1-30-003A & 1-30-003B, respectively) issued by NYSDEC Division of Environmental Remediation in March 2001 and for the NWIRP Bethpage Site by NAVFAC in April 2003 (Revision 1). The selected remedy was chosen in accordance with the New York State Environmental Conservation Law (ECL) and the Navy’s Installation Restoration Program (IRP). It is also consistent with the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended, 42 U.S.C. §§ 9601-9675.

## 1.2 GWTP Overview

Currently, groundwater is extracted from recovery wells RW-1 and RW-4. Pumping at RW-3 was suspended from July 2015 to June 2018, then again in April 2021 when the new recovery well RW-4 was brought online. All extracted groundwater is treated in the GWTP. The treatment process consists of flow equalization, air stripping and vapor-phase carbon treatment, bag filtration, and liquid-phase carbon treatment. In addition, an Advanced Oxidation Process (AOP) system has been installed at the GWTP and is intended to remove residual concentrations of 1,4-dioxane from the GWTP effluent prior to discharge. The AOP commissioning process began in April 2021.

The GWTP was originally equipped with a pH adjustment system utilizing sodium hydroxide; however, it was subsequently determined that pH adjustment is not necessary. The equipment has been taken off-line and sodium hydroxide sent off site for beneficial reuse. A process flow diagram is presented as **Figure 2**. The treated water is either re-injected into injection well IW-1 or discharged into the Nassau County Recharge Basin #495. Under CERCLA, the Navy is required to meet the effluent requirement in the NYSDEC State Pollution Discharge Elimination System (SPDES) Permit Equivalent Application as an Applicable or Relevant and Appropriate Requirement (ARAR).

The GWTP was designed to operate at an average flow rate of 1,100 gallons per minute (gpm), as measured by the average discharge flow rate. It was determined that this flow rate would be optimal with respect to effective containment of the higher concentration of contamination in the GM-38 Area groundwater. During the current reporting period, both the AOP system and recovery well RW-4 have been online full time but at a reduced capacity while operations continue to be evaluated. RW-1 has been operating at approximately 700 gpm and RW-4 has been operating at approximately 200 gpm.

Volatile Organic Compounds (VOCs) in the influent groundwater consist of trichloroethene (TCE), tetrachloroethene (PCE), vinyl chloride (VC), cis-1,2-dichloroethene (DCE), 1,2-dichloroethane (DCA), benzene, toluene, total xylenes, and 1,4-dioxane.

The air stripper (AS) is a structural aluminum tower that is packed with 3.5-inch diameter polypropylene Jaeger Tripack. Groundwater is pumped to the AS distribution port and sprayed over the column of Jaeger Tripack at a design flow rate of approximately 1,100 gpm. Previously, 100 gpm of recirculated water was also rerouted through the AS, but as of October 2010, recirculation was no longer deemed necessary to the operation of the system. An induced draft countercurrent flow of air enters the AS below the base of the



packing material at a rate of 8,000 standard cubic feet per minute (scfm). The large surface area of the packing material allows for a mass transfer of the VOCs from the groundwater into the air stream. The VOCs in the off-gas, except for VC, are removed via two 20,000-pound (lb) vapor phase granular activated carbon (VGAC) units (VGAC-1 and VGAC-2). VC is oxidized into potassium chloride and carbon dioxide via treatment in a 20,000-lb vessel (VGAC-3) containing zeolite impregnated with potassium permanganate. The potassium chloride remains in the pore structure of the zeolite substrate. The treated off-gas is discharged from the stack.

Water treated by the AS is subsequently processed through the AOP unit, followed by processing through three 8,000-lb liquid phase granular activated carbon (LGAC) units in parallel prior to discharge in the recovery basin (or injection well, if necessary).

The GWTP is controlled by a programmable logic controller (PLC)-based digital and analog control system, with instrumentation that monitors pH, pressure, tank level, flow and differential pressure transmitters, water level in recovery wells, and motor operational status. The information in the PLC is made available to an operator via a human-machine interface (HMI) program. By using this program, the status of the GWTP can be displayed in real time and adjusted, if necessary, by the operator. The AOP unit has a standalone PLC to control its internal functions. The GWTP and AOP control systems are interlocked such that shut down of the AOP unit will result in shut down of the GWTP, and vice versa, to ensure that effluent is fully treated prior to discharge.

A 2014 evaluation of the GM-38 Area, conducted in order to better determine the capture zone of the recovery wells, recommended that use of recovery well RW-3 be discontinued (“*Capture Zone Evaluation and Path Forward, GM-38 Area Groundwater Treatment Plant*” [Tetra Tech, Inc. [Tetra Tech], 2014]). The report was sent to NYSDEC in March 2014 and recommended ceasing operation of recovery well RW-3 and increasing the pumping rate of recovery well RW-1. These system modifications would maintain the existing GWTP pumping rate of 1,000 to 1,100 gpm while maintaining the desired capture zone of the GWTP (Tetra Tech, 2014). NYSDEC concurred with the implementation of this path forward and associated system modifications on 20 April 2015. On 1 July 2015, in accordance with the approved path forward, recovery well RW-3 was taken off-line. The flowrate of recovery well RW-1 was increased from approximately 800 gpm to approximately 1,000 gpm. Pumping at RW-3 was once again resumed in June 2018 to address persistent VOC concentrations at this well. Pumping at RW-3 was suspended in April 2021 to facilitate startup and integration of RW-4 into the system.

## 2.0 GWTP OPERATIONS AND MAINTENANCE

While designed to run autonomously, the GWTP requires regular visits by an operator to record and adjust operational parameters and to perform scheduled maintenance. The GWTP is equipped with telemetry that will alert an on-call operator in the event of a plant shutdown.

### 2.1 Routine Maintenance Activities

Routine maintenance activities at the GWTP were performed during the operator's visits. These activities include general site inspections, collection of operational data (water and vapor flowrates, differential pressures across the AS, carbon units, bag filter units and blower discharge pressures, tank levels and totalizer readings), measurement of water levels in the recovery wells, adjustment of pump signal settings, collection of vapor and process water samples, changing out of bag filters, switching of lead/lag pump assignments, and preventive maintenance of system equipment.

In addition, the following maintenance tasks were also performed during 2021:

- 20 March – Operator backwashed LGAC-1 and LGAC-2. Plant offline for 2.5 hours.
- 1 June - Operator backwashed LGAC-1, LGAC-2, and LGAC-3. Plant offline for 5 hours.
- 28 October - Operator backwashed LGAC-1 and LGAC-3. Plant offline for 3 hours.

### 2.2 Non-routine Maintenance / Site Activities

During previous routine maintenance tasks at GWTP, the operator observed that both LGAC backwashing and bag filter changes were required more frequently than usual to maintain the desired process flowrate. In addition, the backwash water from the LGACs in the plant sump was increasingly turbid. Following pumping of the water to the equalization (EQ) tank, a light gray coating was observed on the walls of the sump and on the sump pump and associated piping. In addition, the operation of the sump pump was compromised by the accumulation of solids from the backwash water. Collection and investigation of solids from the floor of the sump identified dark gray clay-sized material that dried and hardened to a light gray solid. Chemical analysis of the solid identified inorganics and elements typical of clay materials. This material was presumed to be accumulating within the LGAC vessels resulting in the required increase in backwash frequency and damage to the sump pump. Discussions between Navy and the project team resulted in a phased approach to determine if one or both of the active recovery wells (RW-1 and RW-3) was the source of the solids observed in the plant influent as discussed below. Following investigative activities in the Fourth Quarter of 2020, it was determined that RW-1 was the apparent source of the solids. RW-1 was rehabilitated and re-developed and a new pump installed in the Fourth Quarter 2020. Pumping rates for RW-1 were increased sequentially while the frequency of bag filter changeouts was assessed. It was determined that a pumping rate within the range of 650-700 gpm could be sustained while not exceeding the typical bag filter changeout frequency of one changeout per week. The flow from RW-1 will continue to be assessed.

During the Fourth Quarter 2021, efforts continued, under separate contract, to integrate the AOP into the existing treatment system. Operational issues related to low flow alarms from the hydrogen peroxide feed line and inconsistent function of the ultraviolet (UV) light transmittance monitor persisted through the

reporting period. Intermittent plant shutdowns associated with the low flow alarms in the AOP unit resulted in surging of flow from RW-4 that caused an additional brown-colored sediment load in the plant influent. It is unclear whether the source of the sediment is from RW-4 itself or possibly from the pipeline to the GWTP. The source of the additional sediment load is currently under investigation by others under a separate contract. The frequency of bag filter changes resulting from this additional sediment load has increased and has varied from once a day to once every four days during the current reporting period.

Various non-routine maintenance tasks associated with adjustments to the AOP unit and startup of RW-4 in 2021 were performed. Recording and reporting of these tasks specific to AOP unit itself are being conducted by others under a separate contract and are not itemized in this report. AOP related events that impacted operation of the GWTP are listed in the following text.

The following non-routine activities occurred at the GWTP during 2021:

- 4 January – RW-3 was taken offline for the RW-4 tie-in.
- 5 January – Plant was offline for approximately 8 hours to integrate the AOP system.
- 9 February – Plant was offline for approximately 99 hours following shutdown after a high air pressure alarm was triggered in the duct of the vapor treatment system. This was caused by a faulty damper which inadvertently closed causing a high air pressure condition. This also resulted in a broken weld on the duct at the exhaust of the AS tower resulting in a breach of the duct. Repairs to the duct were made to correct the broken weld. VOCs potentially discharged to the atmosphere prior to plant shutdown, assuming a maximum discharge time of 10 minutes, were estimated to be 0.0063 pounds of total VOCs.
- 13 February – Plant returned to service.
- 16 February – Plant offline for approximately 2 hours for subsequent repairs (cracked welds) to the vapor treatment system.
- 25 February – Plant offline for approximately 1.5 hours because of high differential pressure in the bag filter system after testing well RW-4.
- 27 February – Plant offline for approximately 13 hours because of high differential pressure in the bag filter system related to solids from the RW-4 pipeline.
- 10 March – Plant offline for approximately 8.5 hours for AOP integration
- 24 March – Plant offline for approximately 8.5 hours to flush the pipeline from RW-4.
- 1 April – RW-3 taken offline and the valves were realigned to integrate well RW-4.
- 2 April – RW-4 experienced issues with the variable frequency drive (VFD).
- 7 April – AOP system online; intermittent PLC and VFD issues.
- 12 April – AOP integration contractor personnel onsite to support AOP system commissioning. Plant offline for approximately 2 hours to facilitate AOP piping/valve work.
- 13 April - Plant is offline for approximately 5 hours for additional AOP piping/valve work.

- 19 April – Power failure at the primary GWTP circuit breaker, plant offline for 12 hours.
- 21 April – Work on AOP piping/AS by-pass line, plant offline for 5 hours.
- 12 May – AOP support contractor onsite to update RW-4 communications with the GWTP PLC.
- 13 May – Plant offline for 22 hours as the result of low UV transmittance alarms from AOP system.
- 25 May – AOP support contractor onsite to reprogram the UV transmittance alarms. A portion of fence at the GM-38 infiltration basin was found to be down; subsequently repaired. A new lock (unidentified non-Navy contractor) added to the gate at the basin.
- 30 May – Operator reset the VFD for RW-4.
- 2 June – RW-4 support contractor onsite to update communication between RW-4 and the GWTP PLC; well offline for 4 hours.
- 5 June - AOP/PLC lost communication; GWTP offline for 1 hour during system reset.
- 22 June – AOP support contractor onsite for additional assessment of continuing low AOP UV transmittance issues.
- 9 July - Power outage caused by severe weather, system down for 9 hours.
- 12 July - Plant offline from 07/09 until 07/11; issues with AOP unit hydrogen peroxide pump system.
- 22 July - System down for 4 hours; issues with AOP unit hydrogen peroxide pump system.
- 26 July - Power outage caused by severe weather, system down for 3.5 hours.
- 28 July - Plant offline 07/27 2000 to 07/28 0500 (7 hours); issues with AOP unit hydrogen peroxide pump system.
- 29 July - RW-4 offline (communication loss) 07/28 1945 to 07/29 0500 (9.25 hours); AOP unit hydrogen peroxide pump issues at 0135 hours; plant off line 0135 to 0500 (3.42 hours). RW-4 continued to periodically lose communication throughout the day.
- 31 July - RW-4 offline 07/31 1900 to 08/01 0400 (9 hours); communication loss.
- 3 August - RW-4 offline (3 hours); communication loss. Plant offline for one hour – AOP system hydrogen peroxide pump issues.
- 5 August – Heavy sediment load noted in bag filters.
- 6 August - RW-4 consistently online, turbidity decreased 32.3 NTU (08/02) to 2.02 NTU (08/06).
- 10 August - Plant offline for 1.5 hours to backwash LGACs #1 and #2.
- 11 August - Plant offline for 8 hours - AOP system hydrogen peroxide pump issues.
- 12 August - Operator backwashed the plant sump, following backwashing of LGAC #1 and #2.
- 14 August - Operator emptied the plant sump.
- 17 August - Plant offline for 7.5 hours - AOP system hydrogen peroxide pump issues.

- 18 August - Plant offline for 1 hour - AOP system hydrogen peroxide pump issues.
- 19 August - Plant offline for 2 hours – AOP contractor working on hydrogen peroxide pumps.
- 21 August - RW-4 offline from 1140 to 1210; communication loss.
- 23 August - Plant offline for 24 hours – Potential Tropical Storm Henri impacts to basin water level.
- 24 August - Plant/AOP offline for 1.5 hours – AOP contractor working on the unit.
- 30 August - Plant offline for 3.5 hours - AOP system hydrogen peroxide pump issues.
- 2 September - Plant offline for 8 hours – power failure from passing storm.
- 3 September - RW-4 communication loses throughout the day.
- 6 September - RW-4 communication loss.
- 10 September - Plant offline for 2 hours – Electrician disconnecting contractor office trailer.
- 1 October – Plant offline for 1 hour – AOP system hydrogen peroxide pump issues.
- 2 October 2021 – Plant offline for 18 hours - AOP system hydrogen peroxide pump issues.
- 5 October – Plant offline for 0.5 hours - AOP system hydrogen peroxide pump issues.
- 27 October – Plant offline for 2.4 hours - AOP system hydrogen peroxide probe removed.
- 18 November – Plant offline for 41.7 hours – LGAC changeout.
- 26 November – RW-4 communication lost.
- 6 December – Operator set RW-4 to 200 gpm.
- 10 December – Plant offline for 62.9 hours – power failure from passing storm.

### 3.0 GWTP MONITORING

The objective of the GWTP is to remove contaminant mass and reduce elevated VOC levels to levels similar to those in the surrounding aquifer. It is anticipated that GWTP operation will minimize contaminant impacts on water supply wells and currently unaffected portions of the groundwater aquifer. The GWTP is not intended to remediate groundwater contamination in the local aquifer to non-detectable levels (TtEC, 2010). Various process samples (water and vapor) are collected on a monthly basis to monitor GWTP efficiency and to ensure compliance with Federal and State effluent discharge and air emission requirements. In addition, groundwater samples are collected semi-annually to monitor water quality and determine the effectiveness of the remediation activities and monitor the hydraulic containment and capture of impacted groundwater by the recovery wells.

#### 3.1 Process Water Quality Monitoring

Processed groundwater is analyzed to comply with calculations submitted by the Navy and documented in the NYSDEC SPDES Equivalent Application for applicable effluent limitations and monitoring requirements. These results are also submitted to NYSDEC on a monthly basis in the form of a Discharge Monitoring Report (DMR). A copy of the current NYSDEC effluent limitations, monitoring constituents, and the reporting forms are included in **Appendix A**.

Monthly aqueous samples are collected from the active recovery wells (RW-1 and RW-4), and the treated effluent (TE) discharge line. In addition, various intermediary process system samples are collected monthly, consisting of air stripper effluent (ASE), bag filter effluent (BFE), and effluent samples (LC1, LC2, and LC3) of each of the three LGAC units.

##### 3.1.1 Fourth Quarter 2021 Summary

The analytical results of monthly process water samples collected during the Fourth Quarter are presented in **Table 1**. The data demonstrate that all permitted constituents were in compliance with regulatory requirements. **Table 1** also summarizes the average monthly flowrates along with the total volume of water processed during each month of the Fourth Quarter. Current effluent limitations and monitoring requirements, and monthly DMRs for the Fourth Quarter (October – December 2021) are included in **Appendix A**. DMRs for January – September 2021 are included in previously submitted quarterly operation reports, as outlined in Section 1.0.

In addition to the monitoring requirements outlined in **Appendix A**, the Navy is conducting monthly sampling and analysis of groundwater from recovery wells RW-1 and RW-4, as well as the plant effluent, for 1,4-dioxane, using United States Environmental Protection Agency (USEPA) Method 8270D Selective Ion Monitoring (SIM). Analytical results for 1,4-dioxane by Method 8270D SIM are also provided in **Table 1**.

### 3.1.2 2021 Annual Summary

#### Flow Totals

Annual flow volumes and system operation for 2021 are summarized in **Table 2**. The total volume of groundwater treated in 2021, based on effluent flow totals, was 413,704,255 gallons. During 2021, GM-38 operated with an average uptime of 94% at an average effluent flowrate of 841 gpm.

#### Mass Removal

Mass removal was calculated based on monthly influent concentrations combined with monthly influent flow totals. During 2021, approximately 488.4 lbs of VOCs were removed by the GWTP, for an average monthly mass removal rate of approximately 40.7 lbs per month. Mass removal calculations are presented in **Table 3**.

### 3.2 Air Quality Monitoring

Treated off-gas discharged at the stack of the GWTP is subject to emissions limitations. Original discharge goals were derived from calculations submitted by the Navy and approved by the NYSDEC Division of Air Resources (DAR) in July 2009. In November 2011, the Navy submitted an evaluation proposing revised discharge goals, which NYSDEC approved in October 2013. A copy of this documentation is included as **Appendix B**.

#### 3.2.1 Fourth Quarter 2021 Summary

Sampling of the stack emissions is required for NYSDEC compliance; however, process vapor samples are also collected using 6-liter (L) summa canisters at various locations to monitor for breakthrough of the VGAC units. The analytical results of monthly influent and effluent vapor samples as well as midfluent samples (VC12 and VC23) collected during the Fourth Quarter are presented in **Table 4**. Air emissions calculations using the stack vapor concentrations along with discharge flowrates are presented in **Table 5**. The calculations demonstrate that all constituents were within the regulatory requirements during the Fourth Quarter, based on the calculated emission rates.

#### 3.2.2 2021 Annual Summary

**Table 6** summarizes annual air emissions based on monthly emissions during the 12-month period. During 2021, total air emissions of permitted constituents consisted of 0.38 lbs of TCE, 0.06 lbs of VC, 6.45 lbs of 1,2-DCE, and 0.14 lbs of PCE, well below the discharge goals approved by NYSDEC in October 2013.

### 3.3 Groundwater Quality Monitoring

The groundwater monitoring well system at the GM-38 Groundwater Remediation Area consists of 14 monitoring wells, four recovery wells (RW-1, RW-2, RW-3, RW-4) and one injection well (IW-1). Well locations are depicted on **Figure 3**. Recovery well RW-4, brought on-line in April 2021, is located approximately one mile to the west of the GWTP (**Figure 4**). Although RW-2 was installed in 2005, a pump was never installed in this well and the well is not operated as a recovery well in response to concerns expressed by the Bethpage Water District. As mentioned in Section 1.2, pumping at RW-3 was

suspended between July 2015 and June 2018. RW-3 was reactivated on 1 June 2018 to address persistent VOC concentrations at this location and was subsequently replaced with Well RW-4 in April 2021. Well RW-1 was offline during the months of October and November 2020 as a result of a rehabilitation and redevelopment effort conducted at that time. Groundwater level measurements were collected from the current groundwater monitoring well system on 17 December 2021 and are summarized in **Table 7**.

Depth to water (DTW) measurements are collected from 12 of the monitoring wells on a quarterly basis. Prior to 2014, water quality samples were collected from eight of the monitoring wells on a quarterly basis; beginning in 2014, the sample collection frequency was reduced to semi-annually, with sample collection generally in the March (annual/First Quarter) and September (semi-annual/Third Quarter) timeframes. The monitoring network includes well clusters located near the recovery wells RW-1 and RW-3 and injection well IW-1 as described below and as shown on **Figure 3**. Two additional wells, GM-38D and GM-38D2, located at the corner of Arthur Avenue and Broadway, are monitored by others.

Semi-annual groundwater samples for 2021 were collected from eight monitoring wells (RW1-MW1, RW1-MW3, RW2-MW1, RW3-MW1, RW3-MW2, RW3-MW3, RW3-MW4, and TP-01) and from two recovery wells (RW-1 and RW-4). Samples are collected from monitoring wells using bladder pumps in accordance with USEPA low-flow sampling methodologies. Samples were collected from recovery wells RW-1 and RW-4 using the dedicated extraction pump as it is normally done during routine O&M sampling. Results of the groundwater sampling for the Fourth Quarter are presented in Section 3.3.1 below. Descriptions of monitoring well locations are as follows:

#### Recovery Well 1 (RW-1) Monitoring Wells

The RW-1 cluster consists of three monitoring wells screened between 395 and 435 feet below ground surface (bgs). RW1-MW1 is located approximately 140 feet northwest of RW-1 and RW1-MW2 is located approximately 50 feet north of RW-1. RW1-MW3 is located approximately 400 feet northeast of RW-1, on the eastern side of Seaford Oyster Bay Expressway. All three wells are hydraulically monitored while only RW1-MW1 and RW1-MW3 are also monitored for water quality.

#### Recovery Well 2 (RW-2) Monitoring Wells

The RW-2 cluster consists of three monitoring wells screened between 470 and 510 feet bgs. RW2-MW1 is located approximately 60 feet northwest of RW-2, RW2-MW2 is located approximately 20 feet west of RW-2, and RW2-MW3 is located approximately 100 feet west of RW-2. All three wells are hydraulically monitored while only RW2-MW1 is monitored for water quality.

#### Recovery Well 3 (RW-3) Monitoring Wells

The RW-3 cluster consists of four monitoring wells. RW3-MW2 and RW3-MW4 are screened between 475 and 495 feet bgs. RW3-MW1 and RW3-MW3 are screened between 330 and 350 feet bgs and 320 and 340 feet bgs, respectively. RW3-MW1 and RW3-MW2 are located approximately 500 feet west of the GM-38 cluster, at the intersection of Arthur Avenue and Leroy Avenue. RW3-MW3 and RW3-MW4 are located approximately 400 feet north of the intersection of Arthur Avenue and Broadway. All four wells are both hydraulically monitored and monitored for water quality.

#### TP-01



TP-01 is screened between 450 and 470 feet bgs and is located approximately 25 feet north of the GWTP building, inside the fenced area. It is hydraulically monitored to observe the change in water levels associated with the influence from the pumping rates at the neighboring public water supply well field adjacent to the hot spot area and is also monitored for water quality.

#### Injection Well 1 (IW-1) Monitoring Well

There is one monitoring well associated with injection well IW-1. IW1-MW1 is screened between 20 and 150 feet bgs, is located approximately 20 feet south of IW-1 and is only hydraulically monitored on a quarterly basis.

### 3.3.1 Groundwater Quality Results

Groundwater samples were collected monthly from recovery well RW-1 and RW-4 throughout the Fourth Quarter 2021. Analytical results are summarized in **Table 1** and shown on **Figure 5a**.

Quarterly groundwater level monitoring of the 12 monitoring wells was performed on 17 December 2021. Results are summarized in **Table 7**. A copy of the field log is included in **Appendix C**.

### 3.3.2 Groundwater Concentration Trends

Historical groundwater analytical results through the Fourth Quarter are presented in **Table 8**. As previously mentioned, no monitoring wells were sampled in the Fourth Quarter, as sampling occurs on a semi-annual basis. Groundwater analytical results of select VOCs (cis-1,2-DCE, PCE, TCE, and VC) for the 2021 monitoring events (11 March and 28-29 September) are presented on **Figure 5b**.

Additionally, concentration trends of select VOCs (cis-1,2-DCE, TCE, PCE, and VC) for RW-1 and RW-4 and the eight monitoring wells sampled during the 2021 semi-annual monitoring events are presented on **Figures 6 through 16** and discussed below.

**Figure 6** presents concentrations measured at recovery well RW-1. No samples were collected from RW-1 in October and November 2020 because of the rehabilitation and redevelopment of the well, and the replacement of the pump conducted during that time period. TCE concentrations have decreased from initial concentrations in early 2010 [747 micrograms per liter ( $\mu\text{g/L}$ ) measured in April 2010], remaining below 300  $\mu\text{g/L}$  since the latter half of 2012, decreasing to a minimum concentration of 49.3  $\mu\text{g/L}$  in September 2021. TCE concentrations remained stable in 2021 ranging between the historical minimum concentration of 49.3  $\mu\text{g/L}$  in September 2021 to 64.2  $\mu\text{g/L}$  in October 2021. Concentrations of cis-1,2-DCE have followed a similar trend, decreasing from a maximum of 160  $\mu\text{g/L}$  in February 2010 to a minimum concentration of 3.23  $\mu\text{g/L}$  in August 2020 and again in September 2021 and have remained below 5.0  $\mu\text{g/L}$  since February 2019. PCE concentrations have also exhibited a decreasing trend over time, with concentrations decreasing from 180  $\mu\text{g/L}$  in February 2010 to a minimum of 14.5  $\mu\text{g/L}$  in July 2021 and have remained below 20  $\mu\text{g/L}$  since April 2020. Concentrations of VC have decreased below initial concentrations in 2010. After reaching a maximum concentration of 61  $\mu\text{g/L}$  in February 2010, VC concentrations have remained below 5.0  $\mu\text{g/L}$  since the final quarter of 2011 and below 1.0  $\mu\text{g/L}$  since June 2013. VC concentrations in the current reporting period were not detected.

**Figure 7** and **Figure 8** present concentrations measured at recovery well RW-4. Well RW-4 was brought online in place of well RW-3 in April 2021, although during the initial weeks pumping was intermittent. Sampling of the well was initiated in May 2021 following stabilization of the pumping rate via the wireless communication with the plant. Measured TCE concentrations in 2021 ranged from a minimum of 331 µg/L in August to a maximum of 708 µg/L in October. Measured PCE concentrations in 2021 ranged from a minimum of 2.75 µg/L in August to a maximum of 6.97 µg/L in October. Measured cis-1,2-DCE concentrations ranged from non-detect in June, July, and December to a maximum of 1.90 µg/L in August.

**Figure 9** presents concentrations measured at RW1-MW1. TCE concentrations have varied widely since the initial sampling in May 2005 (53.6 µg/L). The concentration of TCE in September 2021 (86.2 µg/L) was higher than the concentration reported in May 2005, but less than the maximum concentration observed in September 2013 (175 µg/L). Concentrations of cis-1,2-DCE have remained consistently below 5.0 µg/L since September 2018 until September 2021, when a slightly increased concentration of 7.06 µg/L was measured; this concentration is well below the initial concentration observed in May 2005 (78.6 µg/L). PCE concentrations have remained consistently below 1.0 µg/L; PCE was not detected in September 2021. VC has not been detected since the September 2011 sampling event.

**Figure 10** presents concentrations measured at RW1-MW3. TCE concentrations have consistently remained below 5.0 µg/L since monitoring was initiated in January 2010; TCE was not detected in September 2021. Concentrations of cis-1,2-DCE and PCE have consistently remained below 1.0 µg/L since January 2010. VC has not been detected during any sampling event.

**Figure 11** presents concentrations measured at RW2-MW1. TCE concentrations have varied since the initial sampling in May 2005 (37.6 µg/L). TCE was not detected in September 2021. The concentration of cis-1,2-DCE measured in September 2021 (3.77 µg/L) was above the initial concentration observed in May 2005 (non-detect) but below the maximum concentration observed in the March 2016 (15.3 µg/L). PCE has not been detected during any sampling events.

**Figure 12** presents concentrations measured at RW3-MW1. TCE concentrations have decreased since reaching a maximum in November 2010 (77.6 µg/L). The TCE concentration in September 2021 (21.6 µg/L) was also below the initial concentration observed in January 2010 (35.0 µg/L). Cis-1,2-DCE has not been detected since September 2014. PCE concentrations have remained consistently near or below 2.0 µg/L since May 2005, with a concentration of 2.50 µg/L measured in October 2020, equal to the previous maximum in March 2016. The measured concentration of PCE in September 2021 was 1.91 µg/L.

**Figure 13** presents concentrations measured at RW3-MW2. The TCE concentration observed in September 2021 (89.8 µg/L) was below the initial concentration observed in January 2010 (160 µg/L), below the maximum concentration observed in April 2010 (211 µg/L), and represents the minimum value measured since June 2012. A steadily decreasing trend in the measured concentration of TCE from 131 µg/L (September 2019) to 89.8 µg/L in September 2021 is noted. Concentrations of cis-1,2-DCE at this location have consistently remained below 2.0 µg/L. PCE has been detected at this location at trace levels

throughout most of the period of record, with concentrations ranging from 0.28 J  $\mu\text{g/L}$  in August 2012 to 0.66 J  $\mu\text{g/L}$  in March 2016.

**Figure 14** presents concentrations measured at RW3-MW3. TCE concentrations have decreased since the maximum concentration was observed in June 2013 (410  $\mu\text{g/L}$ ). The TCE concentration observed in September 2021 (176  $\mu\text{g/L}$ ) was well below both the initial concentration observed in January 2010 (350  $\mu\text{g/L}$ ) and the maximum concentration measured in June 2013. Concentrations of cis-1,2-DCE have remained near or below 2.0  $\mu\text{g/L}$  since March 2012. PCE has remained below 1.0  $\mu\text{g/L}$  for all events.

**Figure 15** presents concentrations measured at RW3-MW4. TCE concentrations have decreased since the initial sampling event in January 2010 (21  $\mu\text{g/L}$ ), with a non-detect concentration in September 2021. PCE was detected for the first time in September 2015 at a concentration of 0.31 J  $\mu\text{g/L}$  but has not been detected since the March 2016 sampling event. Cis-1,2-DCE has been detected infrequently since the initial sampling event in January 2010 (0.46  $\mu\text{g/L}$ ), and was detected in September 2021 at an estimated concentration of 0.304 J  $\mu\text{g/L}$ .

**Figure 16** presents concentrations measured at TP-01. TCE concentrations have steadily decreased since the initial sampling event in January 2010. The TCE concentration observed in September 2021 (13.0  $\mu\text{g/L}$ ) was well below the initial and maximum concentration observed in January 2010 (65  $\mu\text{g/L}$ ). Concentrations of cis-1,2-DCE have generally decreased from an initial value of 190  $\mu\text{g/L}$  in January 2010 to the current concentration measured in September 2021 (2.51 J  $\mu\text{g/L}$ ). PCE has remained below 1.0  $\mu\text{g/L}$  since September 2013 and had not been detected since March 2017 until a detection of 0.680 J  $\mu\text{g/L}$  in March 2021 and the most current measurement of 1.21 J  $\mu\text{g/L}$  in September 2021.

#### **4.0 CONCLUSIONS AND RECOMMENDATIONS**

The objective of the groundwater treatment system at GM-38 is to remove contaminant mass and reduce elevated VOC concentrations to levels similar to those in the surrounding aquifer, and in doing so minimize the impacts on downgradient water supply wells and currently unaffected portions of the aquifer. Based on the removal of VOCs by the GWTP and decreasing contaminant concentration trends observed in the recovery wells and several of the monitoring wells, progress toward these goals is apparent. Based on the concentrations in the groundwater wells, the GWTP should continue to be operated. Groundwater sampling frequency for the eight monitoring wells is currently performed on a semi-annual basis in accordance with the O&M Manual. Water levels for the 14 monitoring wells continue to be measured on a quarterly basis.

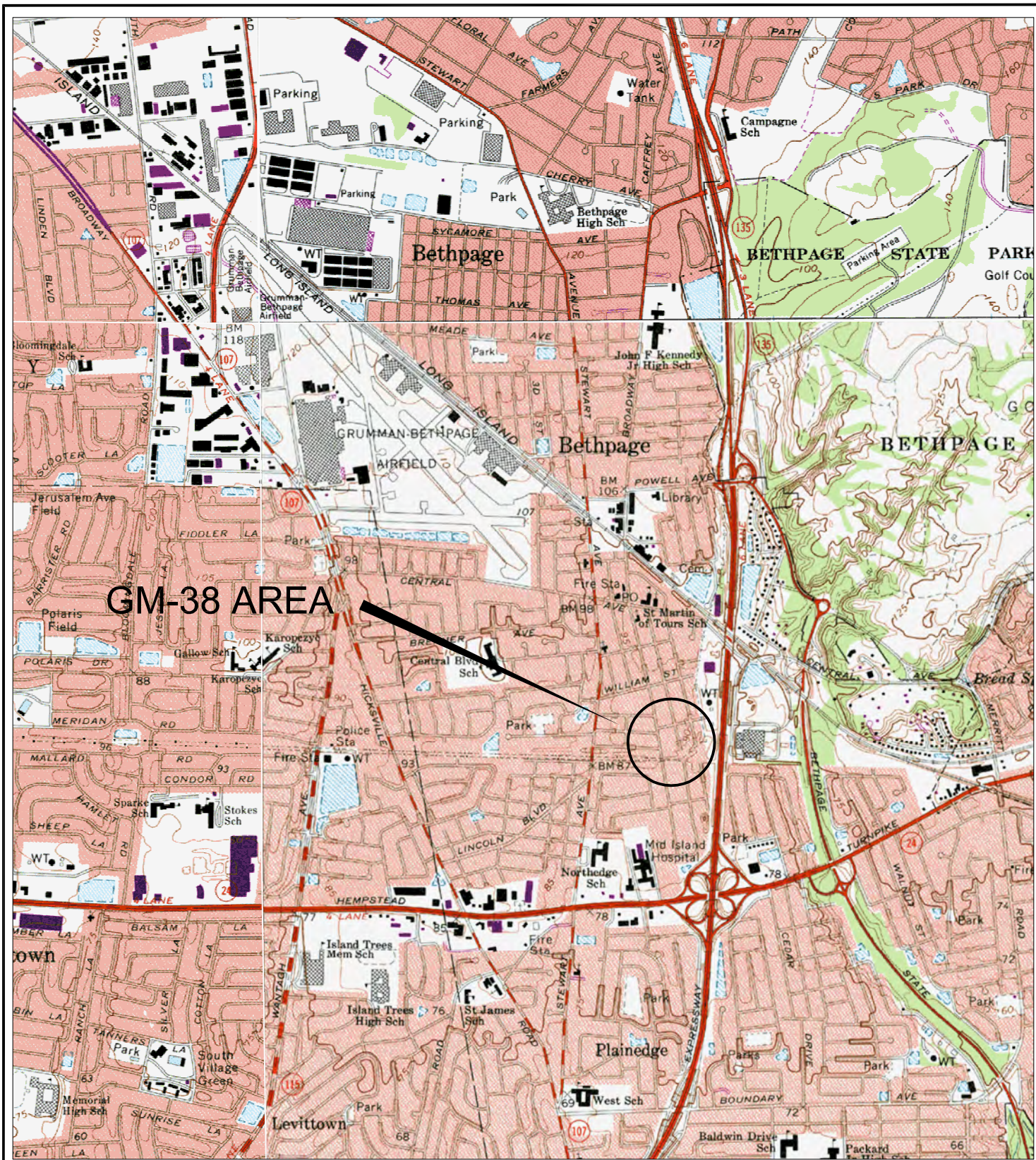
## 5.0 REFERENCES

Tetra Tech, Inc. (Tetra Tech), 2014. *Capture Zone Evaluation and Path Forward, GM-38 Area Groundwater Treatment Plant, Naval Weapons Industrial Reserve Plant, Bethpage, New York.* March.

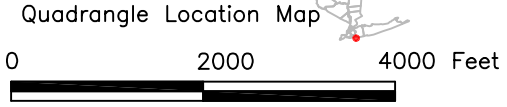
Tetra Tech EC, Inc. (TtEC), 2010. *Final Operation, Maintenance & Monitoring Plan for Groundwater Treatment Plant GM-38 Area Groundwater Remediation, Naval Weapons Industrial Reserve Plant, Bethpage, New York.* April.

Tetra Tech EC, Inc. (TtEC), 2010a. *Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan), UFP-SAP for Operations, Maintenance, and Monitoring of the Groundwater Treatment Plant, GM-38 Area, Naval Weapons Industrial Reserve Plant, Bethpage, New York.* September.

## **FIGURES**



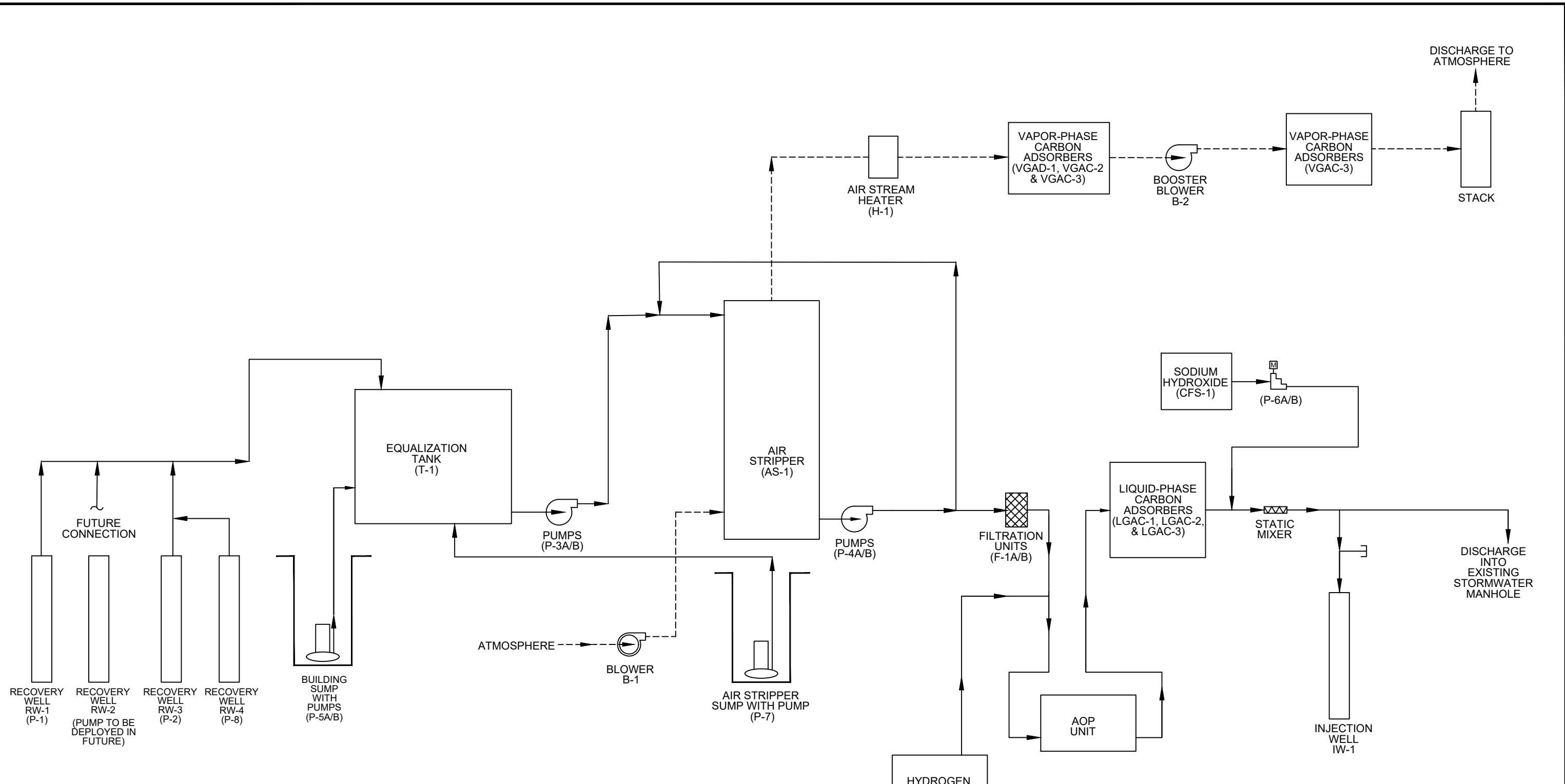
**GM-38 AREA**



U.S. Navy RAC Engineering Field Activity, Northeast GM-38 Area (Offsite) NWIRP Bethpage Bethpage, NY
Figure 1 Site Location Map

Source: U.S.G.S. Topographic Maps (7.5 Minute)  
Amityville, Freeport, Hicksville, Huntington, NY Quadrangles

P:\LantDiv\Bethpage\CAD - GIS\Dwg\O&M Manual\Site Location Map.dwg, 6/29/2009 3:33:52 PM



LEGEND  
 - - - - - VAPOR PIPING  
 \_\_\_\_\_ LIQUID PIPING

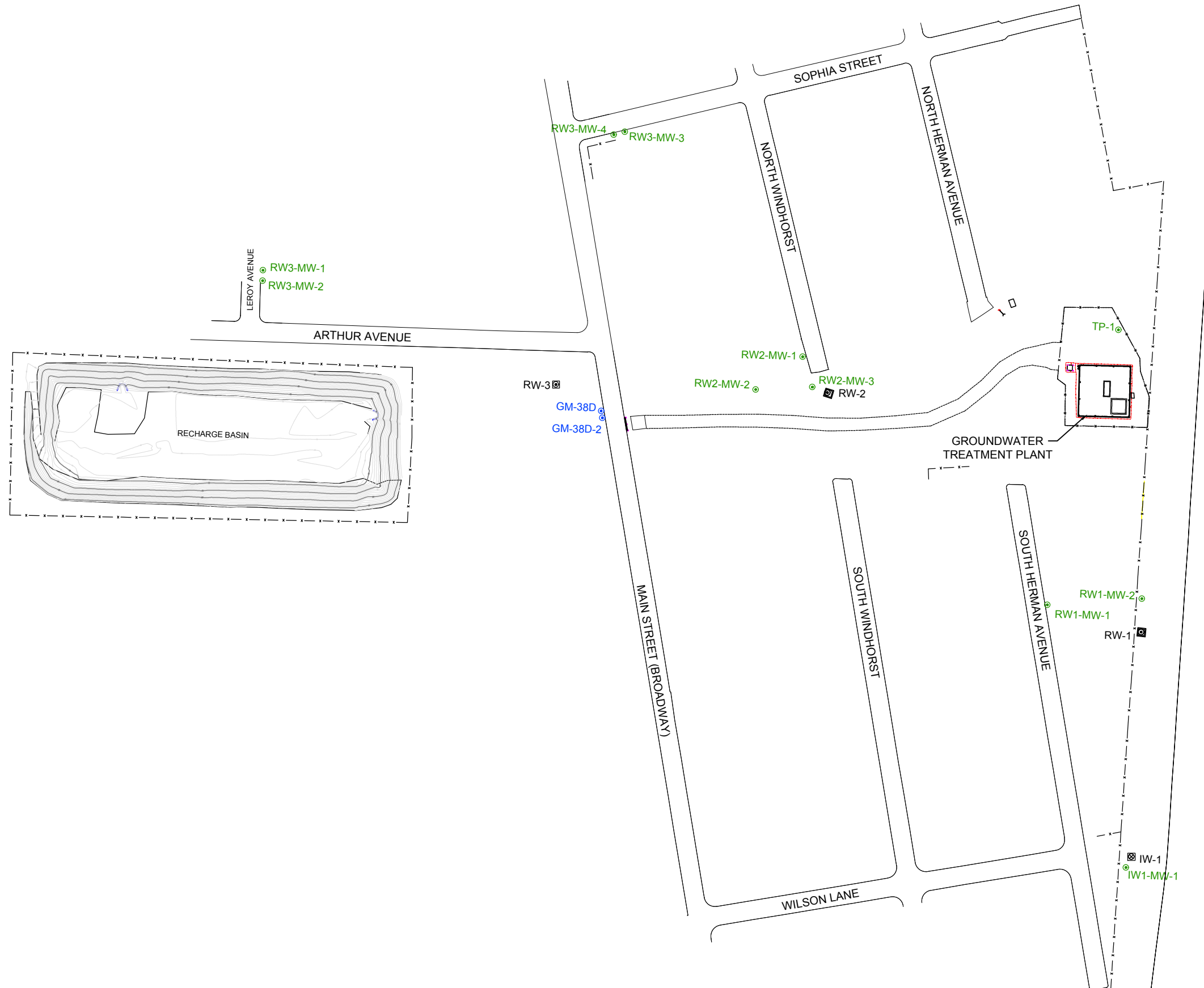
SOURCE:  
 TETRA TECH ENGINEERING CORPORATION, PC, 2006  
 UPDATED BY KGS, JANUARY 2022.

PROCESS FLOW DIAGRAM			
NWIRP BETHPAGE GM-38 AREA BETHPAGE, NEW YORK			
KOMAN Government Solutions, LLC 180 Gordon Drive, Suite 110, Exton, PA 19341			
SCALE NOT TO SCALE	DATE 1/27/2022	FIGURE 2	

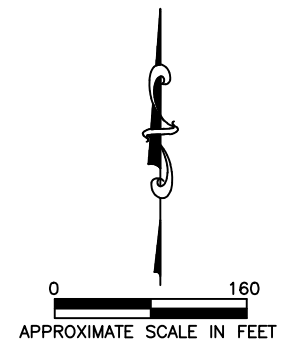


**Legend**

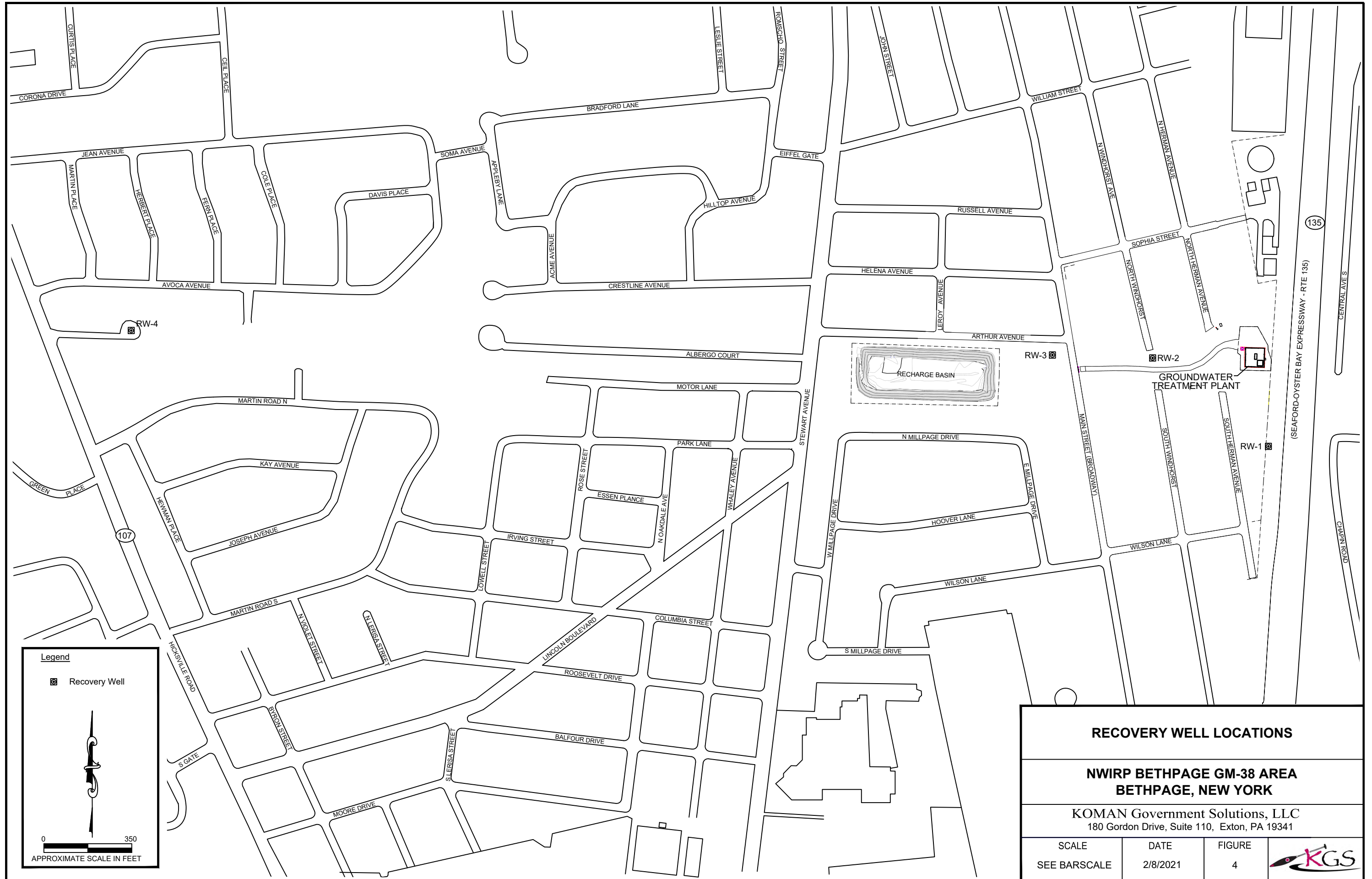
- Monitoring Well (Monitored by Navy)
- Monitoring Well (Monitored by Northrop Grumman)
- ⊠ Recovery Well
- ⊠ Injection Well

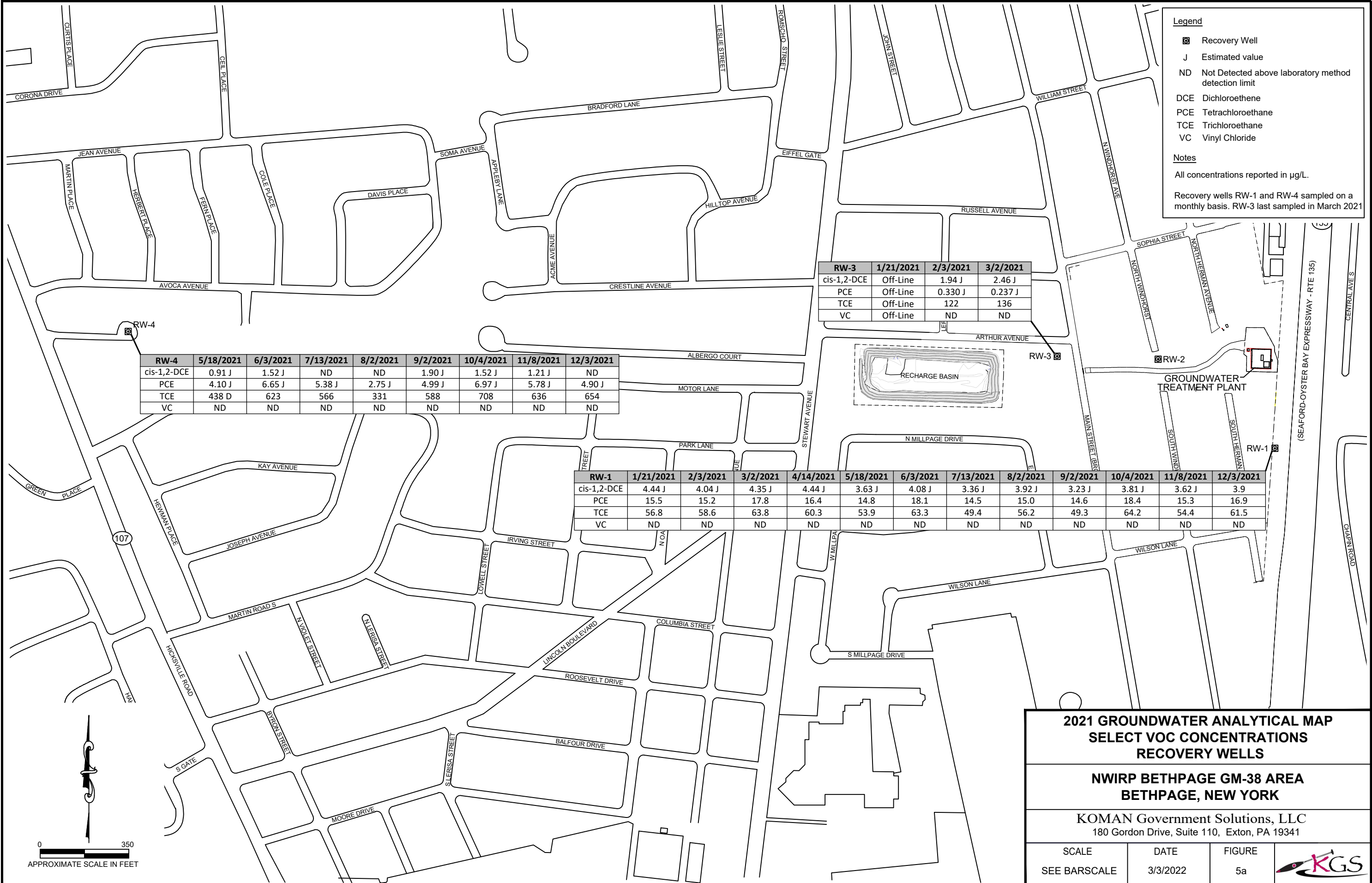


(SEAFORD-OYSTER BAY EXPRESSWAY - RTE 135)



<b>SITE MAP</b>			
<b>NWIRP BETHPAGE GM-38 AREA BETHPAGE, NEW YORK</b>			
KOMAN Government Solutions, LLC 180 Gordon Drive, Suite 110, Exton, PA 19341			
SCALE SEE BARSCALE	DATE 01/15/2018	FIGURE 3	





**Legend**

- ☑ Recovery Well
- J Estimated value
- ND Not Detected above laboratory method detection limit
- DCE Dichloroethene
- PCE Tetrachloroethane
- TCE Trichloroethane
- VC Vinyl Chloride

**Notes**

All concentrations reported in µg/L.

Recovery wells RW-1 and RW-4 sampled on a monthly basis. RW-3 last sampled in March 2021

RW-3	1/21/2021	2/3/2021	3/2/2021
cis-1,2-DCE	Off-Line	1.94 J	2.46 J
PCE	Off-Line	0.330 J	0.237 J
TCE	Off-Line	122	136
VC	Off-Line	ND	ND

RW-4	5/18/2021	6/3/2021	7/13/2021	8/2/2021	9/2/2021	10/4/2021	11/8/2021	12/3/2021
cis-1,2-DCE	0.91 J	1.52 J	ND	ND	1.90 J	1.52 J	1.21 J	ND
PCE	4.10 J	6.65 J	5.38 J	2.75 J	4.99 J	6.97 J	5.78 J	4.90 J
TCE	438 D	623	566	331	588	708	636	654
VC	ND	ND	ND	ND	ND	ND	ND	ND


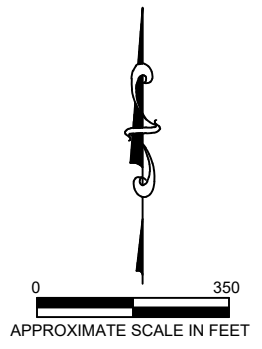
RW-1	1/21/2021	2/3/2021	3/2/2021	4/14/2021	5/18/2021	6/3/2021	7/13/2021	8/2/2021	9/2/2021	10/4/2021	11/8/2021	12/3/2021
cis-1,2-DCE	4.44 J	4.04 J	4.35 J	4.44 J	3.63 J	4.08 J	3.36 J	3.92 J	3.23 J	3.81 J	3.62 J	3.9
PCE	15.5	15.2	17.8	16.4	14.8	18.1	14.5	15.0	14.6	18.4	15.3	16.9
TCE	56.8	58.6	63.8	60.3	53.9	63.3	49.4	56.2	49.3	64.2	54.4	61.5
VC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

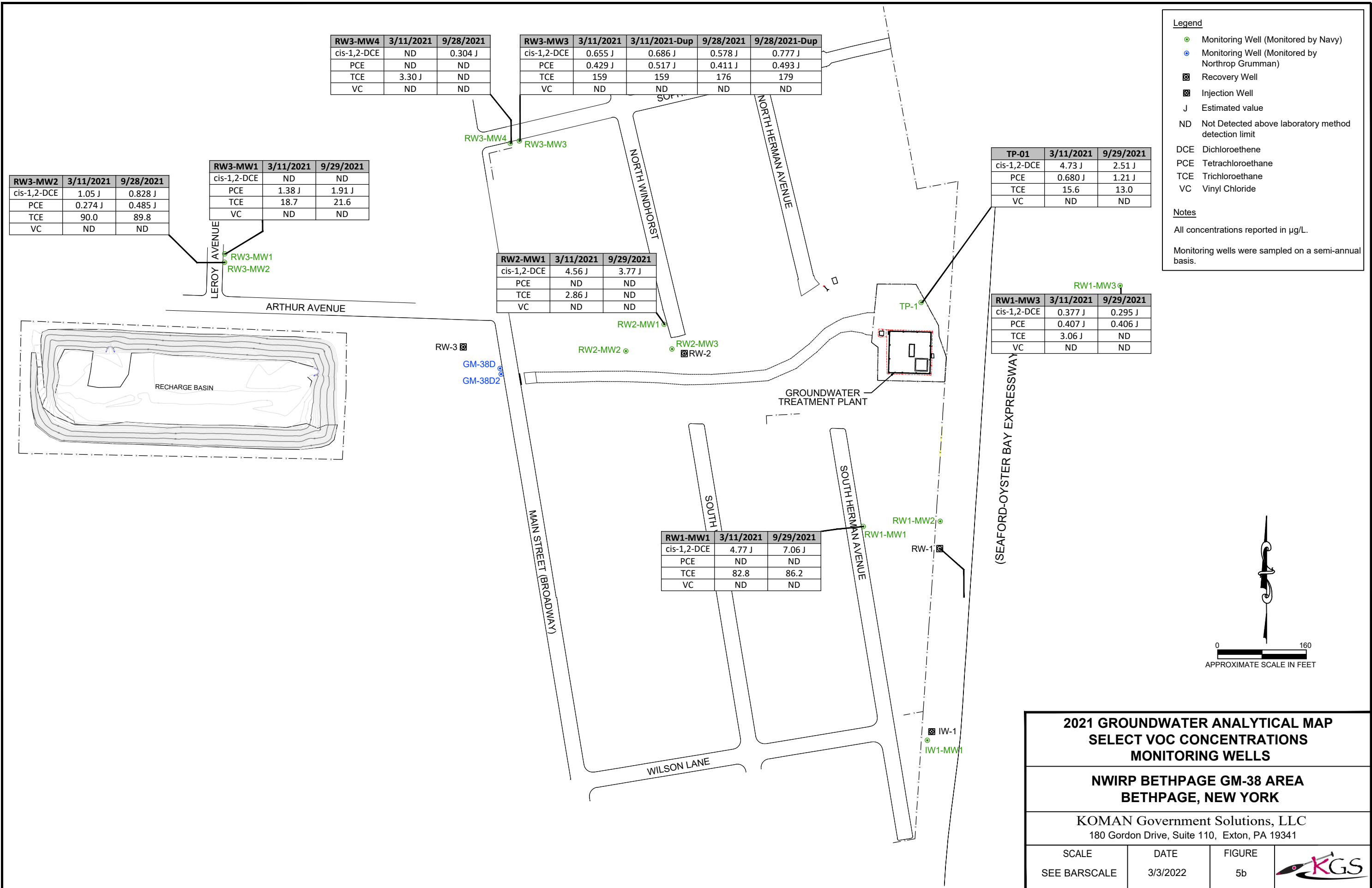
**2021 GROUNDWATER ANALYTICAL MAP  
SELECT VOC CONCENTRATIONS  
RECOVERY WELLS**

**NWIRP BETHPAGE GM-38 AREA  
BETHPAGE, NEW YORK**

KOMAN Government Solutions, LLC  
180 Gordon Drive, Suite 110, Exton, PA 19341

SCALE	DATE	FIGURE
SEE BARSCALE	3/3/2022	5a



RW3-MW4	3/11/2021	9/28/2021
cis-1,2-DCE	ND	0.304 J
PCE	ND	ND
TCE	3.30 J	ND
VC	ND	ND

RW3-MW3	3/11/2021	3/11/2021-Dup	9/28/2021	9/28/2021-Dup
cis-1,2-DCE	0.655 J	0.686 J	0.578 J	0.777 J
PCE	0.429 J	0.517 J	0.411 J	0.493 J
TCE	159	159	176	179
VC	ND	ND	ND	ND

RW3-MW2	3/11/2021	9/28/2021
cis-1,2-DCE	1.05 J	0.828 J
PCE	0.274 J	0.485 J
TCE	90.0	89.8
VC	ND	ND

RW3-MW1	3/11/2021	9/29/2021
cis-1,2-DCE	ND	ND
PCE	1.38 J	1.91 J
TCE	18.7	21.6
VC	ND	ND

RW2-MW1	3/11/2021	9/29/2021
cis-1,2-DCE	4.56 J	3.77 J
PCE	ND	ND
TCE	2.86 J	ND
VC	ND	ND

TP-01	3/11/2021	9/29/2021
cis-1,2-DCE	4.73 J	2.51 J
PCE	0.680 J	1.21 J
TCE	15.6	13.0
VC	ND	ND

RW1-MW3	3/11/2021	9/29/2021
cis-1,2-DCE	0.377 J	0.295 J
PCE	0.407 J	0.406 J
TCE	3.06 J	ND
VC	ND	ND

RW1-MW1	3/11/2021	9/29/2021
cis-1,2-DCE	4.77 J	7.06 J
PCE	ND	ND
TCE	82.8	86.2
VC	ND	ND

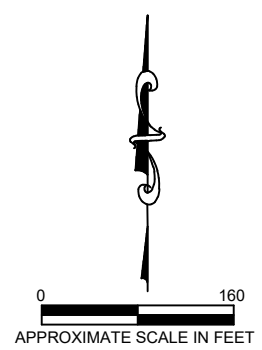
**Legend**

- Monitoring Well (Monitored by Navy)
- Monitoring Well (Monitored by Northrop Grumman)
- ⊠ Recovery Well
- ⊞ Injection Well
- J Estimated value
- ND Not Detected above laboratory method detection limit

**Notes**

All concentrations reported in µg/L.

Monitoring wells were sampled on a semi-annual basis.



<b>2021 GROUNDWATER ANALYTICAL MAP SELECT VOC CONCENTRATIONS MONITORING WELLS</b>			
<b>NWIRP BETHPAGE GM-38 AREA BETHPAGE, NEW YORK</b>			
KOMAN Government Solutions, LLC 180 Gordon Drive, Suite 110, Exton, PA 19341			
SCALE	DATE	FIGURE	
SEE BARSCALE	3/3/2022	5b	

Figure 6  
GM-38 Area Groundwater Remediation  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Groundwater Concentration Trends of Select VOCs  
RW1

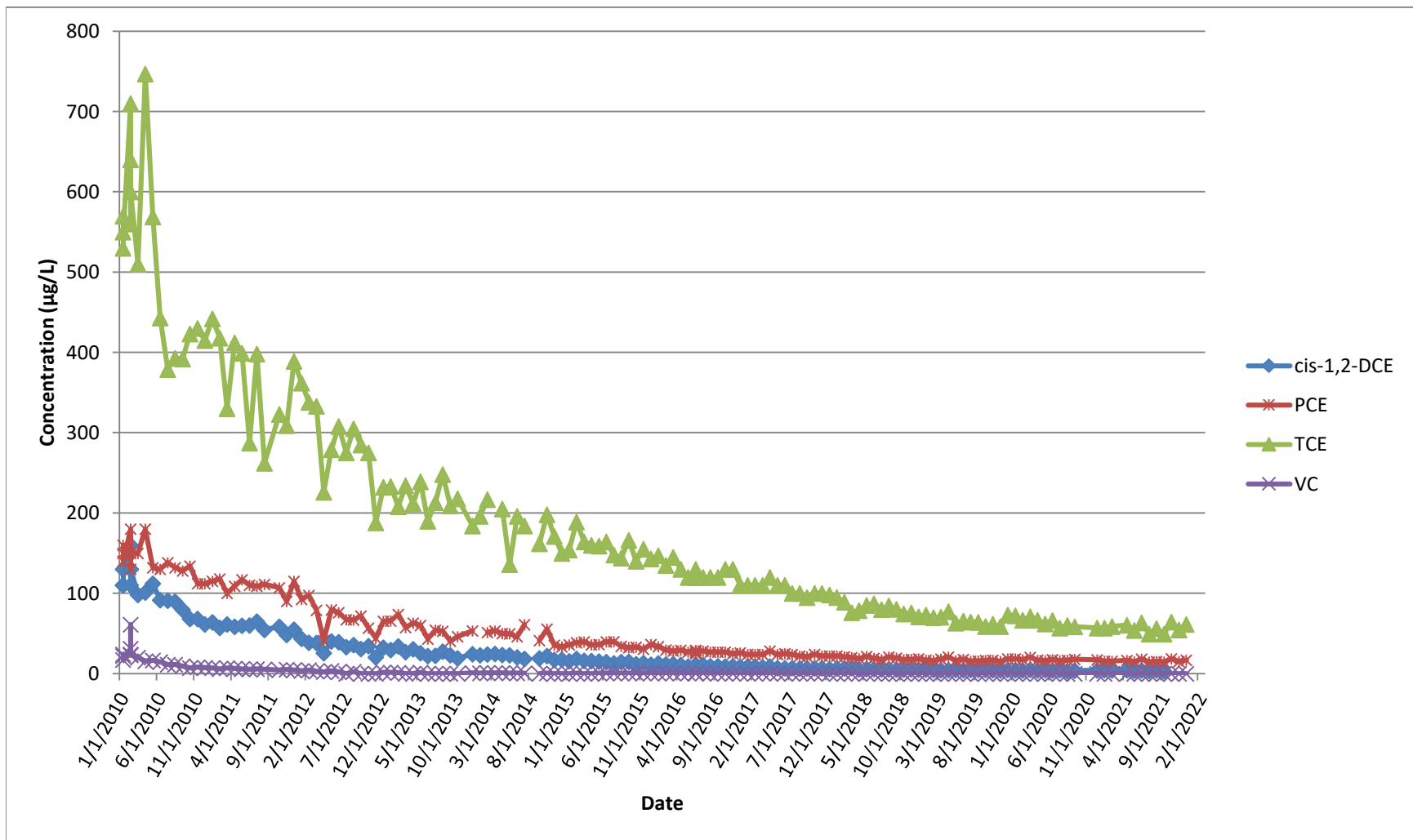
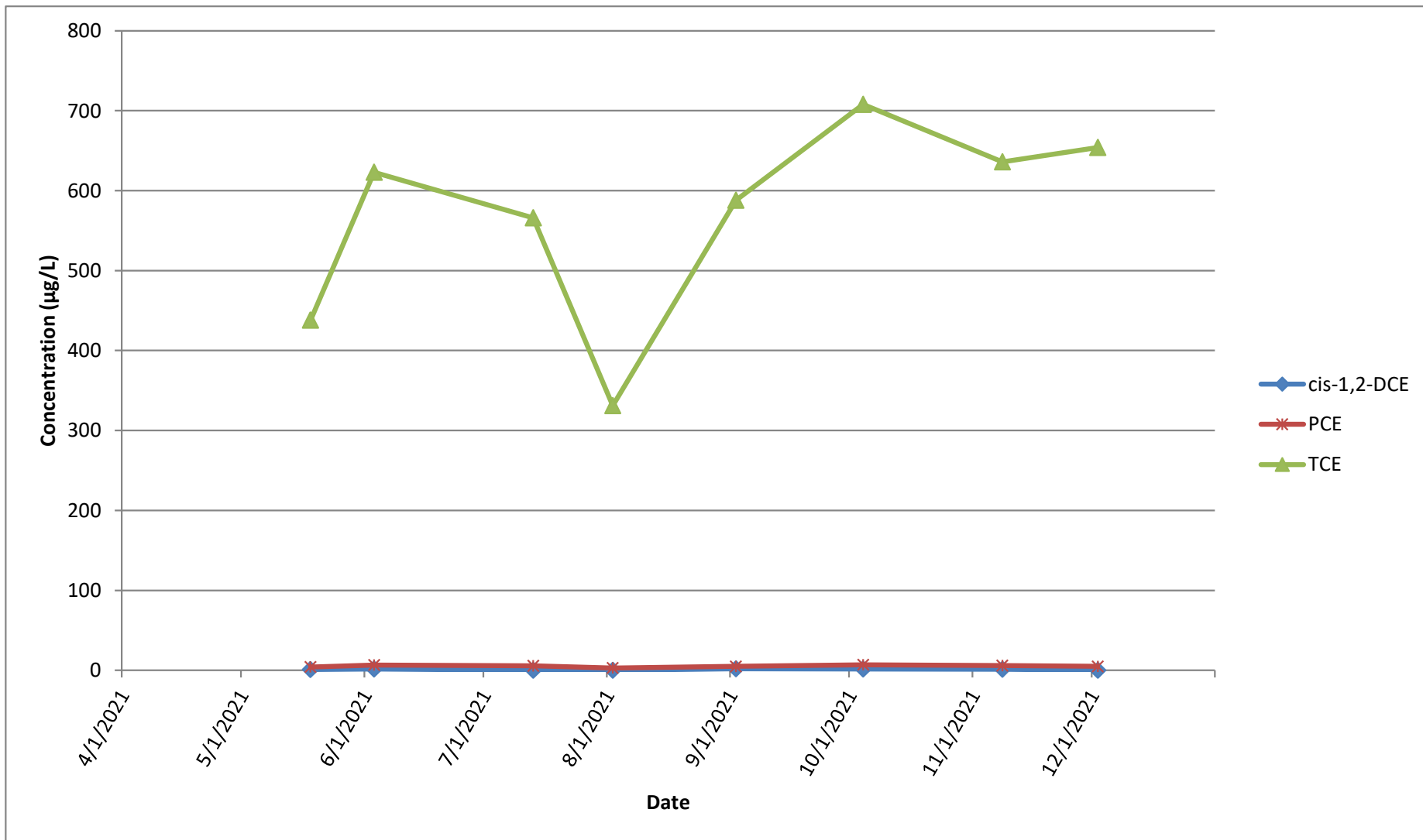


Figure 7  
GM-38 Area Groundwater Remediation  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Groundwater Concentration Trends of Select VOCs  
RW4



**Figure 8**  
**GM-38 Area Groundwater Remediation**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Groundwater Concentration Trends of Select VOCs**  
**RW4**

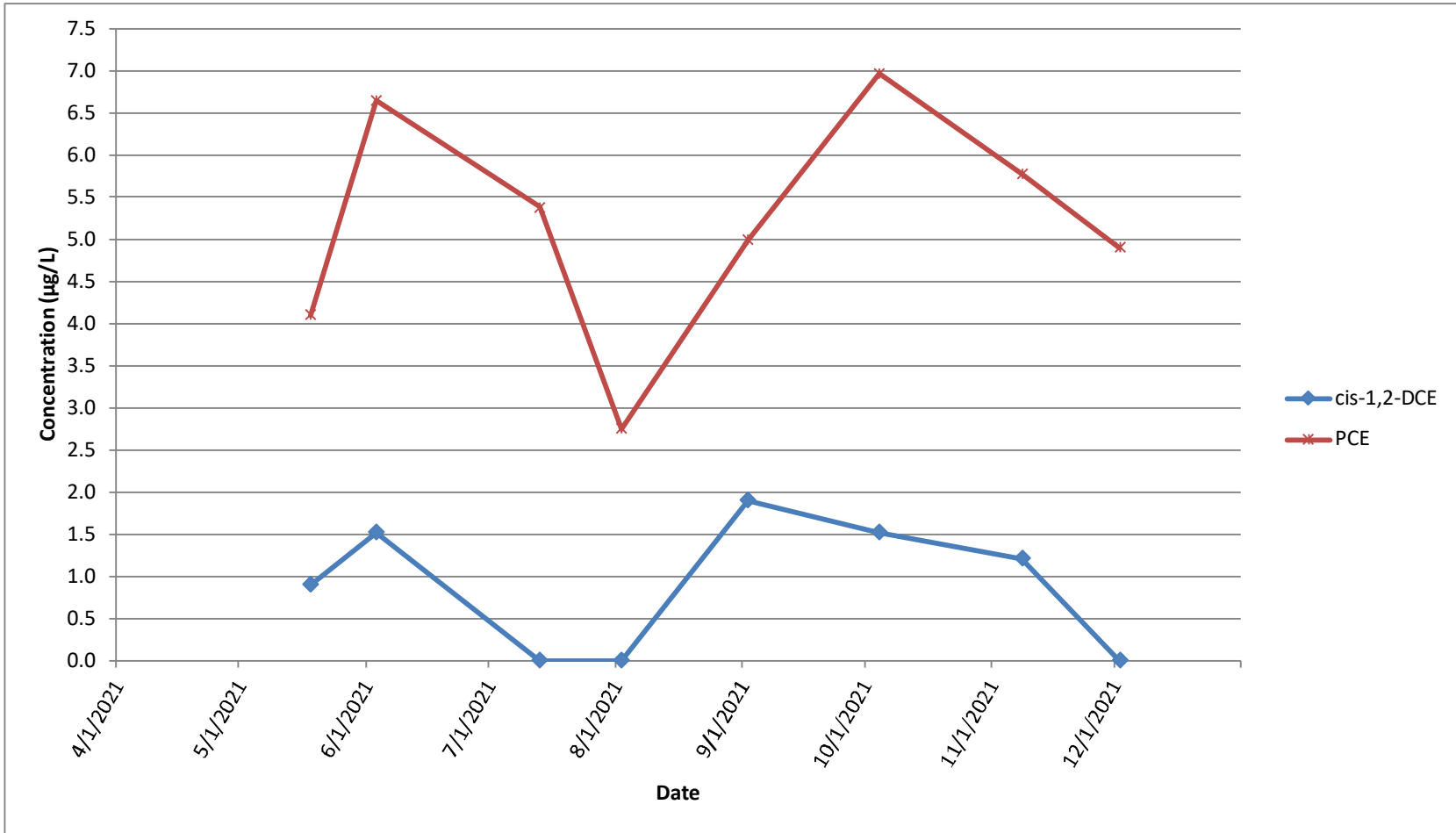
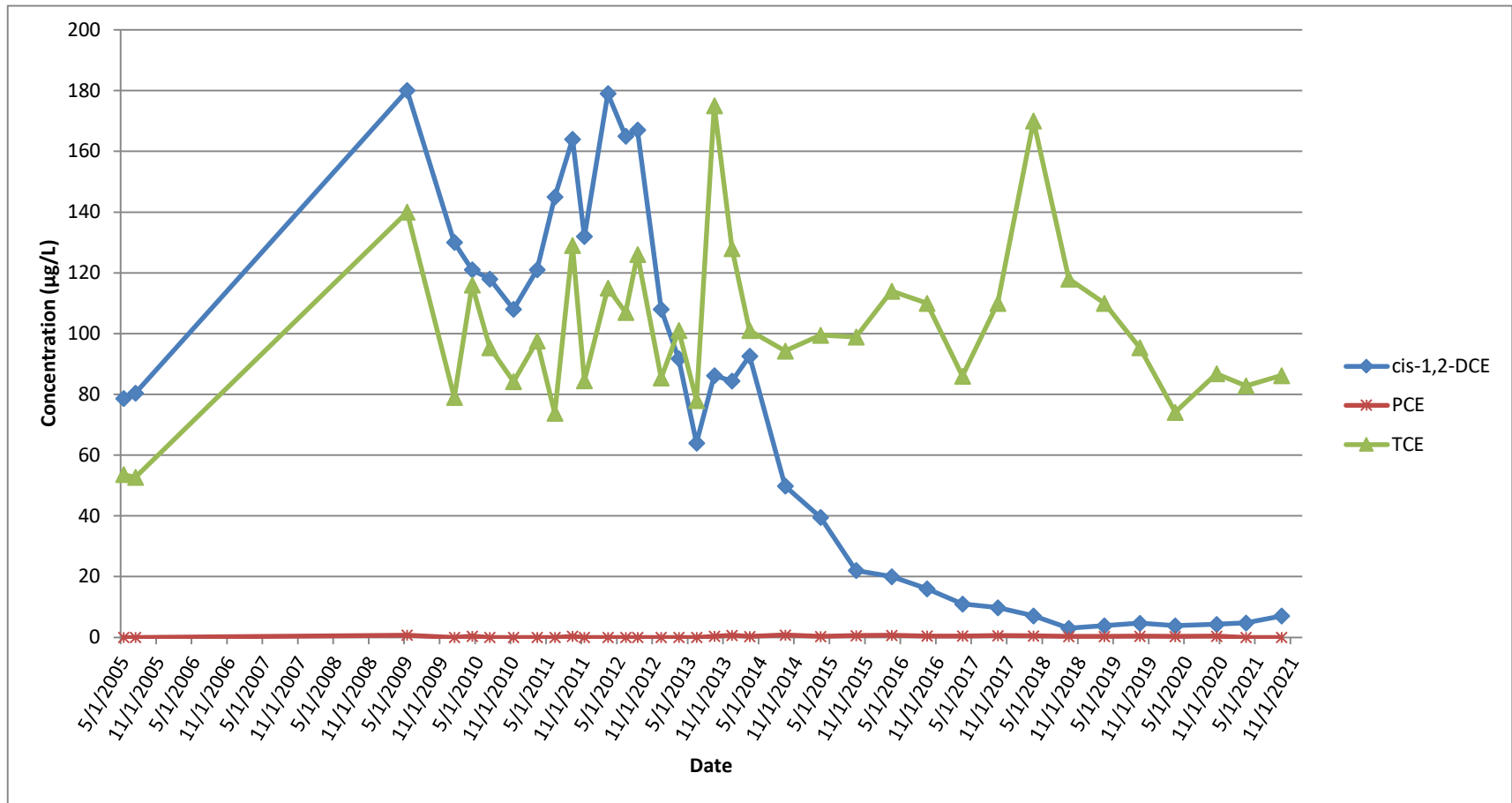


Figure 9  
GM-38 Area Groundwater Remediation  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Groundwater Concentration Trends of Select VOCs  
RW1-MW1





**Figure 10**  
**GM-38 Area Groundwater Remediation**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Groundwater Concentration Trends of Select VOCs**  
**RW1-MW3**

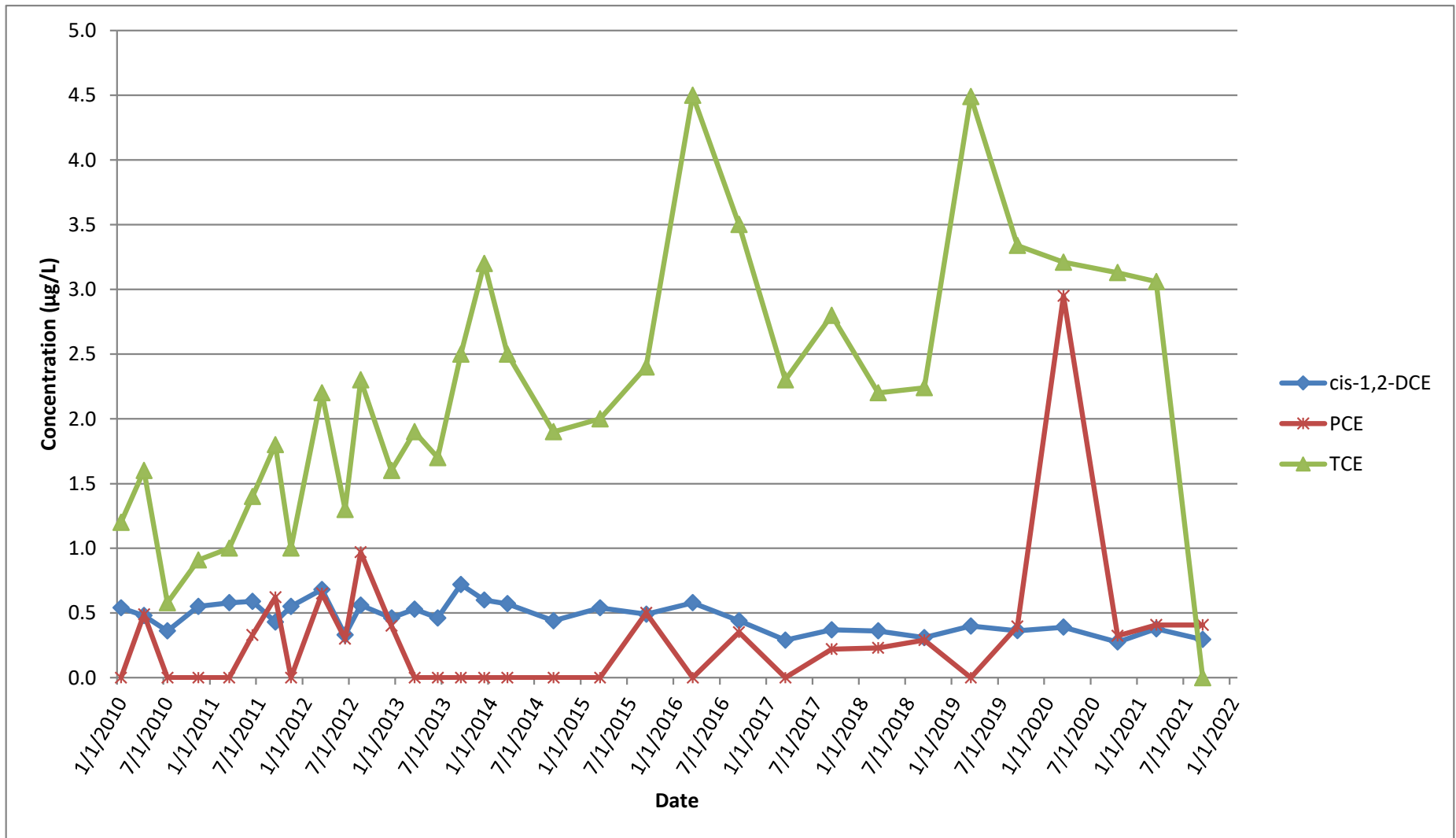


Figure 11  
GM-38 Area Groundwater Remediation  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Groundwater Concentration Trends of Select VOCs  
RW2-MW1

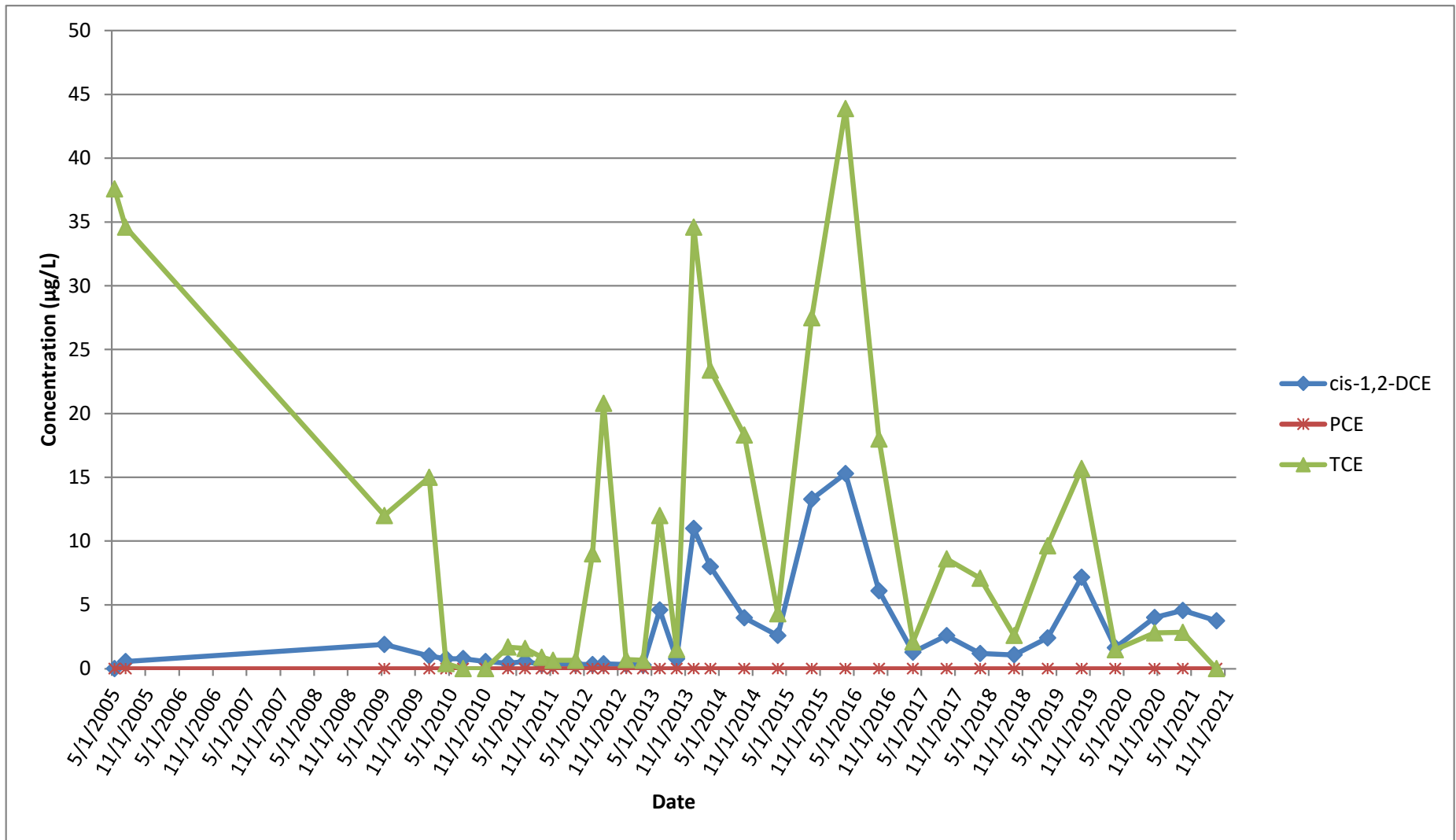


Figure 12  
GM-38 Area Groundwater Remediation  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Groundwater Concentration Trends of Select VOCs  
RW3-MW1

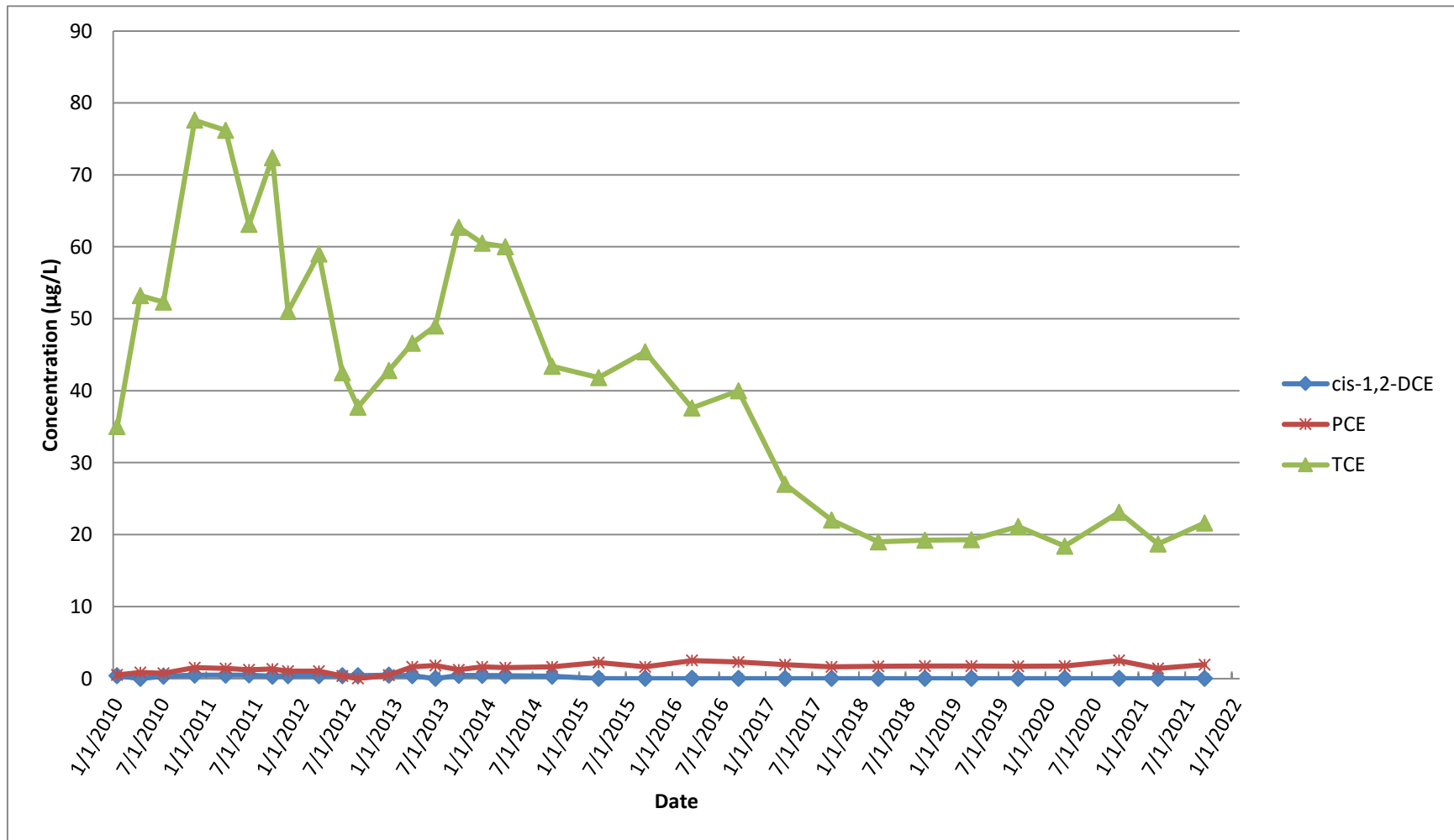


Figure 13  
GM-38 Area Groundwater Remediation  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Groundwater Concentration Trends of Select VOCs  
RW3-MW2

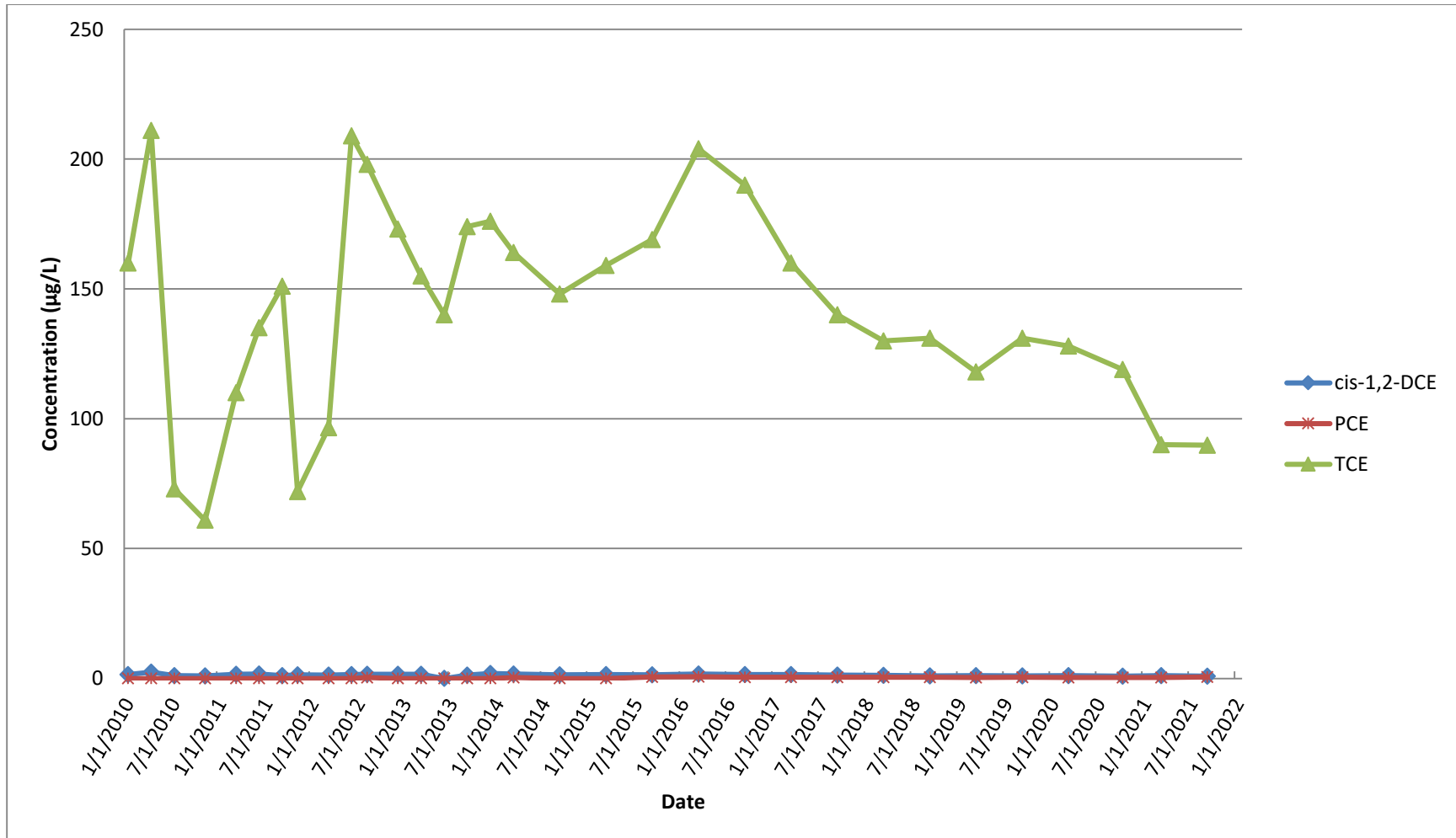


Figure 14  
GM-38 Area Groundwater Remediation  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Groundwater Concentration Trends of Select VOCs  
RW3-MW3

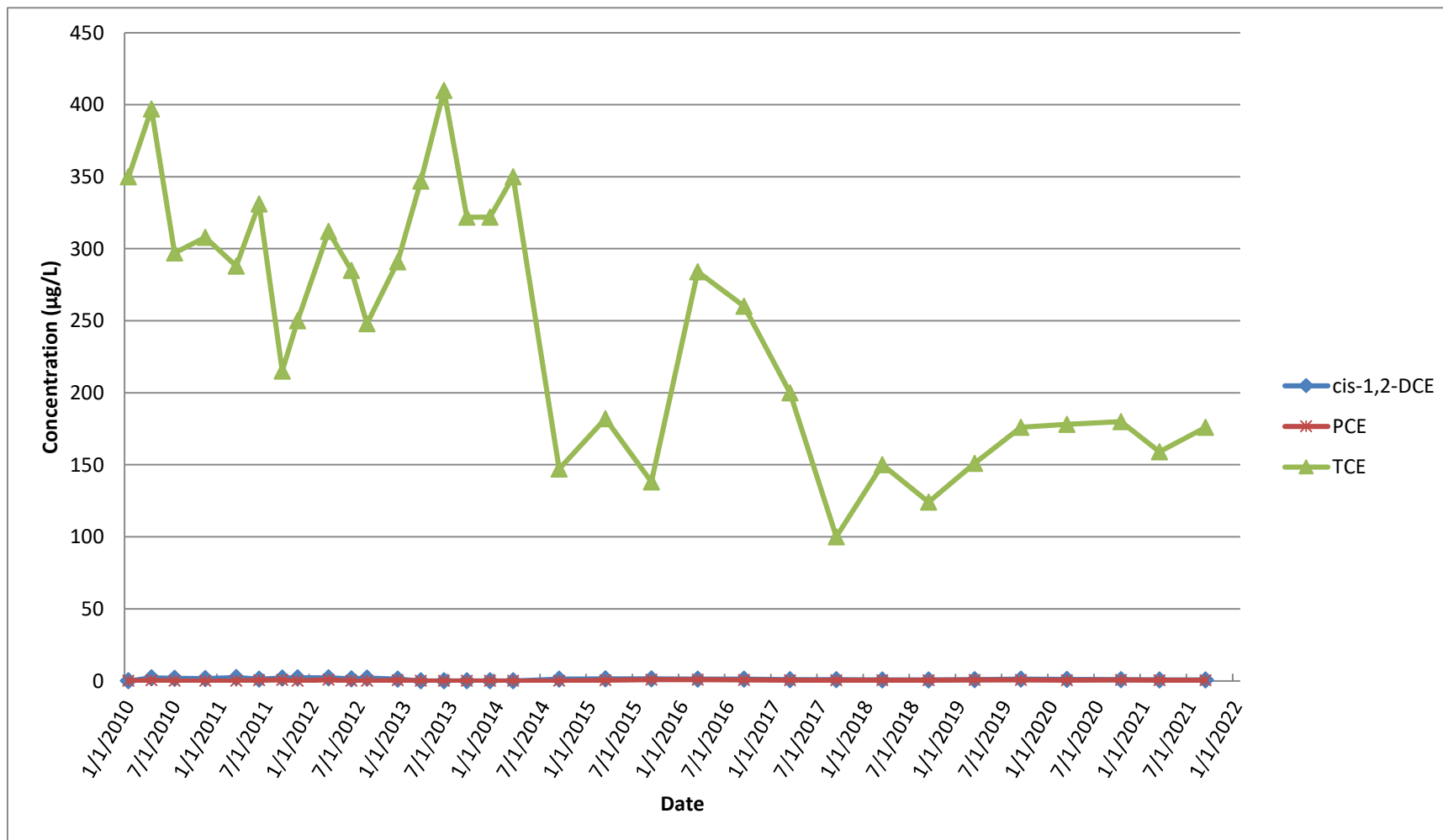


Figure 15  
GM-38 Area Groundwater Remediation  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Groundwater Concentration Trends of Select VOCs  
RW3-MW4

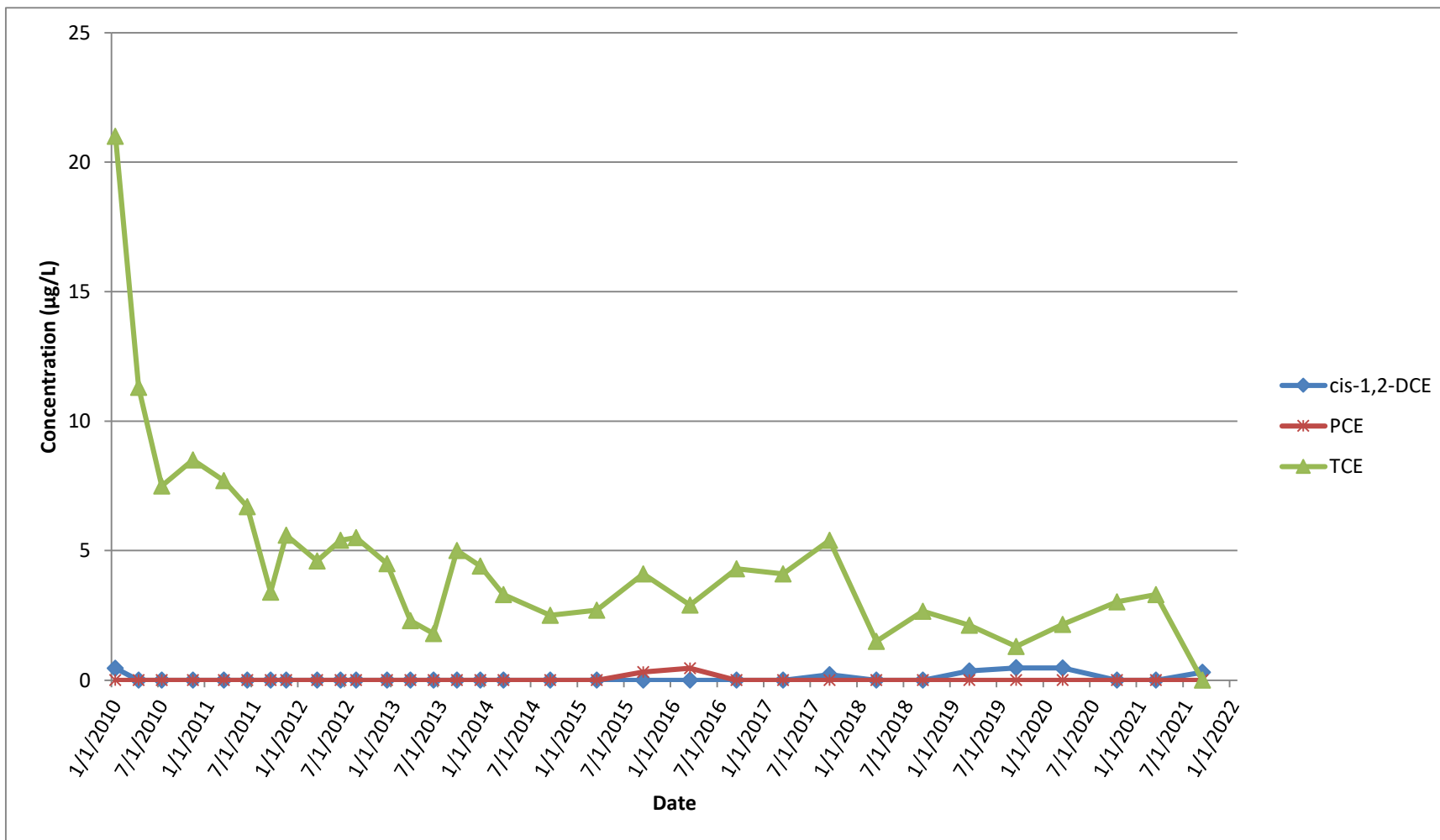
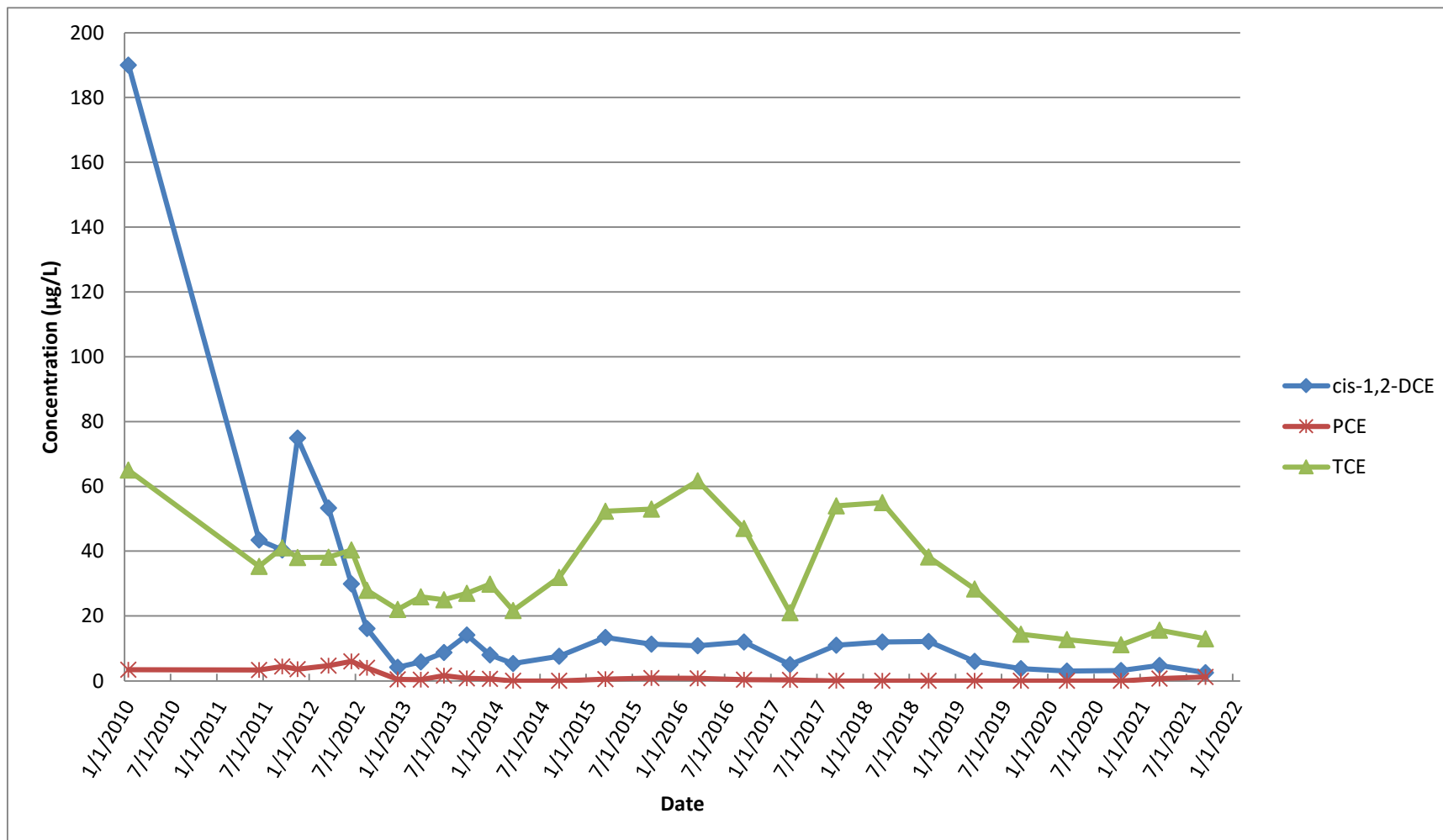


Figure 16  
GM-38 Area Groundwater Remediation  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Groundwater Concentration Trends of Select VOCs  
TP-01



## **TABLES**



**Table 1**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Discharge Monitoring Results**  
**Fourth Quarter 2021**

SPDES Parameters <sup>1</sup>	Daily Maximum Goal	Units	October 2021											
			RW-1	RW-3	RW-4	Combined Influent	Treated Effluent	Treated Effluent DUPLICATE	Air Stripper Effluent (ASE)	Bag Filter Effluent (BFE)	Liquid Carbon 1 Effluent (LC1)	Liquid Carbon 2 Effluent (LC2)	Liquid Carbon 3 Effluent (LC3)	
Process Stream														
Well Depth		ft	445	530	655*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Screened Interval		ft	335-395 410-430	392-412 442-504	550-650*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sampling Date	N/A		10/4/21											
Average Flowrate	1100	GPM	642	0	182	824	869	NR	NR	819	NR	NR	NR	NR
Total Flow	N/A	gallons	27,736,089	0	7,853,285	35,589,375	37,522,468	NR	NR	35,385,182	NR	NR	NR	NR
pH	5.5 - 8.5	SU	5.86	NS	6.24	5.94	6.98	6.99	6.91	6.94	6.95	6.97	6.98	6.98
Chloroform	5	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	5	µg/L	1.29 J	NS	ND (1.0)	1.01 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,2-Dichloroethane	0.6	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethene	5	µg/L	0.712 J	NS	2.06 J	1.009 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
cis 1,2-Dichloroethene	5	µg/L	3.81 J	NS	1.52 J	3.30 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
trans 1,2-Dichloroethene	5	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Tetrachloroethene	5	µg/L	18.4	NS	6.97 J	15.88	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1,1-Trichloroethane	5	µg/L	0.471 J	NS	ND (1.0)	0.367 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Trichloroethene	5	µg/L	64.2	NS	708	206.3	0.408 J	0.251 J	2.25 J	1.89 J	0.258 J	0.431 J	0.298 J	
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	NS	6.66 J	1.470	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl Chloride	2	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,4-Dioxane	--	µg/L	1.9	NS	13	4.35	0.059	NS	NS	NS	NS	NS	NS	NS
Mercury	0.00025	mg/L	ND (0.00010)	NS	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Total Suspended Solids (TSS)	N/A	mg/L	ND (1.0)	NS	27.5	6.07	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	2.4	ND (1.0)	ND (1.0)	ND (1.0)

**Table 1**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Discharge Monitoring Results**  
**Fourth Quarter 2021**

SPDES Parameters <sup>1</sup>	Daily Maximum Goal	Units	November 2021										
			RW-1	RW-3	RW-4	Combined Influent	Treated Effluent	Treated Effluent DUPLICATE	Air Stripper Effluent (ASE)	Bag Filter Effluent (BFE)	Liquid Carbon 1 Effluent (LC1)	Liquid Carbon 2 Effluent (LC2)	Liquid Carbon 3 Effluent (LC3)
Process Stream													
Well Depth		ft	445	530	655*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Screened Interval		ft	335-395 410-430	392-412 442-504	550-650*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sampling Date	N/A		11/8/21										
Average Flowrate	1100	GPM	685	0	90	775	825	NR	NR	783	NR	NR	NR
Total Flow	N/A	gallons	29,973,411	0	4,415,215	34,388,625	36,603,032	NR	NR	34,658,818	NR	NR	NR
pH	5.5 - 8.5	SU	5.68	NS	6.40	5.76	7.08	7.06	6.95	7.04	7.02	7.04	7.06
Chloroform	5	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	5	µg/L	1.15 J	NS	ND (1.0)	1.02 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,2-Dichloroethane	0.6	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethene	5	µg/L	0.573 J	NS	2.37 J	0.781 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
cis 1,2-Dichloroethene	5	µg/L	3.62 J	NS	1.21 J	3.34 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
trans 1,2-Dichloroethene	5	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Tetrachloroethene	5	µg/L	15.3	NS	5.78 J	14.20	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1,1-Trichloroethane	5	µg/L	0.325 J	NS	ND (1.0)	0.287 J	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Trichloroethene	5	µg/L	54.4	NS	636	121.7	0.275 J	0.275 J	1.03 J	0.982 J	ND (1.0)	0.333 J	ND (1.0)
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	NS	4.90 J	0.567	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Vinyl Chloride	2	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,4-Dioxane	--	µg/L	2.0	NS	13	3.27	0.0	NS	NS	NS	NS	NS	NS
Mercury	0.00025	mg/L	ND (0.00010)	NS	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Total Suspended Solids (TSS)	N/A	mg/L	ND (1.0)	NS	7.1	0.82	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)

**Table 1**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Discharge Monitoring Results**  
**Fourth Quarter 2021**

SPDES Parameters <sup>1</sup>	Daily Maximum Goal	Units	December 2021										
			RW-1	RW-3	RW-4	Combined Influent	Treated Effluent	Treated Effluent DUPLICATE	Air Stripper Effluent (ASE)	Bag Filter Effluent (BFE)	Liquid Carbon 1 Effluent (LC1)	Liquid Carbon 2 Effluent (LC2)	Liquid Carbon 3 Effluent (LC3)
Process Stream													
Well Depth		ft	445	530	655*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Screened Interval		ft	335-395 410-430	392-412 442-504	550-650*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sampling Date	N/A		12/3/21										
Average Flowrate	1100	GPM	628	0	169	797	838	NR	NR	789	NR	NR	NR
Total Flow	N/A	gallons	25,652,634	0	6,922,821	32,575,456	34,260,555	NR	NR	32,235,869	NR	NR	NR
pH	5.5 - 8.5	SU	5.61	NS	6.27	5.75	7.14	7.15	6.97	7.00	7.11	7.13	7.15
Chloroform	5	µg/L	ND (0.90)	NS	ND (4.5)	--	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)
1,1-Dichloroethane	5	µg/L	1.3	NS	ND (4.5)	1.02	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)
1,2-Dichloroethane	0.6	µg/L	ND (0.75)	NS	ND (3.8)	--	ND (0.75)	ND (0.75)	ND (0.75)	ND (0.75)	ND (0.75)	ND (0.75)	ND (0.75)
1,1-Dichloroethene	5	µg/L	ND (0.75)	NS	ND (3.8)	--	ND (0.75)	ND (0.75)	ND (0.75)	ND (0.75)	ND (0.75)	ND (0.75)	ND (0.75)
cis 1,2-Dichloroethene	5	µg/L	3.9	NS	ND (3.8)	3.07	ND (0.75)	ND (0.75)	ND (0.75)	ND (0.75)	ND (0.75)	ND (0.75)	ND (0.75)
trans 1,2-Dichloroethene	5	µg/L	ND (0.90)	NS	ND (4.5)	--	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)
Tetrachloroethene	5	µg/L	16.9	NS	4.9 J	14.35	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)
1,1,1-Trichloroethane	5	µg/L	ND (0.90)	NS	ND (4.5)	--	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)
Trichloroethene	5	µg/L	61.5	NS	654	187.4	ND (0.90)	ND (0.90)	1.4	1.3	ND (0.90)	ND (0.90)	ND (0.90)
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.5)	NS	ND (7.5)	--	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)	ND (1.5)
Vinyl Chloride	2	µg/L	ND (0.90)	NS	ND (4.5)	--	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)	ND (0.90)
1,4-Dioxane	--	µg/L	0.323	NS	1.74	0.62	ND (0.15)	ND (0.15)	NS	NS	NS	NS	NS
Mercury	0.00025	mg/L	ND (0.00015)	NS	ND (0.00015)	ND (0.00015)	ND (0.00015)	ND (0.00015)	ND (0.00015)	ND (0.00015)	ND (0.00015)	ND (0.00015)	ND (0.00015)
Total Suspended Solids (TSS)	N/A	mg/L	ND (2.0)	NS	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)

**Notes:**

- J - Estimated result between laboratory method detection limit and reporting limit
- NA - Not Applicable
- ND - Not detected above laboratory method detection limit. Limit of detection (LOD) given in parentheses.
- NR - Not Recorded
- NS - Not Sampled
- gpm - gallons per minute
- \* Design Depths
- LOD for non-detect combined well influent not applicable; RW-4 sample required dilution.

(1) Wastewater discharge equivalence permit renewed on 18 August 2017. Discharge limits established for 10 years. Chloroform, 1,4-dioxane and 1,1,2-trichlorotrifluoroethane are now monitored under the new permit.

**Table 2**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**2021 Annual Flow Summary**

<b>Monthly Flow Totals</b>		
<b>Month</b>	<b>Total GWTP Influent Flow (gal)</b>	<b>Total GWTP Effluent Flow (gal)</b>
Jan-21	28,387,700	30,151,500
Feb-21	28,370,933	29,704,467
Mar-21	35,054,267	36,892,633
Apr-21	27,010,900	28,773,700
May-21	34,929,900	34,804,400
Jun-21	29,009,700	33,067,700
Jul-21	31,690,710	33,424,591
Aug-21	39,779,690	42,197,309
Sep-21	34,336,400	36,301,900
Oct-21	35,589,375	37,522,468
Nov-21	34,388,625	36,603,032
Dec-21	32,575,456	34,260,555
<b>Annual Flow Summary</b>		
	<b>GWTP Influent</b>	<b>GWTP Effluent</b>
2021 Total (gal)	391,123,656	413,704,255
2021 Monthly Average (gal)	32,593,638	34,475,355
2021 Effective Flowrate (gpm)	744	787
2021 Average Flowrate (gpm)	795	841

Notes:

gpm = gallons per minute

Effective Flowrate = total flow volume (gal) / total time period (min)

Average Flowrate = total flow volume (gal) / total system run time (min)

**Table 3**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**2021 Mass Removal Summary**

Month	Total Flow (gal)			CCl <sub>4</sub>			1,1-DCA			1,2-DCA			1,1-DCE			cis-1,2-DCE		
	GWTP Effluent	GWTP Influent	2021 Cumulative Influent	Influent Concentration (µg/l)	Mass Removal (lb)	2021 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2021 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2021 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2021 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2021 Cumulative Mass Removal (lb)
Jan-21	30,151,500	28,387,700	28,387,700	0.00	0.0000	0.0000	1.42	0.3364	0.3364	0.000	0.0000	0.0000	0.810	0.1919	0.1919	4.17	0.9878	0.9878
Feb-21	29,704,467	28,370,933	56,758,633	0.00	0.0000	0.0000	1.67	0.3954	0.7317	0.000	0.0000	0.0000	0.900	0.2131	0.4049	3.59	0.8499	1.8377
Mar-21	36,892,633	35,054,267	91,812,900	0.00	0.0000	0.0000	1.60	0.4680	1.1997	0.000	0.0000	0.0000	1.050	0.3071	0.7121	3.93	1.1496	2.9873
Apr-21	28,773,700	27,010,900	118,823,800	0.00	0.0000	0.0000	1.36	0.3065	1.5063	0.216	0.0487	0.0487	0.905	0.2040	0.9161	4.44	1.0007	3.9880
May-21	34,929,900	34,804,400	153,628,200	0.00	0.0000	0.0000	1.14	0.3311	1.8374	0.000	0.0000	0.0487	0.980	0.2846	1.2007	3.27	0.9497	4.9377
Jun-21	33,067,700	29,009,700	182,637,900	0.00	0.0000	0.0000	0.94	0.2275	2.0649	0.000	0.0000	0.0487	1.300	0.3147	1.5154	3.45	0.8351	5.7728
Jul-21	33,424,591	31,690,710	214,328,610	0.00	0.0000	0.0000	0.83	0.2195	2.2844	0.000	0.0000	0.0487	0.427	0.1129	1.6283	2.59	0.6849	6.4577
Aug-21	42,197,309	39,779,690	254,108,300	0.00	0.0000	0.0000	1.06	0.3519	2.6363	0.000	0.0000	0.0487	0.747	0.2480	1.8762	3.03	1.0058	7.4635
Sep-21	36,301,900	34,336,400	288,444,700	0.00	0.0000	0.0000	0.85	0.2435	2.8798	0.000	0.0000	0.0487	0.945	0.2708	2.1470	2.94	0.8424	8.3059
Oct-21	37,522,468	35,589,375	324,034,075	0.00	0.0000	0.0000	1.01	0.2999	3.1797	0.000	0.0000	0.0487	1.009	0.2996	2.4467	3.30	0.9800	9.2859
Nov-21	36,603,032	34,388,625	358,422,700	0.00	0.0000	0.0000	1.02	0.2927	3.4724	0.000	0.0000	0.0487	0.781	0.2241	2.6708	3.34	0.9584	10.2443
Dec-21	34,260,555	32,575,456	390,998,156	0.00	0.0000	0.0000	1.02	0.2773	3.7497	0.000	0.0000	0.0487	0.000	0.0000	2.6708	3.07	0.8345	11.0788

**2021 Totals**      **413,829,755**    **390,998,156**      **0.0000**      **3.7497**      **0.0487**      **2.6708**      **11.0788**

Month	Total Flow (gal)			trans-1,2-DCE			PCE			1,1,1-TCA			TCE			VC		
	GWTP Effluent	GWTP Influent	2021 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2021 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2021 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2021 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2021 Cumulative Mass Removal (lb)	Influent Concentration (µg/l)	Mass Removal (lb)	2021 Cumulative Mass Removal (lb)
Jan-21	30,151,500	28,387,700	28,387,700	0.20	0.0474	0.0474	14.55	3.4466	3.4466	0.470	0.1113	0.1113	53.3	12.6329	12.6329	0.00	0.0000	0.0000
Feb-21	29,704,467	28,370,933	56,758,633	0.00	0.0000	0.0474	12.35	2.9237	6.3704	0.110	0.0260	0.1374	72.1	17.0572	29.6900	0.00	0.0000	0.0000
Mar-21	36,892,633	35,054,267	91,812,900	0.00	0.0000	0.0474	13.91	4.0688	10.4392	0.542	0.1585	0.2959	79.8	23.3452	53.0352	0.00	0.0000	0.0000
Apr-21	28,773,700	27,010,900	118,823,800	0.00	0.0000	0.0474	16.40	3.6964	14.1356	0.429	0.0967	0.3926	60.3	13.5911	66.6264	0.00	0.0000	0.0000
May-21	34,929,900	34,804,400	153,628,200	0.00	0.0000	0.0474	13.39	3.8888	18.0244	0.342	0.0993	0.4919	107.2	31.1423	97.7686	0.00	0.0000	0.0000
Jun-21	33,067,700	29,009,700	182,637,900	0.00	0.0000	0.0474	15.30	3.7037	21.7281	0.347	0.0840	0.5759	200.2	48.4626	146.2313	0.00	0.0000	0.0000
Jul-21	33,424,591	31,690,710	214,328,610	0.00	0.0000	0.0474	12.41	3.2817	25.0098	0.399	0.1055	0.6814	165.8	43.8446	190.0759	0.00	0.0000	0.0000
Aug-21	42,197,309	39,779,690	254,108,300	0.00	0.0000	0.0474	12.20	4.0497	29.0595	0.397	0.1318	0.8132	118.9	39.4678	229.5437	0.00	0.0000	0.0000
Sep-21	36,301,900	34,336,400	288,444,700	0.00	0.0000	0.0474	12.51	3.5844	32.6439	0.325	0.0931	0.9063	166.6	47.7342	277.2778	0.00	0.0000	0.0000
Oct-21	37,522,468	35,589,375	324,034,075	0.00	0.0000	0.0474	15.88	4.7160	37.3598	0.367	0.1090	1.0153	206.3	61.2660	338.5438	0.00	0.0000	0.0000
Nov-21	36,603,032	34,388,625	358,422,700	0.00	0.0000	0.0474	14.20	4.0748	41.4346	0.287	0.0824	1.0977	121.7	34.9225	373.4663	0.00	0.0000	0.0000
Dec-21	34,260,555	32,575,456	390,998,156	0.00	0.0000	0.0474	14.35	3.9007	45.3353	0.000	0.0000	1.0977	187.4	50.9401	424.4064	0.00	0.0000	0.0000

**2021 Totals**      **413,829,755**    **390,998,156**      **0.0474**      **45.3353**      **1.0977**      **424.4064**      **0.0000**

**2021 Cumulative Mass (VOCs) Removed (lbs)**      **488.43**

**2021 Average Monthly Mass (VOCs) Removed (lbs)**      **40.70**

Notes:  
 CCl<sub>4</sub> = carbon tetrachloride      DCA = dichloroethane  
 TCA = trichloroethane      DCE = dichloroethene  
 TCE = trichloroethene      PCE = tetrachloroethene

Mass removal (lb) = Influent Concentration (ug/L) \* Influent Flow (gal) \* (2.20462 lb/kg) \* (3.785 L/gal) \* (10<sup>-9</sup> ug/kg)  
 (1) Only well RW-3 was running at the time of sampling

**Table 4**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Air Sampling Results**  
**Fourth Quarter 2021**

DAR Parameters	Discharge Goal <sup>(3)</sup>	Units	October 2021				
			Influent (VCI1)	Effluent	Effluent Duplicate	VC12	VC23
Process Stream							
Sampling Date			10/4/21				
Average Flowrate	N/A	CFM	NR	8,872			
Total Flow <sup>(1)</sup>	N/A	ft <sup>3</sup>	NR	383,248,344	NR	NR	NR
Total Flow <sup>(2)</sup>	N/A	m <sup>3</sup>	NR	10,852,385	NR	NR	NR
1,2-Dichloroethane	N/A	µg/m <sup>3</sup>	ND	ND	ND	1.8 J	ND
cis 1,2-Dichloroethene	≤ 100,000 <sup>(4)</sup>	µg/m <sup>3</sup>	36	17	19	26	19
trans 1,2-Dichloroethene		µg/m <sup>3</sup>	ND	ND	ND	ND	ND
1,2-Dichloroethene (total)		µg/m <sup>3</sup>	36	17	19	25	19
Toluene	N/A	µg/m <sup>3</sup>	0.91 J	ND	ND	ND	ND
Total Xylene	N/A	µg/m <sup>3</sup>	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	N/A	µg/m <sup>3</sup>	ND	ND	ND	ND	ND
Trichloroethene	≤ 2600	µg/m <sup>3</sup>	2300	6.3	ND	220	ND
Vinyl Chloride	≤ 560	µg/m <sup>3</sup>	ND	ND	ND	ND	ND
Tetrachloroethene	≤ 5100	µg/m <sup>3</sup>	160	5.00	ND	7.3	ND

Notes:

NA - Not applicable

ND - Not detected

NR - Not recorded

SGC - Short-term Guideline Concentration

µg/m<sup>3</sup> - micrograms per cubic meter

CFM - cubic feet per minute

DAR - Division of Air Resources

(1) Total Flow (ft<sup>3</sup>) = avg flowrate (cfm) \* operational time (min)

(2) Total Flow (m<sup>3</sup>) = total flow (ft<sup>3</sup>) \* (0.3048<sup>3</sup>)m<sup>3</sup>/ft<sup>3</sup>

(3) Discharge goal approved by NYSDEC's letter dated 10/31/2013.

(4) Discharge goal is for total 1,2-Dichloroethene.

**Table 4**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Air Sampling Results**  
**Fourth Quarter 2021**

DAR Parameters	Discharge Goal <sup>(3)</sup>	Units	November 2021				
			Influent (VC11)	Effluent	Effluent Duplicate	VC12	VC23
Process Stream							
Sampling Date			11/8/21				
Average Flowrate	N/A	CFM	NR	9,098			
Total Flow <sup>(1)</sup>	N/A	ft <sup>3</sup>	NR	370,276,605	NR	NR	NR
Total Flow <sup>(2)</sup>	N/A	m <sup>3</sup>	NR	10,485,066	NR	NR	NR
1,2-Dichloroethane	N/A	µg/m <sup>3</sup>	ND	ND	33	2.0 J	ND
cis 1,2-Dichloroethene	≤ 100,000 <sup>(4)</sup>	µg/m <sup>3</sup>	34	32	19	40	36
trans 1,2-Dichloroethene		µg/m <sup>3</sup>	ND	ND	ND	ND	ND
1,2-Dichloroethene (total)	≤ 100,000	µg/m <sup>3</sup>	34	32	33	40	36
Toluene	N/A	µg/m <sup>3</sup>	6.80	ND	ND	1.9 J	ND
Total Xylene	N/A	µg/m <sup>3</sup>	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	N/A	µg/m <sup>3</sup>	ND	ND	ND	ND	ND
Trichloroethene	≤ 2600	µg/m <sup>3</sup>	1500	ND	ND	1100	ND
Vinyl Chloride	≤ 560	µg/m <sup>3</sup>	ND	ND	ND	ND	ND
Tetrachloroethene	≤ 5100	µg/m <sup>3</sup>	180	ND	ND	5.7 J	ND

Notes:

NA - Not applicable

ND - Not detected

NR - Not recorded

SGC - Short-term Guideline Concentration

µg/m<sup>3</sup> - micrograms per cubic meter

CFM - cubic feet per minute

DAR - Division of Air Resources

(1) Total Flow (ft<sup>3</sup>) = avg flowrate (cfm) \* operational time (min)

(2) Total Flow (m<sup>3</sup>) = total flow (ft<sup>3</sup>) \* (0.3048<sup>3</sup>)m<sup>3</sup>/ft<sup>3</sup>

(3) Discharge goal approved by NYSDEC's letter dated 10/31/2013.

(4) Discharge goal is for total 1,2-Dichloroethene.

**Table 4**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Air Sampling Results**  
**Fourth Quarter 2021**

DAR Parameters	Discharge Goal <sup>(3)</sup>	Units	December 2021				
			Influent (VC11)	Effluent	Effluent Duplicate	VC12	VC23
Process Stream							
Sampling Date			12/3/21				
Average Flowrate	N/A	CFM	NR	9,133			
Total Flow <sup>(1)</sup>	N/A	ft <sup>3</sup>	NR	373,222,906	NR	NR	NR
Total Flow <sup>(2)</sup>	N/A	m <sup>3</sup>	NR	10,568,496	NR	NR	NR
1,2-Dichloroethane	N/A	µg/m <sup>3</sup>	1.7 J	ND	ND	2.4 J	ND
cis 1,2-Dichloroethene	≤ 100,000 <sup>(4)</sup>	µg/m <sup>3</sup>	35	39	40	41	41
trans 1,2-Dichloroethene		µg/m <sup>3</sup>	ND	ND	ND	ND	ND
1,2-Dichloroethene (total)	≤ 100,000	µg/m <sup>3</sup>	35	39	40	40	40
Toluene	N/A	µg/m <sup>3</sup>	0.63 J	ND	ND	ND	4.2
Total Xylene	N/A	µg/m <sup>3</sup>	ND	ND	ND	ND	10
1,1,2-Trichloroethane	N/A	µg/m <sup>3</sup>	1.6 J	ND	ND	ND	ND
Trichloroethene	≤ 2600	µg/m <sup>3</sup>	1800	ND	ND	1600	ND
Vinyl Chloride	≤ 560	µg/m <sup>3</sup>	ND	ND	ND	ND	ND
Tetrachloroethene	≤ 5100	µg/m <sup>3</sup>	180	ND	ND	5.1 J	ND

Notes:

NA - Not applicable

ND - Not detected

NR - Not recorded

SGC - Short-term Guideline Concentration

µg/m<sup>3</sup> - micrograms per cubic meter

CFM - cubic feet per minute

DAR - Division of Air Resources

(1) Total Flow (ft<sup>3</sup>) = avg flowrate (cfm) \* operational time (min)

(2) Total Flow (m<sup>3</sup>) = total flow (ft<sup>3</sup>) \* (0.3048<sup>3</sup>)m<sup>3</sup>/ft<sup>3</sup>

(3) Discharge goal approved by NYSDEC's letter dated 10/31/2013.

(4) Discharge goal is for total 1,2-Dichloroethene.



**Table 5**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Stack Emissions**  
**Fourth Quarter 2021**

DAR Parameters	Discharge Goal <sup>(1)</sup>	Units	October 2021	November 2021	December 2021
Sampling Date			10/4/21	11/8/21	12/3/21
Average Flowrate	N/A	CFM	8,872	9,098	9,133
Total Flow	N/A	ft <sup>3</sup>	383,248,344	370,276,605	373,222,906
Total Flow	N/A	m <sup>3</sup>	10,852,385	10,485,066	10,568,496
Trichloroethene	≤ 0.09	lb/hr	0.00020	0.00000	0.00000
Vinyl Chloride	≤ 0.02	lb/hr	0.00000	0.00000	0.00000
1,2 Dichloroethene	≤ 11	lb/hr	0.00055	0.00103	0.00122
1,2-Dichloroethane	N/A	lb/hr	0.00000	0.00000	0.00000
Toluene	N/A	lb/hr	0.00000	0.00000	0.00000
Total Xylene	N/A	lb/hr	0.00000	0.00000	0.00000
1,1,2-Trichloroethane	N/A	lb/hr	0.00000	0.00000	0.00000
Tetrachloroethene	≤ 0.18	lb/hr	0.00016	0.00000	0.00000

Notes:

NA - Not applicable

lb/hr - pounds per hour

DAR - Division of Air Resources

CFM - Cubic feet per minute

Stack Emissions (lb/hr) = average flowrate (cfm) \* (0.3048<sup>^3</sup>)m<sup>3</sup>/ft<sup>3</sup> \* conc.(ug/m<sup>3</sup>) \* 1 lb/453592370 ug \*  
60 min/hr

(1) Discharge goal as approved by NYSDEC's letter dated 31 October 2013.

**Table 6**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**2021 Air Emission Summary**

Month	TCE Effluent Emission Rate		VC Effluent Emission Rate		1,2-DCE Effluent Emission Rate		PCE Effluent Emission Rate	
	lb/hr	lb/mo	lb/hr	lb/mo	lb/hr	lb/mo	lb/hr	lb/mo
Jan-21	0.00000	0.000000	0.00002	0.018453	0.00000	0.000000	0.00000	0.000000
Feb-21	0.00005	0.031405	0.00000	0.000000	0.00000	0.000000	0.00000	0.000000
Mar-21	0.00000	0.000000	0.00000	0.000000	0.00000	0.000000	0.00003	0.018650
Apr-21	0.00000	0.000000	0.00002	0.016629	0.00000	0.000000	0.00000	0.000000
May-21	0.00003	0.019717	0.00002	0.015092	0.00021	0.153357	0.00000	0.000000
Jun-21	0.00005	0.039461	0.00002	0.013463	0.00042	0.301759	0.00000	0.000000
Jul-21	0.00003	0.022514	0.00000	0.000000	0.00057	0.427767	0.00000	0.000000
Aug-21	0.00012	0.092780	0.00000	0.000000	0.00377	2.806043	0.00000	0.000000
Sep-21	0.00004	0.025943	0.00000	0.000000	0.00098	0.707525	0.00000	0.000000
Oct-21	0.00020	0.150730	0.00000	0.000000	0.00055	0.406732	0.00016	0.119627
Nov-21	0.00000	0.000000	0.00000	0.000000	0.00103	0.739700	0.00000	0.000000
Dec-21	0.00000	0.000000	0.00000	0.000000	0.00122	0.908682	0.00000	0.000000

	<u>TCE</u>		<u>VC</u>		<u>1,2-DCE</u>		<u>PCE</u>
<b>Discharge Goal (lb/yr)</b>	<b>770</b>		<b>170</b>		<b>98,000</b>		<b>1,500</b>
<b>2021 Total Emissions (lb/yr)</b>	<b>0.38</b>		<b>0.06</b>		<b>6.45</b>		<b>0.14</b>

Notes:

lb/hr = pounds per hour

lb/mo = pounds per month

lb/yr = pounds per year

DCE = dichloroethene

PCE = tetrachloroethene

TCE = trichloroethene

VC = vinyl chloride

$$\text{Emissions} = \text{average flowrate (cfm)} * (0.3048^3) \text{m}^3/\text{ft}^3 * \text{conc. (mg/m}^3) * 0.000001 \text{ g/mg} * 0.002205 \text{ lbs/g} * 60 \text{ min/hr} * \text{operational time (hr)}$$

**Table 7**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Groundwater Level Measurements**  
**Fourth Quarter 2021**

Monitoring Well ID	Date	Well Elevation (ft amsl)	Total Depth (ft)	Screen Interval (ft)	Depth to Water (ft)	Groundwater Elevation (ft amsl)
RW1-MW1	12/17/2021	85.86	435	395-435	32.47	53.39
RW1-MW2	12/17/2021	87.35	435	395-435	37.84	49.51
RW1-MW3	12/17/2021	80.34	435	395-435	38.91	41.43
RW2-MW1	12/17/2021	90.75	510	470-510	38.67	52.08
RW2-MW2	12/17/2021	90.15	510	470-510	37.68	52.47
RW2-MW3	12/17/2021	89.75	510	470-510	36.21	53.54
RW3-MW1	12/17/2021	92.22	350	330-350	37.35	54.87
RW3-MW2	12/17/2021	91.98	495	475-495	39.11	52.87
RW3-MW3	12/17/2021	92.98	340	320-340	38.72	54.26
RW3-MW4	12/17/2021	92.92	495	475-495	35.93	56.99
TP-01	12/17/2021	85.91	470	450-470	48.34	37.57
IW1-MW1	12/17/2021	89.41	150	20-150	36.14	53.27
RW-1	NA	91.37	340	320-340	NA	NA
RW-3	NA	91.57	495	475-495	NA	NA
RW-4	NA	NA	655*	550-650*	NA	NA

**Notes:**

amsl - above mean sea level

ft - feet

NA - Not Applicable

\* - Design Depths

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW1-MW1															
Sample Date	5/4/2005	7/22/2005	5/27/2009	1/21/2010	4/21/2010	7/28/2010	11/10/2010	3/25/2011	6/14/2011 <sup>(1)</sup>	6/14/2011	9/28/2011	11/30/2011	3/8/2012	6/6/2012	6/6/2012	8/21/2012
Comments										Duplicate					Duplicate	
Well Depth (Ft)	435															
Screened Interval (Ft)	395-435															
VOCS (EPA 624) ug/L <sup>(4)</sup>																
Acrolein	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	30 R
Acrylonitrile	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
2-butanone	R	R	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	0.32J	ND	ND	ND	0.17J	ND	NR	NR	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NR	NR	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND
Chloroform	ND	0.7J	1.1	ND	0.70J	0.65J	0.56J	0.55J	NR	NR	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	0.74J	0.79J	3.3	2.9J	2.8	2.8	3.0	3.6	1.6 J	4.2 J	4.0 J	4.1	5.2	4.8	4.3	5.3
1,2-dichloroethane	ND	ND	0.29J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	1.3	2.8	3.1	1.7J	1.9	1.7	1.7	1.9	0.85 J	2.1 J	2.3 J	2.1	2.7	2.5	2.3	2.8
cis-1,2-dichloroethene	78.6	80.4	180D	130	121	118	108	121	55.8 J	145 J	164	132	179	165	145	167
trans-1,2-dichloroethene	2.0	1.3J	2.8	4J	2.9	2.1	1.3	4.2	0.71 J	2.0 J	2.0 J	1.7	3.0	3.7	2.6	2.4
1,2-dichloropropane	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
1,4-dioxane	1.75J	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
2-hexanone	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR
styrene	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	ND	0.72J	ND	0.42J	ND	ND	ND	ND	ND	0.36 J	ND	ND	ND	ND	ND
Toluene	ND	0.33J	0.68	ND	ND	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ND	ND	0.71J	ND	0.52J	0.43J	0.53J	0.79J	ND	0.63 J	1.1 J	0.66 J	0.96 J	0.98 J	0.89 J	0.99 J
1,1,2-trichloroethane	ND	ND	0.58J	NR	ND	ND	ND	ND	NR	NR	ND	0.33 J	ND	ND	ND	ND
Trichloroethene	53.6	52.7	140.0	79.0	116	95.4	84.2	97.6	26.6 J	73.8 J	129	84.5	115	107	102	126
Vinyl chloride	ND	ND	1.6	ND	ND	ND	0.17J	ND	ND	0.38 J	0.29 J	ND	ND	ND	ND	ND
xylenes (total)	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	NR	NR	ND	0.20	<0.20	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	NR	NR	2.8	2.8	6.0	4.0	4.0	4.0	ND	6	ND	11	16	9	5	6

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW1-MW1															
Sample Date	12/4/2012	3/13/2013	6/19/2013 <sup>(2)</sup>	9/17/2013	12/16/2013	3/24/2014	3/24/2014	9/22/2014	3/25/2015	9/15/2015	3/22/2016	9/14/2016	3/1/2017	9/12/2017	3/5/2018	9/11/2018
Comments							Duplicate									
Well Depth (Ft)	435															
Screened Interval (Ft)	395-435															
VOCS (EPA 624) ug/L <sup>(4)</sup>																
Acrolein	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	ND	ND	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	ND	ND	NR	ND	ND	2.0 R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	0.55 J	0.39 J	ND	ND	0.48 J	0.48 J	0.50 J	0.58 J	0.55 J	0.500 J
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND
1,3-dichlorobenzene	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	4.9	5.3	4.8 J	4.7 J	5.2	5.3	5.3	4.1 J	5.1	5.1	6.5	7.0	6.6	7.7	7.5	7.67
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.35 J	0.26 J	0.220 J
1,1-dichloroethene	2.0	2.8	ND	2.5	2.6	2.8	2.7	2.2 J	2.2 J	1.9	2.2	1.8	1.6	2.1	2.4	2.16
cis-1,2-dichloroethene	108	91.7	64	86.2 J	84.4	92.6 J	94.2	49.8	39.5	22.0	20.0	16	11	9.8	7.1	3.00
trans-1,2-dichloroethene	1.8	1.7	ND	ND	1.4	1.4	1.4	1.0	0.79 J	0.50 J	0.51 J	0.42 J	0.26 J	0.35 J	0.20 J	ND
1,2-dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-hexanone	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,1,2-tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	ND	ND	0.35 J	0.67 J	0.33 J	0.37 J	0.76 J	0.30 J	0.62 J	0.67 J	0.45 J	0.46 J	0.59 J	0.50 J	0.300 J
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	0.88 J	1.1	ND	1.2	1.5	ND	ND	ND	ND	ND	ND	1.0	0.94 J	1	1.2	0.920 J
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	85	101	78	175	128	101	103	94.3	99.5	98.9	114	110	86	110	170	118
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW1-MW1					
	3/7/2019	9/26/2019	3/11/2020	10/6/2020	3/11/2021	9/29/2021
Sample Date						
Comments						
Well Depth (Ft)	435					
Screened Interval (Ft)	395-435					
VOCS (EPA 624) ug/L <sup>(4)</sup>						
Acrolein	NR	NR	NR	NR	NR	NR
Acrylonitrile	ND	ND	ND	ND	ND	ND
Acetone	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND
2-butanone	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR
Chloroform	0.573 J	ND	0.476 J	0.454 J	0.480 J	ND
Chloromethane	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	7.89	6.30	6.26	5.54	4.23 J	4.90 J
1,2-dichloroethane	ND	0.227 J	ND	ND	ND	ND
1,1-dichloroethene	2.19 J	1.79 J	1.76 J	1.81 J	1.44 J	1.25 J
cis-1,2-dichloroethene	3.86 J	4.70 J	3.86 J	4.33 J	4.77 J	7.06
trans-1,2-dichloroethene	ND	ND	ND	ND	0.228 J	ND
1,2-dichloropropane	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND
2-hexanone	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	NR	NR	NR	NR	NR
styrene	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR
Tetrachloroethene	0.323 BJ	0.401 J	0.308 J	0.395 J	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	1.16 J	0.988 J	0.841 J	0.819 J	0.674 J	0.649 J
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND
Trichloroethene	110	95.4	74.1	86.8	82.8	86.2
Vinyl chloride	ND	ND	ND	ND	ND	ND
xylenes (total)	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	ND	ND	ND	3.7	ND	1.5

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW1-MW2				RW1-MW3												
	5/4/2005	7/22/2005	5/28/2009	6/18/2013 <sup>(2)</sup>	1/20/2010	4/21/2010	7/29/2010	11/10/2010	3/25/2011	6/14/2011	9/28/2011	11/30/2011	3/8/2012	6/7/2012	8/22/2012	12/7/2012	
Comments																	
Well Depth (Ft)	435				435												
Screened Interval (Ft)	395-435				395-435												
VOCS (EPA 624) ug/L <sup>(4)</sup>																	
Acrolein	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	30 R	ND	
Acrylonitrile	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	
Acetone	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
Bromodichloromethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
Bromoform	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
Bromomethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
2-butanone	R	R	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	
carbon disulfide	ND	ND	ND	NR	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
Dibromochloromethane	NR	NR	ND	ND	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	
Chloroethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	
Chloroform	ND	1.4	ND	ND	0.67J	0.80J	0.47J	0.69J	0.73J	NR	0.97 J	ND	0.73 J	0.64 J	ND	1.2 J	
Chloromethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
cyclohexane	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
1,2-dibromo-3-chloro-propane	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
1,2-dibromomethane	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
1,2-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	
1,3-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	
1,4-dichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	
dichlorodifluoromethane	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
1,1-dichloroethane	4.6	5.5	3.4	3.9	2.4	4.6	1.5	2.3	2.4	9.3	10.1 J	2.1	8.4	5.7	9.4	9.3	
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,1-dichloroethene	3.2	12.3	ND	ND	0.42J	1.10	ND	0.28J	ND	1.8	2.2 J	ND	1.8	0.86 J	2.4	2.2	
cis-1,2-dichloroethene	181.0	47.6	160.0	120	0.54J	0.48J	0.36J	0.55J	0.58J	0.59 J	0.43 J	0.55 J	0.68 J	0.33 J	0.56 J	0.46 J	
trans-1,2-dichloroethene	2.5	7.6	2.5	1.9 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,2-dichloropropane	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
cis-1,3-dichloropropene	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
trans-1,3-dichloropropene	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
1,4-dioxane	4.01	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
2-hexanone	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	
isopropylbenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
methyl acetate	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
Methylene chloride	1.0	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
4-methyl-2-pentanone	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
styrene	ND	ND	ND	NR	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	0.23 J	ND	ND	
1,2,4-trichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
Tetrachloroethene	ND	134.0	19.0	5.9	ND	049J	ND	ND	ND	0.33 J	0.62 J	ND	0.65 J	0.30 J	0.97 J	0.40 J	
Toluene	0.32J	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
1,1,1-trichloroethane	1.3	1.0	ND	ND	0.41J	0.98J	ND	0.26J	0.33J	1.6	2.7 J	ND	ND	1.1 J	1.9	1.7	
1,1,2-trichloroethane	ND	0.65J	ND	ND	0.62J	0.60J	0.36J	0.55J	0.41J	NR	0.57 J	0.63 J	0.70 J	0.61 J	0.56 J	0.54 J	
Trichloroethene	158.0	198.0	200.0	64	1.2	1.6	0.58J	0.91J	1.0	1.4	1.8 J	1.0 J	2.2	1.3	2.3	1.6	
Vinyl chloride	12.9	187.0	4.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
xylenes (total)	ND	ND	ND	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	
Mercury (EPA 245.1) ug/L	NR	NR	0.20	NR	NR	<0.20	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	ND	ND	
TSS (SM20 2540D) mg/L	NR	NR	4.0	NR	NR	8.0	<4.0	<4.0	<4.0	ND	ND	ND	5	ND	ND	ND	

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW1-MW3															
Sample Date	3/14/2013	6/19/2013 <sup>(2)</sup>	9/17/2013	12/17/2013	3/25/2014	9/23/2014	3/25/2015	9/14/2015	3/21/2016	9/14/2016	3/1/2017	9/13/2017	3/5/2018	9/12/2018	3/7/2019	9/26/2019
Comments																
Well Depth (Ft)	435															
Screened Interval (Ft)	395-435															
VOCS (EPA 624) ug/L <sup>(4)</sup>																
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	0.41 J	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	NR	NR
Chloroform	ND	0.82	ND	ND	0.74 J	0.67 J	0.79 J	ND	0.79 J	0.80 J	0.61 J	0.69 J	0.67 J	0.720 J	0.725 J	ND
Chloromethane	ND	ND	ND	ND	ND	ND	0.29 J	ND	ND	ND	ND	ND	ND	D	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	8.5	10	9.7 J	8.1	8.6	6.1 J	8.1	7.7	7.4	7.0	4.5	4.4	4.1	3.47	4.14 J	2.86 J
1,2-dichloroethane	ND	0.18 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	1.7	1.8	1.6	1.9	2.1	1.6 J	2.3 J	2.3	2.5	1.7	1.1	1.2	0.97 J	0.950 J	1.08 J	0.888 J
cis-1,2-dichloroethene	0.53 J	0.46 J	0.72 J	0.60 J	0.57 J	0.44 J	0.54 J	0.49 J	0.58 J	0.44 J	0.29 J	0.37 J	0.36 J	0.310 J	0.398 J	0.363 J
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND
2-hexanone	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	ND	0.20 J	ND	ND	ND	ND	ND	ND	0.25 J	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	0.50 J	ND	0.35 J	ND	0.22 J	0.23 J	0.290 J	ND	0.397 J
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	1.4	1.8	1.5	2.0	1.7	1.2 J	1.5	1.6	2.1	1.6	1	1.1	0.87 J	0.810 J	1.27 J	0.711 J
1,1,2-trichloroethane	0.61 J	0.46 J	ND	0.55 J	0.46 J	0.46 J	0.43 J	0.44 J	0.47 J	0.41 J	0.51 J	0.35 J	0.37 J	0.400 J	0.296 J	0.284 J
Trichloroethene	1.9	1.7	2.5	3.2	2.5	1.9	2.0	2.4	4.5	3.5	2.3	2.8	2.2	2.24	4.49 J	3.34 J
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	ND	ND	ND	ND	5	ND	ND	ND	ND	1.8	2.1	5.6	7.1	2.7	8.6	2.2



**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW1-MW3				RW2-MW1													
	3/12/2020	10/6/2020	3/11/2021	9/29/2021	5/4/2005	7/20/2005	5/27/2009	1/18/2010	4/21/2010	7/28/2010	11/3/2010	3/24/2011	6/14/2011	9/27/2011	11/29/2011	3/7/2012	6/6/2012	
Comments																		
Well Depth (Ft)	435				510													
Screened Interval (Ft)	395-435				470-510													
VOCS (EPA 624) ug/L <sup>(4)</sup>																		
Acrolein	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND
Acetone	NR	NR	NR	NR	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	0.15J	0.69J	0.58J	0.30J	NR	0.22 J	0.27 J	0.22 J	ND	
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	
Bromoform	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	
Bromomethane	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	
2-butanone	NR	NR	NR	NR	R	R	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	
carbon disulfide	NR	NR	NR	NR	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	
Dibromochloromethane	ND	ND	ND	ND	NR	NR	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	
Chloroethane	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	
Chloroform	0.631 J	0.623 J	0.590 J	0.308 J	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	0.38 J	
Chloromethane	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	
cyclohexane	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
1,2-dibromomethane	NR	NR	NR	NR	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
1,2-dichlorobenzene	ND	ND	ND	ND	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	
1,3-dichlorobenzene	ND	ND	ND	ND	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	
1,4-dichlorobenzene	ND	ND	ND	ND	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
1,1-dichloroethane	4.03 J	4.00 J	3.69 J	3.87 J	0.53J	0.93J	1.2J	0.82J	0.60J	0.58J	0.42J	ND	0.61 J	0.64 J	ND	0.50 J	4.2	
1,2-dichloroethane	ND	ND	ND	0.205 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,1-dichloroethene	1.1 J	1.22 J	1.13 J	1.02 J	ND	0.58J	0.55J	0.63J	ND	ND	ND	ND	ND	ND	ND	ND	0.55 J	
cis-1,2-dichloroethene	0.39 J	0.275 J	0.377 J	0.295 J	ND	0.55J	1.9	1.0	0.78J	0.80J	0.55J	0.43J	0.56 J	0.32 J	0.39 J	0.34 J	0.32 J	
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,2-dichloropropane	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	
cis-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	
1,4-dioxane	NR	NR	NR	NR	5.34	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	
2-hexanone	NR	NR	NR	NR	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	
isopropylbenzene	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
methyl acetate	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	
4-methyl-2-pentanone	NR	NR	NR	NR	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	
styrene	NR	NR	NR	NR	ND	ND	ND	NR	ND	ND	ND	ND	NR	NR	NR	NR	NR	
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	ND	NR	ND	ND	ND	ND	NR	ND	ND	ND	ND	
Tetrachloroethene	0.295 J	0.324 J	0.407 J	0.406 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
Toluene	ND	ND	ND	ND	ND	0.85J	1.0	ND	0.52J	0.49J	0.50J	ND	NR	0.24 J	0.29 J	0.19 J	ND	
1,1,1-trichloroethane	0.754 J	0.817 J	0.641 J	0.753 J	ND	0.37J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
1,1,2-trichloroethane	0.312 J	0.346 J	0.381 J	0.429 J	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	
Trichloroethene	3.21 J	3.13 J	3.06 J	ND	37.6	34.6	12.0	15.0	0.42J	ND	ND	1.7	1.6	0.89 J	0.67 J	0.67 J	9.0	
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
xylenes (total)	NR	NR	NR	NR	ND	1.4J	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	
Mercury (EPA 245.1) ug/L	ND	ND	ND	ND	NR	NR	0.05J	NR	<0.20	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	
TSS (SM20 2540D) mg/L	ND	2.3	3.9	3.8	NR	NR	2260.0	NR	58.0	<4.0	<4.0	<4.0	181	5	36	6	25	

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW2-MW1															
Sample Date	8/21/2012	12/7/2012	3/13/2013	6/17/2013 <sup>(2)</sup>	9/17/2013	12/17/2013	12/17/2013	3/25/2014	9/23/2014	3/26/2015	9/14/2015	3/21/2016	3/21/2016	9/15/2016	3/1/2017	9/13/2017
Comments							Duplicate						Duplicate			
Well Depth (Ft)	510															
Screened Interval (Ft)	470-510															
VOCS (EPA 624) ug/L <sup>(4)</sup>																
Acrolein	30 R	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	ND	0.68 J	0.54 J	ND	0.59 J	ND	ND	0.21 J	0.21 J	0.56 J	ND	ND	0.18 J	ND	0.51 J	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	1.8 J	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.0 J	1.6 J	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	ND	ND	ND	NR	ND	2.0 R	2.0 R	ND	ND	ND	ND	ND	ND	ND	NR	ND
Chloroform	ND	ND	ND	2.9	ND	ND	ND	2.8 J	1.5	0.46 J	2.2	3.4	3.5	2.4	0.25 J	2
Chloromethane	ND	ND	ND	ND	ND	ND	ND	0.68 J	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	4.8	0.58 J	0.52 J	7.0	ND	5.8	6.4	5.1	ND	2.1	6.3	8.7	8.5	6.4	1.7	6.6
1,2-dichloroethane	ND	ND	ND	1.3	ND	1.9 J	1.7 J	1.3	0.69 J	0.41 J	1.4	1.4	1.3	0.93 J	ND	0.71 J
1,1-dichloroethene	0.95 J	0.19 J	ND	1.9	ND	2.6	2.6	1.8	1.3 J	0.61 J	2.6	3.7	3.4	1.6	0.27 J	1.3
cis-1,2-dichloroethene	0.39 J	0.33 J	0.29 J	7.7	0.77 J	11.0 J	11.1 J	8.0	4.0	2.6	13.3	15.3	15.0	6.1	1.3	2.6
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND
2-hexanone	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	0.27 J	ND	ND	0.31 J	ND	ND	ND	ND	0.26 J	ND	0.20 J	ND	ND	ND	ND
1,1,1-trichloroethane	0.33 J	ND	ND	0.84	ND	0.94 J	0.94 J	ND	0.39 J	ND	ND	ND	ND	0.56 J	ND	0.49 J
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	20.8	0.73 J	0.67 J	14	1.5	34.6	33.5	23.4	18.3	4.3	27.5	43.9	44.2	18	2.1	8.6
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	12	10	ND	13	12	30	24	12	6	17	11	24	26	3.8	13.8	8.7

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW2-MW1								RW2-MW2			RW2-MW3			
	3/5/2018	9/11/2018	3/7/2019	9/25/2019	3/12/2020	10/6/2020	3/11/2021	9/29/2021	5/4/2005	7/21/2005	6/17/2013 <sup>(2)</sup>	5/3/2005	7/20/2005	5/28/2009	6/18/2013 <sup>(2)</sup>
Comments															
Well Depth (Ft)	510								510			510			
Screened Interval (Ft)	470-510								470-510			470-510			
VOCS (EPA 624) ug/L <sup>(4)</sup>															
Acrolein	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	30 R	NR
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR
Acetone	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	0.250 J	ND	ND	0.233 J	0.208 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	NR	NR	NR	NR	NR	NR	NR	R	R	ND	R	R	ND	ND
carbon disulfide	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	NR	ND	ND	ND	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chloroform	1.0	0.550 J	2.03 J	ND	ND	ND	ND	ND	ND	ND	0.55	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	NR	ND	ND	ND	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	NR	ND	ND	ND	NR
1,2-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	ND	NR
1,3-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	ND	NR
1,4-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	ND	NR
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	6.5	2.75	7.81	6.03	2.18 J	2.38	2.36 J	2.31 J	ND	0.78J	4.9	0.68J	0.31J	1.4	7.4
1,2-dichloroethane	0.39 J	0.330 J	0.552 J	0.627 J	0.26 J	0.393 J	0.372 J	0.474 J	ND	ND	0.32 J	ND	ND	ND	ND
1,1-dichloroethene	1.5	0.470 J	1.67 J	1.87 J	0.269 J	0.532 J	0.479 J	0.554 J	ND	0.41J	0.72	ND	ND	0.42J	ND
cis-1,2-dichloroethene	1.2	1.09	2.42 J	7.18	1.66 J	4.01 J	4.56 J	3.77 J	0.33J	0.41J	4.6	0.40J	0.66J	2.3	ND
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	7.45J	NR	NR	7.42J	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-hexanone	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND
styrene	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	NR	ND	ND	ND	NR
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	0.33J	0.53J	ND	ND	0.50J	0.39J	ND
1,1,1-trichloroethane	0.43 J	ND	0.761 J	0.712 J	ND	ND	ND	ND	ND	ND	0.34 J	ND	ND	ND	ND
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	D	ND	ND	ND	ND	ND	ND
Trichloroethene	7.1	2.61	9.65	15.7	1.49 J	2.82 J	2.86 J	ND	7.8	13.8	12	16.2	20.6	18.0	60
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	NR	ND	ND	ND	NR
Mercury (EPA 245.1) ug/L	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	ND	NR
TSS (SM20 2540D) mg/L	12.1	7.6	24.2	14	36.2	116	2.7	18.3	NR	NR	NR	NR	NR	14.8	NR

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW3-MW1															
Sample Date	1/19/2010	4/22/2010	7/29/2010	11/9/2010	3/25/2011	3/25/2011	6/14/2011	9/27/2011	11/30/2011	11/30/2011	3/7/2012	6/7/2012	8/22/2012	12/6/2012	3/14/2013	6/20/2013 <sup>(2)</sup>
Comments						Duplicate				Duplicate						
Well Depth (Ft)	350															
Screened Interval (Ft)	330-350															
VOCS (EPA 624) ug/L <sup>(4)</sup>																
Acrolein	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	30 R	ND	ND	NR
Acrylonitrile	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR
Acetone	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND
carbon disulfide	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	0.19J	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR
Chloroform	ND	ND	ND	0.20J	ND	ND	NR	ND	ND	ND	ND	ND	ND	0.63 J	ND	ND
Chloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR
1,3-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR
1,4-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	1.6	1.5	1.7	1.4	1.3	1.3	1.1	1.0 J	0.96 J	0.93 J	0.90 J	0.80 J	0.87 J	0.98 J	1.2	ND
1,2-dichloroethane	0.27J	ND	ND	ND	ND	ND	ND	0.57 J	ND	ND	0.43 J	ND	ND	0.50 J	ND	ND
1,1-dichloroethene	1.2	1.3	1.2	1.2	1.2	1.1	0.85 J	0.65 J	0.64 J	0.66 J	0.47 J	0.19 J	0.54 J	0.65 J	0.68 J	ND
cis-1,2-dichloroethene	0.37J	ND	0.32J	0.45J	0.47J	0.45J	0.48 J	0.31 J	0.36 J	0.43 J	0.37 J	0.39 J	0.36 J	0.44 J	0.38 J	ND
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-hexanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND
styrene	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	0.49J	0.81J	0.73J	1.5	1.4	1.6	1.2	1.3 J	1.0	1.1	1.0	0.33 J	ND	0.44 J	1.6	1.8 J
Toluene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	0.26 J	ND	ND	ND	ND
1,1,1-trichloroethane	ND	0.98J	0.84J	1.2	1.1	1.1	0.78 J	1.0 J	0.59 J	0.63 J	0.58 J	0.54 J	0.42 J	0.34 J	0.49 J	ND
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	35.0	53.2	52.3	77.6	76.2	77.9	63.1	72.4 J	51.0	55.2	59.0	42.5	37.7	42.8	46.6	49
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xlenes (total)	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	NR	<0.20	<0.20	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	NR	<4.0	<4.0	<4.0	<4.0	<4.0	5160	ND	ND	ND	NR	17	ND	ND	16	ND

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW3-MW1															
Sample Date	6/20/2013 <sup>(2)</sup>	9/18/2013	12/17/2013	3/25/2014	9/23/2014	3/25/2015	9/15/2015	3/22/2016	9/14/2016	3/2/2017	9/12/2017	3/6/2018	9/11/2018	3/5/2019	9/25/2019	3/11/2020
Comments	Duplicate															
Well Depth (Ft)	350															
Screened Interval (Ft)	330-350															
VOCS (EPA 624) ug/L <sup>(4)</sup>																
Acrolein	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR
Acrylonitrile	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	NR	NR	NR
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	ND	1.2 J	1.2	1.1	0.69 J	0.64 J	0.76 J	0.40 J	0.33 J	ND	ND	ND	ND	ND	ND	ND
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	ND	0.57 J	0.69 J	0.74 J	0.43 J	0.42 J	0.41 J	0.29 J	0.21 J	ND	ND	ND	ND	ND	ND	ND
cis-1,2-dichloroethene	ND	0.43 J	0.41 J	0.38 J	0.30 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND
2-hexanone	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	1.7 J	1.2	1.6	1.5	1.6	2.2	1.6	2.5	2.3	1.9	1.6	1.7	1.71	ND	1.69 J	1.73 J
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ND	0.61 J	0.66 J	0.66 J	0.39 J	0.35 J	0.36 J	0.30 J	0.21 J	ND	ND	ND	ND	ND	ND	ND
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	48	62.7	60.5	60.0	43.4	41.8	45.4	37.6	40	27	22	19	19.2	19.3	21.1	18.4
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	ND	ND	ND	ND	ND	ND	0.04 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	9.5 J	ND	15	14	8	12	ND	ND	ND	3.3	2.9	1.3	3.3	16.4	16	15.3

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW3-MW1			RW3-MW2														
	10/6/2020	3/11/2021	9/29/2021	1/19/2010	1/19/2010	4/22/2010	7/29/2010	11/9/2010	11/9/2010	3/25/2011	6/14/2011	9/27/2011	11/30/2011	3/8/2012	6/7/2012	8/22/2012	8/22/2012	
Sample Date					Duplicate			Duplicate									Duplicate	
Comments																		
Well Depth (Ft)	350			495														
Screened Interval (Ft)	330-350			475-495														
VOCS (EPA 624) ug/L <sup>(4)</sup>																		
Acrolein	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	30 R	30 R
Acrylonitrile	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND
Acetone	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	0.23 J	ND	ND	ND
Chloromethane	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	ND	ND	ND	ND	ND	0.54J	ND	ND	ND	ND	0.52 J	0.37 J	ND	0.41 J	0.66 J	0.74 J	0.73 J	0.73 J
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	ND	ND	ND	ND	ND	1.2	ND	ND	ND	ND	0.57 J	0.45 J	0.27 J	0.27 J	0.36 J	0.49 J	0.49 J	0.49 J
cis-1,2-dichloroethene	ND	ND	ND	1.5J	1.6J	2.4	1.1	0.92J	0.92J	1.6	1.7	1.1	1.4	1.3	1.5	1.6	1.5	1.5
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	0.43 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
2-hexanone	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR
1,1,1,2-tetrachloroethane	ND	ND	ND	NR	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	2.50 J	1.38 J	1.91 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.28 J	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ND	ND	ND	ND	ND	0.58J	ND	ND	ND	ND	0.39 J	0.43 J	ND	ND	0.54 J	0.52 J	0.49 J	0.49 J
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	ND	0.25 J	0.27J	ND	NR	0.32 J	0.32 J	0.32 J	ND	ND	ND	ND
Trichloroethene	23.1	18.7	21.6	160	170	211	73	58.2	60.9	110	135	151	71.9	96.5	209	198	192	192
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	ND	ND	ND	NR	NR	<0.20	<0.20	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	1.1	1.3	ND	NR	NR	5.0	6.0	ND	10.0	10.0	7	6	ND	8	ND	ND	ND	ND

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW3-MW2															
Sample Date	12/4/2012	12/4/2012	3/14/2013	6/20/2013 <sup>(2)</sup>	9/17/2013	12/17/2013	3/25/2014	9/23/2014	9/23/2014	3/25/2015	9/14/2015	3/22/2016	9/14/2016	9/14/2016	3/2/2017	3/2/2017
Comments		Duplicate							Duplicate					Duplicate		Duplicate
Well Depth (Ft)	495															
Screened Interval (Ft)	475-495															
VOCS (EPA 624) ug/L <sup>(4)</sup>																
Acrolein	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR
Chloroform	0.62 J	0.64 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.27 J	0.24 J	0.23 J	0.26 J	0.24 J
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	0.69 J	0.71 J	0.68 J	ND	0.65 J	0.59 J	0.62 J	0.51 J	0.51 J	0.56 J	0.47 J	0.52 J	0.39 J	0.34 J	0.39 J	0.47 J
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	0.40 J	0.43 J	0.53 J	ND	0.29 J	0.45 J	0.44 J	0.38 J	0.33 J	0.33 J	0.30 J	0.46 J	0.31 J	0.37 J	0.25 J	ND
cis-1,2-dichloroethene	1.6	1.6	1.6	ND	1.3 J	1.9	1.7	1.4	1.3	1.5	1.4	1.7	1.5	1.5	1.5	1.3
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	0.69 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR
2-hexanone	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	ND	ND	ND	ND	ND	0.29 J	ND	ND	ND	0.52 J	0.66 J	0.48 J	0.54 J	0.44 J	0.38 J
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	0.42 J	0.43 J	0.41 J	ND	0.47 J	0.50 J	0.43 J	0.36 J	0.39 J	0.38 J	0.41 J	0.47 J	0.44 J	0.47 J	0.41 J	0.34 J
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.32 J	0.31 J	0.21 J	0.32 J	0.24 J
Trichloroethene	173 J	171	155	140	174	176	164	148	151	159	169	204	190	190	160	150
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW3-MW2								
	9/12/2017	3/6/2018	9/11/2018	3/5/2019	9/25/2019	3/11/2020	10/6/2020	3/11/2021	9/29/2021
Sample Date									
Comments									
Well Depth (Ft)	495								
Screened Interval (Ft)	475-495								
VOCS (EPA 624) ug/L <sup>(4)</sup>									
Acrolein	ND	ND	ND	NR	NR	NR	NR	NR	NR
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	ND	ND	ND	NR	NR	NR	NR	NR	NR
Chloroform	0.24 J	0.23 J	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	0.36 J	0.29 J	0.290 J	0.364 J	ND	0.203 J	0.287 J	0.279 J	0.350 J
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	0.26 J	ND	ND	0.256 J	ND	ND	ND	ND	ND
cis-1,2-dichloroethene	1.3	1.2	0.990 J	1.10 J	0.994 J	1.00 J	0.809 J	1.05 J	0.828 J
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	ND	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-hexanone	NR	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	0.43 J	0.38 J	0.430 J	0.328 J	0.477 J	0.367 J	0.317 J	0.274 J	0.485 J
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	0.26 J	0.33 J	ND	ND	ND	ND	ND	ND	ND
1,1,2-trichloroethane	0.26 J	ND	ND	0.240 J	0.204 J	ND	ND	ND	ND
Trichloroethene	140	130	131	118	131	128	119	90.0	89.8
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND



**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW3-MW3															
Sample Date	1/20/2010	4/22/2010	4/22/2010	7/28/2010	11/3/2010 <sup>(1)</sup>	3/25/2011	6/15/2011	9/28/2011	11/29/2011	3/7/2012	3/7/2012	6/7/2012	8/22/2012	12/4/2012	3/14/2013	6/21/2013 <sup>(2)</sup>
Comments			Duplicate								Duplicate					
Well Depth (Ft)	340															
Screened Interval (Ft)	320-340															
VOCS (EPA 624) ug/L <sup>(4)</sup>																
Acrolein	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	150 R	ND	ND	ND
Acrylonitrile	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND
carbon disulfide	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	0.40J	0.46J	ND	0.33J	NR	0.48 J	ND	0.42 J	0.42 J	2.3 J	ND	0.88 J	ND	ND
Chloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	ND	1.6	1.6	2.3	1.0	1.5	7.1	3.2 J	1.5	3.3	3.3	2.6 J	ND	4.2	4.5 J	ND
1,2-dichloroethane	ND	0.52J	0.54J	ND	ND	ND	0.37 J	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	ND	1.1	1.3	1.2	ND	0.96J	2.6	1.8 J	0.96 J	1.9	1.9	1.7 J	1.4 J	1.9	2.1 J	ND
cis-1,2-dichloroethene	ND	2.1	2.1	1.7	ND	2.3	1.2	1.9	2.1	2.1	2.1	1.4 J	1.8 J	1.2	ND	ND
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-hexanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	3.2 J	ND
4-methyl-2-pentanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	ND
styrene	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	0.45J	0.49J	ND	ND	ND	0.40 J	0.50 J	ND	0.72 J	0.69 J	ND	ND	0.43 J	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ND	0.95J	1.0J	0.72J	ND	0.62J	1.3	1.0 J	0.49 J	0.84 J	0.87 J	ND	ND	0.85 J	ND	ND
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	350	397	382	297	8.5	288	331	215 J	250	312	325	285	248	291	347	410
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	NR	<0.20	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	NR	4.0	5.0	<4.0	<4.0	<4.0	ND	ND	ND	ND	ND	13	10	5	ND	ND

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW3-MW3															
Sample Date	9/18/2013	12/17/2013	3/26/2014	9/23/2014	3/25/2015	3/25/2015	9/15/2015	3/21/2016	9/15/2016	3/2/2017	9/12/2017	9/12/2017	3/6/2018	3/6/2018	9/12/2018	9/12/2018
Comments						Duplicate						Duplicate		Duplicate		Duplicate
Well Depth (Ft)	340															
Screened Interval (Ft)	320-340															
VOCS (EPA 624) ug/L <sup>(4)</sup>																
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	ND	ND	ND	ND	2.0 R	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND
Chloroform	ND	3.4 J	ND	0.27 J	0.40 J	0.33 J	ND	ND	0.48 J	0.45 J	0.35 J	0.27 J	0.33 J	0.37 J	0.400 J	0.400 J
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	ND	3.7 J	4.9 J	1.3 J	1.8	1.8	1.2	4.0	3.5	2.9	2.5	2.2	2.0	2.3	2.08	2.24
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	0.30 J	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	ND	ND	2.4 J	0.94 J	1.5 J	1.4 J	1.1	2.4	2.0	1.3	ND	0.78 J	1.1	1.2	1.00	1.14
cis-1,2-dichloroethene	ND	ND	ND	1.2	1.3	1.3	1.3	1.1	1.1	0.83 J	0.8 J	0.76 J	0.63 J	0.59 J	0.590 J	0.640 J
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND
2-hexanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	6.2 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	ND	ND	ND	0.36 J	0.37 J	0.77 J	0.71 J	0.58 J	0.43 J	0.31 J	0.44 J	0.36 J	0.32 J	0.390 J	0.390 J
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ND	ND	ND	0.40 J	0.48 J	0.45 J	0.36 J	1.1	0.75 J	0.69 J	0.46 J	0.38 J	0.61 J	0.57 J	0.550 J	0.530 J
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	322	322	350	147	182	184	138	284	260	200	100	95	150	160	124	155
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	ND	ND	ND	ND	ND	ND	ND	ND	1.1	2.4	3	1.9	4.7 J	2.8 J	5.7	6.0

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW3-MW3											
Sample Date	3/5/2019	3/5/2019	9/25/2019	9/25/2019	3/11/2020	3/11/2020	10/6/2020	10/6/2020	3/11/2021	3/11/2021	9/29/2021	9/29/2021
Comments		Duplicate		Duplicate		Duplicate		Duplicate		Duplicate		Duplicate
Well Depth (Ft)	340											
Screened Interval (Ft)	320-340											
VOCS (EPA 624) ug/L <sup>(4)</sup>												
Acrolein	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	NR	NR	NR	NR	NR	ND	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Chloroform	0.420 J	0.370 J	ND	ND	0.269 J	0.324 J	0.328 J	0.342 J	0.364 J	0.334 J	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	2.21 J	1.97 J	1.85 J	1.80 J	2.01 J	2.06 J	1.78 J	1.90 J	1.59 J	1.50 J	1.73 J	1.66 J
1,2-dichloroethane	ND	ND	0.255 J	ND	ND	0.223 J	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	1.17 J	1.14 J	1.52 J	1.36 J	1.13 J	1.26 J	1.38 J	1.39 J	0.880 J	0.970 J	1.01 J	1.13 J
cis-1,2-dichloroethene	0.840 J	0.805 J	1.07 J	1.05 J	0.91 J	0.983 J	0.803 J	0.840 J	0.655 J	0.686 J	0.578 J	0.777 J
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-hexanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	ND	0.672 J	0.727 J	0.446 J	0.471 J	0.533 J	0.545 J	0.429 J	0.517 J	0.411 J	0.493 J
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	0.594 J	0.599 J	0.518 J	0.467 J	0.472 J	0.388 J	0.402 J	0.384 J	ND	0.273 J	0.438 J	0.286 J
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	151	147	176	172	178 J	183	180	180	159	159	176	179
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	0.88 J	0.122 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	5.1	1.6	2.6 J	1.7	2.3	2.3	6.5	5.9	1.2	1.6	3.2	2.7

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW3-MW4															
Sample Date	1/20/2010	4/22/2010	7/28/2010	7/28/2010	11/3/2010 <sup>(1)</sup>	3/24/2011	6/15/2011	9/28/2011	11/29/2011	3/7/2012	6/7/2012	8/22/2012	12/4/2012	3/14/2013	6/21/2013 <sup>(2)</sup>	9/17/2013
Comments				Duplicate												
Well Depth (Ft)	495															
Screened Interval (Ft)	475-495															
VOCS (EPA 624) ug/L <sup>(4)</sup>																
Acrolein	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	30 R	ND	ND	NR	ND
Acrylonitrile	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND
Acetone	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	NR
Benzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND
Chloroform	ND	ND	ND	ND	0.32J	ND	NR	0.87 J	ND	0.38 J	ND	ND	0.71 J	ND	1.2	ND
Chloromethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND
1,3-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND
1,4-dichlorobenzene	NR	NR	NR	NR	NR	NR	NR	ND	ND	ND	ND	ND	ND	ND	NR	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	2.5	0.6	0.54J	0.50J	1.8	0.81	0.78 J	5.4 J	0.84 J	1.8	0.50 J	ND	1.2	3.8	4.6	2.9
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.23 J	ND
1,1-dichloroethene	1.0	ND	ND	ND	0.86J	ND	0.20 J	0.53 J	ND	0.21 J	ND	ND	0.19 J	0.38 J	0.42 J	ND
cis-1,2-dichloroethene	0.46J	ND	ND	ND	1.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-hexanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	NR	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ND	ND	ND	ND	0.67J	ND	ND	0.66 J	ND	ND	ND	ND	ND	ND	0.29 J	ND
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	21	11	7.5	8.0	308	7.7	6.7	3.4 J	5.6	4.6	5.4	5.5	4.5	2.3	1.8	5.0
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xlenes (total)	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	NR	<0.20	<0.20	<0.20	<0.20	<0.20	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	NR	16.0	<4.0	<4.0	<4.0	<4.0	ND	11	6	5	ND	ND	ND	22	ND	ND

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	RW3-MW4																
	12/17/2013	3/26/2014	9/23/2014	3/25/2015	9/15/2015	3/21/2016	9/15/2016	3/2/2017	9/12/2017	3/6/2018	9/12/2018	3/5/2019	9/25/2019	3/11/2020	10/5/2020	3/11/2021	9/29/2021
Sample Date																	
Comments																	
Well Depth (Ft)	z																
Screened Interval (Ft)	475-495																
VOCS (EPA 624) ug/L <sup>(4)</sup>																	
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	NR	NR	NR	NR	NR	NR
Chloroform	ND	1.2 J	0.38 J	1.2	ND	0.64 J	ND	ND	0.21 J	0.47 J	ND	0.996 J	ND	0.954 J	ND	0.367 J	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	4.9	5.5	2.7 J	6.9	0.88 J	4.9	2.0	1.5	2.6	3.9	1.47	6.22	5.72	6.99	1.50 J	3.03 J	4.60 J
1,2-dichloroethane	ND	0.37 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.235 J	0.253 J	ND	ND	ND	ND
1,1-dichloroethene	0.39 J	0.95 J	0.37 J	1.3 J	0.21 J	0.85 J	0.40 J	0.27 J	0.41 J	0.70 J	0.340 J	0.981 J	1.37 J	1.7 J	0.409 J	0.842 J	1.22 J
cis-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	0.21 J	ND	ND	0.351 J	0.475 J	0.465 J	ND	ND	0.304 J
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-hexanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	ND	ND	0.43 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	ND	ND	ND	0.31 J	0.46 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	0.39 J	0.48 J	ND	0.60 J	ND	0.48 J	0.24 J	ND	0.26 J	0.40 J	ND	0.481 J	0.668 J	0.727 J	ND	0.422 J	0.624 J
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	4.4	3.3	2.5	2.7	4.1	2.9	4.3	4.1	5.4	1.5	2.66	2.12 J	1.30 J	2.15 J	3.02 J	3.30 J	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	ND	9	5	5	ND	ND	1.4	ND	1.3	ND	ND	1.3	2.7	2.6	2.2	2.2	ND

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	TP-01															
Sample Date	1/21/2010	6/15/2011	9/27/2011	9/27/2011	11/30/2011	3/8/2012	6/6/2012	8/22/2012	12/4/2012	3/13/2013	3/13/2013	6/17/2013 <sup>(2)</sup>	9/17/2013	9/17/2013	12/16/2013	3/25/2014
Comments				Duplicate							Duplicate			Duplicate		
Well Depth (Ft)	470															
Screened Interval (Ft)	450-470															
VOCS (EPA 624) ug/L <sup>(4)</sup>																
Acrolein	NR	NR	ND	ND	ND	ND	ND	30 R	ND	ND	ND	NR	ND	ND	ND	ND
Acrylonitrile	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND
Acetone	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.34 J	ND	ND	ND	ND
Bromoform	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	ND	ND	ND	ND	ND	ND	ND	2.0 R	2.0 R	NR	ND	ND	ND	ND
Chloroform	ND	NR	0.68 J	0.74 J	ND	0.74 J	0.82 J	ND	2.5 J	1.2	1.1	11	5.2 J	ND	7.4	6.8 J
Chloromethane	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND
1,3-dichlorobenzene	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND
1,4-dichlorobenzene	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	3.6J	5.0	3.7	3.7	2.9	3.7	3.7	3.4	1.1	1.5	1.4	3.2	2.1 J	2.8	1.5	ND
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	0.35 J	0.36 J	0.37 J	0.30 J	ND	ND	ND	ND
1,1-dichloroethene	ND	1.7	1.1	1.0	1.0	1.2	1.4	1.1	0.23 J	0.44 J	0.42 J	0.77	0.66 J	0.74 J	0.33 J	0.22 J
cis-1,2-dichloroethene	190	43.4	40.4	40.2	74.9	53.3	29.9	16.1	4.2	5.8	5.8	8.7	14.1 J	14.7	8.0	5.3
trans-1,2-dichloroethene	3.0J	1.1	1.0 J	0.92 J	1.1	0.87 J	0.79 J	0.35 J	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-hexanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	NR	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	3.4J	3.3	4.4	4.4	3.6	4.7	6.0	4.0	0.42 J	0.34 J	0.32 J	1.6	0.77 J	1.5 J	0.57 J	ND
Toluene	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ND	0.63 J	0.73 J	0.76 J	0.29 J	0.57 J	1.1 J	0.86 J	ND	0.35 J	0.35 J	0.62	0.66 J	0.66 J	0.50 J	ND
1,1,2-trichloroethane	ND	NR	0.31 J	0.31 J	0.32 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	65	35.3	41.0	39.6	38.0	38.1	40.4	27.9	22.0	25.9	25.4	25	27.0	26.7	29.8	21.7
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	NR	63	18	NR	ND	7	6	ND	ND	ND	ND	ND	ND	ND	ND	ND

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	TP-01															
	9/22/2014	3/25/2015	9/14/2015	9/14/2015	3/21/2016	9/14/2016	3/1/2017	9/13/2017	3/5/2018	9/11/2018	3/6/2019	9/25/2019	3/12/2020	10/6/2020	3/11/2021	9/29/2021
Comments				Duplicate												
Well Depth (Ft)	470															
Screened Interval (Ft)	450-470															
VOCS (EPA 624) ug/L <sup>(4)</sup>																
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	0.53 J	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
carbon disulfide	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	ND	ND	2.0 R	ND	ND	ND	NR	ND	ND	ND	NR	NR	NR	NR	NR	NR
Chloroform	1.9	2.6	1.3	1.3	1.7	1.6	1.2	6.3	2.0	1.08	0.684 J	ND	ND	0.292 J	1.17 J	0.478 J
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cyclohexane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dibromomethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,2-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1-dichloroethane	1.3 J	2.5	2.1	2.0	1.8	2.1	0.78 J	1.3	1.2	1.24	0.717 J	0.381 J	0.335 J	0.363 J	0.629 J	0.533 J
1,2-dichloroethane	0.67 J	0.88 J	0.82 J	0.82 J	0.86 J	0.70 J	0.45 J	0.79	0.79 J	0.650 J	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	0.47 J	1.2 J	0.77 J	0.83 J	0.75 J	0.68 J	0.23 J	0.36 J	0.46 J	0.420 J	ND	ND	ND	ND	0.301 J	0.221 J
cis-1,2-dichloroethene	7.6	13.4	11.3	11.6	10.8	12	5	11	12	12.1	6.01	3.75 J	3.01 J	3.14 J	4.73 J	2.51 J
trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Ethylbenzene	ND	ND	ND	ND	ND	ND	NR	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-hexanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
methyl acetate	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	ND	0.37 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-methyl-2-pentanone	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
styrene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
1,1,1,2-tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Tetrachloroethene	ND	0.48 J	0.82 J	0.88 J	0.72 J	0.37 J	0.22 J	ND	ND	ND	ND	ND	ND	ND	0.680 J	1.21 J
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-trichloroethane	ND	ND	ND	ND	ND	0.49 J	0.25 J	0.29 J	0.27 J	ND	ND	ND	ND	ND	ND	ND
1,1,2-trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	31.9	52.3	53.0	53.9	61.7	47	21	54	55	38.2	28.3	14.4	12.7	11.1	15.6	13
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	ND	1.0	ND	1.7

**Table 8**  
**GM-38 Area Groundwater Remediation**  
**Groundwater Treatment Plant**  
**Naval Weapons Industrial Reserve Plant - Bethpage, NY**  
**Summary of Historical Groundwater Analytical Results**  
**Through Fourth Quarter 2021**

Sample ID	IW-1 MW-1		IW-1	RW-3 <sup>(3)</sup>				
	5/3/2005	6/18/2013 <sup>(2)</sup>		5/27/2009	9/15/2015	3/22/2016	9/15/2016	3/2/2017
Comments								
Well Depth (Ft)	150		230	530				
Screened Interval (Ft)	20-150		200-230	392-412				
<b>VOCS (EPA 624) ug/L<sup>(4)</sup></b>								
Acrolein	NR	NR	NR	ND	ND	ND	ND	ND
Acrylonitrile	NR	NR	NR	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	NR	NR
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND
2-butanone	R	ND	ND	NR	NR	NR	NR	NR
carbon disulfide	ND	NR	ND	NR	NR	NR	NR	NR
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	NR	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND
2-chloroethylvinyl ether	NR	NR	NR	ND	ND	ND	NR	ND
Chloroform	0.94J	ND	0.98J	ND	0.46 J	0.26 J	ND	0.28 J
Chloromethane	ND	ND	ND	ND	ND	ND	NR	ND
cyclohexane	NR	NR	ND	NR	NR	NR	NR	NR
1,2-dibromo-3-chloro-propane	ND	NR	ND	NR	NR	NR	NR	NR
1,2-dibromomethane	ND	NR	ND	NR	NR	NR	NR	NR
1,2-dichlorobenzene	NR	NR	ND	ND	ND	ND	ND	ND
1,3-dichlorobenzene	NR	NR	ND	ND	ND	ND	ND	ND
1,4-dichlorobenzene	NR	NR	ND	ND	ND	ND	ND	ND
dichlorodifluoromethane	NR	NR	ND	NR	NR	NR	NR	NR
1,1-dichloroethane	0.39J	0.51	0.22J	1.9	2.1	1.8	1.4 J	1.5
1,2-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethene	ND	ND	ND	1.9	2.5	1.5	1.3 J	1.4
cis-1,2-dichloroethene	ND	ND	ND	1.6	2.4	1.4	1.6 J	1.9
trans-1,2-dichloroethene	ND	ND	ND	ND	0.23 J	ND	ND	ND
1,2-dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND
1,4-dioxane	NR	NR	NR	NR	NR	NR	NR	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	NR	ND
2-hexanone	ND	ND	ND	NR	NR	NR	NR	NR
isopropylbenzene	NR	NR	ND	NR	NR	NR	NR	NR
methyl acetate	NR	NR	ND	NR	NR	NR	NR	NR
Methylene chloride	ND	ND	ND	ND	0.64 J	ND	ND	ND
4-methyl-2-pentanone	ND	ND	ND	NR	NR	NR	NR	NR
styrene	ND	NR	ND	NR	NR	NR	NR	NR
1,1,2,2-tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-trichlorobenzene	NR	NR	ND	NR	NR	NR	NR	NR
Tetrachloroethene	ND	0.55	ND	0.68 J	0.79 J	0.64 J	0.60 J	0.65 J
Toluene	ND	ND	0.19J	ND	ND	ND	ND	ND
1,1,1-trichloroethane	0.47	0.92	0.49J	0.96 J	1.3	0.95 J	ND	0.83 J
1,1,2-trichloroethane	ND	ND	ND	0.30 J	0.49 J	0.29 J	ND	0.45 J
Trichloroethene	ND	ND	0.17J	237	371	230	230	220
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND
xylenes (total)	ND	NR	ND	NR	NR	NR	NR	NR
Mercury (EPA 245.1) ug/L	NR	NR	0.20	ND	ND	ND	ND	ND
TSS (SM20 2540D) mg/L	NR	NR	2.4	ND	ND	ND	2.4	8.1

**Note:**

VOC analysis changed from SW846 8260B to EPA Method 624 in January 2010.

D = Dilution

J = estimated value

J- =biased low estimated value

ND = not detected

NR = not reported / required

R = rejected

mg/L - milligrams per liter

µg/L - micrograms per liter

(1) Analytical results presented above for samples collected from RW3-MW3 and RW3-MW4 in November 2010 are not consistent with historical trends, indicating samples may have been switched. For trend analysis, concentrations for RW3-MW3 were used for RW3-MW4 for November 2010 and vice versa.

(2) VOCs were analyzed by USEPA Method 524.2 (as opposed to Method 624) in June 2013 to correlate with samples collected under the Bethpage Regional Plume Comprehensive Groundwater Sampling Plan conducted in June 2013.

(3) RW-3, previously an active extraction well sampled on a monthly basis, was taken off-line on 7/1/15. While off-line, RW-3 was sampled semi-annually in conjunction with the semi-annual LTM events.

(4) Samples were analyzed for TCL VOCs, including tentatively identified compounds (TICs), beginning in March 2016. No TICs were detected, unless otherwise indicated.

Data prior to June 2011 were collected by others.



**APPENDIX A**

**NYSDEC EFFLUENT LIMITATIONS AND MONITORING  
REQUIREMENTS AND  
OCTOBER - DECEMBER 2021 DMRS**

**New York State Department of Environmental Conservation**

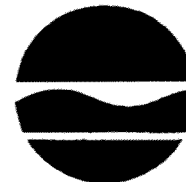
**Division of Water**

**Bureau of Water Permits, 4<sup>th</sup> Floor**

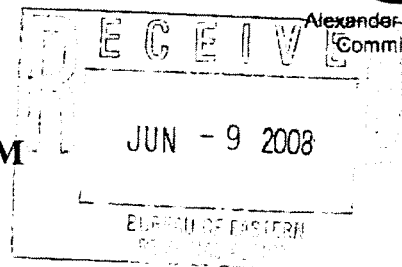
625 Broadway, Albany, New York 12233-3505

Phone: (518) 402-8111 • FAX: (518) 402-9029

Website: www.dec.state.ny.us



Alexander-B. Grannis  
Commissioner



**MEMORANDUM**

**TO:** Steven Scharf, DER

**FROM:** Jean Occidental, DOW, Bureau of Water Permits JO

**SUBJECT:** Naval Weapons Industrial Reserve Plant (NWIRP); DER Site # 1-01-001

**DRAINAGE BASIN:** na

**DATE:** June 6, 2008

In response to your request and the permittee's SPDES Permit Equivalent Application dated April 27, 2008, attached is the effluent criteria for the above noted groundwater remediation discharge.

The Division of Water does not have any regulatory authority over a discharge from a State, PRP, or Federal Superfund Site. The Division of Environmental Remediation will be responsible for ensuring compliance with the attached effluent criteria and approval of all engineering submissions. Additional Condition (1) identifies the contact to send all effluent results, engineering submissions, and modification requests. The Regional Water Engineer should be kept appraised of the status of these discharges and, in accordance with the attached criteria, receive a copy of the effluent results for informational purposes.

If you have any questions, please call me at (518) 402-8116.

Attachment

cc: (w/att) RWE, Region 1  
 C. Webber  
 BWP Permit Coordinator

Naval Weapons Industrial Reserve Plant

DER site # 1-01-001

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## EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning: April 1, 2009and lasting until: April 1, 2014

the discharges from the treatment facility to Groundwater shall be limited and monitored by the operator as specified below:

Outfall and Parameters	Limitations		Units	Minimum Monitoring Requirements	
	Daily Avg.	Daily Max.		Measurement Frequency	Sample Type
Treated Groundwater Remediation Discharge from: Recovery Wells 1, 2, and 3					
Flow	Monitor	1100	GPM	Continuous	Recorder
pH (range)	5.5 - 8.5		SU	Weekly	Grab
1,1-Dichloroethane	NA	5	µg/l	Monthly <sup>1</sup>	Grab
1,2-Dichloroethane	NA	0.6	µg/l	Monthly <sup>1</sup>	Grab
1,1-Dichloroethene	NA	5	µg/l	Monthly <sup>1</sup>	Grab
cis-1,2-Dichloroethene	NA	5	µg/l	Monthly <sup>1</sup>	Grab
trans-1,2-Dichloroethene	NA	5	µg/l	Monthly <sup>1</sup>	Grab
Tetrachloroethene	NA	5	µg/l	Monthly <sup>1</sup>	Grab
1,1,1-Trichloroethane	NA	5	µg/l	Monthly <sup>1</sup>	Grab
Trichloroethene	NA	5	µg/l	Monthly <sup>1</sup>	Grab
Vinyl chloride	NA	2	µg/l	Monthly <sup>1</sup>	Grab
Mercury	NA	0.25	µg/l	Monthly <sup>1</sup>	Grab

Footnotes:

- (1) The minimum measurement frequency shall be monthly following a period of 24 consecutive weekly sampling events showing no exceedances of the stated discharge limitations.

Naval Weapons Industrial Reserve Plant

DER site # 1-01-001

Page 1 of 2

Additional Conditions:

- (1) Discharge is not authorized until such time as an engineering submission showing the method of treatment is approved by the Department. The discharge rate may not exceed the effective or design treatment system capacity. All monitoring data, engineering submissions and modification requests must be submitted to:

Steven Scharf  
Division of Environmental Remediation  
NYSDEC, 625 Broadway  
Albany, NY 12233-7015  
Phone: (518) 402-9620

With a copy sent to:

Regional Water Engineer  
NYSDEC - Region 1  
Building 40, SUNY Campus  
Stony Brook, New York 11790-2356  
Phone: (631) 444-0354

- (2) Only site generated wastewater is authorized for treatment and discharge.
- (3) Authorization to discharge is valid only for the period noted above but may be renewed if appropriate. A request for renewal must be received 6 months prior to the expiration date to allow for a review of monitoring data and reassessment of monitoring requirements.
- (4) Any use of corrosion/scale inhibitors, biocidal-type compounds, or other water treatment chemicals used in the treatment process must be approved by the department prior to use.
- (5) This discharge and administration of this discharge must comply with the substantive requirements of 6NYCRR Part 750.

# NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Environmental Remediation, Remedial Bureau D

625 Broadway, 12th Floor, Albany, NY 12233-7013

P: (518) 402-9676 | F: (518) 402-9773

[www.dec.ny.gov](http://www.dec.ny.gov)

August 31, 2017

Ms. Lora Fly  
Remedial Project Manager  
Naval Facilities Engineering Command  
9324 Virginia Ave.  
Bldg. Z-144, Code OPTE3-6  
Norfolk, VA 23511

Re: SPDES Permit Equivalent Application,  
Naval Weapons Industrial Reserve  
Plant Site (NWIRP), Bethpage.  
NYSDEC Site No 130003B

Lora:

The Department of the Navy (Navy) has requested to renew the State Pollutant Discharge Elimination System (SPDES) effluent for the GM-38 groundwater extraction and treatment system. The New York State Department Environmental Conservation (NYSDEC) has reviewed this request and has established discharge limits for the GM-38 system. These discharge limits, and associated reporting requirements, are detailed in the attached memorandum from the NYSDEC Division of Water.

Thanks and please do not hesitate to contact me at (518) 402-9478 or [jason.pelton@dec.ny.gov](mailto:jason.pelton@dec.ny.gov) with any questions.

Sincerely,

Jason M. Pelton  
Project Manager  
Remedial Section B, Remedial Bureau D  
Division of Environmental Remediation

ec: B. Caldwell, EnSafe/Resolution Consultants  
S. Edwards, NYSDEC  
D. Hesler, NYSDEC  
C. Haas, NYSDEC Region 1  
W. Parish, NYSDEC Region 1  
S. Karpinski, NYSDOH  
J. DeFranco/J. Lovejoy, NCDOH  
L. Thantu, USEPA Region 2

# NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Water, Bureau of Permits

625 Broadway, Albany, New York 12233-3505

P: (518) 402-8111 | F: (518) 402-9029

www.dec.ny.gov

## MEMORANDUM

**TO:** Jason Pelton, DER  
**FROM:** Robert Wither, Chief, South Permits Section, DOW  
**SUBJECT:** Naval Weapons Industrial Reserve Plant, DER Site #1-30-003B  
**DATE:** August 18, 2017

In response to your request received July 13, 2017, attached please find effluent limitations and monitoring requirements for the above noted remediation discharge.

The DOW does not have any regulatory authority over a discharge from a State, PRP, or Federal Superfund Site. DER will be responsible for ensuring compliance with the attached effluent limitations and monitoring requirements, and approval of all engineering submissions. Footnote 1 identifies the appropriate DER contact as the place to send all effluent results, engineering submissions, and modification requests. The Regional Water Engineer should be kept appraised of the status of this discharge and, in accordance with the attached criteria, receive a copy of the effluent results for informational purposes.

If you have any questions, please call me at 518-402-8123.

Attachment (Effluent Limitations and Monitoring Requirements)

cc: Cathy Haas, RWE, Region 1

**EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS**

During the period beginning **September 1, 2017** and lasting until **August 31, 2027** the discharges from the wastewater treatment facility to groundwater, Class GA shall be limited and monitored by the operator as specified below:

Outfall Number and Parameter	Discharge Limitations		Units	Minimum Monitoring Requirements	
	Monthly Avg.	Daily Max		Measurement Frequency	Sample Type
Outfall 001 - Treated Remediation Discharge:					
Flow	Monitor	1100	GPM	Continuous	Recorder
pH (range)	5.5 - 8.5		SU	Monthly	Grab
1,1-Dichloroethane	NA	5	µg/l	Monthly	Grab
1,2-Dichloroethane	NA	0.6	µg/l	Monthly	Grab
1,1-Dichloroethene	NA	5	µg/l	Monthly	Grab
cis-1,2-Dichloroethene	NA	5	µg/l	Monthly	Grab
trans-1,2-Dichloroethene	NA	5	µg/l	Monthly	Grab
Tetrachloroethene	NA	5	µg/l	Monthly	Grab
1,1,1-Trichloroethane	NA	5	µg/l	Monthly	Grab
Trichloroethene	NA	5	µg/l	Monthly	Grab
Vinyl Chloride	NA	2	µg/l	Monthly	Grab
Mercury	NA	0.25	µg/l	Monthly	Grab
Chloroform	NA	5	µg/l	Monthly	Grab
Trichlorotrifluoroethane (Freon 113)	NA	5	µg/l	Monthly	Grab
1,4 Dioxane	NA	Monitor	µg/l	Monthly	Grab

Additional Conditions:

1. The discharge rate may not exceed the effective or design treatment system capacity. All monitoring data, engineering submissions and modification requests must be submitted to:

Jason Pelton  
Division of Environmental Remediation  
NYSDEC  
625 Broadway  
Albany, New York 12233- 7015  
518-402-9870

With a copy sent to:

Regional Water Engineer, Region 1  
NYSDEC  
SUNY @ Stony Brook  
50 Circle Road  
Stony Brook, NY 11790-3409

2. Only site generated wastewater is authorized for treatment and discharge.
3. Authorization to discharge is valid only for the period noted above but may be renewed if appropriate. A request for renewal must be received 6 months prior to the expiration date to allow for a review of monitoring data and reassessment of monitoring requirements.
4. Both concentration (mg/l or µg/l) and mass loadings (lbs/day) must be reported to the Department for all parameters except flow and pH.
5. Any use of corrosion/scale inhibitors, biocidal-type compounds, or other water treatment chemicals used in the treatment process must be approved by the department prior to use.
6. This discharge and administration of this discharge must comply with the substantive requirements of 6NYCRR Part 750.



**OCTOBER 2021**



8 November 2021

Mr. Jason Pelton  
New York State Department of Environmental Conservation  
Division of Solid & Hazardous Materials  
625 Broadway  
Albany, NY 12233-7252

**Subject: GROUNDWATER DISCHARGE MONITORING/AIR EMISSION REPORT  
GM-38 AREA, NWIRP BETHPAGE, NY; DER SITE # 1-30-003B-OU 2  
OCTOBER 2021 REPORTING PERIOD**

Dear Mr. Pelton:

KOMAN Government Solutions, LLC (KGS) is submitting this monthly monitoring report of the groundwater discharge and air emission results for the Groundwater Treatment Plant (GWTP) located at the Former Naval Weapons Industrial Reserve Plant (NWIRP), Bethpage, NY, GM-38 Area. This report was prepared in accordance with GWTP operational requirements for DER Site # 1-30-003B-OU 2, and the SPDES Permit Equivalent # 13003B.

GWTP operational data from 1 October to 31 October 2021 are presented in Attachment A. The plant was down for approximately 24 hours during the reporting period. Down time is a result of events associated with the Advanced Oxidation Process (AOP) pilot test.

As indicated in Attachment A, all SPDES permitted constituents are in compliance with regulatory guidelines during this reporting period.

Please contact me at 610-400-0636 with any questions or concerns you may have regarding this report.

Sincerely,

***KOMAN Government Solutions, LLC***

A handwritten signature in black ink that reads 'Robert G. Gregory'.

Robert G. Gregory  
Project Manager

Attachment A: Groundwater and Air Sampling Results for October 2021

cc: C. Haas, NYSDEC Region 1  
C. Engelhardt, NYSDEC Region 1  
J. Pilewski, NYSDEC – Region 1 Water Engineer  
J. Sullivan, NYSDOH  
G. Ennis, Nassau County Department of Public Works  
T. Licata, Town of Oyster Bay  
M. Russo, Town of Oyster Bay  
S. Sokolowski, NAVFAC Mid-Atlantic  
V. Varricchio, NWIRP Bethpage Facilities Management  
P. Schauble, KGS  
GM-38 Copy

**ATTACHMENT A**  
**GROUNDWATER AND AIR SAMPLING RESULTS**  
**OCTOBER 2021**

**GM-38 Area Groundwater Remediation  
Groundwater Treatment Plant  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Discharge Monitoring Report  
October 2021**

SPDES Parameters			October 2021 <sup>(1)</sup>				
Process Stream	Daily Treated Effluent Maximum <sup>(1)</sup>	Units	RW-1	RW-3	RW-4	Combined Influent (RW-1 + RW-3 + RW-4)	Treated Effluent
Well Depth	N/A	ft	445	530	655*	N/A	N/A
Screened Interval	N/A	ft bgs	335-395 410-430	392-412 442-504	550-650*	N/A	N/A
Sampling Date	N/A		10/4/21				
Effective Flowrate	1100	GPM	642	0	182	824	869
Total Flow	N/A	gallons	27,736,089	0	7,853,285	35,589,375	37,522,468
pH	5.5 - 8.5	SU	5.86	NS	6.24	5.94	6.98
Chloroform	5	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	5	µg/L	1.29 J	NS	ND (1.0)	1.01 J	ND (1.0)
1,2-Dichloroethane	0.6	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethene	5	µg/L	0.712 J	NS	2.06 J	1.009 J	ND (1.0)
cis 1,2-Dichloroethene	5	µg/L	3.81 J	NS	1.52 J	3.30 J	ND (1.0)
trans 1,2-Dichloroethene	5	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)
Tetrachloroethene	5	µg/L	18.4	NS	6.97 J	15.88	ND (1.0)
1,1,1-Trichloroethane	5	µg/L	0.471 J	NS	ND (1.0)	0.367 J	ND (1.0)
Trichloroethene	5	µg/L	64.2	NS	708	206.3	0.408 J
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	NS	6.66 J	1.470	ND (1.0)
Vinyl Chloride	2	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)
1,4-Dioxane	--	µg/L	1.9	NS	13	4.35	0.059
Mercury	0.00025	mg/L	ND (0.00010)	NS	ND (0.00010)	ND (0.00010)	ND (0.00010)
Total Suspended Solids (TSS)	N/A	mg/L	ND (1.0)	NS	27.5	6.07	ND (1.0)

**Notes:**

J - Estimated result between laboratory method detection limit and reporting limit

ND - Not detected above laboratory method detection limit. Reporting Limit (RL) given in parentheses.

NR - Not Recorded

N/A - Not Applicable

NS - Not Sampled

(1) Wastewater discharge equivalence permit renewed on 18 August 2017. Discharge limits established for 10 years. Chloroform, 1,4-dioxane and 1,1,2-trichlorotrifluoroethane are now monitored under the new permit.

\* Design depths

**GM-38 Area Groundwater Remediation  
Groundwater Treatment Plant  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Air Sampling Results  
October 2021**

DAR Parameters			October 2021	
Process Stream	Units	Discharge Goal <sup>(1)</sup>	Influent	Effluent
Sampling Date			10/4/21	
Average Flowrate	CFM	N/A	NR	8,872
Total Flow	ft <sup>3</sup>	N/A	NR	383,248,344
Total Flow	m <sup>3</sup>	N/A	NR	10,852,385
1,2-Dichloroethane	µg/m <sup>3</sup>	N/A	ND	ND
cis 1,2-Dichloroethene	µg/m <sup>3</sup>	≤ 100,000 <sup>(2)</sup>	36	17
trans 1,2-Dichloroethene	µg/m <sup>3</sup>		ND	ND
1,2-Dichloroethene (total)	µg/m <sup>3</sup>	≤ 100,000	36	17
Toluene	µg/m <sup>3</sup>	N/A	0.91 J	ND
Total Xylene	µg/m <sup>3</sup>	N/A	ND	ND
1,1,2-Trichloroethane	µg/m <sup>3</sup>	N/A	ND	ND
Trichloroethene	µg/m <sup>3</sup>	≤ 2600	2300	6.3
Vinyl Chloride	µg/m <sup>3</sup>	≤ 560	ND	ND
Tetrachloroethene	µg/m <sup>3</sup>	≤ 5100	160	5.0

Notes:

CFM - cubic feet per minute

DAR - Division of Air Resources

J - Estimated result between laboratory method detection limit and reporting limit

N/A - Not Applicable

NR - Not recorded

(1) Discharge goal as approved by NYSDEC's letter dated 31 October 2013.

(2) Discharge goal is for total 1,2-Dichloroethene.

**GM-38 Area Groundwater Remediation  
Groundwater Treatment Plant  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Controlled Stack Emissions  
October 2021**

<b>DAR Parameters</b>	<b>Units</b>	<b>Discharge Goal <sup>(1)</sup></b>	<b>October 2021</b>
Sampling Date			10/4/21
Average Flowrate	CFM	N/A	8,872
Total Flow	ft <sup>3</sup>	N/A	383,248,344
Total Flow	m <sup>3</sup>	N/A	10,852,385
Trichloroethene	lb/hr	≤ 0.09	0.00020
Vinyl Chloride	lb/hr	≤ 0.02	0.00000
1,2 Dichloroethene	lb/hr	≤ 11	0.00055
1,2-Dichloroethane	lb/hr	N/A	0.00000
Toluene	lb/hr	N/A	0.00000
Total Xylene	lb/hr	N/A	0.00000
1,1,2-Trichloroethane	lb/hr	N/A	0.00000
Tetrachloroethene	lb/hr	≤ 0.18	0.00016

Notes:

CFM - cubic feet per minute

DAR - Division of Air Resources

N/A - Not Applicable

(1) Discharge goal as approved by NYSDEC's letter dated 31 October 2013.

**NOVEMBER 2021**





6 December 2021

Mr. Jason Pelton  
New York State Department of Environmental Conservation  
Division of Solid & Hazardous Materials  
625 Broadway  
Albany, NY 12233-7252

**Subject: GROUNDWATER DISCHARGE MONITORING/AIR EMISSION REPORT  
GM-38 AREA, NWIRP BETHPAGE, NY; DER SITE # 1-30-003B-OU 2  
NOVEMBER 2021 REPORTING PERIOD**

Dear Mr. Pelton:

KOMAN Government Solutions, LLC (KGS) is submitting this monthly monitoring report of the groundwater discharge and air emission results for the Groundwater Treatment Plant (GWTP) located at the Former Naval Weapons Industrial Reserve Plant (NWIRP), Bethpage, NY, GM-38 Area. This report was prepared in accordance with GWTP operational requirements for DER Site # 1-30-003B-OU 2, and the SPDES Permit Equivalent # 13003B.

GWTP operational data from 1 November to 30 November 2021 are presented in Attachment A. The plant was down for approximately 41 hours during the reporting period as the result of the changeout of the liquid phase carbon conducted on 18 November 2021.

As indicated in Attachment A, all SPDES permitted constituents are in compliance with regulatory guidelines during this reporting period.

Please contact me at 610-400-0636 with any questions or concerns you may have regarding this report.

Sincerely,

***KOMAN Government Solutions, LLC***

A handwritten signature in black ink that reads 'Robert G. Gregory'.

Robert G. Gregory  
Project Manager

Attachment A: Groundwater and Air Sampling Results for November 2021

cc: C. Haas, NYSDEC Region 1  
C. Engelhardt, NYSDEC Region 1  
J. Pilewski, NYSDEC – Region 1 Water Engineer  
J. Sullivan, NYSDOH  
G. Ennis, Nassau County Department of Public Works  
T. Licata, Town of Oyster Bay  
M. Russo, Town of Oyster Bay  
S. Sokolowski, NAVFAC Mid-Atlantic  
V. Varricchio, NWIRP Bethpage Facilities Management  
P. Schauble, KGS  
GM-38 Copy

**ATTACHMENT A**  
**GROUNDWATER AND AIR SAMPLING RESULTS**  
**NOVEMBER 2021**

**GM-38 Area Groundwater Remediation  
Groundwater Treatment Plant  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Discharge Monitoring Report  
November 2021**

SPDES Parameters			November 2021 <sup>(1)</sup>				
Process Stream	Daily Treated Effluent Maximum <sup>(1)</sup>	Units	RW-1	RW-3	RW-4	Combined Influent (RW-1 + RW-3 + RW-4)	Treated Effluent
Well Depth	N/A	ft	445	530	655*	N/A	N/A
Screened Interval	N/A	ft bgs	335-395 410-430	392-412 442-504	550-650*	N/A	N/A
Sampling Date	N/A		11/8/21				
Effective Flowrate	1100	GPM	644	0	84	729	776
Total Flow	N/A	gallons	29,973,411	0	4,415,215	34,388,625	36,603,032
pH	5.5 - 8.5	SU	5.68	NS	6.40	5.76	7.08
Chloroform	5	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethane	5	µg/L	1.15 J	NS	ND (1.0)	1.02 J	ND (1.0)
1,2-Dichloroethane	0.6	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)
1,1-Dichloroethene	5	µg/L	0.573 J	NS	2.37 J	0.781 J	ND (1.0)
cis 1,2-Dichloroethene	5	µg/L	3.62 J	NS	1.21 J	3.34 J	ND (1.0)
trans 1,2-Dichloroethene	5	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)
Tetrachloroethene	5	µg/L	15.3	NS	5.78 J	14.20	ND (1.0)
1,1,1-Trichloroethane	5	µg/L	0.325 J	NS	ND (1.0)	0.287 J	ND (1.0)
Trichloroethene	5	µg/L	54.4	NS	636	121.7	0.275 J
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	NS	4.90 J	0.567	ND (1.0)
Vinyl Chloride	2	µg/L	ND (1.0)	NS	ND (1.0)	ND (1.0)	ND (1.0)
1,4-Dioxane	--	µg/L	2.0	NS	13	3.27	0.049
Mercury	0.00025	mg/L	ND (0.00010)	NS	ND (0.00010)	ND (0.00010)	ND (0.00010)
Total Suspended Solids (TSS)	N/A	mg/L	ND (1.0)	NS	7.1	0.82	ND (1.0)

**Notes:**

J - Estimated result between laboratory method detection limit and reporting limit

ND - Not detected above laboratory method detection limit. Reporting Limit (RL) given in parentheses.

NR - Not Recorded

N/A - Not Applicable

NS - Not Sampled

(1) Wastewater discharge equivalence permit renewed on 18 August 2017. Discharge limits established for 10 years. Chloroform, 1,4-dioxane and 1,1,2-trichlorotrifluoroethane are now monitored under the new permit.

\* Design depths

**GM-38 Area Groundwater Remediation  
Groundwater Treatment Plant  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Air Sampling Results  
November 2021**

DAR Parameters			November 2021	
Process Stream	Units	Discharge Goal <sup>(1)</sup>	Influent	Effluent
Sampling Date			11/8/21	
Average Flowrate	CFM	N/A	NR	9,098
Total Flow	ft <sup>3</sup>	N/A	NR	393,022,800
Total Flow	m <sup>3</sup>	N/A	NR	11,129,166
1,2-Dichloroethane	µg/m <sup>3</sup>	N/A	ND	ND
cis 1,2-Dichloroethene	µg/m <sup>3</sup>	≤ 100,000 <sup>(2)</sup>	34	32
trans 1,2-Dichloroethene	µg/m <sup>3</sup>		ND	ND
1,2-Dichloroethene (total)	µg/m <sup>3</sup>	≤ 100,000	34	32
Toluene	µg/m <sup>3</sup>	N/A	6.8	ND
Total Xylene	µg/m <sup>3</sup>	N/A	ND	ND
1,1,2-Trichloroethane	µg/m <sup>3</sup>	N/A	ND	ND
Trichloroethene	µg/m <sup>3</sup>	≤ 2600	1500	ND
Vinyl Chloride	µg/m <sup>3</sup>	≤ 560	ND	ND
Tetrachloroethene	µg/m <sup>3</sup>	≤ 5100	180	ND

Notes:

CFM - cubic feet per minute

DAR - Division of Air Resources

J - Estimated result between laboratory method detection limit and reporting limit

N/A - Not Applicable

NR - Not recorded

(1) Discharge goal as approved by NYSDEC's letter dated 31 October 2013.

(2) Discharge goal is for total 1,2-Dichloroethene.

**GM-38 Area Groundwater Remediation  
Groundwater Treatment Plant  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Controlled Stack Emissions  
November 2021**

<b>DAR Parameters</b>	<b>Units</b>	<b>Discharge Goal <sup>(1)</sup></b>	<b>November 2021</b>
Sampling Date			11/8/21
Average Flowrate	CFM	N/A	9,098
Total Flow	ft <sup>3</sup>	N/A	393,022,800
Total Flow	m <sup>3</sup>	N/A	11,129,166
Trichloroethene	lb/hr	≤ 0.09	0.00000
Vinyl Chloride	lb/hr	≤ 0.02	0.00000
1,2 Dichloroethene	lb/hr	≤ 11	0.00109
1,2-Dichloroethane	lb/hr	N/A	0.00000
Toluene	lb/hr	N/A	0.00000
Total Xylene	lb/hr	N/A	0.00000
1,1,2-Trichloroethane	lb/hr	N/A	0.00000
Tetrachloroethene	lb/hr	≤ 0.18	0.00000

Notes:

CFM - cubic feet per minute

DAR - Division of Air Resources

N/A - Not Applicable

(1) Discharge goal as approved by NYSDEC's letter dated 31 October 2013.

**DECEMBER 2021**



6 January 2022

Mr. Jason Pelton  
New York State Department of Environmental Conservation  
Division of Solid & Hazardous Materials  
625 Broadway  
Albany, NY 12233-7252

**Subject: GROUNDWATER DISCHARGE MONITORING/AIR EMISSION REPORT  
GM-38 AREA, NWIRP BETHPAGE, NY; DER SITE # 1-30-003B-OU 2  
DECEMBER 2021 REPORTING PERIOD**

Dear Mr. Pelton:

KOMAN Government Solutions, LLC (KGS) is submitting this monthly monitoring report of the groundwater discharge and air emission results for the Groundwater Treatment Plant (GWTP) located at the Former Naval Weapons Industrial Reserve Plant (NWIRP), Bethpage, NY, GM-38 Area. This report was prepared in accordance with GWTP operational requirements for DER Site # 1-30-003B-OU 2, and the SPDES Permit Equivalent # 13003B.

GWTP operational data from 1 December to 31 December 2021 are presented in Attachment A. The plant was down for approximately 63 hours during the reporting period as the result intermittent power outages throughout weekend of 10-13 December 2021.

As indicated in Attachment A, all SPDES permitted constituents are in compliance with regulatory guidelines during this reporting period.

Please contact me at 610-400-0636 with any questions or concerns you may have regarding this report.

Sincerely,

***KOMAN Government Solutions, LLC***

A handwritten signature in black ink that reads 'Robert G. Gregory'.

Robert G. Gregory  
Project Manager

Attachment A: Groundwater and Air Sampling Results for December 2021



cc: C. Haas, NYSDEC Region 1  
C. Engelhardt, NYSDEC Region 1  
J. Pilewski, NYSDEC – Region 1 Water Engineer  
J. Sullivan, NYSDOH  
G. Ennis, Nassau County Department of Public Works  
T. Licata, Town of Oyster Bay  
M. Russo, Town of Oyster Bay  
S. Sokolowski, NAVFAC Mid-Atlantic  
V. Varricchio, NWIRP Bethpage Facilities Management  
P. Schauble, KGS  
GM-38 Copy

**ATTACHMENT A**  
**GROUNDWATER AND AIR SAMPLING RESULTS**  
**DECEMBER 2021**

**GM-38 Area Groundwater Remediation  
Groundwater Treatment Plant  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Discharge Monitoring Report  
December 2021**

SPDES Parameters			December 2021 <sup>(1)</sup>				
Process Stream	Daily Treated Effluent Maximum <sup>(1)</sup>	Units	RW-1	RW-3	RW-4	Combined Influent (RW-1 + RW-3 + RW-4)	Treated Effluent
Well Depth	N/A	ft	445	530	655*	N/A	N/A
Screened Interval	N/A	ft bgs	335-395 410-430	392-412 442-504	550-650*	N/A	N/A
Sampling Date	N/A		12/3/21				
Effective Flowrate	1100	GPM	628	0	169	797	838
Total Flow	N/A	gallons	25,652,634	0	6,922,821	32,575,456	34,260,555
pH	5.5 - 8.5	SU	5.61	NS	6.27	5.75	7.14
Chloroform	5	µg/L	ND (0.90)	NS	ND (4.5)	--	ND (0.90)
1,1-Dichloroethane	5	µg/L	1.3	NS	ND (4.5)	1.02	ND (0.90)
1,2-Dichloroethane	0.6	µg/L	ND (0.75)	NS	ND (3.8)	--	ND (0.75)
1,1-Dichloroethene	5	µg/L	ND (0.75)	NS	ND (3.8)	--	ND (0.75)
cis 1,2-Dichloroethene	5	µg/L	3.9	NS	ND (3.8)	3.07	ND (0.75)
trans 1,2-Dichloroethene	5	µg/L	ND (0.90)	NS	ND (4.5)	--	ND (0.90)
Tetrachloroethene	5	µg/L	16.9	NS	4.9 J	14.35	ND (0.90)
1,1,1-Trichloroethane	5	µg/L	ND (0.90)	NS	ND (4.5)	--	ND (0.90)
Trichloroethene	5	µg/L	61.5	NS	654	187.4	ND (0.90)
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.5)	NS	ND (7.5)	--	ND (1.5)
Vinyl Chloride	2	µg/L	ND (0.90)	NS	ND (4.5)	--	ND (0.90)
1,4-Dioxane	--	µg/L	0.323	NS	1.74	0.62	ND (0.15)
Mercury	0.00025	mg/L	ND (0.00015)	NS	ND (0.00015)	ND (0.00015)	ND (0.00015)
Total Suspended Solids (TSS)	N/A	mg/L	ND (2.0)	NS	ND (2.0)	ND (2.0)	ND (2.0)

**Notes:**

J - Estimated result between laboratory method detection limit and reporting limit

ND - Not detected above laboratory method detection limit. Limit of Detection (LOD) given in parentheses.

NR - Not Recorded

N/A - Not Applicable

NS - Not Sampled

-- LOD for non-detect combined well influent not applicable; RW-4 sample required dilution.

(1) Wastewater discharge equivalence permit renewed on 18 August 2017. Discharge limits established for 10 years. Chloroform, 1,4-dioxane and 1,1,2-trichlorotrifluoroethane are now monitored under the new permit.

\* Design depths

**GM-38 Area Groundwater Remediation  
Groundwater Treatment Plant  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Air Sampling Results  
December 2021**

DAR Parameters			December 2021	
Process Stream	Units	Discharge Goal <sup>(1)</sup>	Influent	Effluent
Sampling Date			12/3/21	
Average Flowrate	CFM	N/A	NR	9,133
Total Flow	ft <sup>3</sup>	N/A	NR	373,222,906
Total Flow	m <sup>3</sup>	N/A	NR	10,568,496
1,2-Dichloroethane	µg/m <sup>3</sup>	N/A	1.7 J	ND
cis 1,2-Dichloroethene	µg/m <sup>3</sup>	≤ 100,000 <sup>(2)</sup>	35	39
trans 1,2-Dichloroethene	µg/m <sup>3</sup>		ND	ND
1,2-Dichloroethene (total)	µg/m <sup>3</sup>	≤ 100,000	35	39
Toluene	µg/m <sup>3</sup>	N/A	0.63 J	ND
Total Xylene	µg/m <sup>3</sup>	N/A	ND	ND
1,1,2-Trichloroethane	µg/m <sup>3</sup>	N/A	1.6 J	ND
Trichloroethene	µg/m <sup>3</sup>	≤ 2600	1800	ND
Vinyl Chloride	µg/m <sup>3</sup>	≤ 560	ND	ND
Tetrachloroethene	µg/m <sup>3</sup>	≤ 5100	180	ND

Notes:

CFM - cubic feet per minute

DAR - Division of Air Resources

J - Estimated result between laboratory method detection limit and reporting limit

N/A - Not Applicable

NR - Not recorded

(1) Discharge goal as approved by NYSDEC's letter dated 31 October 2013.

(2) Discharge goal is for total 1,2-Dichloroethene.

**GM-38 Area Groundwater Remediation  
Groundwater Treatment Plant  
Naval Weapons Industrial Reserve Plant - Bethpage, NY  
Controlled Stack Emissions  
December 2021**

<b>DAR Parameters</b>	<b>Units</b>	<b>Discharge Goal <sup>(1)</sup></b>	<b>December 2021</b>
Sampling Date			12/3/21
Average Flowrate	CFM	N/A	9,133
Total Flow	ft <sup>3</sup>	N/A	373,222,906
Total Flow	m <sup>3</sup>	N/A	10,568,496
Trichloroethene	lb/hr	≤ 0.09	0.00000
Vinyl Chloride	lb/hr	≤ 0.02	0.00000
1,2 Dichloroethene	lb/hr	≤ 11	0.00122
1,2-Dichloroethane	lb/hr	N/A	0.00000
Toluene	lb/hr	N/A	0.00000
Total Xylene	lb/hr	N/A	0.00000
1,1,2-Trichloroethane	lb/hr	N/A	0.00000
Tetrachloroethene	lb/hr	≤ 0.18	0.00000

Notes:

CFM - cubic feet per minute

DAR - Division of Air Resources

N/A - Not Applicable

(1) Discharge goal as approved by NYSDEC's letter dated 31 October 2013.

**APPENDIX B**

**NYSDEC AIR DISCHARGE LIMIT  
DOCUMENTATION**

**New York State Department of Environmental Conservation**  
**Division of Environmental Remediation**  
**Remedial Action Bureau A, 12<sup>th</sup> Floor**  
625 Broadway, Albany, New York 12233-7015  
Phone: (518) 402-9620 FAX: (518) 402-9022



Joseph Martens  
Commissioner

October 31, 2013

Lora Fly  
Remedial Program Manager  
NAVFAC Mid-Atlantic  
Northeast IPT  
9742 Maryland Avenue  
Norfolk, VA, 23511-3095

RE: Northrop Grumman, Naval Weapons Industrial Reserve Plant (NWIRP) and Grumman Steel Los Sites, NYSDEC Site No.'s I-30-003 A & B.

Dear Ms. Fly:

Tetra Tech NUS Inc., on behalf of the Department of the Navy NAVFAC Midlantic, has submitted an application to remove the GM 38 Area Groundwater Extraction and Treatment system impregnated Xeolite™ resin from the air discharge treatment system. Currently, the air treatment system uses a combined activated carbon with permanganate impregnated resin treatment train. The New York State Department of Environmental Conservation (NYSDEC) has reviewed the Department of the Navy application and concurs with the findings presented.

The routine monitoring, as detailed in Table 1, clearly indicates that vinyl chloride, one of the main contaminants of concern, has diminished to almost non-detect, and discharge concentrations have dropped to below the limit to require air treatment for the other contaminants as well. However, NAVFAC Midlantic is still proposing activated carbon to reduce the other discharge contaminant levels. Therefore, the NYSDEC hereby approves the proposed changes to the GM 38 Area air treatment. The Xeolite™ resin beds will remain in place should reactivation, based on routine monitoring, be required.

If you have any questions in the interim, please contact me at (518)402-9620.

Sincerely,

Steven M. Scharf, P.E.  
Project Engineer  
Remedial Action Bureau A  
Division of Environmental Remediation

EC: J. Swartwout  
S. Scharf  
W. Parish, Region 1  
S. Karpinski, NYSDOH  
E. Hannon, NGC  
D. Stern, Arcadis  
D. Brayack, TTNUS



NOR-01264

November 21, 2011

Mr. Stephen Scharf  
New York Department of Environmental Conservation  
Division of Environmental Remediation  
Bureau of Remedial Action A  
625 Broadway, 11<sup>th</sup> Floor  
Albany, New York 12233-7015

Reference: CLEAN Contract No. N62470-08-D-1001  
Contract Task Order WE06

Subject: Proposed Modification to Discharge Limits for Off Gas Volatile Organic Compounds (VOCs)  
for Air Stripping Tower  
GM-38 Offsite Groundwater Treatment Plant,  
NWIRP Bethpage, New York

Dear Mr. Scharf:

On behalf of the Navy, please find enclosed a copy of the subject document. This document presents an evaluation of current concentrations of off gas VOCs from the GM-38 groundwater treatment plant air-stripping tower (prior to treatment with granular activated carbon). Maximum emission rates were re-evaluated due to decreasing maximum concentrations of target VOCs in un-treated air stripper AS-1 off gas. In addition, breakthrough of target contaminants (e.g., cis-1,2-dichloroethene) is beginning to occur in the granular activated carbon bed. Maximum emission rates were re-evaluated to provide a determination if breakthrough of contaminants would trigger the need for a replacement of the granular activated carbon bed.

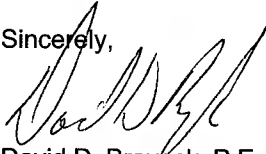
Existing Discharge Goals were established in the "Final Operation, Maintenance and Monitoring Plan for Groundwater Treatment Plant GM-38 Area Groundwater Remediation" prepared by Tetra Tech EC (April 2010). Existing goals were based on emission estimates for a 95% reduction (see Attachment A), instead of being based on the original DAR-1 analysis of air stripper off gas. Emission estimates were calculated using the air stripper design flow rate of 8,000 cubic feet per minute (cfm), and previous contaminant discharge rates in pounds per hour (lb/hr). Original emission estimates are provided in Attachment B.

Proposed Revised Discharge Goals were calculated using an average flow rate of 9,200 cfm, January to March 2011 VOC loading rates (taken from the Quarterly Operations Report First Quarter 2011 from ECOR Federal Services), and the Actual Annual % of Annual Guideline Concentrations (AGCs), taken from the revised DAR-1 Model Output. The revised DAR-1 Model Output is provided in Attachment C. Existing Discharge Goals and Proposed Revised Discharge Goals are compared in tabular format in the first page of the attachment. Proposed Revised Discharge Goals for trichloroethene (TCE) are the same as previous. The proposed limit for tetrachloroethene (PCE) is approximately 10 times the previous limit, and vinyl chloride is approximately 2 times the previous limit. Revised Discharge Goals for 1,2-dichloroethene (goals are the same for cis-1,2-dichloroethene) are 100 times greater than previously established limits. It is recommended that these revised limits replace previous discharge goals, and treatment of air stripper off gas by granular activated carbon is recommended to continue for TCE and PCE, with no treatment required for vinyl chloride and 1,2-dichloroethene.



If you have any questions please contact Ms. Lora Fly, NAVFAC Mid-LANT, at (757) 341-2012.

Sincerely,



David D. Brayack, P.E.  
Project Manager

Enclosure: (1) Proposed Modification to Discharge Limits for Off Gas Volatile Organic Compounds  
(VOCs) for Air Stripping Tower  
GM-38 Offsite Groundwater Treatment Plant

Distribution:

Mid-Lant, Lora Fly  
NYSDEC (Albany), Henry Wilkie  
NYSDOH (Troy), Steve Karpinski  
NAVAIR, Richard Smith  
USEPA, Carol Stein  
NGC, Kent Smith  
Tetra Tech NUS, Dave Brayack  
ECOR Solutions, Al Taormina  
Administrative Record  
Public Repository  
Project File

Tetra Tech NUS, Inc.

5700 Lake Wright Drive, Suite 309, Norfolk, VA 23502  
Tel 757.461.3768 Fax 757.461.4148 www.ttnus.com

**TABLE 1**  
**COMPARISON OF EXISTING DISCHARGE GOALS WITH ACTUAL EMISSIONS AND PROPOSED DISCHARGE GOALS**  
**AIR STRIPPING TOWER GM-38 OFFSITE GROUNDWATER TREATMENT PLANT**  
**NWIRP BETHPAGE, NEW YORK**

Chemical	Existing Discharge Goal		Actual January to March 2011 Values (Pre-Off Gas Treatment)		Proposed Revised Discharge Goals based on DAR-1 Analysis	
	Existing Discharge Loading Rate (pounds (lbs)/hour) <sup>(1)</sup>	Equivalent Existing Discharge Goals (µg/m <sup>3</sup> ) <sup>(2)</sup>	Actual Jan-Mar 2011 Concentration (µg/m <sup>3</sup> ) <sup>(3)</sup>	Actual VOC Loading Pre-Off Gas Treatment (lbs/hour) <sup>(4)</sup>	Proposed Discharge Loading Rate (lbs/hour) <sup>(5)</sup>	Equivalent Proposed Discharge Goal (µg/m <sup>3</sup> ) <sup>(5)</sup>
TCE	0.09	2,600	10,000	0.345	0.09	2,600
PCE	0.02	580	6,800	0.234	0.18	5,100
Vinyl Chloride	0.01	290	76	0.003	0.02	560
1,2-Dichloroethene (total)	0.03	870	750	0.026	11	greater than 100,000

**Notes:**

<sup>(1)</sup>Existing Discharge Goals are based on the design flow rate of 8,000 cfm. Existing Discharge Goals were taken from the Final Operations and Maintenance Plan for GM-38 Area Groundwater Remediation from Tetra Tech EC. Existing goals were based on emission estimates for a 95% reduction, and not the previous DAR-1 Analysis. Attachment B (provided at the end of this package) provides the original emission estimates.

<sup>(2)</sup>Existing Discharge Goals were calculated using the actual flow rate of 9,200 cfm and the existing discharge loading rate in pounds per hour (lb/hr).

<sup>(3)</sup>Values were taken from the Quarterly Operations Report First Quarter 2011 from ECOR Federal Services. Values were the maximum effluent concentration in off gas from air stripper stack AS-1 prior to treatment with vapor phase granular activated carbon (GAC), for the months of January, February and March 2011.

<sup>(4)</sup>Actual VOC Loading was calculated using an average flow rate of 9,200 cfm and the January-March 2011 concentrations. Existing off gas treatment consists of two stage vapor phase GAC followed by potassium permanganate zeolite media to provide additional treatment for vinyl chloride.

<sup>(5)</sup>Values were calculated using an average flow rate of 9,200 cfm, and the Actual Annual % of the AGCs from the 2011 DAR-1 Model Output to achieve air quality requirements.

**ATTACHMENT A**  
**2008 AIR PERMIT SUBMITTAL**



New York State Department of Environmental Conservation  
Air Permit Application



DEC ID									
-									

**Section III - Facility Information**

Classification					
<input type="checkbox"/> Hospital	<input type="checkbox"/> Residential	<input type="checkbox"/> Educational/Institutional	<input type="checkbox"/> Commercial	<input checked="" type="checkbox"/> Industrial	<input type="checkbox"/> Utility

Affected States (Title V Only) N/A					
<input type="checkbox"/> Vermont	<input type="checkbox"/> Massachusetts	<input type="checkbox"/> Rhode Island	<input type="checkbox"/> Pennsylvania	Tribal Land: _____	
<input type="checkbox"/> New Hampshire	<input type="checkbox"/> Connecticut	<input type="checkbox"/> New Jersey	<input type="checkbox"/> Ohio	Tribal Land: _____	

SIC Codes									
9999									

Facility Description		<input type="checkbox"/> Continuation Sheet(s)
Groundwater Remediation by Air Stripping followed by Vapor-Phase GAC for emission control		

Compliance Statements (Title V Only) N/A	
<p>I certify that as of the date of this application the facility is in compliance with all applicable requirements: <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>If one or more emission units at the facility are not in compliance with all applicable requirements at the time of signing this application (the 'NO' box must be checked), the noncomplying units must be identified in the "Compliance Plan" block on page 8 of this form along with the compliance plan information required. For all emission units at this facility that are operating <u>in compliance</u> with all applicable requirements complete the following:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> This facility will continue to be operated and maintained in such a manner as to assure compliance for the duration of the permit, except those units referenced in the compliance plan portion of Section IV of this application.</li> <li><input type="checkbox"/> For all emission units, subject to any applicable requirements that will become effective during the term of the permit, this facility will meet all such requirements on a timely basis.</li> <li><input type="checkbox"/> Compliance certification reports will be submitted at least once a year. Each report will certify compliance status with respect to each requirement, and the method used to determine the status.</li> </ul>	

Facility Applicable Federal Requirements N/A										<input type="checkbox"/> Continuation Sheet(s)
Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause	
	CERCLA	all substantive requirements								

Facility State Only Requirements										<input type="checkbox"/> Continuation Sheet(s)
Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause	



New York State Department of Environmental Conservation  
Air Permit Application



DEC ID									
-									

**Section IV - Emission Unit Information**

<b>Emission Unit Description</b>										<input type="checkbox"/> Continuation Sheet(s)
EMISSION UNIT	0	-	0	0	E	U	1			
Air Stripper AS-1 for groundwater remediation, provided with activated carbon for emission control.										
The emission point is stack 00ST-1. The 2-stage VGAC is followed by a 3rd vessel containing a potassium permanganate zeolite media for increased VC capacity.										

<b>Building</b>					<input type="checkbox"/> Continuation Sheet(s)
Building	Building Name		Length (ft)	Width (ft)	Orientation
BLDG-1	Treatment Plant		75	75	0

<b>Emission Point</b>							<input type="checkbox"/> Continuation Sheet(s)
EMISSION PT.	00ST1						
Ground Elev. (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp. (°F)	Cross Section		
90	40	15	36	80	Length (in)	Width (in)	
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line (ft)	Date of Removal	
19	8020			BLDG-1	50		
EMISSION PT.							
Ground Elev. (ft)	Height (ft)	Height Above Structure (ft)	Inside Diameter (in)	Exit Temp. (°F)	Cross Section		
					Length (in)	Width (in)	
Exit Velocity (FPS)	Exit Flow (ACFM)	NYTM (E) (KM)	NYTM (N) (KM)	Building	Distance to Property Line (ft)	Date of Removal	

<b>Emission Source/Control</b>								<input type="checkbox"/> Continuation Sheet(s)
Emission Source		Date of Construction	Date of Operation	Date of Removal	Control Type		Manufacturer's Name/Model No.	
ID	Type				Code	Description		
AS-1	I				048	Granular Act. Carbon	Air Stripping Column	
Design Capacity	Design Capacity Units			Waste Feed		Waste Type		
	Code	Description		Code	Description	Code	Description	
Emission Source		Date of Construction	Date of Operation	Date of Removal	Control Type		Manufacturer's Name/Model No.	
ID	Type				Code	Description		
Design Capacity	Design Capacity Units			Waste Feed		Waste Type		
	Code	Description		Code	Description	Code	Description	

New York State Department of Environmental Conservation  
Air Permit Application



DEC ID									
-									

**Section IV - Emission Unit Information (continued)**

Process Information										<input type="checkbox"/> Continuation Sheet(s)	
EMISSION UNIT 0 - 00 E U 1								PROCESS		PR 1	
Description											
The remedial system is air stripping, using a packed column at a groundwater flow rate of 1,100 gpm (plus 100 gpm recycle, for a total of 1,200 gpm). Vapor phase treatment includes the use of 3 vessels, a 2-stage GAC unit, followed by a 3rd vessel containing a potassium permanganate impregnated zeolite for increased VC capacity. Prior to entering the vapor-phase GAC adsorption system, the humidity of the air stripper exhaust is reduced to approximately 50 percent or less to optimize the efficiency of the vapor-phase GAC.											
Air Stripper AS-1: Existing. Type: Vertical, Cylindrical Construction: Aluminum											
Packing: 25-foot Jaeger Tripack. Dimensions: 10.0 ft. Dia x 47 ft. H											
Source Classification Code (SCC)		Total Thruput		Thruput Quantity Units							
		Quantity/Hr	Quantity/Yr	Code	Description						
<input type="checkbox"/> Confidential <input checked="" type="checkbox"/> Operating at Maximum Capacity <input type="checkbox"/> Activity with Insignificant Emissions		Operating Schedule		Building		Floor/Location					
		Hrs/Day	Days/Yr								
		24	365	BLDG-1		Main					
Emission Source/Control Identifier(s)											
AS-1											
EMISSION UNIT -								PROCESS			
Description											
Source Classification Code (SCC)		Total Thruput		Thruput Quantity Units							
		Quantity/Hr	Quantity/Yr	Code	Description						
<input type="checkbox"/> Confidential <input type="checkbox"/> Operating at Maximum Capacity <input type="checkbox"/> Activity with Insignificant Emissions		Operating Schedule		Building		Floor/Location					
		Hrs/Day	Days/Yr								
Emission Source/Control Identifier(s)											



New York State Department of Environmental Conservation  
Air Permit Application



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**Section IV - Emission Unit Information (continued)**

Emission Unit	Emission Point	Process	Emission Source	Emission Unit Applicable Federal Requirements										<input type="checkbox"/> Continuation Sheet(s)	
				Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause		
-															
-															
-															
-															

Emission Unit	Emission Point	Process	Emission Source	Emission Unit State Only Requirements										<input type="checkbox"/> Continuation Sheet(s)	
				Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause		
-															
-															
-															
-															

Emission Unit Compliance Certification											<input type="checkbox"/> Continuation Sheet(s)
<b>Rule Citation</b>											
Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause		
6	NYCRR	212									
<input checked="" type="checkbox"/> Applicable Federal Requirement				<input type="checkbox"/> State Only Requirement				<input type="checkbox"/> Capping			
Emission Unit	Emission Point	Process	Emission Source	CAS No.			Contaminant Name				
0-00EU1	00ST1	PR1	AS-1	00079 - 01 - 6			Trichloroethylene				
<b>Monitoring Information</b>											
<input type="checkbox"/> Continuous Emission Monitoring <input checked="" type="checkbox"/> Intermittent Emission Testing <input type="checkbox"/> Ambient Air Monitoring				<input type="checkbox"/> Monitoring of Process or Control Device Parameters as Surrogate <input type="checkbox"/> Work Practice Involving Specific Operations <input type="checkbox"/> Record Keeping/Maintenance Procedures							
<b>Description</b>											
Monthly grab samples analyzed for VOCs from the vapor phase treatment system influent, effluent and two intermediate locations.											
Work Practice		Process Material					Reference Test Method				
Type	Code	Description									
Parameter		Manufacturer Name/Model No.									
Code	Description										
23	Concentration										
Limit			Limit Units								
Upper	Lower	Code	Description								
3,125		255	micrograms per cubic meter								
Averaging Method			Monitoring Frequency			Reporting Requirements					
Code	Description	Code	Description	Code	Description						
01	Instantaneous	05	Monthly	10	Upon Request						

New York State Department of Environmental Conservation  
Air Permit Application



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-									

**Section IV - Emission Unit Information (continued)**

Determination of Non-Applicability (Title V Only) N/A <input type="checkbox"/> Continuation Sheet(s)										
Rule Citation										
Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause	
Emission Unit	Emission Point	Process	Emission Source			<input type="checkbox"/> Applicable Federal Requirement <input type="checkbox"/> State Only Requirement				
-										
Description										
Rule Citation										
Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause	
Emission Unit	Emission Point	Process	Emission Source			<input type="checkbox"/> Applicable Federal Requirement <input type="checkbox"/> State Only Requirement				
-										
Description										
Process Emissions Summary <input type="checkbox"/> Continuation Sheet(s)										
EMISSION UNIT	0 - 0 0 E U 1					PROCESS	P	R	1	
CAS No.	Contaminant Name			% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined		
0079 - 01 - 6	Trichloroethylene					95	1.87	02		
PTE			Standard Units	PTE How Determined		Actual				
(lbs/hr)	(lbs/yr)	(standard units)				(lbs/hr)	(lbs/yr)			
0.09	99			02						
EMISSION UNIT	0 - 0 0 E U 1					PROCESS	P	R	1	
CAS No.	Contaminant Name			% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined		
00075 - 01 - 4	Vinyl Chloride					95	0.17	03		
PTE			Standard Units	PTE How Determined		Actual				
(lbs/hr)	(lbs/yr)	(standard units)				(lbs/hr)	(lbs/yr)			
0.01	3.7			02						
EMISSION UNIT	0 - 0 0 E U 1					PROCESS	P	R	1	
CAS No.	Contaminant Name			% Thruput	% Capture	% Control	ERP (lbs/hr)	ERP How Determined		
000540 - 59 - 0	1,2-Dichloroethylene					95	0.6	02		
PTE			Standard Units	PTE How Determined		Actual				
(lbs/hr)	(lbs/yr)	(standard units)				(lbs/hr)	(lbs/yr)			
0.03	7.3			02						

New York State Department of Environmental Conservation  
Air Permit Application



DEC ID									
-									

**Section IV - Emission Unit Information (continued)**

EMISSION UNIT		Emission Unit Emissions Summary				<input type="checkbox"/> Continuation Sheet(s)
0	-	0	0	E	U	1
CAS No.		Contaminant Name				
00107- 06 - 2		1,2-Dichloroethane				
ERP (lbs/yr)	PTE Emissions		Actual			
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)		
13.4	Below Reporting Threshold		BRT			
CAS No.		Contaminant Name				
00108 - 88 - 3		Toluene				
ERP (lbs/yr)	PTE Emissions		Actual			
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)		
72.7	BRT		BRT			
CAS No.		Contaminant Name				
01330- 20 - 7		Xylene				
ERP (lbs/yr)	PTE Emissions		Actual			
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)		
77.1	BRT		BRT			
CAS No.		Contaminant Name				
-		1,1,2-Trichloroethane				
ERP (lbs/yr)	PTE Emissions		Actual			
	(lbs/hr)	(lbs/yr)	(lbs/hr)	(lbs/yr)		
	BRT		BRT			

Compliance Plan													<input type="checkbox"/> Continuation Sheet(s)
For any emission units which are <u>not in compliance</u> at the time of permit application, the applicant shall complete the following													
Consent Order			Certified progress reports are to be submitted every 6 months beginning ____ / ____ / ____										
Emission Unit	Process	Emission Source	Applicable Federal Requirement										
			Title	Type	Part	Sub Part	Section	Sub Division	Parag.	Sub Parag.	Clause	Sub Clause	
Remedial Measure / Intermediate Milestones										R/I	Date Scheduled		

New York State Department of Environmental Conservation  
Air Permit Application



DEC ID											
-											

**Section IV - Emission Unit Information (continued)**

Request for Emission Reduction Credits										<input type="checkbox"/> Continuation Sheet(s)	
EMISSION UNIT -											
Emission Reduction Description											
Contaminant Emission Reduction Data											
Baseline Period ____ / ____ / ____ to ____ / ____ / ____						Reduction					
						Date		Method			
						/ /					
CAS No.			Contaminant Name			ERC (lbs/yr)					
-			-			Netting		Offset			
-			-			-		-			
-			-			-		-			
Facility to Use Future Reduction											
Name						APPLICATION ID					
						- / -					
Location Address											
<input type="checkbox"/> City / <input type="checkbox"/> Town / <input type="checkbox"/> Village						State		Zip			

Use of Emission Reduction Credits										<input type="checkbox"/> Continuation Sheet(s)	
EMISSION UNIT -											
Proposed Project Description											
Contaminant Emissions Increase Data											
CAS No.			Contaminant Name			PEP (lbs/yr)					
-			-			-					
Statement of Compliance											
<input type="checkbox"/> All facilities under the ownership of this "ownership/firm" are operating in compliance with all applicable requirements and state regulations including any compliance certification requirements under Section 114(a)(3) of the Clean Air Act Amendments of 1990, or are meeting the schedule of a consent order.											
Source of Emission Reduction Credit - Facility											
Name						PERMIT ID					
						- / -					
Location Address											
<input type="checkbox"/> City / <input type="checkbox"/> Town / <input type="checkbox"/> Village						State		Zip			
Emission Unit		CAS No.		Contaminant Name		ERC (lbs/yr)					
-		-		-		Netting		Offset			
-		-		-		-		-			
-		-		-		-		-			



DEC ID									
-									

Supporting Documentation

- P.E. Certification (form attached)
- List of Exempt Activities (form attached)
- Plot Plan
- Methods Used to Determine Compliance (form attached)
- Calculations
- Air Quality Model ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- Confidentiality Justification
- Ambient Air Monitoring Plan ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- Stack Test Protocols/Reports ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- Continuous Emissions Monitoring Plans/QA/QC ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- MACT Demonstration ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- Operational Flexibility: Description of Alternative Operating Scenarios and Protocols
- Title IV: Application/Registration
- ERC Quantification (form attached)
- Use of ERC(s) (form attached)
- Baseline Period Demonstration
- Analysis of Contemporaneous Emission Increase/Decrease
- LAER Demonstration ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- BACT Demonstration ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )
- Other Document(s): \_\_\_\_\_ ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )  
 \_\_\_\_\_ ( \_\_\_\_ / \_\_\_\_ / \_\_\_\_ )  
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**ATTACHMENT B**

**2008 EMISSION ESTIMATES BASED ON 95% REMOVAL**

**ATTACHMENT 1  
Emission Estimate**

POTENTIAL EMISSION ESTIMATES,  
USED TO DEVELOP 95% REDUCTION  
OF EMISSION VALUES AS BASED ON  
INFLUENT GROUNDWATER CONCENTRATIONS  
(95% REDUCTION OF EMISSION  
VALUES ARE PROVIDED  
ON PAGE 7 OF THE 2008 AIR  
PERMIT APPLICATION PROCESS  
EMISSIONS SUMMARY)

Feed Water Flow 1,100 gpm: max or normal  
250 m<sup>3</sup>/hr  
Water Flow Including Recycle 1,200 gpm: max or normal  
273 m<sup>3</sup>/hr  
Air Flow 8,000 cfm  
13,592 m<sup>3</sup>/hr  
A/W vol ratio 50

EXAMPLE EMISSION CALC: Vinyl Chloride  
4.8 ug/L x 1000 L/m<sup>3</sup> x 250 m<sup>3</sup> water/13,623 m<sup>3</sup> air = 88 ug/m<sup>3</sup>

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Name	CAS Number	Toxicity: H/M/L <sup>2</sup>	VOC <sup>3</sup>	HAP <sup>4</sup>	GW Conc. <sup>1</sup>		Effluent Conc. <sup>1</sup>		Uncontrolled Stripper Exhaust							
					Max ug/L	Avg ug/L	Max ug/L	Avg ug/L	Max lb/day	Avg lb/day	Max lb/hr	Avg lb/hr	Max gm/sec	Avg gm/sec	Max ug/m <sup>3</sup>	Avg ug/m <sup>3</sup>
1,1,1-Trichloroethane (Methyl Chloroform)	00071-55-6	L	No	Yes	3	3.0			0.04	0.04	0.00	0.00	2.08E-04	2.08E-04	55	55
1,1,2-Trichloroethane	00079-00-5	M	Yes	Yes	3.5	0.3			0.05	0.00	0.00	0.00	2.43E-04	2.08E-05	64	6
1,1-Dichloroethane	00075-34-3	L	Yes	Yes	4	0.7			0.05	0.01	0.00	0.00	2.77E-04	4.85E-05	74	13
1,2-Dichloroethane	00107-06-2	M	Yes	Yes	3	1.0	0.3	0.1	0.04	0.01	0.00	0.00	1.87E-04	6.24E-05	55	18
1,1-Dichloroethylene (Vinylidene Chloride)	00075-35-4	M	Yes	Yes	9	1.6			0.12	0.02	0.00	0.00	6.24E-04	1.11E-04	165	29
1,2-Dichloroethylene	00540-59-0	M	Yes	No	1,100	31.5	1.3	0.0	14.51	0.42	0.60	0.02	7.62E-02	2.18E-03	20,219	579
Benzene	00071-43-2	H	Yes	Yes	4	0.1			0.05	0.00	0.00	0.00	2.77E-04	6.94E-06	74	2
Carbon Tetrachloride	00056-23-5	H	Yes	Yes	4	0.1			0.05	0.00	0.00	0.00	2.77E-04	6.94E-06	74	2
Chlorobenzene (Monochlorobenzene)	00108-90-7	M	Yes	Yes	1	0.1			0.01	0.00	0.00	0.00	6.94E-05	6.94E-06	18	2
Chloroform	00067-66-3	M	Yes	Yes	2	0.8			0.03	0.01	0.00	0.00	1.39E-04	5.55E-05	37	15
Methyl Tert Butyl Ether	01634-04-4	M	Yes	Yes	2	0.1			0.03	0.00	0.00	0.00	1.39E-04	6.94E-06	37	2
Tetrachloroethylene	00127-18-4	M	Yes	Yes	900	33.8	0.9	0.0	11.88	0.45	0.49	0.02	6.24E-02	2.34E-03	16,543	621
Toluene	00108-88-3	L	Yes	Yes	15	0.7			0.20	0.01	0.01	0.00	1.04E-03	4.85E-05	276	13
Trichloroethylene	00079-01-6	M	Yes	Yes	3,400	411.5	4.5	0.5	44.86	5.43	1.87	0.23	2.35E-01	2.85E-02	62,494	7,564
Vinyl chloride	00075-01-4	H	Yes	Yes	300	4.8	0.0	0.0	3.96	0.06	0.17	0.00	2.08E-02	3.33E-04	5,514	88
Xylenes	01330-20-7	M	Yes	Yes	16	0.2			0.21	0.00	0.01	0.00	1.11E-03	1.39E-05	294	4
Total VOCs					5,764	487.3	7.0	0.6	76.05	6.43	3.17	0.27				
Total HAPs					4,667	458.8	5.7	0.6	61.57	6.05	2.57	0.25				

Total Uncontrolled VOC 2,347 lb/yr  
Total Uncontrolled HAP 2,209 lb/yr

1. Source: "GM-38 Groundwater Remedy Analysis Report", February 2003
2. Source: DAR-1 AGC/SGC Tables, NYSDEC Division of Air Resources, Air Toxics Section, September 10, 2007.
3. Source: 6 NYCRR Part 200.1(cg)
4. Source: 6 NYCRR Part 200.1(ag)

**ATTACHMENT 1  
Emission Estimate**

Feed Water Flow 1,100 gpm: max or normal  
250 m<sup>3</sup>/hr  
Water Flow Including Recycle 1,200 gpm: max or normal  
273 m<sup>3</sup>/hr  
Air Flow 8,000 cfm  
13,592 m<sup>3</sup>/hr  
A/W vol ratio 50

Controlled Stripper Exhat

Name	CAS Number	Toxicity: H/M/L <sup>2</sup>	VOC <sup>3</sup>	HAP <sup>4</sup>	Control by	Max	Avg	Max	Avg
					GAC	lb/day	lb/day	gm/sec	gm/sec
1,1,1-Trichloroethane (Methyl Chloroform)	00071-55-6	L	No	Yes	95%	0.00	0.00	1.04E-05	1.04E-05
1,1,2-Trichloroethane	00079-00-5	M	Yes	Yes	95%	0.00	0.00	1.21E-05	1.04E-06
1,1-Dichloroethane	00075-34-3	L	Yes	Yes	95%	0.00	0.00	1.39E-05	2.43E-06
1,2-Dichloroethane	00107-06-2	M	Yes	Yes	95%	0.00	0.00	9.36E-06	3.12E-06
1,1-Dichloroethylene (Vinylidene Chloride)	00075-35-4	M	Yes	Yes	95%	0.01	0.00	3.12E-05	5.55E-06
1,2-Dichloroethylene	00540-59-0	M	Yes	No	95%	0.73	0.02	3.81E-03	1.09E-04
Benzene	00071-43-2	H	Yes	Yes	95%	0.00	0.00	1.39E-05	3.47E-07
Carbon Tetrachloride	00056-23-5	H	Yes	Yes	95%	0.00	0.00	1.39E-05	3.47E-07
Chlorobenzene (Monochlorobenzene)	00108-90-7	M	Yes	Yes	95%	0.00	0.00	3.47E-06	3.47E-07
Chloroform	00067-66-3	M	Yes	Yes	95%	0.00	0.00	6.94E-06	2.77E-06
Methyl Tert Butyl Ether	01634-04-4	M	Yes	Yes	95%	0.00	0.00	6.94E-06	3.47E-07
Tetrachloroethylene	00127-18-4	M	Yes	Yes	95%	0.59	0.02	3.12E-03	1.17E-04
Toluene	00108-88-3	L	Yes	Yes	95%	0.01	0.00	5.20E-05	2.43E-06
Trichloroethylene	00079-01-6	M	Yes	Yes	95%	2.24	0.27	1.18E-02	1.43E-03
Vinyl chloride	00075-01-4	H	Yes	Yes	95%	0.20	0.00	1.04E-03	1.66E-05
Xylenes	01330-20-7	M	Yes	Yes	95%	0.01	0.00	5.55E-05	6.94E-07
Total VOCs						3.80	0.32		
Total HAPs						3.08	0.30		
						Total Controlled VOC	117 lb/yr		
						Total Controlled HAP	110 lb/yr		

1. Source: "GM-38 Groundwater Remedy Analysis Report", February 2003
2. Source: DAR-1 AGC/SGC Tables, NYSDEC Division of Air Resources, Air Tox
3. Source: 6 NYCRR Part 200.1(cg)
4. Source: 6 NYCRR Part 200.1(ag)



**ATTACHMENT C**  
**2011 DISCHARGE GOALS AND 2011 DAR-1 ANALYSIS**

Tetra Tech NUS		STANDARD CALCULATION SHEET	
CLIENT: US CLEAN	FILE No:	BY: SK	PAGE: 1 of 1
SUBJECT: Calculation of Current Discharge Goals GM-38 Area NWIRP Bethpage, New York		CHECKED BY:	DATE: 9/7/2011

**1. Purpose:**

To calculate current discharge goals for Trichloroethene (TCE), Tetrachloroethene (PCE), Vinyl Chloride, cis 1,2-Dichloroethene, and 1,2-Dichloroethene (total), for treatment of off-gas from the air stripper stack AS-1.

**2. Approach:**

From the Contaminant Assessment Summary of the DAR-1 Model output for TCE, PCE, Vinyl Chloride, cis 1,2-Dichloroethene, and 1,2-Dichloroethene (total) (see DAR-1 output for analysis inputs), use the Actual Annual % of the Annual Guideline Concentration (AGC), a current average flow rate of 9,200 cubic feet per minute (cfm), and influent chemical emission rates in pounds per hour (lb/hour) and pounds per year (lb/year) to back calculate current discharge goals.

**3. Calculation of Current Discharge Goals:**

Chemical	Current Actual Annual % of AGC <sup>(1)</sup>	Current Maximum Concentration (µg/m <sup>3</sup> ) <sup>(2)</sup>	Current Chemical Emission Rate Prior to Treatment (lb/hour) <sup>(3)</sup>	Current Chemical Emission Rate Prior to Treatment (lb/year) <sup>(3)</sup>	Calculated Discharge Goal (lb/hr) <sup>(4)</sup>	Calculated Discharge Goal (lb/year) <sup>(4)</sup>	Maximum Allowable Concentration (µg/m <sup>3</sup> ) <sup>(4)</sup>
TCE	390.6	10,000	0.3446	3,019	0.0882	770	2,600
PCE	132.8	6,800	0.2344	2,053	0.1764	1,500	5,100
Vinyl Chloride	13.49	76	0.0026	22.94	0.0194	170	560
cis 1,2-Dichloroethene	0.2322	750	0.0258	226.4	11.13	98,000	320,000
1,2-Dichloroethene (total)	0.2322	750	0.0258	226.4	11.13	98,000	320,000

**Notes:**

<sup>(1)</sup>Actual Annual % of the AGCs is from the attached DAR-1 Model Output.

<sup>(2)</sup>Values were taken from the Quarterly Operations Report First Quarter 2011 (June 2011) from ECOR Federal Services. Values were the maximum effluent concentration in off gas from air stripper stack AS-1 for the months of January, February, and March 2011.

<sup>(3)</sup>Chemical Emission Rates were calculated from maximum concentrations and an average flow rate of 9,200 cfm.

<sup>(4)</sup>Discharge Goals are based on a flow of 9,200 cfm, and calculated from the Actual Annual % of the AGCs from the DAR-1 Model Output to achieve air quality requirements. The summary of additional inputs for this model run is provided in the DAR-1 Model Output. Stack height is 40 feet, and the property line was evaluated at a distance of 50 feet.

BETHPAGE SITE GM-38 OFF-SITE GROUNDWATER AIR STRIPPER STACK EMISSIONS  
 DAR-1 MODEL OUTPUT, POINT SOURCE (STACK EMISSIONS) TYPE  
 INCLUDES ISCLT MODELING SUMMARY

- I. Summary of Inputs for Model Run to Nearest Property Line (50 feet), worst case scenario (highest contaminant concentrations seen in first quarter 2011 in untreated effluent from Air Stripper AS-1 prior to treatment with granular activated carbon (GAC))

Chemical	CAS No. 00079-01-6 (TCE)	CAS No. 00127-18-4 (PCE)	CAS No. 00075-01-4 (Vinyl Chloride)	CAS No. 00156-59-2 (cis 1,2- Dichloroethene)	CAS No. 00540-59-0 (1,2- Dichloroethene, total)
Emission Rate Prior to Treatment <sup>(1)</sup> (lb/hour)	0.3444	0.2342	0.0026	0.0258	0.0258
Emission Rate Prior to Treatment <sup>(1)</sup> (lb/year)	3,017	2,052	22.93	226.0	226.0
Maximum Concentration of Untreated Off Gas ( $\mu\text{g}/\text{m}^3$ ) <sup>(1)</sup>	10,000	6,800	76	750	750
Annual Guideline Concentration (AGC) ( $\mu\text{g}/\text{m}^3$ )	0.5	1.0	0.11	63	63
Short-term Guideline Concentration (SGC) ( $\mu\text{g}/\text{m}^3$ )	14,000	1,000	180,000	--	--

HA	Height Above stack/ maximum height of plume (HA, feet)	15
SH	Stack Height/Treatment Building Air Stack (SH, feet)	40
D	Stack Diameter (D, inches)	36
T	Stack Exit Temperature (T, degrees Fahrenheit)	80
V	Stack Exit Velocity (V, ft/sec)	21.69
Q <sup>(2)</sup>	Stack Exit Flow Rate [Q, Actual Cubic Feet per Minute (ACFM)]	9,200
Dpl	Shortest Distance from Source Building (Treatment Building) to Property Line (Dpl, feet) for point sources	50
BW	Building Width (BW, feet) of Source Building (Treatment Building) for point sources	75
BL	Building Length (BL, feet) of Source Building (Treatment Building)	75
Q	Actual Hourly Emission Rate (lbs/hour) for source contaminant	Chemical specific, see above
Qa	Actual Annual Emission Rate (lbs/year) for source contaminant	Chemical specific, see above

<sup>(1)</sup> Emission rates and maximum concentration values were taken from the Quarterly Operations Report First Quarter (June 2011) as provided by ECOR Services, using January, February, and March 2011 maximum rates of untreated off gas from Air Stripper AS-1 in the

GM-38 Treatment Building. Emission rates are based on continuous operation 24 hours per day, 7 days a week, 52 weeks a year, or approximately 8,760 hours of operation.

<sup>(2)</sup> "Q" is an average value of January and February 2011 monthly flow rates. Effective water and vapor flow rates were reduced during the reporting period of March due to a shutdown of the Treatment Plant on March 23, 2011.

II. Contaminant Assessment Summary of TCE, PCE, Vinyl Chloride, cis 1,2-Dichloroethene, and 1,2-Dichloroethene (total):

CONTAMINANT ASSESSMENT SUMMARY OF DAR-1 ANALYSIS						9/ 8/11
						Page 1
CAS NUMBER	AGC ug/m3	SHORT-TERM	CAVITY	POINT or AREA SOURCE		
		MAXIMUM (Cav. Pt. Area) % OF SGC	ACTUAL ANNUAL % OF AGC	POTENTIAL ANNUAL % OF AGC	ACTUAL ANNUAL % OF AGC	
00075-01-4	0.11000000	0.0005	0.0000	13.3889	13.4948	
00079-01-6	0.50000000	0.7757	0.0000	390.1734	390.6266	
00127-18-4	1.00000000	7.3852	0.0000	132.6635	132.8415	
00156-59-2	63.00000000	0.0000	0.0000	0.2320	0.2322	
00540-59-0	63.00000000	0.0000	0.0000	0.2320	0.2322	
SUMMARY TOTALS		8.1614	0.0000	536.6897	537.4274	

III. Contaminant Impact Summary of TCE, PCE, Vinyl Chloride, cis 1,2-Dichloroethene, and 1,2-Dichloroethene (total):

CONTAMINANT IMPACT SUMMARY OF DAR-1 ANALYSIS						9/ 8/11
						Page 1
CAS NUMBER	AGC ug/m3	SHORT-TERM	CAVITY	POINT or AREA SOURCE		
		MAXIMUM (Cav. Pt. Area) ug/m3	ACTUAL ANNUAL ug/m3	POTENTIAL ANNUAL ug/m3	ACTUAL ANNUAL ug/m3	
00075-01-4	0.11000000	0.81988204	0.00000000	0.01472780	0.01484433	
00079-01-6	0.50000000	108.60282900	0.00000000	1.95086694	1.95113296	
00127-18-4	1.00000000	73.85244750	0.00000000	1.32663476	1.32841504	
00156-59-2	63.00000000	8.13575172	0.00000000	0.14614509	0.14630693	
00540-59-0	63.00000000	8.13575172	0.00000000	0.14614509	0.14630693	

IV. Contaminant Impact Summary Step by Step Menu for TCE:

```

*****
NWIRP BETHPAGE GM-38 AREA          BETHPAGE          OYSTER BAY, NEW
EMISSION POINT =          TOTAL          CAS NUMBER = 00079-01-6          SIC = 0
AGC =          0.500000000 ug/m3          SGC =          14000.000000 ug/m3
STACK: HA= 15., SH= 40., D= 36., T= 80., U= 21.69, q= 9200.00
BUILDING: Dpl= 50., BW= 75., BL= 75., %CONTROL= 0.0000
** Reported Hourly Emission Rate <Q> is equal to          0.344400000 lbs/hour.
** Reported Annual Emission Rate <Qa> is equal to          3017.000000 lbs/year.
II.B. REFINED CAVITY IMPACT METHOD <DAR-1, APPENDIX B>.
II.B.1. Shortest Distance from building to Property Line < 50. feet >
is less than or equal to the cavity length, or 3 building
heights < 75. feet >. Therefore, this building will have
cavity impacts <if they occur> at receptors off plant property.
II.B.2. The largest building dimension < 75. feet > is greater than or
equal to the building height < 25. feet >. Therefore, the
computer will NOT redefine the cavity length.
II.B.3. Stack height < 40. feet > is greater than cavity height
< 38. feet >. Therefore, this source does not contribute to
the buildings cavity impact. The Computer will assume the
CAVITY Annual Impact equals 0.00 ug/m3.
II.C. CAVITY Annual Impact < 0.000 ug/m3 > is less than AGC
< 0.500 ug/m3 >.
III.A. STANDARD POINT SOURCE METHOD <DAR-1, APPENDIX B>.
III.A.1.b. Momentum flux, Fm, is equal to 1000.331 ft<4>/sec<2>.
III.A.1.b. Effective stack height, he, is equal to 51.001 feet.
III.A.2. STANDARD POINT SOURCE Actual Annual Impact is equal
to 2.604 ug/m3 for 8760. hours/year of operation.
III.A.3. STANDARD POINT SOURCE Potential Annual Impact is equal
to 2.601 ug/m3 assuming 8,760 hours/year of operation.
III.A.4.a. Stack height to building height ratio is greater than
1.5, but less than 2.5. Computer will multiply actual
annual & potential annual impacts by 0.75 factor.

```

III.A.5. STANDARD POINT SOURCE Short-Term Impact is calculated below using the DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.

III.D. STANDARD POINT SOURCE Actual Annual Impact < 1.953 ug/m3 > is greater than AGC < 0.500 ug/m3 >.

\*\*\*\* Refer to DAR-1 Section III.D.1. A refined site \*\*\*\*  
 \*\*\*\* specific modeling analysis may be required. \*\*\*\*

III.D. STANDARD POINT SOURCE Potential Annual Impact < 1.951 ug/m3 > is greater than AGC < 0.500 ug/m3 >.

\*\*\*\* Potential Annual Impact is based upon 8760 hours/year \*\*\*\*  
 \*\*\*\* operation instead of reported 8760. hours/year. \*\*\*\*

2.0 DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.  
 See "Technical Reference for the Screening Procedures of the DAR-1 Software Program, Wade/Sedefian," 1/11/94.

2.2 CAVITY Short-Term Impact is equal to 0.00 ug/m3 as the plume escaped the cavity region:  $h_s < 40. \text{ feet} > > h_c < 26. \text{ feet} >$ .

II.C. CAVITY Short-Term Impact < 0.000 ug/m3 > is less than SGC < 14000.000 ug/m3 >.

2.3 Momentum flux,  $F_m$ , is equal to 1000.331 ft(4)/sec(2).

2.3 Effective stack height,  $h_e$ , is equal to 51.001 feet.

2.4 Maximum non-downwash GEP stack Short-Term Impact (GSTP) is equal to 38.826 ug/m3, for  $h_s/h_b = 1.60$

2.5 Maximum downwash Short-Term Impact (GSTD) is equal to 129.908 ug/m3, for:  $h_s/h_b = 1.60$  and ESH = 51. feet.

2.6 Adjusted maximum downwash Short-Term (GSTD) is equal to 108.603 ug/m3, for: RF = 0.84

III.D. Maximum non-cavity Short-Term Impact (CST: 108.603 ug/m3 > is less than the SGC < 14000.000 ug/m3 > for the point source.

2.7 Maximum Short-Term cavity, point, or area source impact (SHORT-TERM MAXIMUM, (Cav,Pt,Area)) equals 108.603 ug/m3 and is reported in the ANALYSIS MENU. This value is less than the SGC < 14000.000 ug/m3 >.

V. Contaminant Impact Summary Step by Step Menu for PCE:

```

*****
NWIRP BETHPAGE GM-38 AREA          BETHPAGE          OYSTER BAY, MEV
EMISSION POINT =          TOTAL          CAS NUMBER = 00127-18-4          SIC = 0
AGC =          1.000000000 ug/m3          SGC =          1000.000000 ug/m3
STACK: HA=          15., SH=          40., D=          36., T=          80., U=          21.69, q=          9200.00
BUILDING: Dpl=          50., BW=          75., BL=          75., %CONTROL=          0.0000
** Reported Hourly Emission Rate (Q) is equal to          0.234200000 lbs/hour.
** Reported Annual Emission Rate (Qa) is equal to          2052.000000 lbs/year.
II.B. REFINED CAVITY IMPACT METHOD (DAR-1, APPENDIX B).
II.B.1. Shortest Distance from building to Property Line ( 50. feet )
is less than or equal to the cavity length, or 3 building
heights ( 75. feet ). Therefore, this building will have
cavity impacts (if they occur) at receptors off plant property.
II.B.2. The largest building dimension ( 75. feet ) is greater than or
equal to the building height ( 25. feet ). Therefore, the
computer will NOT redefine the cavity length.
II.B.3. Stack height ( 40. feet ) is greater than cavity height
( 38. feet ). Therefore, this source does not contribute to
the buildings cavity impact. The Computer will assume the
CAVITY Annual Impact equals 0.00 ug/m3.
II.C. CAVITY Annual Impact ( 0.000 ug/m3 ) is less than AGC
( 1.000 ug/m3 ).
III.A. STANDARD POINT SOURCE METHOD (DAR-1, APPENDIX B).
III.A.1.b. Momentum flux, Fm, is equal to 1000.331 ft<4>/sec<2>.
III.A.1.b. Effective stack height, he, is equal to 51.001 feet.
III.A.2. STANDARD POINT SOURCE Actual Annual Impact is equal
to 1.771 ug/m3 for 8762. hours/year of operation.
III.A.3. STANDARD POINT SOURCE Potential Annual Impact is equal
to 1.769 ug/m3 assuming 8,760 hours/year of operation.
III.A.4.a. Stack height to building height ratio is greater than
1.5, but less than 2.5. Computer will multiply actual
annual & potential annual impacts by 0.75 factor.

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III.A.5. STANDARD POINT SOURCE Short-Term Impact is calculated below using the DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.

III.D. STANDARD POINT SOURCE Actual Annual Impact ( 1.328 ug/m3 ) is greater than AGC ( 1.000 ug/m3 ).

\*\*\*\* Refer to DAR-1 Section III.D.1. A refined site \*\*\*\*  
\*\*\*\* specific modeling analysis may be required. \*\*\*\*

III.D. STANDARD POINT SOURCE Potential Annual Impact ( 1.327 ug/m3 ) is greater than AGC ( 1.000 ug/m3 ).

\*\*\*\* Potential Annual Impact is based upon 8760 hours/year \*\*\*\*  
\*\*\*\* operation instead of reported 8762. hours/year. \*\*\*\*

2.0 DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.  
See "Technical Reference for the Screening Procedures of the DAR-1 Software Program, Wade/Sedefian," 1/11/94.

2.2 CAVITY Short-Term Impact is equal to 0.000 ug/m3 as the plume escaped the cavity region: hc( 40. feet ) > hc( 26. feet ).

II.C. CAVITY Short-Term Impact ( 0.000 ug/m3 ) is less than SGC ( 1000.000 ug/m3 ).

2.3 Momentum Flux,  $F_m$ , is equal to 1000.331 ft<sup>4</sup>/sec<sup>2</sup>.

2.3 Effective stack height,  $h_e$ , is equal to 51.001 feet.

2.4 Maximum non-downwash GEP stack Short-Term Impact (CSTP) is equal to 26.403 ug/m3, for  $h_c/h_b = 1.60$

2.5 Maximum downwash Short-Term Impact (CSTD) is equal to 88.340 ug/m3, for:  $h_c/h_b = 1.60$  and ESH = 51. feet.

2.6 Adjusted maximum downwash Short-Term (CSTD) is equal to 73.852 ug/m3, for: RF = 0.84

III.D. Maximum non-cavity Short-Term Impact (CST: 73.852 ug/m3 ) is less than the SGC ( 1000.000 ug/m3 ) for the point source.

2.7 Maximum Short-Term cavity, point, or area source impact (SHORT-TERM MAXIMUM, (Cav,Pt,Area)) equals 73.852 ug/m3 and is reported in the ANALYSIS MENU. This value is less than the SGC ( 1000.000 ug/m3 ).



VI. Contaminant Impact Summary Step by Step Menu for Vinyl Chloride:

```

*****
NWIRP BETHPAGE GM-38 AREA          BETHPAGE          OYSTER BAY, NEW
EMISSION POINT =          TOTAL          CAS NUMBER = 00075-01-4          SIC = 0
AGC =          0.110000000 ug/m3          SGC =          180000.000000 ug/m3
STACK: HA=          15., SH=          40., D=          36., I=          80., U=          21.69, q=          9200.00
BUILDING: Dpl=          50., BW=          75., BL=          75., %CONTROL=          0.0000
** Reported Hourly Emission Rate <Q> is equal to          0.002600000 lbs/hour.
** Reported Annual Emission Rate <Qa> is equal to          22.930000 lbs/year.
II.B. REFINED CAVITY IMPACT METHOD <DAR-1, APPENDIX B>.
II.B.1. Shortest Distance from building to Property Line < 50. feet >
is less than or equal to the cavity length, or 3 building
heights < 75. feet >. Therefore, this building will have
cavity impacts <if they occur> at receptors off plant property.
II.B.2. The largest building dimension < 75. feet > is greater than or
equal to the building height < 25. feet >. Therefore, the
computer will NOT redefine the cavity length.
II.B.3. Stack height < 40. feet > is greater than cavity height
< 38. feet >. Therefore, this source does not contribute to
the buildings cavity impact. The Computer will assume the
CAVITY Annual Impact equals 0.00 ug/m3.
II.C. CAVITY Annual Impact < 0.000 ug/m3 > is less than AGC
< 0.110 ug/m3 >.
III.A. STANDARD POINT SOURCE METHOD <DAR-1, APPENDIX B>.
III.A.1.b. Momentum flux, Fm, is equal to 1000.331 ft<4>/sec<2>.
III.A.1.b. Effective stack height, he, is equal to 51.001 feet.
III.A.2. STANDARD POINT SOURCE Actual Annual Impact is equal
to 0.020 ug/m3 for 8819. hours/year of operation.
III.A.3. STANDARD POINT SOURCE Potential Annual Impact is equal
to 0.020 ug/m3 assuming 8,760 hours/year of operation.
III.A.4.a. Stack height to building height ratio is greater than
1.5, but less than 2.5. Computer will multiply actual
annual & potential annual impacts by 0.75 factor.

```

III.A.5. STANDARD POINT SOURCE Short-Term Impact is calculated below using the DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.

III.D. STANDARD POINT SOURCE Actual Annual Impact < 0.015 ug/m3 > is less than AGC < 0.110 ug/m3 >.

III.D. STANDARD POINT SOURCE Potential Annual Impact < 0.015 ug/m3 > is less than AGC < 0.110 ug/m3 >.

\*\*\*\* Potential Annual Impact is based upon 8760 hours/year \*\*\*\*  
\*\*\*\* operation instead of reported 8819. hours/year. \*\*\*\*

2.0 DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.  
See "Technical Reference for the Screening Procedures of the DAR-1 Software Program, Wade/Sedefian," 1/11/94.

2.2 CAVITY Short-Term Impact is equal to 0.00 ug/m3 as the plume escaped the cavity region: hs< 40. feet > hc< 26. feet >.

II.C. CAVITY Short-Term Impact < 0.000 ug/m3 > is less than SGC < 180000.000 ug/m3 >.

2.3 Momentum flux,  $F_a$ , is equal to 1000.331 ft<4>/sec<2>.

2.3 Effective stack height,  $h_e$ , is equal to 51.001 feet.

2.4 Maximum non-downwash GEP stack Short-Term Impact (CSTP) is equal to 0.293 ug/m3, for  $h_s/h_b = 1.60$

2.5 Maximum downwash Short-Term Impact (CSTD) is equal to 0.981 ug/m3, for:  $h_s/h_b = 1.60$  and  $ESH = 51. feet.$

2.6 Adjusted maximum downwash Short-Term (CSTD) is equal to 0.820 ug/m3, for:  $RF = 0.84$

III.D. Maximum non-cavity Short-Term Impact (CST: 0.820 ug/m3 > is less than the SGC < 180000.000 ug/m3 > for the point source.

2.7 Maximum Short-Term cavity, point, or area source impact (SHORT-TERM MAXIMUM, (Cav,Pt,Area)) equals 0.820 ug/m3 and is reported in the ANALYSIS MENU. This value is less than the SGC < 180000.000 ug/m3 >.

VII. Contaminant Impact Summary Step by Step Menu for cis 1,2-Dichloroethene:

```

*****
NWIRP BETHPAGE GM-38 AREA          BETHPAGE          OYSTER BAY, NEW
EMISSION POINT =          TOTAL          CAS NUMBER = 00156-59-2          SIC = 0
AGC =          63.000000000 ug/m3          SGC =          0.000000 ug/m3
STACK: HA=          15., SH=          40., D=          36., I=          80., U=          21.69, q=          9200.00
BUILDING: Dpl=          50., BW=          75., BL=          75., %CONTROL=          0.0000
** Reported Hourly Emission Rate <Q> is equal to          0.025800000 lbs/hour.
** Reported Annual Emission Rate <Qa> is equal to          226.000000 lbs/year.
II.B. REFINED CAVITY IMPACT METHOD <DAR-1, APPENDIX B>.
II.B.1. Shortest Distance from building to Property Line < 50. feet >
is less than or equal to the cavity length, or 3 building
heights < 75. feet >. Therefore, this building will have
cavity impacts <if they occur> at receptors off plant property.
II.B.2. The largest building dimension < 75. feet > is greater than or
equal to the building height < 25. feet >. Therefore, the
computer will NOT redefine the cavity length.
II.B.3. Stack height < 40. feet > is greater than cavity height
< 38. feet >. Therefore, this source does not contribute to
the buildings cavity impact. The Computer will assume the
CAVITY Annual Impact equals 0.00 ug/m3.
II.C. CAVITY Annual Impact < 0.000 ug/m3 > is less than AGC
< 63.000 ug/m3 >.
III.A. STANDARD POINT SOURCE METHOD <DAR-1, APPENDIX B>.
III.A.1.b. Momentum flux, Fm, is equal to 1000.331 ft<4>/sec<2>.
III.A.1.b. Effective stack height, he, is equal to 51.001 feet.
III.A.2. STANDARD POINT SOURCE Actual Annual Impact is equal
to 0.195 ug/m3 for 8760. hours/year of operation.
III.A.3. STANDARD POINT SOURCE Potential Annual Impact is equal
to 0.195 ug/m3 assuming 8,760 hours/year of operation.
III.A.4.a. Stack height to building height ratio is greater than
1.5, but less than 2.5. Computer will multiply actual
annual & potential annual impacts by 0.75 factor.

```

III.A.5. STANDARD POINT SOURCE Short-Term Impact is calculated below using the DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.

III.D. STANDARD POINT SOURCE Actual Annual Impact < 0.146 ug/m3 > is less than AGC < 63.000 ug/m3 >.

III.D. STANDARD POINT SOURCE Potential Annual Impact < 0.146 ug/m3 > is less than AGC < 63.000 ug/m3 >.

\*\*\*\* Potential Annual Impact is based upon 8760 hours/year \*\*\*\*  
\*\*\*\* operation instead of reported 8760. hours/year. \*\*\*\*

2.0 DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.  
See 'Technical Reference for the Screening Procedures of the DAR-1 Software Program, Wade/Sedefian,' 1/11/94.

2.2 CAVITY Short-Term Impact is equal to 0.00 ug/m3 as the plume escaped the cavity region: hs( 40. feet) > hc( 26. feet).

II.C. CAVITY Short-Term Impact is equal to 0.000 ug/m3.  
There is no SGC for this contaminant.

2.3 Momentum flux, Fm, is equal to 1000.331 ft(4)/sec(2).

2.3 Effective stack height, he, is equal to 51.001 feet.

2.4 Maximum non-downwash GEP stack Short-Term Impact (CSTP) is equal to 2.909 ug/m3, for hs/hb = 1.60

2.5 Maximum downwash Short-Term Impact (CSTD) is equal to 9.732 ug/m3, for: hs/hb = 1.60 and ESH = 51. feet.

2.6 Adjusted maximum downwash Short-Term (CSTD) is equal to 8.136 ug/m3, for: RF = 0.84

III.D. Maximum non-cavity Short-Term Impact (CST) equals 8.136 ug/m3 for the point source. There is no SGC for this contaminant.

2.7 Maximum Short-Term cavity, point, or area source impact (SHORT-TERM MAXIMUM, (Cav,Pt,Area)) equals 8.136 ug/m3 and is reported in the ANALYSIS MENU.

VIII. Contaminant Impact Summary Step by Step Menu for 1,2-Dichloroethene (total):

```
*****
NWIRP BETHPAGE GM-38 AREA          BETHPAGE          OYSTER BAY, NEW
EMISSION POINT =          TOTAL          CAS NUMBER = 00540-59-0          SIC = 0
AGC =          63.000000000 ug/m3          SGC =          0.000000 ug/m3
STACK: HA=          15., SH=          40., D=          36., T=          80., U=          21.69, q=          9200.00
BUILDING: Dpl=          50., BW=          75., BL=          75., %CONTROL=          0.0000
** Reported Hourly Emission Rate <Q> is equal to          0.025800000 lbs/hour.
** Reported Annual Emission Rate <Qa> is equal to          226.000000 lbs/year.
II.B. REFINED CAVITY IMPACT METHOD <DAR-1, APPENDIX B>.
II.B.1. Shortest Distance from building to Property Line < 50. feet >
is less than or equal to the cavity length, or 3 building
heights < 75. feet >. Therefore, this building will have
cavity impacts <if they occur> at receptors off plant property.
II.B.2. The largest building dimension < 75. feet > is greater than or
equal to the building height < 25. feet >. Therefore, the
computer will NOT redefine the cavity length.
II.B.3. Stack height < 40. feet > is greater than cavity height
< 38. feet >. Therefore, this source does not contribute to
the buildings cavity impact. The Computer will assume the
CAVITY Annual Impact equals 0.00 ug/m3.
II.C. CAVITY Annual Impact < 0.000 ug/m3 > is less than AGC
< 63.000 ug/m3 >.
III.A. STANDARD POINT SOURCE METHOD <DAR-1, APPENDIX B>.
III.A.1.b. Momentum flux, Pm, is equal to 1000.331 ft<4>/sec<2>.
III.A.1.b. Effective stack height, he, is equal to 51.001 feet.
III.A.2. STANDARD POINT SOURCE Actual Annual Impact is equal
to 0.195 ug/m3 for 8760. hours/year of operation.
III.A.3. STANDARD POINT SOURCE Potential Annual Impact is equal
to 0.195 ug/m3 assuming 8,760 hours/year of operation.
III.A.4.a. Stack height to building height ratio is greater than
1.5, but less than 2.5. Computer will multiply actual
annual & potential annual impacts by 0.75 factor.
```

```

III.A.5. STANDARD POINT SOURCE Short-Term Impact is calculated below
using the DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.

III.D. STANDARD POINT SOURCE Actual Annual Impact < 0.146 ug/m3 > is
less than AGC < 63.000 ug/m3 >.

III.D. STANDARD POINT SOURCE Potential Annual Impact < 0.146 ug/m3 >
is less than AGC < 63.000 ug/m3 >.

**** Potential Annual Impact is based upon 8760 hours/year ****
**** operation instead of reported 8760. hours/year. ****

2.0 DAR-1 SOFTWARE PROGRAM SHORT-TERM METHOD.
See "Technical Reference for the Screening Procedures of the
DAR-1 Software Program, Wade/Sedefian," 1/11/94.

2.2 CAVITY Short-Term Impact is equal to 0.00 ug/m3 as the plume
escaped the cavity region: hs< 40. feet > hc< 26. feet >.

II.C. CAVITY Short-Term Impact is equal to 0.000 ug/m3.
There is no SGC for this contaminant.

2.3 Momentum flux, Fm, is equal to 1000.331 ft<4>/sec<2>.

2.3 Effective stack height, he, is equal to 51.001 feet.

2.4 Maximum non-downwash GEP stack Short-Term Impact <CSTP> is equal
to 2.909 ug/m3, for hs/hb = 1.60

2.5 Maximum downwash Short-Term Impact <CSTD> is equal
to 9.732 ug/m3, for: hs/hb = 1.60 and ESH = 51. feet.

2.6 Adjusted maximum downwash Short-Term <CSTD> is equal
to 8.136 ug/m3, for: RF = 0.84

III.D. Maximum non-cavity Short-Term Impact <CST> equals 8.136 ug/m3
for the point source. There is no SGC for this contaminant.

2.7 Maximum Short-Term cavity, point, or area source impact
<SHORT-TERM MAXIMUM, <Cav.Pt.Area>> equals 8.136 ug/m3
and is reported in the ANALYSIS MENU.

```

IX. AGCs and SGCs for TCE, PCE, Vinyl Chloride, cis 1,2-Dichloroethene, and 1,2-Dichloroethene (total):

AGCs & SGCs				9/ 8/11	
				Page 1	
CAS NUMBER	CONTAMINANT NAME	SGC ug/m3	II O V	AGC ug/m3	II I O O V X CODES
00075-01-4	VINYL CHLORIDE	18000.00000	D	0.110000000	E H U HA
00079-01-6	TRICHLOROETHYLENE	14000.00000	Z	0.500000000	D M O HA
00127-10-4	TETRACHLOROETHYLENE	1000.00000	H	1.000000000	H M O HA
00156-59-2	DICHLOROETHYLENE, cis	0.00000		63.000000000	D M
00540-59-0	DICHLOROETHYLENE, 12	0.00000		63.000000000	D M

X. Contaminant Emissions Summary for TCE, PCE, Vinyl Chloride, cis 1,2-Dichloroethene, and 1,2-Dichloroethene (total):

CONTAMINANT EMISSIONS SUMMARY				9/ 8/11
				Page 1
CAS NUMBER	CONTAMINANT NAME	NUM. OF EPs PER CONTAM.	EMISSIONS (lbs/hour)	EMISSIONS (lbs/year)
00075-01-4	VINYL CHLORIDE	1	0.0026000	22.93000
00079-01-6	TRICHLOROETHYLENE	1	0.3444000	3017.00000
00127-10-4	TETRACHLOROETHYLENE	1	0.2342000	2052.00000
00156-59-2	DICHLOROETHYLENE, cis	1	0.0258000	226.00000
00540-59-0	DICHLOROETHYLENE, 12	1	0.0258000	226.00000
SUMMARY TOTALS		5	0.6328000	5543.93000

XI. Meter Grid Modeling Results for Maximum Annual Concentrations of TCE, within 25 meters:

CONCENTRATIONS x 10 <sup>-2</sup> (ug/m3) for 00079-01-6														09/08/11
AGC =														13:17:58
	367000.	368000.	369000.	370000.	371000.	372000.	373000.	374000.	375000.	376000.	377000.	378000.	379000.	
TIME +	368000.	370000.	372000.	374000.	376000.	378000.								
4511000.	0.04	0.06	0.08	0.14	0.23	0.32	0.41	0.30	0.14	0.10	0.08	0.06	0.05	
4510000.	0.03	0.05	0.08	0.13	0.25	0.43	0.60	0.40	0.17	0.12	0.09	0.07	0.06	
4509000.	0.02	0.03	0.06	0.11	0.24	0.58	1.01	0.52	0.22	0.14	0.11	0.08	0.06	
4508000.	0.02	0.03	0.04	0.06	0.18	0.62	2.16	0.64	0.31	0.19	0.13	0.11	0.09	
4507000.	0.02	0.03	0.04	0.06	0.11	0.26	7.27	1.43	0.60	0.34	0.22	0.15	0.12	
4506000.	0.03	0.03	0.05	0.07	0.13	0.33	2.58	2.99	1.12	0.51	0.30	0.20	0.14	
4505000.	0.03	0.04	0.05	0.08	0.20	0.45	0.94	0.81	0.60	0.45	0.33	0.23	0.16	
4504000.	0.03	0.04	0.07	0.12	0.20	0.22	0.47	0.43	0.33	0.27	0.24	0.20	0.16	

TOP 100 CONTRIBUTORS TO MAXIMUM CONCENTRATION FOR 00079-01-6							09/08/11
@ UTMN: 373000. UTMN: 4507000.							13:17:58
Emission Point	Facility Name (shortened)	EP DIR	Distance to Max.(m)	CONC. ug/m3	Percent of Max.		
TOTAL	NWIRP BETHPAGE GM-38 AREA	SSE	539.	0.727E-01	100.000		
TOTAL OF ALL	1 CONTRIBUTORS					0.727E-01	100.000

XII. ISCLT Model Run Information, within 25 meters:

```

MODEL RUN INFORMATION
09/08/11
13:17:58

1. Current GRID SPACING equals 1000. meters.
2. Maximum Concentration (flashing) equals 0.0727115273 ug/m3
   @ UTME: 373000. UTMN: 4507000.

3. RUN FILE: TEMP?.RUN
4. METEOROLOGICAL FILE: ALB.MET
5. RUN MODE: URBAN
6. HALF-LIVES: not used to account for pollutant removal from air.
7. BLD. WAKE EFFECTS: AS-1 METHOD, All data KNOWN (hb, hv, hl, orientation)
8. EMISSIONS: ACTUAL ANNUAL EMISSIONS
9. SOURCES: All sources within 25. meters of
   UTME: 373275. UTMN: 4506537.
10. CONTAMINANT CAS NUMBER(s): 00079-01-6
11. EMISSION POINT - CONTAMINANT(s) found by computer: 1
12. No data is being copied to DUMP file.
```



## **APPENDIX C**

### **FIELD LOGS**

Date



### Groundwater L level Measurement Sheet

Project Site: NWIRP Bethpage - GM-38

Location: Bethpage, NY

Field Crew: RA

Water Level Meter: Solinst

Weather: Sunny, 54°F 5mph / WSA: 29.91" Hg

Time of Low Tide: N/A

Time of High Tide: N/A

Well ID	Time	Depth to Water (ft.)	Total Depth of Well / Screenshot Interval (ft.)	PID (ppm)	Comments
RW1-MW1	10:30	32.47	435 / 395-435	---	
RW1-MW2	12:30	37.84	435 / 395-435	---	
RW1-MW3	12:40	38.91	435 / 395-435	---	
RW2-MW1	10:45	38.67	510 / 470-510	---	
RW2-MW2	10:50	37.68	510 / 470-510	---	
RW2-MW3	10:55	36.21	510 / 470-510	---	
RW3-MW1	11:10	37.35	350 / 330-350	---	
RW3-MW2	11:20	39.11	495 / 475-495	---	
RW3-MW3	11:35	38.72	340 / 320-340	---	
RW3-MW4	11:45	35.93	495 / 475-495	---	
TP1	10:10	48.34	470 / 450-470	---	
IW1-MW1	10:40	56.14	470 / 450-470	---	
RW-1					
RW-3	10:20				Open vault and check integrity of piping, etc. OK
					Open vault and check integrity of piping, etc. OK

Signature: \_\_\_\_\_

Date: 12.17.2021