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Mr. Scott Sokolowski
Remedial Project Manager
Naval Facilities Engineering Systems Command, Mid Atlantic
9324 Virginia Avenue, Building Z-144
Norfolk, VA 23511-3095

**Subject: US NAVY CONTRACT NO. N40085-16-D-2288
CONTRACT TASK ORDER NO. 0005
SECOND QUARTER 2021 OPERATIONS REPORT
GWTP GM-38 AREA REMEDIATION
NAVAL WEAPONS INDUSTRIAL RESERVE PLANT, BETHPAGE, NY**

Dear Mr. Sokolowski:

An electronic copy of the *Quarterly Operations Report, Second Quarter 2021, Groundwater Treatment Plant, GM-38 Area Groundwater Remediation, Naval Weapons Industrial Reserve Plant, Bethpage, New York*, has been submitted to your attention via email.

Please contact me at rgregory@komangs.com or 610.400.0636 if you have any questions or comments regarding this submittal.

Sincerely,
KOMAN Government Solutions, LLC (KGS)

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

Robert G. Gregory
Project Manager

Cc: Mr. Jason Pelton (NYSDEC) – electronic only
Mr. Steven Scharf (NYSDEC) – electronic only
Mr. James Sullivan (NYSDOH) – electronic only
Mr. James Watts-Gravette (NAVFAC) – electronic only
Mr. William Cords (NAVAIR) – electronic only
Mr. Vin Varricchio (NWIRP Bethpage) – 2 hard copies, 2 CDs
Ms. Monica Marrow (Jacobs - NIRIS) – 1 hard copy, 1 CD
Mr. Ed Hannon (Northrop Grumman) – electronic only
Mr. David Stern (ARCADIS) – electronic only
Mr. David Brayack (Tetra Tech) – electronic only

**Quarterly Operations Report
Second Quarter 2021**

**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**

October 2021

Prepared for:



Naval Facilities Engineering Systems Command Mid-Atlantic
9324 Virginia Avenue
Norfolk, VA 23511

Prepared by:



**KOMAN Government Solutions, LLC
180 Gordon Drive, Suite 110
Exton, Pennsylvania 19341
(610) 363-3000**

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Norfolk, VA 23511



Patrick Schauble
Program Manager

10/27/2021

Date

Robert Gregory
Project Manager

10/27/2021

Date

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1-1
1.1	Background.....	1-1
1.2	GWTP Overview	1-2
2.0	GWTP OPERATIONS AND MAINTENANCE.....	2-1
2.1	Routine Maintenance Activities	2-1
2.2	Non-routine Maintenance / Site Activities	2-1
3.0	GWTP MONITORING.....	3-1
3.1	Process Water Quality Monitoring.....	3-1
3.2	Air Quality Monitoring.....	3-1
3.3	Groundwater Quality Monitoring.....	3-2
3.3.1	Groundwater Quality Results.....	3-3
3.3.2	Groundwater Concentration Trends	3-3
4.0	CONCLUSIONS AND RECOMMENDATIONS.....	4-1
5.0	REFERENCES.....	5-1

FIGURES

FIGURE 1	Site Map
FIGURE 2	Process Flow Diagram
FIGURE 3	GM-38 Area Site Map
FIGURE 4	Recovery Well Locations
FIGURE 5a	Second Quarter 2021 Groundwater Analytical Map – Select VOC Concentrations (RW-1 and RW-3)
FIGURE 5b	Second Quarter 2021 Groundwater Analytical Map – Select VOC Concentrations (RW-4)
FIGURE 6	Groundwater Concentrations Trends of Select VOCs – RW-1
FIGURE 7a	Groundwater Concentrations Trends of Select VOCs – RW-3 (PCE, TCE, cis-1,2-DCE)
FIGURE 7b	Groundwater Concentrations Trends of Select VOCs – RW-3 (PCE, cis-1,2-DCE)
FIGURE 8a	Groundwater Concentrations Trends of Select VOCs – RW-4 (PCE, TCE, cis-1,2-DCE)
FIGURE 8b	Groundwater Concentrations Trends of Select VOCs – RW-4 (PCE, cis-1,2-DCE)

TABLES

TABLE 1 Discharge Monitoring Results – Second Quarter 2021
TABLE 2 Air Sampling Results – Second Quarter 2021
TABLE 3 Stack Emissions – Second Quarter 2021
TABLE 4 Groundwater Level Measurements – Second Quarter 2021

APPENDICES

APPENDIX A NYSDEC Effluent Limitations and Monitoring Requirements and April 2021 –
June 2021 DMRs
APPENDIX B NYSDEC Air Discharge Limit Documentation
APPENDIX C Field Logs – Second Quarter 2021

Acronyms and Abbreviations

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
DTW	depth to water
ECL	Environmental Conservation Law
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
NAVFAC	Naval Facilities Engineering Systems Command
Navy	United States Department of the Navy
NG	Northrop Grumman
NWIRP	Naval Weapons Industrial Reserve Plant
NYSDEC	New York State Department of Environmental Conservation
O&M	Operation and Maintenance
OU	operable unit
PCE	tetrachloroethene
PLC	programmable logic controller
ROD	Record of Decision

scfm	standard cubic feet per minute
SPDES	State Pollution Discharge Elimination System
TCE	trichloroethene
TE	treated effluent
Tetra Tech	Tetra Tech, Inc.
TtEC	Tetra Tech EC, Inc.
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 Quarterly 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 Second Quarter 2021 Operations Report details activities that occurred from April to June 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.

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, startup/commissioning activities for the AOP system have been ongoing, and recovery well RW-4 has been in the process of being brought online on a full-time basis. In support of these two activities, RW-1 has been operating at 700 gpm and RW-4 has been operating at 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 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.

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 this reporting period:

- 1 June - Operator backwashed LGAC-1, LGAC-2, and LGAC-3. Plant offline for 5 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 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 current reporting period, efforts continued, under separate contract, to integrate the AOP into the existing treatment train at a point following the LGAC units and prior to plant discharge. In addition, new recovery well RW-4 was connected to the plant in place of well RW-3. Integration of RW-4 into the system has resulted an additional sediment load in the plant influent. This sediment is brown colored. 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 under current investigation via a separate contract. The frequency of bag filter changes resulting from this additional sediment load has increased to approximately once every four days during the current reporting period.

The following non-routine activities occurred at the GWTP during the current reporting period:

- 1 April – RW-3 was 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 was 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 ultraviolet (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.

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.

The analytical results of monthly process water samples collected during the Second 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 Second Quarter. Monthly DMRs for the Second Quarter (April – June 2021) are included in **Appendix A**.

Based on NYSDEC's interest with several non-VOC parameters in groundwater near Bethpage Water District Plant 4, the Navy has agreed to sample and analyze groundwater for 1,4-dioxane, using United States Environmental Protection Agency (USEPA) Method 8270D SIM, on a monthly basis from the recovery well influent. Analytical results for 1,4-dioxane are also provided in **Table 1**.

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**.

While only sampling of the stack emissions is required for NYSDEC compliance, 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 Second Quarter are presented in **Table 2**. Air emissions calculations using the stack vapor concentrations along with discharge flowrates are presented in **Table 3**.

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 beginning 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 because of 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.

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 and injection wells 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.

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

Quarterly groundwater level measurements of the 12 monitoring wells were recorded on 30 June 2021. Results are summarized in **Table 4**. A copy of the field log is included in **Appendix C**.

As mentioned above, groundwater samples are collected semi-annually in the First and Third Quarters; no groundwater samples were collected from the monitoring wells during the Second Quarter 2021. Samples are collected monthly from recovery wells RW-1 and RW-4, results are summarized in **Table 1**.

3.3.2 Groundwater Concentration Trends

Groundwater analytical results of select VOCs (cis-1,2-DCE, PCE, TCE, and VC) for the recovery wells during the Second Quarter monitoring event are presented graphically as **Figures 5a and 5b**. Additionally, concentration trends of select VOCs for RW-1 (cis-1,2-DCE, TCE, PCE, and VC), RW-3 (cis-1,2-DCE, TCE, and PCE), and RW-4 (cis-1,2-DCE, TCE, and PCE) are presented in **Figure 6**, **Figures 7a and 7b**, and **Figures 8a and 8b**, respectively.

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 53.9 $\mu\text{g/L}$ in May 2021. TCE concentrations remained stable in 2020 and 2021 ranging between 72 $\mu\text{g/L}$ in January 2020 to 53.9 $\mu\text{g/L}$ in May 2021 and ranging from 53.9 $\mu\text{g/L}$ (May 2021) to 63.3 $\mu\text{g/L}$ (June 2021) within the current reporting period. 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 of 3.23 $\mu\text{g/L}$ in August 2020 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 14.8 $\mu\text{g/L}$ in May 2021 and ranging from 14.8 $\mu\text{g/L}$ (May 2021) to 18.1 $\mu\text{g/L}$ (June 2021) within the current reporting

period. PCE concentrations have remained below 20 µg/L since April 2020. Concentrations of VC have decreased below initial concentrations in 2010. After reaching a maximum concentration of 61 µg/L in February 2010, VC concentrations have remained below 5.0 µg/L since the final quarter of 2011 and below 1.0 µg/L since June 2013.

Figure 7a and Figure 7b present concentrations measured at recovery well RW-3. TCE concentrations at this location have decreased from initial concentrations in February 2010 (660 µg/L), remaining below 300 µg/L from the latter half of 2012 through the Third Quarter 2015. RW-3 was temporarily taken off-line between July 2015 and June 2018, which may have contributed to the increase to 371 µg/L in March 2016. However, since March 2016, TCE concentrations decreased from 371 µg/L to a minimum of 120 µg/L in March 2018. No sample was collected in January as this recovery well was offline for the tie-in of the new recovery well RW-4 to the GWTP. The TCE concentrations for the First Quarter 2021 remained similar to the concentrations measured in 2020 ranging between 122 µg/L and 136 µg/L. Concentrations of cis-1,2-DCE have remained consistently below 4.0 µg/L, and below 2.5 µg/L since June 2018. PCE has been detected only infrequently at this location, with the most recent detections of 0.300 J µg/L in February and 0.237 J µg/L in March 2021. VC has not been detected during any sampling event. In April 2021, well RW-3 was taken offline and replaced with well RW-4, therefore there are no additional data for RW-3 during the current reporting period.

Figure 8a and Figure 8b 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. TCE concentrations 438 µg/L and 623 µg/L in May and June, respectively; PCE concentrations were 4.10 J µg/L and 6.65 µg/L in May and June, respectively; and cis-1,2-DCE concentrations were 0.905 J µg/L and 1.52 J µg/L in May and June, respectively.

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.

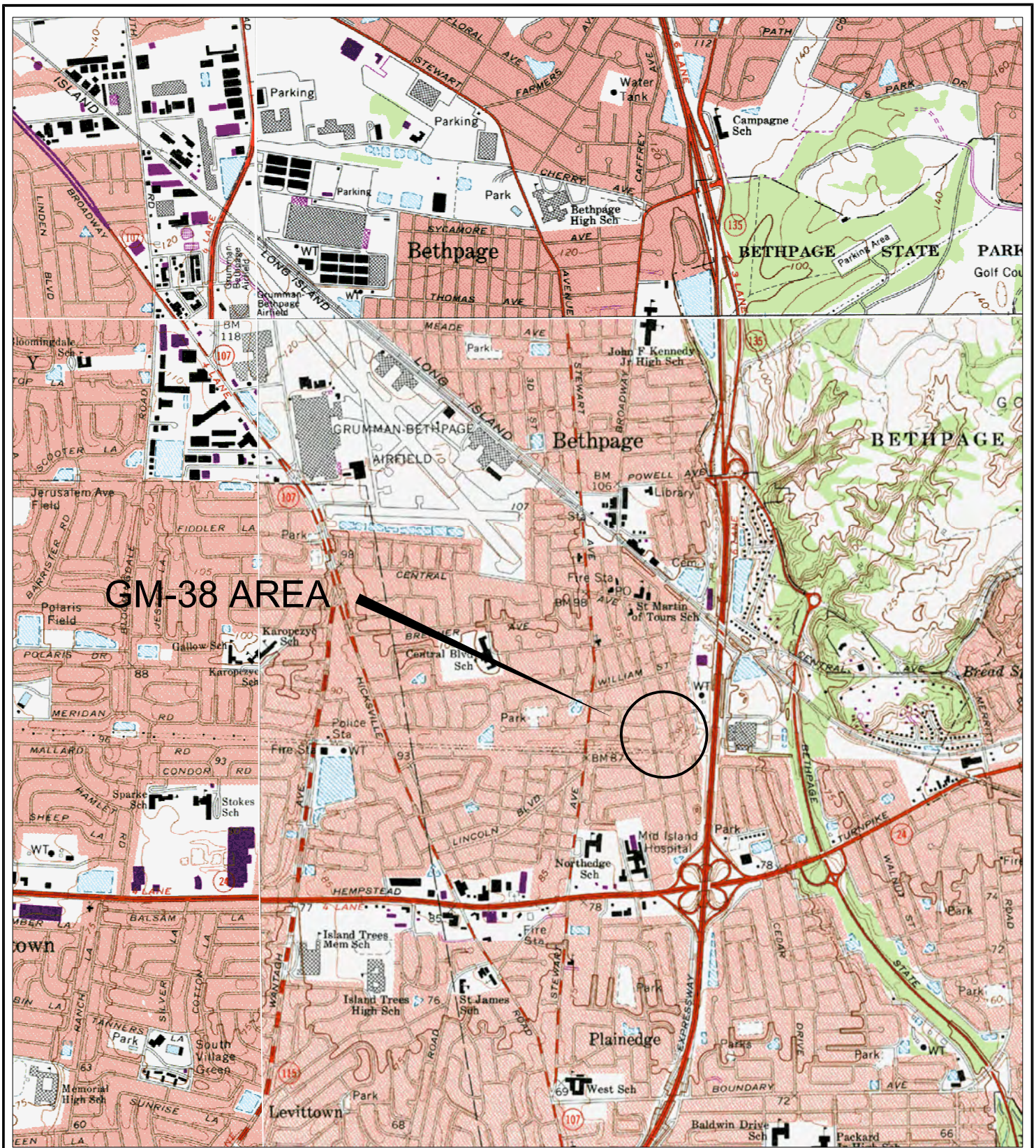
5.0 REFERENCES

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.

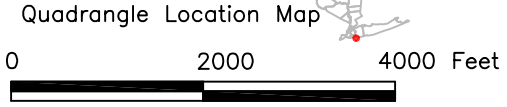
Tetra Tech EC, Inc. (TtEC), 2010. *Final Operation, Maintenance & Monitoring Plan for Groundwater Treatment Plant GM-38 Area Groundwater Remediation, Naval Weapons Industrial Reserve Plant, Bethpage, New York.* April.

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

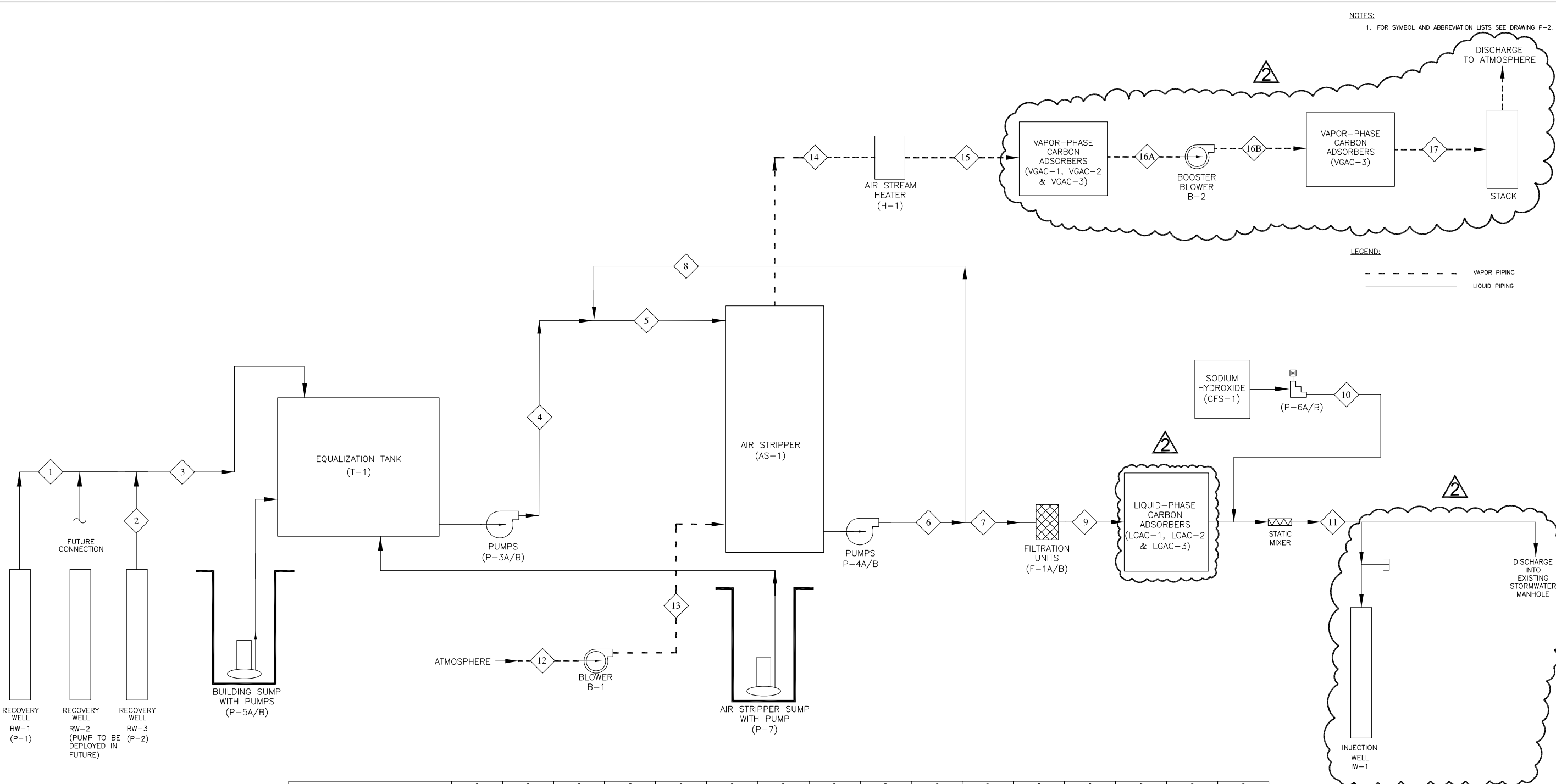


GM-38 AREA



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

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



NOTES:
1. FOR SYMBOL AND ABBREVIATION LISTS SEE DRAWING P-2.

LEGEND:
- - - - - VAPOR PIPING
_____ LIQUID PIPING

STREAM NO.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
COMPOSITION (UG/L, UNLESS OTHERWISE NOTED)																	
BENZENE	4	4	4	4	3	-	-	-	-	-	-	-	-	-	-	-	-
TOLUENE	15	15	15	15	12	-	-	-	-	-	-	-	-	-	-	-	-
XYLENES, TOTAL	16	16	16	16	12	-	-	-	-	-	-	-	-	-	-	-	-
1,2-DICHLOROETHANE	3	3	3	3	2.8	-	-	-	-	-	2.7 ^{E-07}	-	-	-	-	-	-
cis 1,2-DICHLOROETHENE	1100	1100	1100	1100	1008	0.10	0.10	0.10	0.10	-	1.0 ^{E-04}	-	-	-	-	-	-
VINYL CHLORIDE	300	300	300	300	275	0.03	0.03	0.03	0.03	-	2.7 ^{E-05}	-	-	-	-	-	-
TETRACHLOROETHENE (PCE)	900	900	900	900	825	0.08	0.08	0.08	0.08	-	8.2 ^{E-05}	-	-	-	-	-	-
TRICHLOROETHENE (TCE)	3400	3400	3400	3400	3117	3.12	3.12	3.12	3.12	-	3.1 ^{E-03}	-	-	-	-	-	-
WATER FLOW RATE (GPM)	800	300	1100	1100	1200	1200	1100	100	1100	1.1 gpd	1100	-	-	-	-	-	-
TEMPERATURE (°F)	55	55	55	55	55	55	55	55	55	60	55	-	-	-	-	-	-
PRESSURE (PSIG)												-0.27	1.50	1.36	1.18	0.53	
DENSITY (lb/ft ³)										95.5		0.077	0.085	0.084	0.082	0.079	
MASS FLOW RATE (lb/hr)	400364	150136	550500	550500	600545	600545	550500	50,045	550500	0.59	550500	36,960	40,800	40,320	39,360	37,920	
RELATIVE HUMIDITY (%)												50	50	100	50	50	
STATIC PRESSURE (PSIA)												0.214	0.214	0.214	0.275	0.275	
pH (S.U.)	5.5	5.5	5.5	5.5	5.5	6.0	6.0	6.0	6.0	14	7.0						
VAPOR FLOW RATE (CFM)												8000	8000	8000	8000	8000	
TOTAL VAPOR VOC (PPMV)															25.5	25.5	1.2
TOTAL VAPOR VOC (LBS/HR)															3.18	3.18	0.15

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DEPARTMENT OF THE NAVY

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT

ENGINEERING FIELD ACTIVITY - NORTHEAST

GM-38 AREA

GROUNDWATER TREATMENT PLANT

PROCESS FLOW DIAGRAM - GROUNDWATER AND OFF-GAS TREATMENT

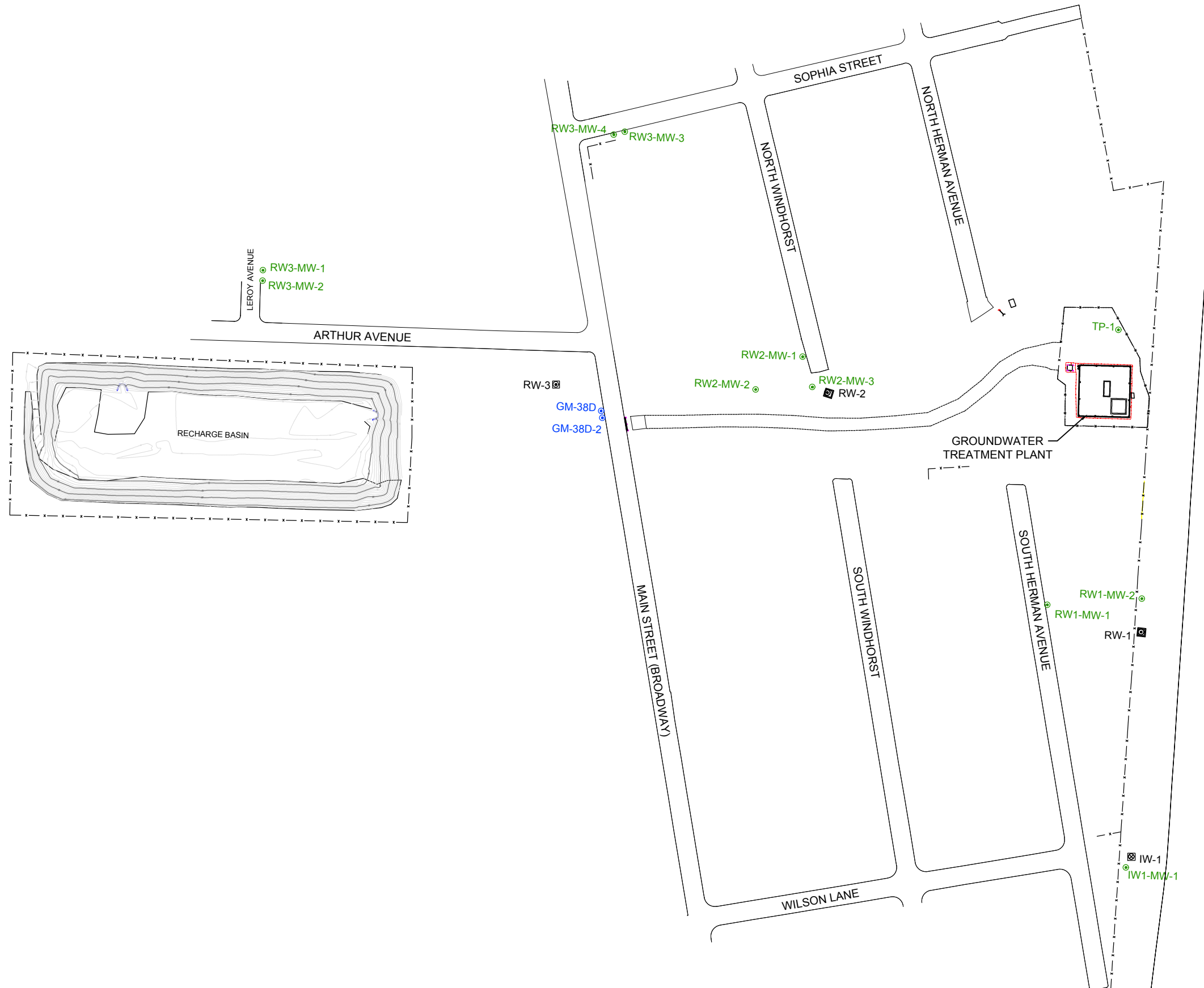
DATE: 05/05/06

SCALE: AS SHOWN

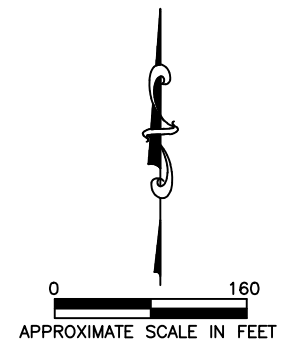
FIGURE 2

Legend

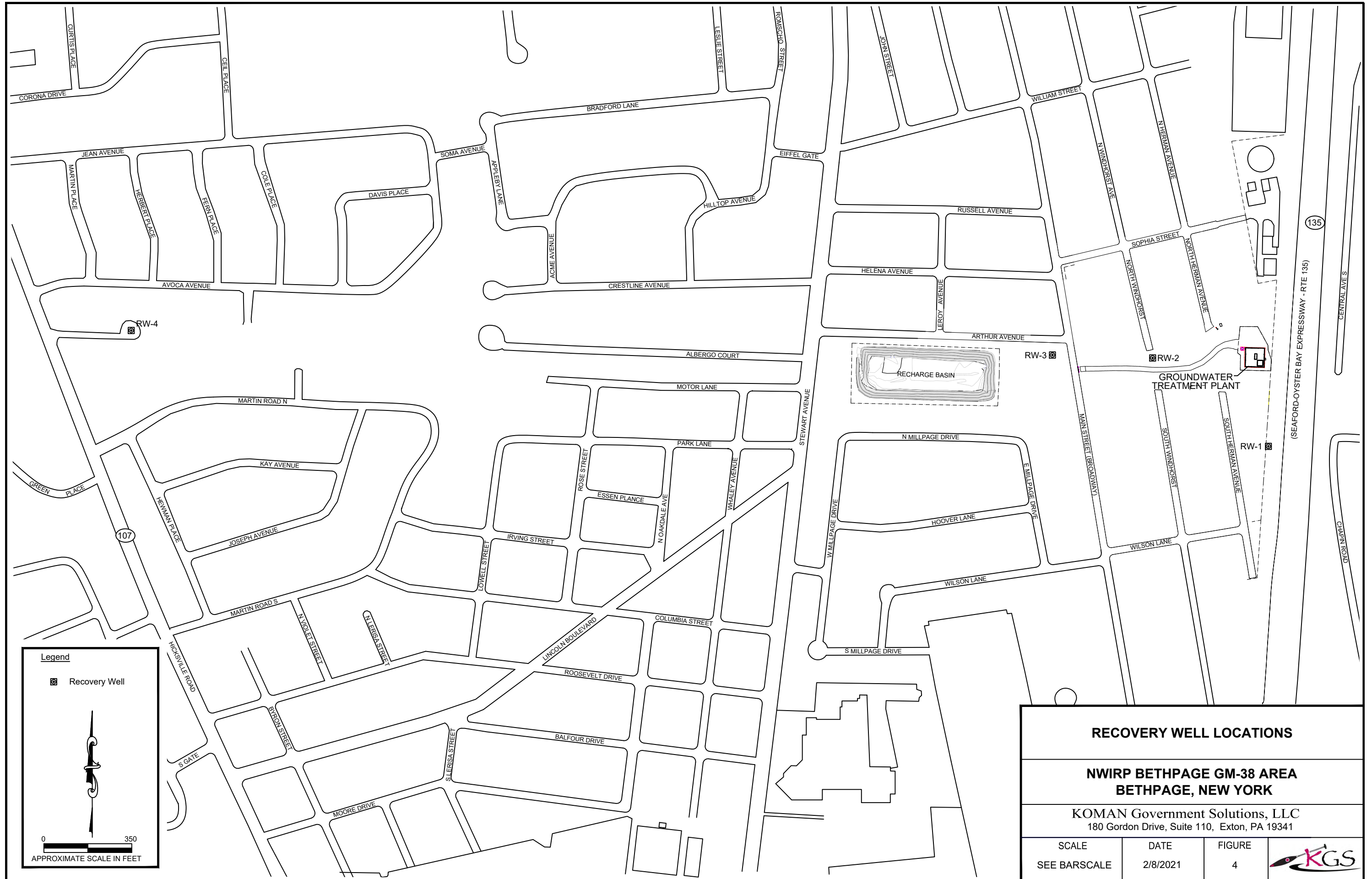
- Monitoring Well (Monitored by Navy)
- Monitoring Well (Monitored by Northrop Grumman)
- ⊠ Recovery Well
- ⊠ Injection Well



(SEAFORD-OYSTER BAY EXPRESSWAY - RTE 135)



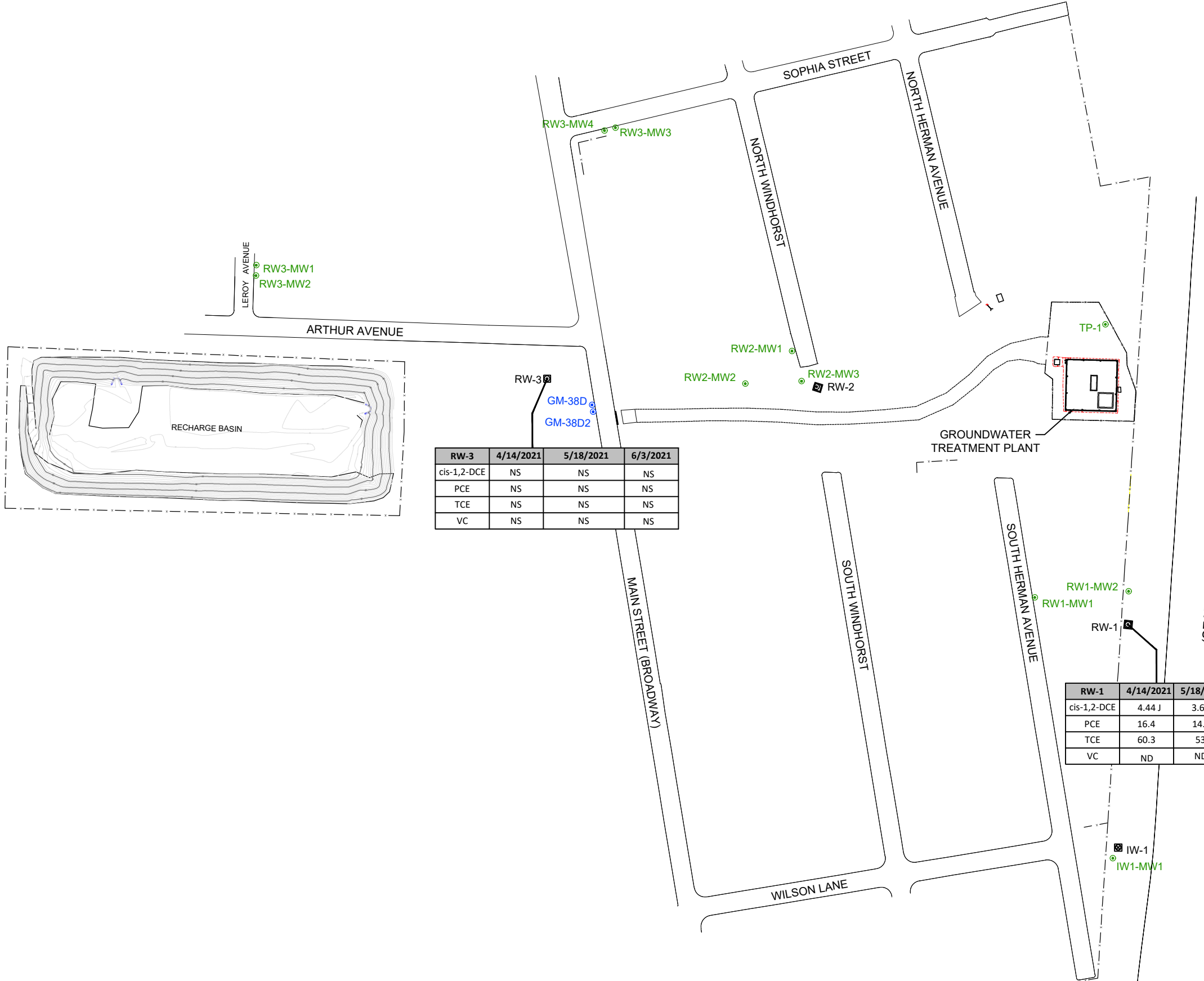
SITE MAP			
NWIRP BETHPAGE GM-38 AREA BETHPAGE, NEW YORK			
KOMAN Government Solutions, LLC 180 Gordon Drive, Suite 110, Exton, PA 19341			
SCALE	DATE	FIGURE	
SEE BARSCALE	01/15/2018	3	



- 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
 - NS Not Sampled
 - DCE Dichloroethene
 - PCE Tetrachloroethane
 - TCE Trichloroethane
 - VC Vinyl Chloride

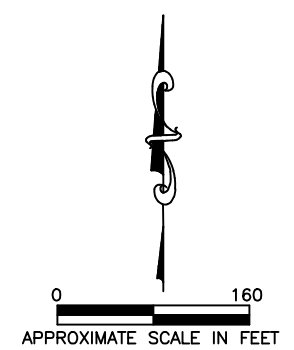
Notes:
 All concentrations reported in µg/L.

Monitoring wells are sampled on a semi-annual basis and were not sampled during the 2nd Quarter 2019. Recovery wells RW-1 and RW-3 are sampled on a monthly basis.



RW-3	4/14/2021	5/18/2021	6/3/2021
cis-1,2-DCE	NS	NS	NS
PCE	NS	NS	NS
TCE	NS	NS	NS
VC	NS	NS	NS

RW-1	4/14/2021	5/18/2021	6/3/2021
cis-1,2-DCE	4.44 J	3.63 J	4.08 J
PCE	16.4	14.8	18.1
TCE	60.3	53.9	66.3
VC	ND	ND	ND

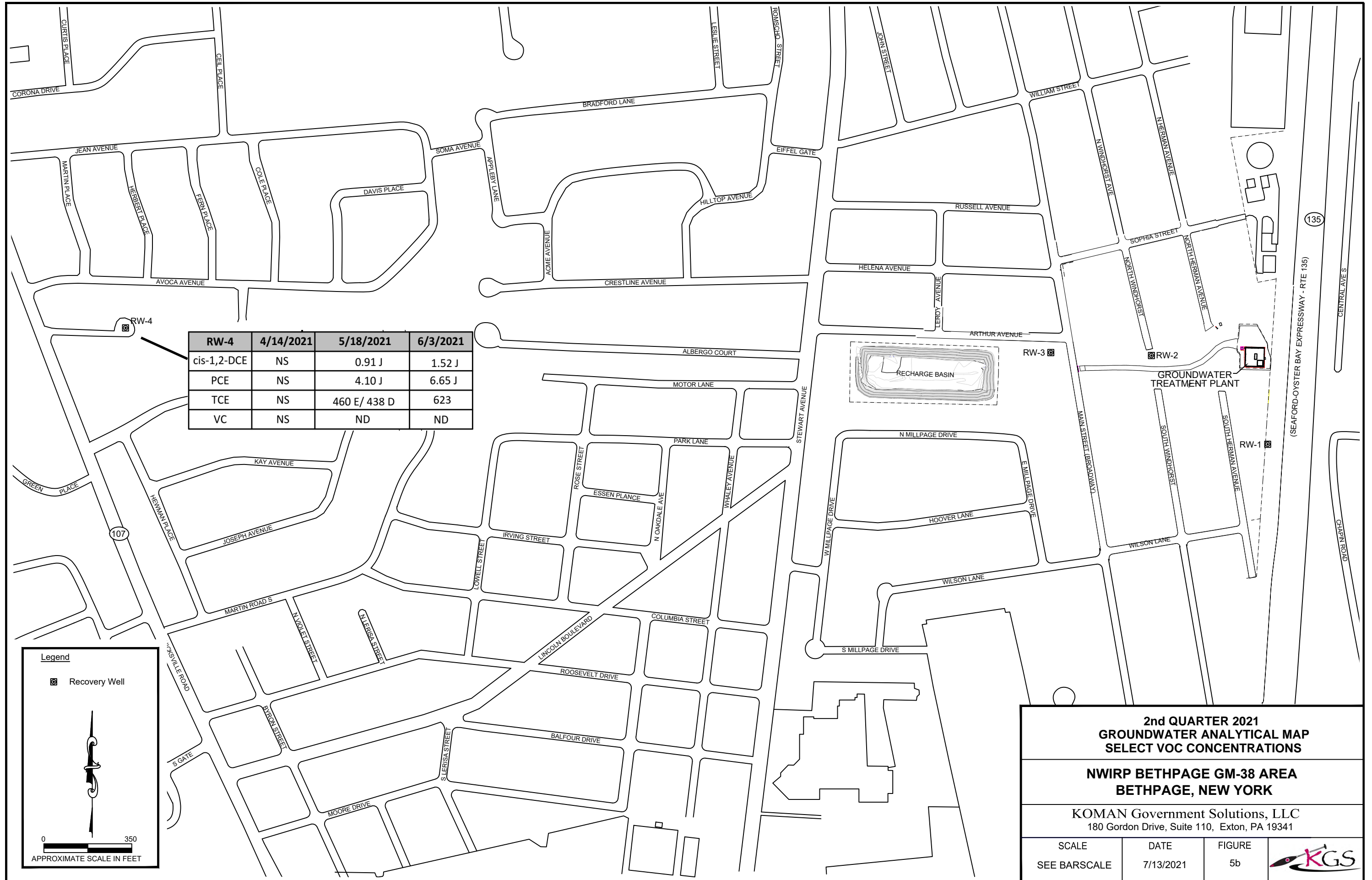


**2nd QUARTER 2021
 GROUNDWATER ANALYTICAL MAP
 SELECT VOC CONCENTRATIONS**

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

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


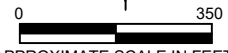
SCALE	DATE	FIGURE	
SEE BARSCALE	7/13/2021	5a	



RW-4	4/14/2021	5/18/2021	6/3/2021
cis-1,2-DCE	NS	0.91 J	1.52 J
PCE	NS	4.10 J	6.65 J
TCE	NS	460 E/ 438 D	623
VC	NS	ND	ND

Legend

☒ Recovery Well

APPROXIMATE SCALE IN FEET

**2nd QUARTER 2021
GROUNDWATER ANALYTICAL MAP
SELECT VOC CONCENTRATIONS**

**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	7/13/2021	5b	

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

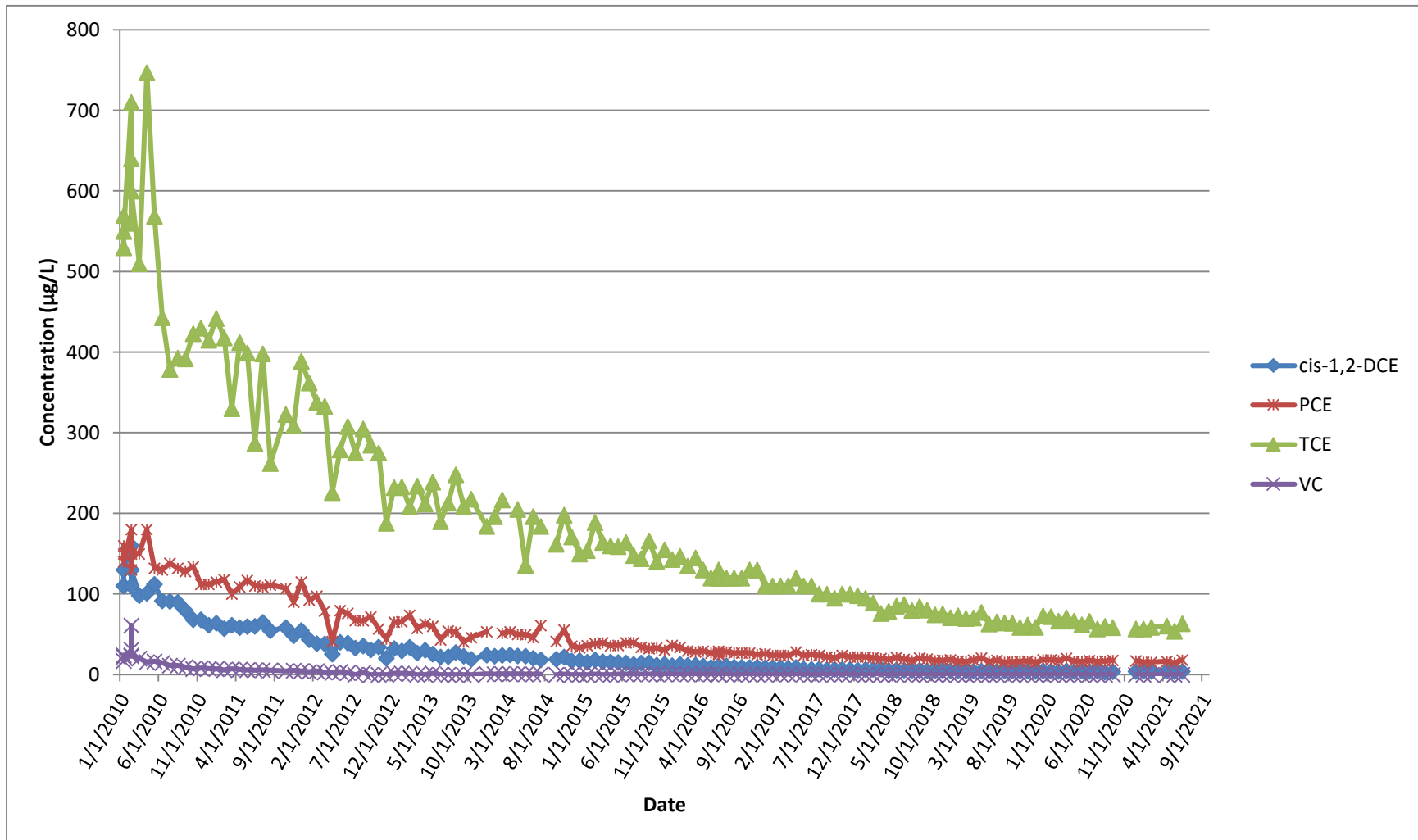


Figure 7a
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs
RW3

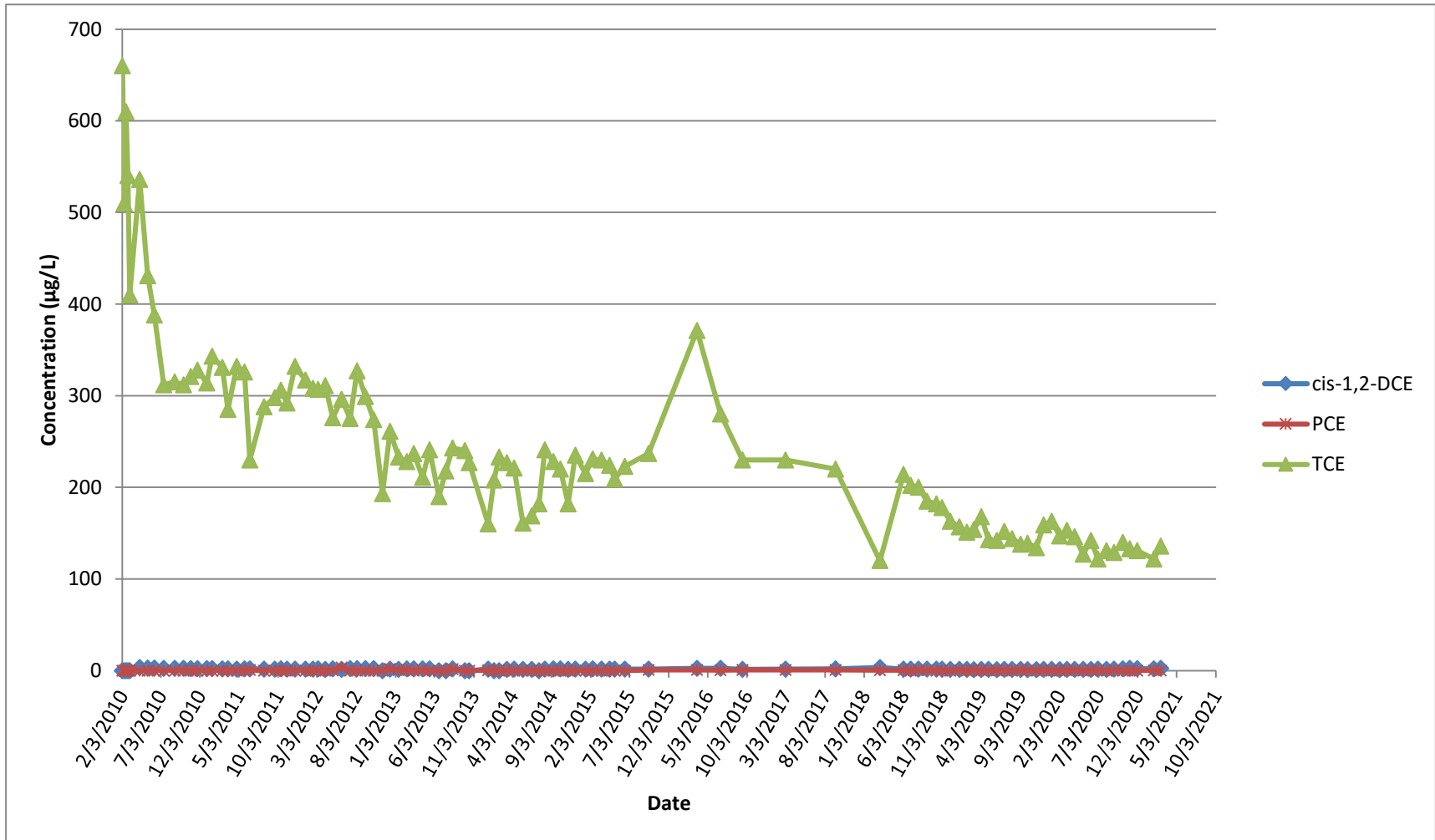


Figure 7b
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs
RW3

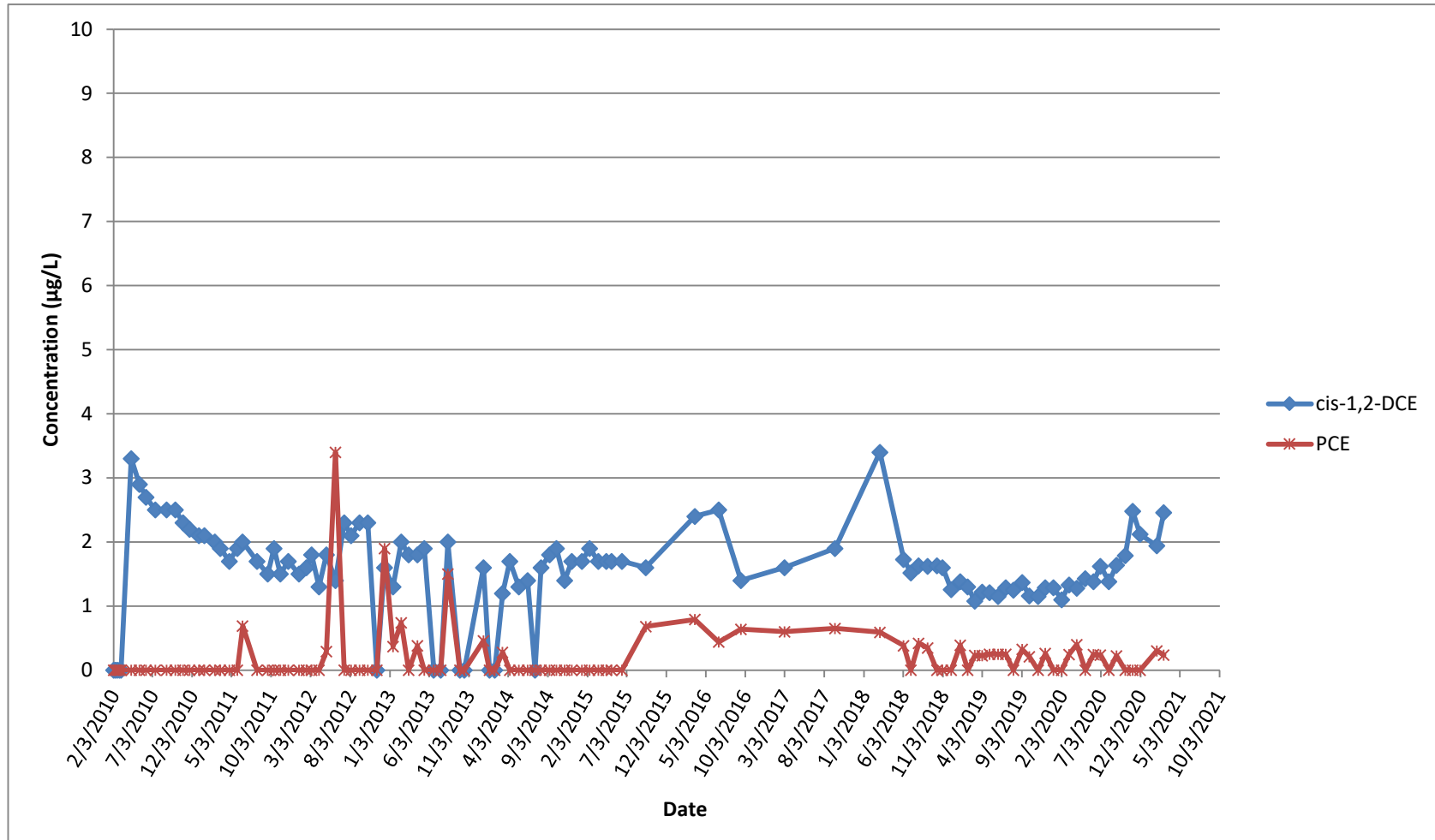


Figure 8a
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs
RW4

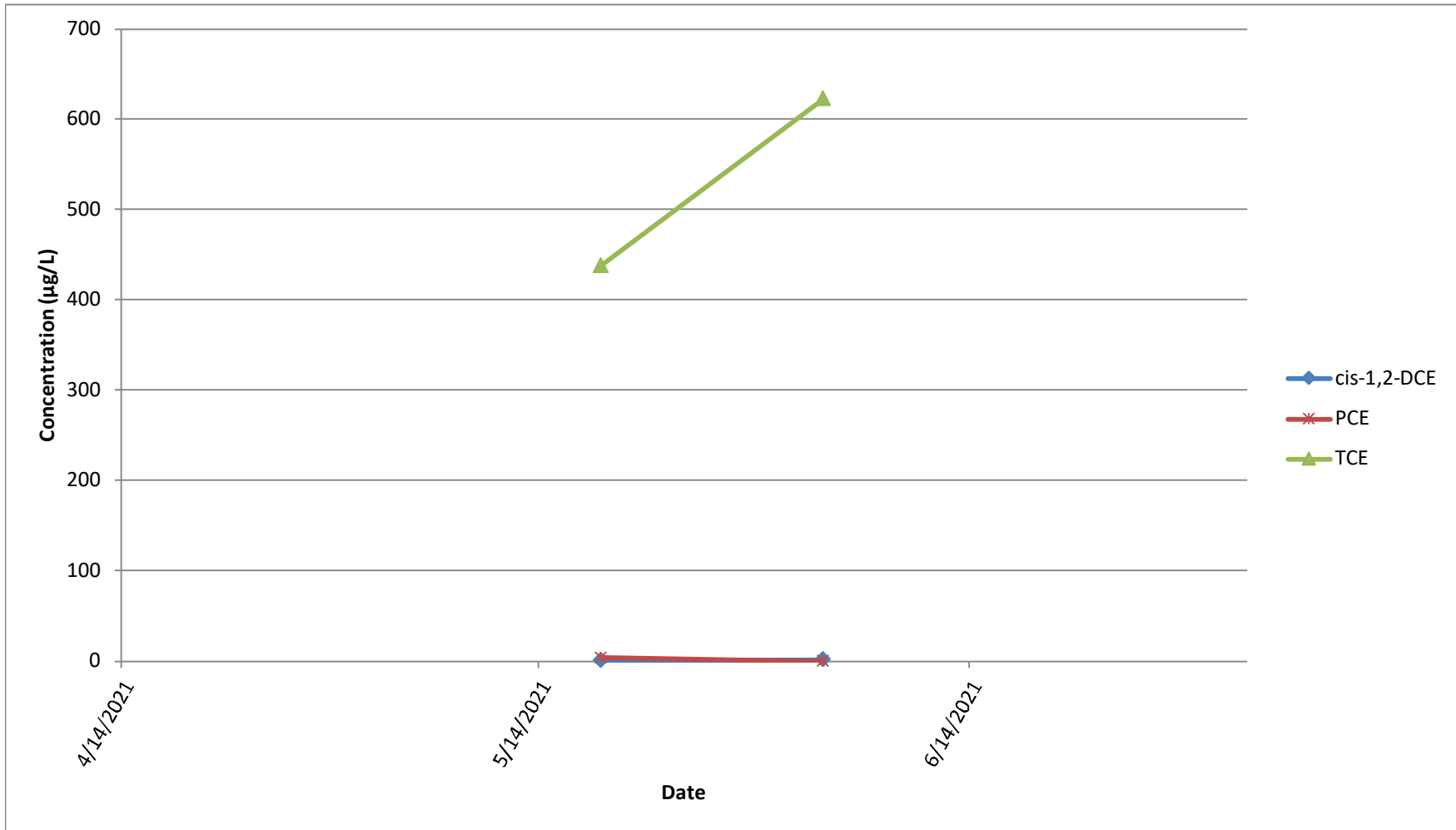
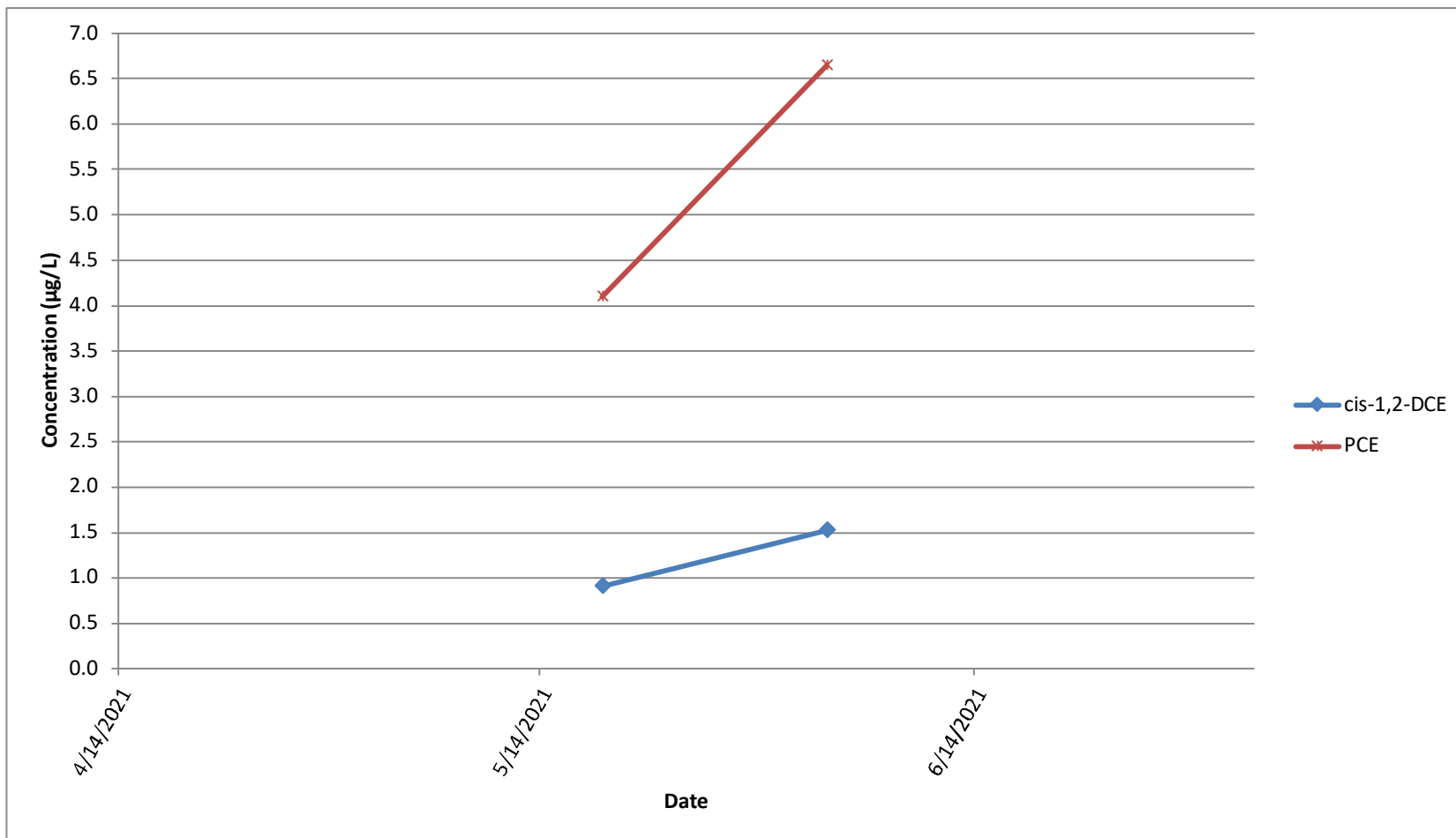


Figure 8b
GM-38 Area Groundwater Remediation
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Concentration Trends of Select VOCs
RW4



TABLES

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

SPDES Parameters	Daily Maximum Goal	Units	April 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			4/14/21										
Average Flowrate	1100	GPM	653	0	26	679	724	NR	NR	685	NR	NR	NR
Total Flow	NA	gallons	25,923,200	228,400	859,300	27,010,900	28,773,700	NR	NR	27,212,700	NR	NR	NR
pH	5.5 - 8.5	SU	5.47	NS	NS	5.47	6.57	6.55	6.50	6.52	6.55	6.54	6.55
Chloroform	5	µg/L	0.334 J	NS	NS	0.334 J	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	1.36 J	NS	NS	1.36 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	0.216 J	NS	NS	0.216 J	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	0.905 J	NS	NS	0.905 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	4.44 J	NS	NS	4.44 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	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)
Tetrachloroethene	5	µg/L	16.4	NS	NS	16.4	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	0.429 J	NS	NS	0.429 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	60.3	NS	NS	60.3	0.385 J	0.415 J	0.639 J	0.657 J	0.372 J	0.487 J	0.317 J
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	NS	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)
Vinyl Chloride	2	µg/L	ND (1.0)	NS	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)
1,4-Dioxane	--	µg/L	2.2	NS	NS	2.2	NS	NS	NS	NS	NS	NS	NS
Mercury	0.00025	mg/L	ND (0.00010)	NS	NS	ND (0.00010)	ND (0.00010)	ND (0.00010)	35.0	ND (0.00010)	ND (0.00010)	ND (0.00010)	ND (0.00010)
Total Suspended Solids (TSS)	NA	mg/L	ND (1.0)	NS	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)

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

SPDES Parameters	Daily Maximum Goal	Units	May 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			5/18/21										
Average Flowrate	1100	GPM	700	0	106	806	803	NR	NR	755	NR	NR	NR
Total Flow	NA	gallons	30,342,700	0	4,587,200	34,929,900	34,804,400	NR	NR	32,724,300	NR	NR	NR
pH	5.5 - 8.5	SU	5.48	NS	6.15	5.57	6.83	6.84	6.78	6.80	6.82	6.83	6.84
Chloroform	5	µg/L	0.268 J	NS	0.269 J	0.268 J	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	1.27 J	NS	0.249 J	1.14 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	0.864 J	NS	1.73 J	0.98 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	3.63 J	NS	0.91 J	3.27 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	14.8	NS	4.10 J	13.39	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	0.394 J	NS	ND (1.0)	0.342 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	53.9	NS	460 E/460 D	107.23	0.394 J	0.396 J	1.37 J	1.23 J	0.355 J	0.438 J	0.314 J
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	NS	3.63 J	0.477	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	14	3.58	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)
Total Suspended Solids (TSS)	NA	mg/L	ND (1.0)	NS	1.7	0.22	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
Second Quarter 2021

SPDES Parameters	Daily Maximum Goal	Units	June 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			6/3/21										
Average Flowrate	1100	GPM	522	0	169	692	788	NR	NR	748	NR	NR	NR
Total Flow	NA	gallons	21,912,100	0	7,097,600	29,009,700	33,067,700	NR	NR	31,368,200	NR	NR	NR
pH	5.5 - 8.5	SU	5.47	NS	6.12	5.63	7.03	7.05	6.93	6.98	7.03	7.04	7.05
Chloroform	5	µg/L	0.332 J	NS	ND (1.0)	0.251 J	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	1.25 J	NS	ND (1.0)	0.94 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	0.778 J	NS	2.90 J	1.30 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	4.08 J	NS	1.52 J	3.45 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	18.1	NS	6.65 J	15.30	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	0.459 J	NS	ND (1.0)	0.347 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	63.3	NS	623	200.24	1.65 J	0.267 J	1.74 J	0.324 J	0.243 J	0.312 J	0.254 J
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	NS	5.10 J	1.248	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	2.4	NS	17	5.97	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)
Total Suspended Solids (TSS)	NA	mg/L	ND (1.0)	NS	6.4	1.57	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)

Notes:

- J - Estimated result between laboratory method detection limit and reporting limit
- D - Concentration is a result of a dilution.
- E - Concentration has exceeded the calibration range for that specific analysis.
- 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

(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
Air Sampling Results
Second Quarter 2021

DAR Parameters	Discharge Goal ⁽³⁾	Units	April 2021				
			Influent (VCI1)	Effluent	Effluent Duplicate	VC12	VC23
Process Stream							
Sampling Date			4/1/21				
Average Flowrate		CFM	NR	9,314	NR	NR	NR
Total Flow ⁽¹⁾		ft ³	NR	369,966,975	NR	NR	NR
Total Flow ⁽²⁾		m ³	NR	10,476,298	NR	NR	NR
1,2-Dichloroethane	NA	µg/m ³	1.8 J	ND	ND	0.82 J	ND
cis 1,2-Dichloroethene	≤ 100,000 ⁽⁴⁾	µg/m ³	44	2.0 J	2.0 J	44	2.0 J
trans 1,2-Dichloroethene		µg/m ³	1.2 J	ND	ND	0.67 J	ND
1,2-Dichloroethene (total)	≤ 100,000	µg/m ³	45	ND	ND	44	ND
Toluene	N/A	µg/m ³	0.43 J	ND	ND	ND	60
Total Xylene	N/A	µg/m ³	ND	ND	ND	ND	43
1,1,2-Trichloroethane	N/A	µg/m ³	ND	ND	ND	ND	ND
Trichloroethene	≤ 2600	µg/m ³	980	ND	0.96 J	3.1 J	ND
Vinyl Chloride	≤ 560	µg/m ³	0.84 J	0.72 J	0.69 J	0.87 J	0.75 J
Tetrachloroethene	≤ 5100	µg/m ³	140	ND	0.77 J	2.3 J	ND

Notes:

NA - Not applicable

ND - Not detected

NR - Not recorded

SGC - Short-term Guideline Concentration

µg/m³ - micrograms per cubic meter

CFM - cubic feet per minute

DAR - Division of Air Resources

(1) Total Flow (ft³) = avg flowrate (cfm) * operational time (min)

(2) Total Flow (m³) = total flow (ft³) * (0.3048³)m³/ft³

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

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

Table 2
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Air Sampling Results
Second Quarter 2021

DAR Parameters	Discharge Goal ⁽³⁾	Units	May 2021					
			Influent (VCI1)	Effluent	Effluent Duplicate	VC12	VC23	
Process Stream								
Sampling Date			5/5/21					
Average Flowrate		CFM	NR	9,001	NR	NR	NR	NR
Total Flow ⁽¹⁾		ft ³	NR	389,928,133	NR	NR	NR	NR
Total Flow ⁽²⁾		m ³	NR	11,041,535	NR	NR	NR	NR
1,2-Dichloroethane	NA	µg/m ³	3.0 J	ND	ND	1.4 J	ND	ND
cis 1,2-Dichloroethene	≤ 100,000 ⁽⁴⁾	µg/m ³	37	6.5	6.9	53	8.3	
trans 1,2-Dichloroethene		µg/m ³	ND	ND	ND	1.2 J	ND	
1,2-Dichloroethene (total)	≤ 100,000	µg/m ³	37	6.3	6.7	53	8.3	
Toluene	N/A	µg/m ³	0.80 J	ND	ND	ND	ND	ND
Total Xylene	N/A	µg/m ³	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	N/A	µg/m ³	3.0 J	ND	ND	ND	ND	ND
Trichloroethene	≤ 2600	µg/m ³	2000	0.81 J	ND	3.1 J	ND	
Vinyl Chloride	≤ 560	µg/m ³	ND	0.62 J	ND	0.76 J	0.75 J	
Tetrachloroethene	≤ 5100	µg/m ³	170	ND	ND	4.5 J	ND	

Notes:

NA - Not applicable

ND - Not detected

NR - Not recorded

SGC - Short-term Guideline Concentration

µg/m³ - micrograms per cubic meter

CFM - cubic feet per minute

DAR - Division of Air Resources

(1) Total Flow (ft³) = avg flowrate (cfm) * operational time (min)

(2) Total Flow (m³) = total flow (ft³) * (0.3048³)m³/ft³

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

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

Table 2
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Air Sampling Results
Second Quarter 2021

DAR Parameters	Discharge Goal ⁽³⁾	Units	June 2021				
			Influent (VCI1)	Effluent	Effluent Duplicate	VC12	VC23
Process Stream							
Sampling Date			6/3/21				
Average Flowrate		CFM	NR	8,866	NR	NR	NR
Total Flow ⁽¹⁾		ft ³	NR	371,824,313	NR	NR	NR
Total Flow ⁽²⁾		m ³	NR	10,528,892	NR	NR	NR
1,2-Dichloroethane	NA	µg/m ³	1.5 J	ND	ND	1.6 J	ND
cis 1,2-Dichloroethene	≤ 100,000 ⁽⁴⁾	µg/m ³	38	14	14	52	16
trans 1,2-Dichloroethene		µg/m ³	0.84 J	ND	ND	1.1 J	0.64 J
1,2-Dichloroethene (total)	≤ 100,000	µg/m ³	39	13	13	52	17
Toluene	N/A	µg/m ³	1.4 J	ND	ND	ND	ND
Total Xylene	N/A	µg/m ³	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	N/A	µg/m ³	ND	ND	ND	ND	ND
Trichloroethene	≤ 2600	µg/m ³	670	1.7 J	ND	3.6 J	0.84 J
Vinyl Chloride	≤ 560	µg/m ³	0.70 J	0.58 J	0.58 J	0.77 J	0.85 J
Tetrachloroethene	≤ 5100	µg/m ³	160	ND	ND	5.0	ND

Notes:

NA - Not applicable

ND - Not detected

NR - Not recorded

SGC - Short-term Guideline Concentration

µg/m³ - micrograms per cubic meter

CFM - cubic feet per minute

DAR - Division of Air Resources

(1) Total Flow (ft³) = avg flowrate (cfm) * operational time (min)

(2) Total Flow (m³) = total flow (ft³) * (0.3048³)m³/ft³

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

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

Table 3
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Stack Emissions
Second Quarter 2021

DAR Parameters	Discharge Goal ⁽¹⁾	Units	April 2021	May 2021	June 2021
Sampling Date			4/1/21	5/5/21	6/3/21
Average Flowrate	N/A	CFM	9,314	9,001	8,866
Total Flow	N/A	ft ³	369,966,975	389,928,133	371,824,313
Total Flow	N/A	m ³	10,476,298	11,041,535	10,528,892
Trichloroethene	≤ 0.09	lb/hr	0.00000	0.00003	0.00005
Vinyl Chloride	≤ 0.02	lb/hr	0.00002	0.00002	0.00002
1,2 Dichloroethene	≤ 11	lb/hr	0.00000	0.00021	0.00042
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	0.00000	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^{^3})m³/ft³ * conc.(ug/m³) * 1 lb/453592370 ug *
60 min/hr

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

Table 4
GM-38 Area Groundwater Remediation
Groundwater Treatment Plant
Naval Weapons Industrial Reserve Plant - Bethpage, NY
Groundwater Level Measurements
Second 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	6/30/2021	85.86	435	395-435	34.44	51.42
RW1-MW2	6/30/2021	87.35	435	395-435	36.04	51.31
RW1-MW3	6/30/2021	80.34	435	395-435	37.68	42.66
RW2-MW1	6/30/2021	90.75	510	470-510	37.88	52.87
RW2-MW2	6/30/2021	90.15	510	470-510	37.11	53.04
RW2-MW3	6/30/2021	89.75	510	470-510	36.94	52.81
RW3-MW1	6/30/2021	92.22	350	330-350	37.28	54.94
RW3-MW2	6/30/2021	91.98	495	475-495	38.44	53.54
RW3-MW3	6/30/2021	92.98	340	320-340	38.09	54.89
RW3-MW4	6/30/2021	92.92	495	475-495	39.14	53.78
TP-01	6/30/2021	85.91	470	450-470	35.75	50.16
IW1-MW1	6/30/2021	89.41	150	20-150	39.44	49.97
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

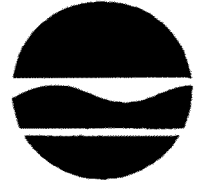
* - Design Depths

APPENDIX A

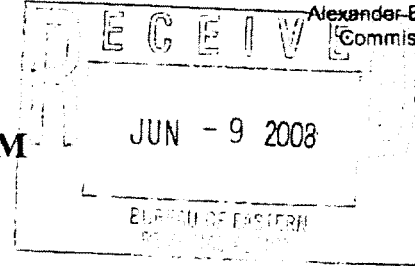
NYSDEC EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS AND MONTHLY DMRS

**New York State Department of Environmental Conservation
Division of Water**

Bureau of Water Permits, 4th 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

Page 1 of 2

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 ¹	Grab
1,2-Dichloroethane	NA	0.6	µg/l	Monthly ¹	Grab
1,1-Dichloroethene	NA	5	µg/l	Monthly ¹	Grab
cis-1,2-Dichloroethene	NA	5	µg/l	Monthly ¹	Grab
trans-1,2-Dichloroethene	NA	5	µg/l	Monthly ¹	Grab
Tetrachloroethene	NA	5	µg/l	Monthly ¹	Grab
1,1,1-Trichloroethane	NA	5	µg/l	Monthly ¹	Grab
Trichloroethene	NA	5	µg/l	Monthly ¹	Grab
Vinyl chloride	NA	2	µg/l	Monthly ¹	Grab
Mercury	NA	0.25	µg/l	Monthly ¹	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

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 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.

APRIL 2021



12 May 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
APRIL 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 April to 30 April 2021 are presented in Attachment A. The plant was down for approximately 58 hours during the reporting period as the result of construction and testing activities associated with the addition of the Advanced Oxidation Process (AOP) system to the current treatment train and a power failure.

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 Gregory'.

Robert Gregory
Project Manager

Attachment A: Groundwater and Air Sampling Results from April 2021

cc: S. Edwards, NYSDEC
D. Hesler, NYSDEC
C. Haas, NYSDEC Region 1
C. Engelhardt, NYSDEC Region 1
J. Pilewski, NYSDEC – Region 1 Water Engineer
J. Sullivan, NYSDOH
J. Lovejoy, NCDOH
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
J. Watts-Gravette, NAVFAC Mid-Atlantic
V. Varricchio, NWIRP Bethpage Facilities Management
P. Schauble, KGS
GM-38 Copy

ATTACHMENT A
GROUNDWATER AND AIR SAMPLING RESULTS
APRIL 2021

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

SPDES Parameters			April 2021 ⁽¹⁾				
Process Stream	Daily Treated Effluent Maximum ⁽¹⁾	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		4/14/21				
Effective Flowrate	1100	GPM	653	0	26	679	724
Total Flow	N/A	gallons	25,923,200	228,400	859,300	27,010,900	28,773,700
pH	5.5 - 8.5	SU	5.47	NS	NS	5.47	6.57
Chloroform	5	µg/L	0.334 J	NS	NS	0.334 J	ND (1.0)
1,1-Dichloroethane	5	µg/L	1.36 J	NS	NS	1.36 J	ND (1.0)
1,2-Dichloroethane	0.6	µg/L	0.216 J	NS	NS	0.216 J	ND (1.0)
1,1-Dichloroethene	5	µg/L	0.905 J	NS	NS	0.905 J	ND (1.0)
cis 1,2-Dichloroethene	5	µg/L	4.44 J	NS	NS	4.44 J	ND (1.0)
trans 1,2-Dichloroethene	5	µg/L	ND (1.0)	NS	NS	ND (1.0)	ND (1.0)
Tetrachloroethene	5	µg/L	16.4	NS	NS	16.4	ND (1.0)
1,1,1-Trichloroethane	5	µg/L	0.429 J	NS	NS	0.429 J	ND (1.0)
Trichloroethene	5	µg/L	60.3	NS	NS	60.3	0.385 J
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	NS	NS	ND (1.0)	ND (1.0)
Vinyl Chloride	2	µg/L	ND (1.0)	NS	NS	ND (1.0)	ND (1.0)
1,4-Dioxane	--	µg/L	2.2	NS	NS	2.2	NS
Mercury	0.00025	mg/L	ND (0.00010)	NS	NS	ND (0.00010)	ND (0.00010)
Total Suspended Solids (TSS)	N/A	mg/L	ND (1.0)	NS	NS	ND (1.0)	ND (1.0)

Notes:

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

D - Concentration is a result of a dilution.

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
April 2021**

DAR Parameters			April 2021	
Process Stream	Units	Discharge Goal ⁽¹⁾	Influent	Effluent
Sampling Date			4/1/21	
Average Flowrate	CFM	N/A	NR	9,314
Total Flow	ft ³	N/A	NR	369,966,975
Total Flow	m ³	N/A	NR	10,476,298
1,2-Dichloroethane	µg/m ³	N/A	1.8 J	ND
cis 1,2-Dichloroethene	µg/m ³	≤ 100,000 ⁽²⁾	44	2.0 J
trans 1,2-Dichloroethene	µg/m ³		1.2 J	ND
1,2-Dichloroethene (total)	µg/m ³	≤ 100,000	45	ND
Toluene	µg/m ³	N/A	0.43 J	ND
Total Xylene	µg/m ³	N/A	ND	ND
1,1,2-Trichloroethane	µg/m ³	N/A	ND	ND
Trichloroethene	µg/m ³	≤ 2600	980	ND
Vinyl Chloride	µg/m ³	≤ 560	0.84 J	0.72 J
Tetrachloroethene	µg/m ³	≤ 5100	140	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
April 2021**

DAR Parameters	Units	Discharge Goal ⁽¹⁾	April 2021
Sampling Date			4/1/21
Average Flowrate	CFM	N/A	9,314
Total Flow	ft ³	N/A	369,966,975
Total Flow	m ³	N/A	10,476,298
Trichloroethene	lb/hr	≤ 0.09	0.00000
Vinyl Chloride	lb/hr	≤ 0.02	0.00002
1,2 Dichloroethene	lb/hr	≤ 11	0.00000
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.

MAY 2021



8 June 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
MAY 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 May to 31 May 2021 are presented in Attachment A. The plant was down for approximately 22 hours during the reporting period as the result of construction and testing activities associated with the addition of the Advanced Oxidation Process (AOP) system to the current treatment train.

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 Gregory'.

Robert Gregory
Project Manager

Attachment A: Groundwater and Air Sampling Results from May 2021

cc: S. Edwards, NYSDEC
D. Hesler, NYSDEC
C. Haas, NYSDEC Region 1
C. Engelhardt, NYSDEC Region 1
J. Pilewski, NYSDEC – Region 1 Water Engineer
J. Sullivan, NYSDOH
J. Lovejoy, NCDOH
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
J. Watts-Gravette, NAVFAC Mid-Atlantic
V. Varricchio, NWIRP Bethpage Facilities Management
P. Schauble, KGS
GM-38 Copy

ATTACHMENT A
GROUNDWATER AND AIR SAMPLING RESULTS
MAY 2021

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

SPDES Parameters			May 2021 ⁽¹⁾				
Process Stream	Daily Treated Effluent Maximum ⁽¹⁾	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		5/18/21				
Effective Flowrate	1100	GPM	700	0	106	806	803
Total Flow	N/A	gallons	30,342,700	0	4,587,200	34,929,900	34,804,400
pH	5.5 - 8.5	SU	5.48	NS	6.15	5.57	6.83
Chloroform	5	µg/L	0.268 J	NS	0.269 J	0.268 J	ND (1.0)
1,1-Dichloroethane	5	µg/L	1.27 J	NS	0.249 J	1.14 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	0.864 J	NS	1.73 J	0.98 J	ND (1.0)
cis 1,2-Dichloroethene	5	µg/L	3.63 J	NS	0.905 J	3.27 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	14.8	NS	4.10 J	13.39	ND (1.0)
1,1,1-Trichloroethane	5	µg/L	0.394 J	NS	ND (1.0)	0.342 J	ND (1.0)
Trichloroethene	5	µg/L	53.9	NS	460 E/460 D	107.23	0.394 J
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	NS	3.63 J	0.477	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	14	3.58	NS
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	1.7	0.22	ND (1.0)

Notes:

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

D - Concentration is a result of a dilution.

E - Concentration has exceeded the calibration range for that specific analysis

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
May 2021**

DAR Parameters			May 2021	
Process Stream	Units	Discharge Goal ⁽¹⁾	Influent	Effluent
Sampling Date			5/5/21	
Average Flowrate	CFM	N/A	NR	9,001
Total Flow	ft ³	N/A	NR	389,928,133
Total Flow	m ³	N/A	NR	11,041,535
1,2-Dichloroethane	µg/m ³	N/A	3.0 J	ND
cis 1,2-Dichloroethene	µg/m ³	≤ 100,000 ⁽²⁾	37	6.5
trans 1,2-Dichloroethene	µg/m ³		ND	ND
1,2-Dichloroethene (total)	µg/m ³	≤ 100,000	37	6.3
Toluene	µg/m ³	N/A	0.80 J	ND
Total Xylene	µg/m ³	N/A	ND	ND
1,1,2-Trichloroethane	µg/m ³	N/A	3.0 J	ND
Trichloroethene	µg/m ³	≤ 2600	2000	0.81 J
Vinyl Chloride	µg/m ³	≤ 560	ND	0.62 J
Tetrachloroethene	µg/m ³	≤ 5100	170	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
May 2021**

DAR Parameters	Units	Discharge Goal ⁽¹⁾	May 2021
Sampling Date			5/5/21
Average Flowrate	CFM	N/A	9,001
Total Flow	ft ³	N/A	389,928,133
Total Flow	m ³	N/A	11,041,535
Trichloroethene	lb/hr	≤ 0.09	0.00003
Vinyl Chloride	lb/hr	≤ 0.02	0.00002
1,2 Dichloroethene	lb/hr	≤ 11	0.00021
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.

JUNE 2021



9 July 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
JUNE 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 June to 30 June 2021 are presented in Attachment A. The plant was down for approximately 21 hours during the reporting period as the result of construction and testing activities associated with the addition of the Advanced Oxidation Process (AOP) system to the current treatment train.

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 from June 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
J. Watts-Gravette, NAVFAC Mid-Atlantic
V. Varricchio, NWIRP Bethpage Facilities Management
P. Schauble, KGS
GM-38 Copy

ATTACHMENT A
GROUNDWATER AND AIR SAMPLING RESULTS
JUNE 2021

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

SPDES Parameters			June 2021 ⁽¹⁾				
Process Stream	Daily Treated Effluent Maximum ⁽¹⁾	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		6/3/21				
Effective Flowrate	1100	GPM	522	0	169	692	788
Total Flow	N/A	gallons	21,912,100	0	7,097,600	29,009,700	33,067,700
pH	5.5 - 8.5	SU	5.47	NS	6.12	5.63	7.03
Chloroform	5	µg/L	0.332 J	NS	ND (1.0)	0.251 J	ND (1.0)
1,1-Dichloroethane	5	µg/L	1.25 J	NS	ND (1.0)	0.94 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	0.778 J	NS	2.90 J	1.30 J	ND (1.0)
cis 1,2-Dichloroethene	5	µg/L	4.08 J	NS	1.52 J	3.45 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	18.1	NS	6.65 J	15.30	ND (1.0)
1,1,1-Trichloroethane	5	µg/L	0.459 J	NS	ND (1.0)	0.347 J	ND (1.0)
Trichloroethene	5	µg/L	63.3	NS	623	200.2	1.65 J/0.267 J
1,1,2-Trichlorotrifluoroethane	5	µg/L	ND (1.0)	NS	5.10 J	1.248	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	2.4	NS	17	5.97	NS
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	6.4	1.57	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
June 2021**

DAR Parameters			June 2021	
Process Stream	Units	Discharge Goal ⁽¹⁾	Influent	Effluent
Sampling Date			6/3/21	
Average Flowrate	CFM	N/A	NR	8,866
Total Flow	ft ³	N/A	NR	371,824,313
Total Flow	m ³	N/A	NR	10,528,892
1,2-Dichloroethane	µg/m ³	N/A	1.5 J	ND
cis 1,2-Dichloroethene	µg/m ³	≤ 100,000 ⁽²⁾	38	14
trans 1,2-Dichloroethene	µg/m ³		0.84 J	ND
1,2-Dichloroethene (total)	µg/m ³	≤ 100,000	39	13
Toluene	µg/m ³	N/A	1.4 J	ND
Total Xylene	µg/m ³	N/A	ND	ND
1,1,2-Trichloroethane	µg/m ³	N/A	ND	ND
Trichloroethene	µg/m ³	≤ 2600	670	1.7 J
Vinyl Chloride	µg/m ³	≤ 560	0.70 J	0.58 J
Tetrachloroethene	µg/m ³	≤ 5100	160	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
June 2021**

DAR Parameters	Units	Discharge Goal ⁽¹⁾	June 2021
Sampling Date			6/3/21
Average Flowrate	CFM	N/A	8,866
Total Flow	ft ³	N/A	371,824,313
Total Flow	m ³	N/A	10,528,892
Trichloroethene	lb/hr	≤ 0.09	0.00005
Vinyl Chloride	lb/hr	≤ 0.02	0.00002
1,2 Dichloroethene	lb/hr	≤ 11	0.00042
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, 12th 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, 11th 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) ⁽¹⁾	Equivalent Existing Discharge Goals ($\mu\text{g}/\text{m}^3$) ⁽²⁾	Actual Jan-Mar 2011 Concentration ($\mu\text{g}/\text{m}^3$) ⁽³⁾	Actual VOC Loading Pre-Off Gas Treatment (lbs/hour) ⁽⁴⁾	Proposed Discharge Loading Rate (lbs/hour) ⁽⁵⁾	Equivalent Proposed Discharge Goal ($\mu\text{g}/\text{m}^3$) ⁽⁵⁾
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:

⁽¹⁾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.

⁽²⁾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).

⁽³⁾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.

⁽⁴⁾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.

⁽⁵⁾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									
-									

APPLICATION ID									
-							/		

OFFICE USE ONLY									

Section I - Certification

Title V Certification	
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information [required pursuant to 6 NYCRR 201-6.3(d)] I believe the information is, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.	
Responsible Official	Title
Signature	Date ____ / ____ / ____

State Facility Certification	
I certify that this facility will be operated in conformance with all provisions of existing regulations.	
Responsible Official	Title
Signature	Date ____ / ____ / ____

Section II - Identification Information

Title V Facility Permit <u>N/A</u>	<input type="checkbox"/> New	<input type="checkbox"/> Significant Modification	<input type="checkbox"/> Administrative Amendment	State Facility Permit <u>N/A</u>	<input type="checkbox"/> New	<input type="checkbox"/> Modification
<input type="checkbox"/> Renewal	<input type="checkbox"/> Minor Modification	General Permit Title: _____		General Permit Title: _____		
<input checked="" type="checkbox"/> Application involves construction of new facility			<input type="checkbox"/> Application involves construction of new emission unit(s)			

Owner/Firm			
Name <u>US Navy/NAVFAC Midlant</u>			
Street Address <u>9742 Maryland Ave, Bldg Z-144</u>			
City <u>Norfolk</u>	State <u>VA</u>	Country <u>US</u>	Zip <u>23511-3095</u>
Owner Classification <input checked="" type="checkbox"/> Federal		<input type="checkbox"/> State <input type="checkbox"/> Municipal	
<input type="checkbox"/> Corporation/Partnership		<input type="checkbox"/> Individual	
Taxpayer ID [] [] [] [] [] [] [] [] [] []			
Facility			<input type="checkbox"/> Confidential
Name <u>Naval Weapons Industrial Reserve Plant (NWIRP) GM-38 Area</u>			
Location Address <u>Bethpage</u>			
<input type="checkbox"/> City / <input checked="" type="checkbox"/> Town / <input type="checkbox"/> Village <u>Oyster Bay, New York</u>			Zip <u>11714</u>
Project Description			<input type="checkbox"/> Continuation Sheet(s)
<u>Air stripping of groundwater to remove VOCs</u>			

Owner/Firm Contact Mailing Address			
Name (Last, First, Middle Initial) <u>Fly, Lora</u>		Phone No. (757)444-0781	
Affiliation <u>Department of the Navy</u>	Title <u>Remedial PM</u>	Fax No. ()	
Street Address <u>9742 Maryland Ave. Bldg Z-144</u>			
City <u>Norfolk</u>	State <u>VA</u>	Country <u>US</u>	Zip <u>23511-3095</u>
Facility Contact Mailing Address			
Name (Last, First, Middle Initial) <u>Same</u>		Phone No. ()	
Affiliation	Title	Fax No. ()	
Street Address			
City	State	Country	Zip

New York State Department of Environmental Conservation
Air Permit Application



DEC ID									
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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"> <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. <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. <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. 	

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										
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Section III - Facility Information (continued)

Facility Compliance Certification N/A										<input type="checkbox"/> Continuation Sheet(s)
Rule Citation										
Title	Type	Part	Sub Part	Section	Sub Division	Paragraph	Sub Paragraph	Clause	Sub Clause	
<input type="checkbox"/> Applicable Federal Requirement		<input type="checkbox"/> Capping		CAS No.			Contaminant Name			
<input type="checkbox"/> State Only Requirement										
Monitoring Information										
<input type="checkbox"/> Ambient Air Monitoring <input type="checkbox"/> Work Practice Involving Specific Operations <input type="checkbox"/> Record Keeping/Maintenance Procedures										
Description										
Work Practice		Process Material					Reference Test Method			
Type	Code	Description								
Parameter						Manufacturer Name/Model No.				
Code		Description								
Limit				Limit Units						
Upper		Lower		Code		Description				
Averaging Method				Monitoring Frequency			Reporting Requirements			
Code	Description			Code	Description		Code	Description		

Facility Emissions Summary						<input type="checkbox"/> Continuation Sheet(s)
CAS No.	Contaminant Name		PTE		Actual (lbs/yr)	
			(lbs/yr)	Range Code		
NY075 - 00 - 5	PM-10					
NY075 - 00 - 0	PARTICULATES					
7446 - 09 - 5	SULFUR DIOXIDE					
NY210 - 00 - 0	OXIDES OF NITROGEN					
630 - 08 - 0	CARBON MONOXIDE					
7439 - 92 - 1	LEAD					
NY998 - 00 - 0	VOC		117			
NY100 - 00 - 0	HAP		110			
0079 - 01 - 6	Trichloroethylene		99			
00075 - 01 - 4	Vinyl Chloride		3.7			
00540 - 59 - 0	1,2-Dichloroethylene		7.3			
- - -						
- - -						

New York State Department of Environmental Conservation
Air Permit Application



DEC ID									
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Section IV - Emission Unit Information

Emission Unit Description										<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.										

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

Emission Point							<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	

Emission Source/Control							<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



DEC ID									
-									

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)
Rule Citation											
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				
Monitoring Information											
<input type="checkbox"/> Continuous Emission Monitoring				<input type="checkbox"/> Monitoring of Process or Control Device Parameters as Surrogate							
<input checked="" type="checkbox"/> Intermittent Emission Testing				<input type="checkbox"/> Work Practice Involving Specific Operations							
<input type="checkbox"/> Ambient Air Monitoring				<input type="checkbox"/> Record Keeping/Maintenance Procedures							
Description											
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



DEC ID									
-									

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										
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									
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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): _____ (____ / ____ / ____)
 _____ (____ / ____ / ____)
 _____ (____ / ____ / ____)
 _____ (____ / ____ / ____)
 _____ (____ / ____ / ____)
 _____ (____ / ____ / ____)
 _____ (____ / ____ / ____)
 _____ (____ / ____ / ____)
 _____ (____ / ____ / ____)
 _____ (____ / ____ / ____)
 _____ (____ / ____ / ____)
 _____ (____ / ____ / ____)

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 m³/hr
Water Flow Including Recycle 1,200 gpm: max or normal
273 m³/hr
Air Flow 8,000 cfm
13,592 m³/hr
A/W vol ratio 50

EXAMPLE EMISSION CALC: Vinyl Chloride
4.8 ug/L x 1000 L/m³ x 250 m³ water/13,623 m³ air = 88 ug/m³

16

Name	CAS Number	Toxicity: H/M/L ²	VOC ³	HAP ⁴	GW Conc. ¹		Effluent Conc. ¹		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 ³	Avg ug/m ³
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 m³/hr
Water Flow Including Recycle 1,200 gpm: max or normal
273 m³/hr
Air Flow 8,000 cfm
13,592 m³/hr
A/W vol ratio 50

Controlled Stripper Exhat

Name	CAS Number	Toxicity: H/M/L ²	VOC ³	HAP ⁴	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 ⁽¹⁾	Current Maximum Concentration (µg/m ³) ⁽²⁾	Current Chemical Emission Rate Prior to Treatment (lb/hour) ⁽³⁾	Current Chemical Emission Rate Prior to Treatment (lb/year) ⁽³⁾	Calculated Discharge Goal (lb/hr) ⁽⁴⁾	Calculated Discharge Goal (lb/year) ⁽⁴⁾	Maximum Allowable Concentration (µg/m ³) ⁽⁴⁾
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:

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

⁽²⁾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.

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

⁽⁴⁾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 ⁽¹⁾ (lb/hour)	0.3444	0.2342	0.0026	0.0258	0.0258
Emission Rate Prior to Treatment ⁽¹⁾ (lb/year)	3,017	2,052	22.93	226.0	226.0
Maximum Concentration of Untreated Off Gas ($\mu\text{g}/\text{m}^3$) ⁽¹⁾	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 ⁽²⁾	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

⁽¹⁾ 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.

⁽²⁾ "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
	SHORT-TERM	CAVITY	POINT or AREA SOURCE			
CAS NUMBER	AGC ug/m3	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
	SHORT-TERM	CAVITY	POINT or AREA SOURCE			
CAS NUMBER	AGC ug/m3	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:

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*****
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:

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*****
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.

```

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 0.00 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 ft⁴/sec².

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:

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*****
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_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 (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:

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*****
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):

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*****
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.

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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 < 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.

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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 ⁻² <ug/m3> for 00079-01-6													09/08/11
AGC = 0.500000000 ug/m3													13:17:58
TIME	367000.	368000.	369000.	370000.	371000.	372000.	373000.	374000.	375000.	376000.	377000.	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:

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                                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: 06/30/2021



Groundwater Level Measurement Sheet

Project Site: NWIRP Bethpage - GM-38
 Location: Bethpage, NY
 Field Crew: RH

Water Level Meter: Solinst
 Weather: Sunny 90°F, SSW 10mph, 30.0" 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	8:25	34.44	435 / 395-435	---	
RW1-MW2	10:00	36.04	435 / 395-435	---	
RW1-MW3	7:30	37.68	435 / 395-435	---	
RW2-MW1	9:00	37.88	510 / 470-510	---	
RW2-MW2	9:10	37.11	510 / 470-510	---	
RW2-MW3	9:13	36.94	510 / 470-510	---	
RW3-MW1	9:30	37.28	350 / 330-350	---	
RW3-MW2	9:35	38.44	495 / 475-495	---	
RW3-MW3	9:45	38.09	340 / 320-340	---	
RW3-MW4	9:47	39.14	495 / 475-495	---	
TP1	8:20	35.25	470 / 450-470	---	
IW1-MW1		39.44	470 / 450-470	---	
RW-1	8:30		Open vault and check integrity of piping, etc.		OK
RW-3	9:50		Open vault and check integrity of piping, etc.		OK

Signature: _____

Date: _____