

Mr. Jason Pelton
Project Manager
New York State Department of Environmental Conservation
Remedial Bureau D
625 Broadway
Albany, New York 12233-7015

Arcadis of New York, Inc.
Two Huntington Quadrangle
Suite 1S10
Melville
New York 11747
Tel 631 249 7600
Fax 631 249 7610
www.arcadis.com

Subject:

2019 Annual Operation Maintenance and Monitoring Report,
Operable Unit 2, Northrop Grumman Systems Corporation and Naval Weapons
Industrial Reserve Plant (NWIRP) Sites, Bethpage, New York.
(NYSDEC Site #s 1-30-003A and B)
Water Contour Figures and Table of Contents Revisions

ENVIRONMENT

Date:
June 24, 2020

Contact:
Christopher Engler

Phone:
315.409.6579

Email:
christopher.engler@arcadis.com

Our ref:
30038454.RPTI4
30038457.NAVI4

Dear Jason:

On behalf of Northrop Grumman Systems Corporation (Northrop Grumman), Arcadis is providing the NYSDEC with the below responses to your questions related to the water contour figures (i.e., Figures 9 and 10) from the Operable Unit 2 (OU2) 2019 Annual Operation Maintenance and Monitoring Report.

Upon further review of Figures 9 and 10 originally included in the subject report, CADD-related typos, including presentation of the 4Q 2018 contour line "layer" being mistakenly shown (Figure 9), and inaccurate title/date blocks (Figures 9 and 10) were noted. The date typos were also carried over into the Table of Contents. Electronic PDF copies of revised Figures 9 and 10 and the affected page of the Table of Contents are provided herein. Hard copies can be provided upon request.

Please note that the revisions to the contour lines on Figure 9 do not represent a substantial difference from what was previously submitted and do not materially change overall groundwater flow directions or our findings and conclusions.

We regret any confusion that this issue may have caused.

Mr. Jason Pelton
June 24, 2020

Please contact us if you have any questions or comments.

Sincerely,

Arcadis of New York, Inc.



Christopher Engler, P.E.
New York PE-069748
Vice President

Enclosure

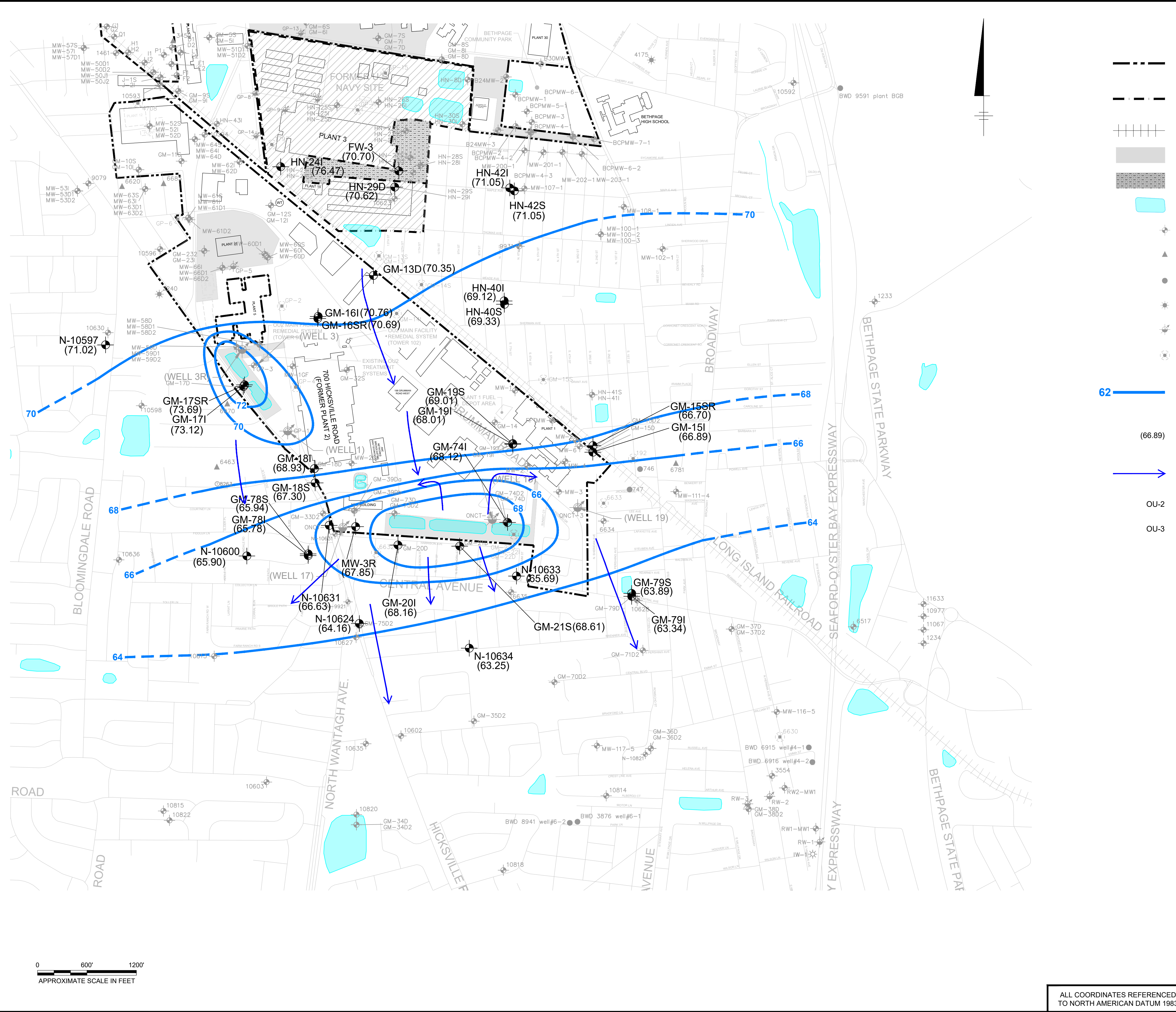
Copies:

Ed Hannon – Northrop Grumman
Walter Parish – NYSDEC Region 1
Donald Hesler – NYSDEC
Steven Scharf – NYSDEC
James Sullivan – New York State Department of Health
John Lovejoy - NCDOH
Brian S. Murray – NAVFAC Midlant Environmental
David Brayack – TetraTech NUS, Inc.
Paul Bluestein – Glenn Springs Holdings, Inc.
Manfred Bohms – Steel Equities
Mike Negrelli – USEPA
Nidal Azzam – USEPA
Carol Stein - USEPA
Matthew Russo – Town of Oyster Bay
Stan Carey – Massapequa Water District
Richard Kern – New York American Water
Frank Koch – South Farmingdale Water District
John Reinhardt – Town of Hempstead Water District
Michael Boufis – Bethpage Water District
Bethpage Public Library
File

ATTACHMENTS



CITY/SUR/CLUSE.NY_DWG/GEOL/GENV.BP.A.SANCHEZ.LD.ALS.DFG(CA).PRJ(RC).TH(CA).LVR(CA)ONCT-GW-S-LZONE.dwg LAYOUT: 9_SAVED: 6/15/2020 9:48 AM ACADVER: 23.1S(LMS TECH) PAGES: 23 PLOTSETUP: PLOTSETUP: PLOTTED: 6/22/2020 4:39 PM BY: SANCHEZ, ADRIAN
 C:\Users\asanchez\BIM_380\ArchiCAD\ANA - Northrop Grumman Project Files\OU2\ONCT-GW-S-LZONE.dwg Program: 2020/03/30/30384541-01-DWG\NGCBP-ONCT-GW-S-LZONE.dwg
 XREFS: IMAGES: PROJECTNAME: X-02-BDR-DL X-LIN_V_RD&ST x-1496X01



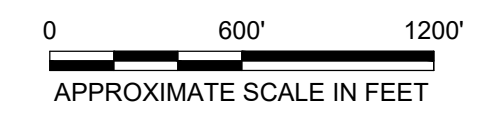
- EXPLANATION:**
- PROPERTY BOUNDARY OF THE FORMER GRUMMAN AEROSPACE SITE
 - PROPERTY BOUNDARY OF THE FORMER U.S. NAVY SITE
 - LONG ISLAND RAILROAD
 - NORTHROP GRUMMAN PROPERTY AS OF 2009
 - NAVY PROPERTY AS OF 2014
 - RECHARGE BASIN
 - OBSERVATION/MONITORING WELL
 - INDUSTRIAL WELL
 - PUBLIC SUPPLY WELL
 - IRRIGATION WELL
 - NORTHROP GRUMMAN ONCT WELL
 - ABANDONED WELL
 - LINE OF EQUAL WATER-LEVEL ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL (DASHED WHERE LESS CONTROL)
 - (66.89) WATER-LEVEL ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL
 - DIRECTION OF HORIZONTAL COMPONENT OF GROUNDWATER FLOW
 - OU-2 OPERABLE UNIT 2
 - OU-3 OPERABLE UNIT 3

- NOTES:**
1. NORTHROP GRUMMAN ONCT WELLS 1, 3R, 17, 18 AND 19 SCREENED IN DEEP ZONE.
 2. BETHPAGE WATER DISTRICT WELL 3876 SCREENED IN DEEP ZONE (NOT PUMPING FOR 2019).
 3. BETHPAGE WATER DISTRICT WELLS 6915 AND 6916 SCREENED IN DEEP 2 ZONE.
 4. BETHPAGE WATER DISTRICT WELL 8941 SCREENED IN DEEP 3 ZONE.

NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OPERABLE UNIT 2

WATER-TABLE ELEVATION AND GENERALIZED
HORIZONTAL GROUNDWATER FLOW DIRECTIONS IN
THE SHALLOW/INTERMEDIATE ZONE,
DECEMBER 2019

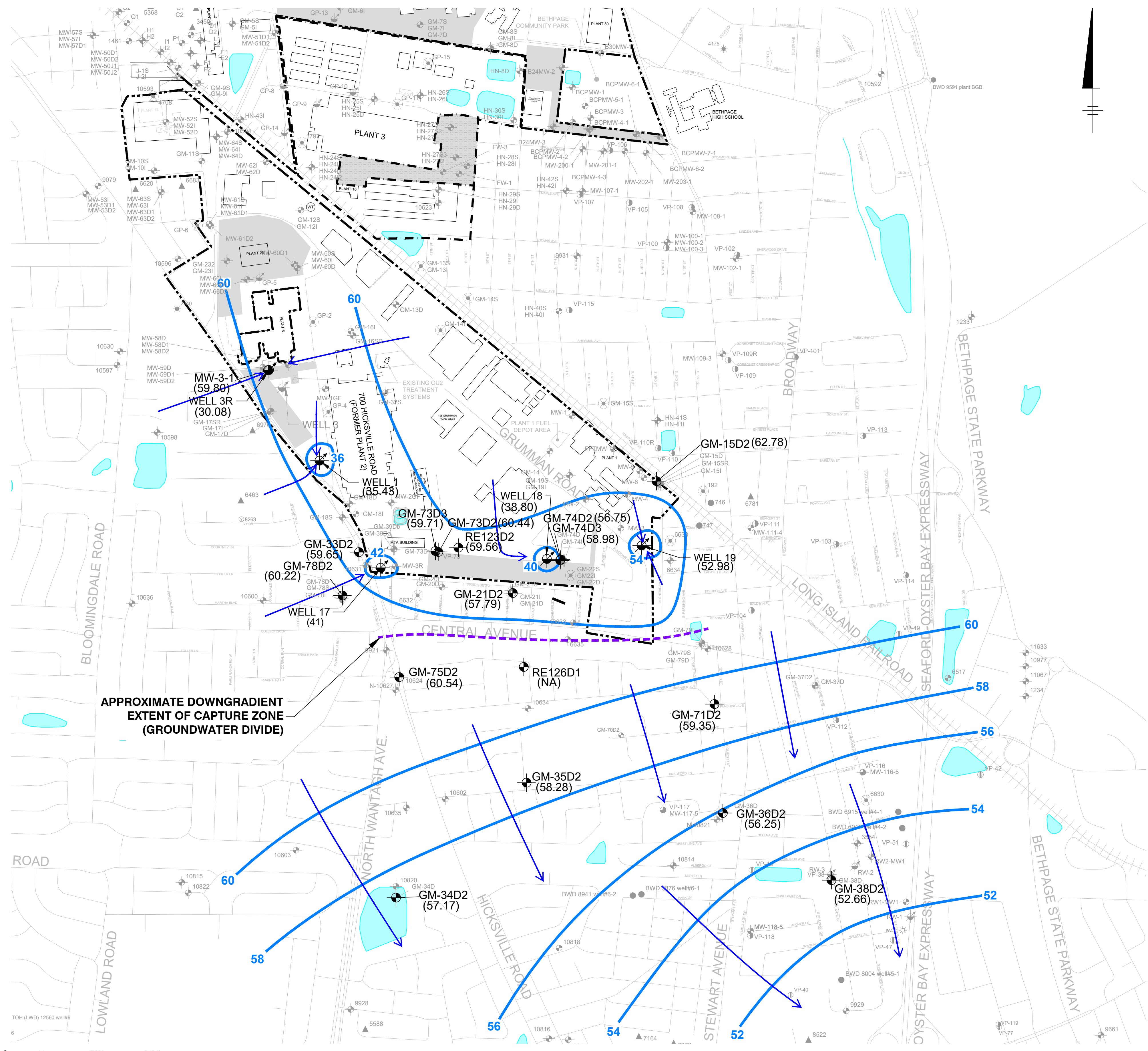
ALL COORDINATES REFERENCED TO NORTH AMERICAN DATUM 1983



CITY/SUBDIVISION: BETHPAGE, NY; DRAWING: POTENTIOMETRIC SURFACE ELEVATION AND GENERALIZED HORIZONTAL GROUNDWATER FLOW DIRECTIONS IN THE DEEP 2 ZONE; DATE: 12/15/2019; PROJECT: NORTHROP GRUMMAN OPERABLE UNIT 2; DRAWING NO.: 10; SCALE: AS SHOWN; AUTHOR: J. SANCHEZ; CHECKED: A. ADRIAN; PLOTTED: 6/17/2020 10:55 AM BY: SANCHEZ, ADRIAN

XREFS: X-1486X01; X-02-6DR-DL; X-11-NY-FD&ST; X-1486X0P; X-5DR-EL

IMAGES: PROJECTNAME:



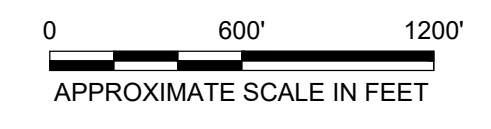
- EXPLANATION:**
- PROPERTY BOUNDARY OF THE FORMER GRUMMAN AEROSPACE SITE
 - PROPERTY BOUNDARY OF THE FORMER NAVY SITE
 - ||||| LONG ISLAND RAILROAD
 - █ NORTHROP GRUMMAN PROPERTY AS OF 2009
 - █ NAVY PROPERTY AS OF 2014
 - █ RECHARGE BASIN
 - ⊕ OBSERVATION/MONITORING WELL
 - ▲ INDUSTRIAL WELL
 - PUBLIC SUPPLY WELL
 - ⊙ IRRIGATION WELL
 - ⊙ NORTHROP GRUMMAN ONCT WELL
 - ⊙ ABANDONED WELL
 - 58 — LINE OF EQUAL WATER-LEVEL ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL (DASHED WHERE LESS CONTROL)
 - (52.48) — WATER-LEVEL ELEVATION IN FEET RELATIVE TO MEAN SEA LEVEL
 - DIRECTION OF HORIZONTAL COMPONENT OF GROUNDWATER FLOW
 - OU-2 OPERABLE UNIT 2
 - OU-3 OPERABLE UNIT 3
 - NA NOT APPLICABLE, WATER LEVEL MEASUREMENT WAS COLLECTED OUTSIDE OF DECEMBER 2019 SYNOPTIC PERIOD

- NOTES:**
1. NORTHROP GRUMMAN ONCT WELLS 1, 3R, 17, 18 AND 19 SCREENED IN DEEP ZONE.
 2. BETHPAGE WATER DISTRICT WELL 3876 SCREENED IN DEEP ZONE (NOT PUMPING IN 2019).
 3. BETHPAGE WATER DISTRICT WELLS 6915 AND 6916 SCREENED IN DEEP 2 ZONE.
 4. BETHPAGE WATER DISTRICT WELL 8941 SCREENED IN DEEP 3 ZONE

NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OPERABLE UNIT 2

POTENTIOMETRIC SURFACE ELEVATION AND
GENERALIZED HORIZONTAL GROUNDWATER FLOW
DIRECTIONS IN THE DEEP 2 ZONE
DECEMBER 2019

ALL COORDINATES REFERENCED TO NORTH AMERICAN DATUM 1983



2019 ANNUAL OPERATION, MAINTENANCE AND MONITORING REPORT
OPERABLE UNIT 2

- Table 13. Summary of Metals Concentrations in Groundwater Proximate to Former Northrop Grumman Plants 1 and 2
- Table 14. Summary of 1,4-Dioxane Concentrations in OU2 Groundwater Samples
- Table 15. Comparison of OU2 Fourth Quarter 2019 Vertical Hydraulic Gradients to Model-Predicted Gradients
- Table 16. Percent Change of Total Volatile Organic Compounds in OU2 Monitoring Wells

FIGURES

- Figure 1. Locations of Treatment System and Discharges
- Figure 2. ONCT Groundwater Extraction and Treatment System Site Plan
- Figure 3. ONCT Groundwater Extraction and Treatment System Schematic
- Figure 4. Remedial Wells Total VOC Mass Recovery Rates Through December 2019
- Figure 5. Remedial Wells Yearly Total VOC Mass Removed Through December 2019
- Figure 6. Remedial Wells Cumulative Total VOC Mass Removed Through December 2019
- Figure 7. Total Volatile Organic Compound Concentrations in On-Site Deep2 OU2 Remedial Wells
- Figure 8. Total Volatile Organic Compound Concentrations in Intermediate, Deep, and Deep2 Monitoring Wells Proximate to OU2 ONCT System
- Figure 9. Water Table Elevation and Generalized Horizontal Groundwater Flow Directions in the Shallow/Intermediate Zone, December 2019
- Figure 10. Potentiometric Surface Elevation and Generalized Horizontal Groundwater Flow Directions in the Deep2 Zone, December 2019
- Figure 11. Cross Sections Lines and Maximum Total Volatile Organic Compound Concentrations 2019
- Figure 12. TVOCs in Groundwater 2019 Cross-Section A-A'
- Figure 13. TVOCs in Groundwater 2019 Cross-Section B-B'
- Figure 14. Deep Zone Maximum TVOC Concentrations 2019
- Figure 15. Deep2 Zone Maximum TVOC Concentrations 2019
- Figure 16. Deep3 Zone Maximum TVOC Concentrations 2019
- Figure 17. Model Simulated Groundwater Elevations and Groundwater Capture Zones: At the End of 2019 – Layers 5 through 8
- Figure 18. Total Volatile Organic Compound Concentrations in Upgradient Intermediate and Deep Monitoring Wells
- Figure 19. Total Volatile Organic Compound Concentrations in Deep and Deep2 Monitoring Wells Downgradient of OU2 ONCT System