TAC Meeting

NYSDEC / USEPA Region 2
Northrop Grumman Systems Corporation
NAVFAC

June 22, 2015

ARCADIS

Northrop Grumman Discussion Topics

- ONCT Effectiveness
- Status of Submittals Pursuant to OU2 Consent Order
- Northrop Grumman / Navy Cooperation (Monitoring Well RE108D2 Hot Spot)
    - Also previously referred to as VPB-142

Northrop Grumman OU2 ONCT Effectiveness

- Summary and Conclusions for ONCT System (Year 2013) (PRR, October 2014)
- Historical Perspective on Monitoring Well RE108D2 Hot Spot
- 2014 Update on ONCT Hydraulic Effectiveness
    - Including Navy data

Northrop Grumman OU2 ONCT Effectiveness-What to Expect?

- Clean Water Front will Develop
  - Initially development will begin near site and at shallow depth
  - With time front will continue to develop further from site and at deeper depths
  - Development of front will generally occur consistent with natural movement of groundwater
  - Declining Trends in VOC Concentrations
- Plume Bifurcation will Occur
  - Splitting plume into two parts

ONCT Periodic Review Report

- Key Conclusions:
  - Operating as designed
  - Preventing off-site migration of VOC-impacted groundwater
  - Hydraulic containment is being achieved
  - Complying with SCGs for treated water and air emissions
- Groundwater Quality (VOCs):
  - Few exceedances of groundwater standards on-site (Shallow/Intermediate zones) based on data in 2013 Periodic Review Report
  - Plume bifurcation/Clean water front (Deep and Deep2 zones)
  - Downward trends on-site and immediately downgradient
- ONCT Hydraulic Effectiveness Program (2011-2013):
  - Confirmed system controls vertical/horizontal movement of VOC-impacted groundwater

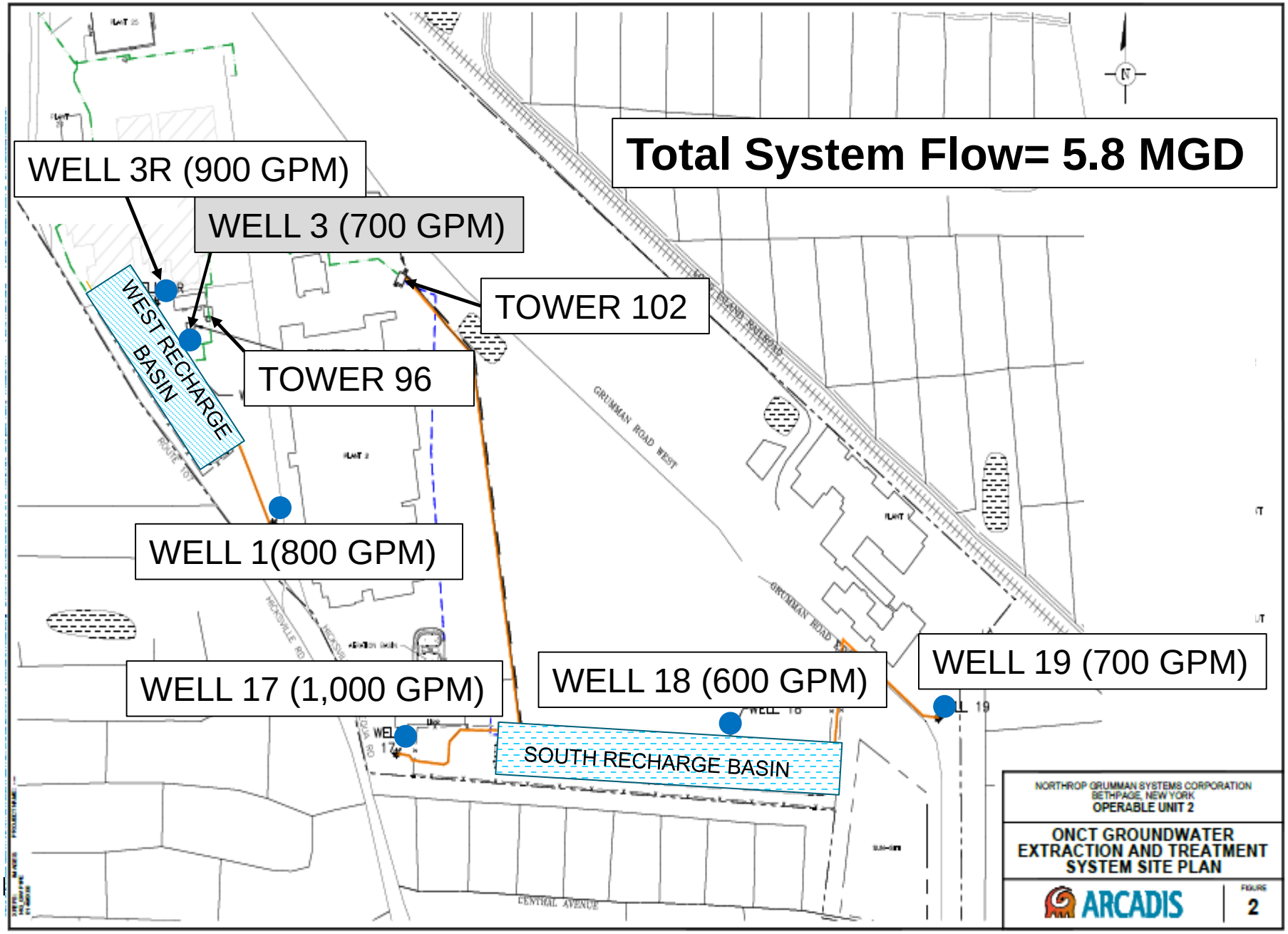
Total System Flow= 5.8 MGD
WELL 3R (900 GPM)
WELL 3 (700 GPM)
TOWER 102
TOWER 96
WEST RECHARGE BASIN
WELL 1(800 GPM)
WELL 17 (1,000 GPM)
WELL 18 (600 GPM)
WELL 19 (700 GPM)
SOUTH RECHARGE BASIN
GRUMMAN ROAD WEST
GRUMMAN ROAD
CENTRAL AVENUE
NORTHROP GRUMMAN SYSTEMS CORPORATION
BETHPAGE, NEW YORK
OPERABLE UNIT 2
ONCT GROUNDWATER EXTRACTION AND TREATMENT SYSTEM SITE PLAN
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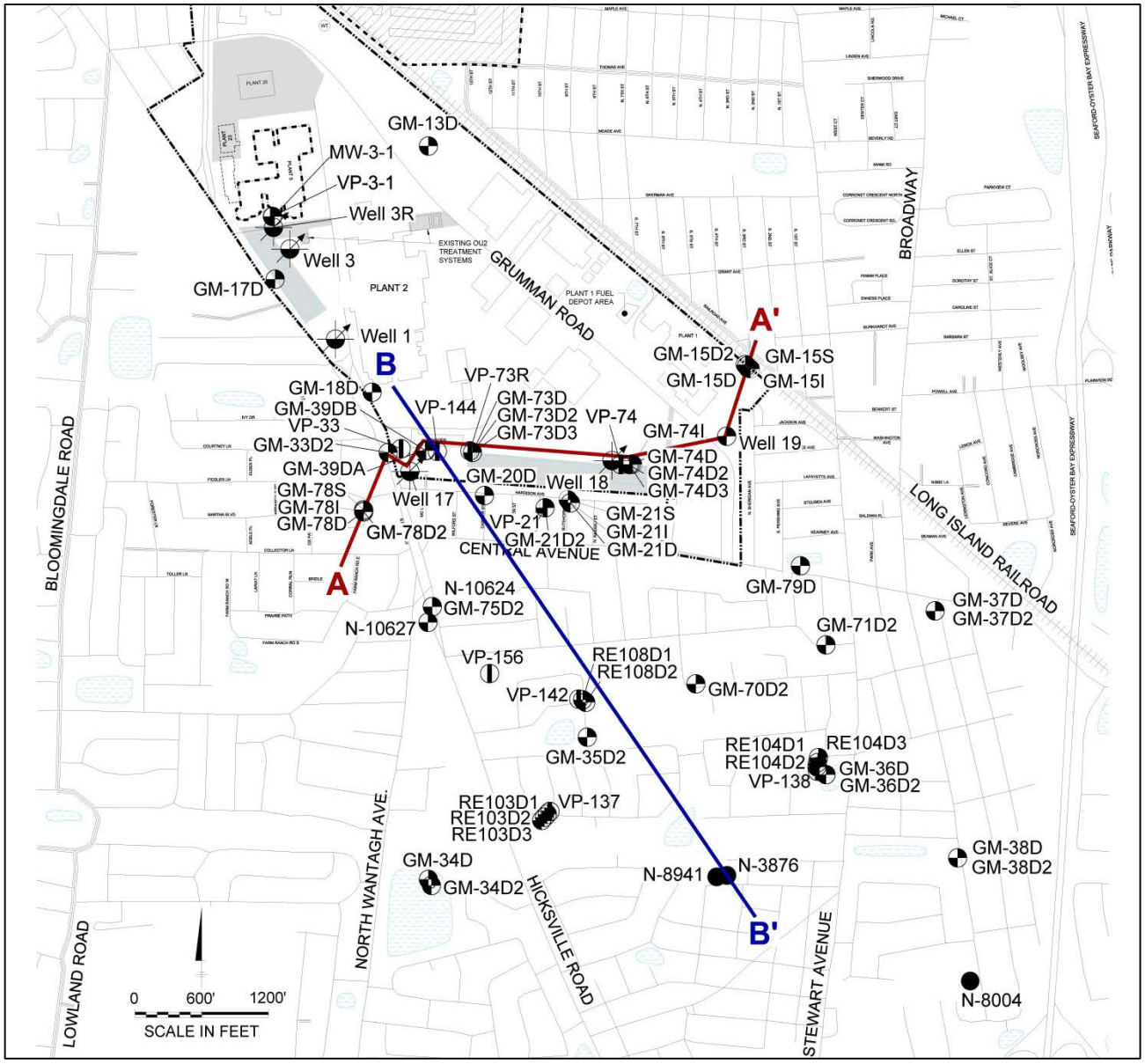
FIGURE
2

SITE PLAN SHOWING MONITORING WELLS AND VERTICAL PROFILE BORINGS

Monitoring Well RE108D2 Hot Spot

- Key Conclusion for ONCT System:
  - Preventing off-site VOC migration since startup (Nov-1998)
- Groundwater Quality (VOCs):
  - Historical trends for GM-33D2 and GM-75D2



Well and Cross-section Locations

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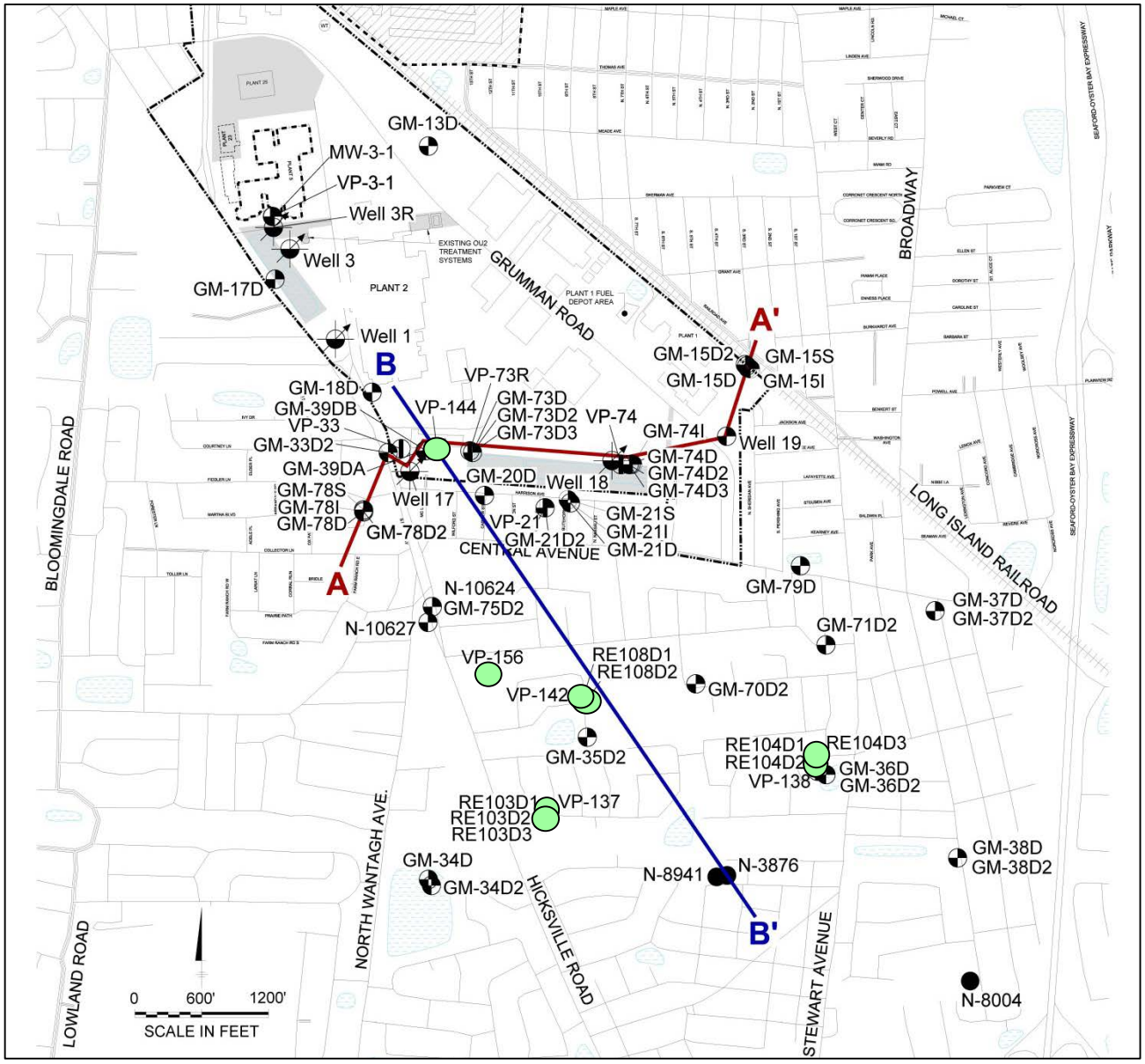

Well and Cross-section Locations

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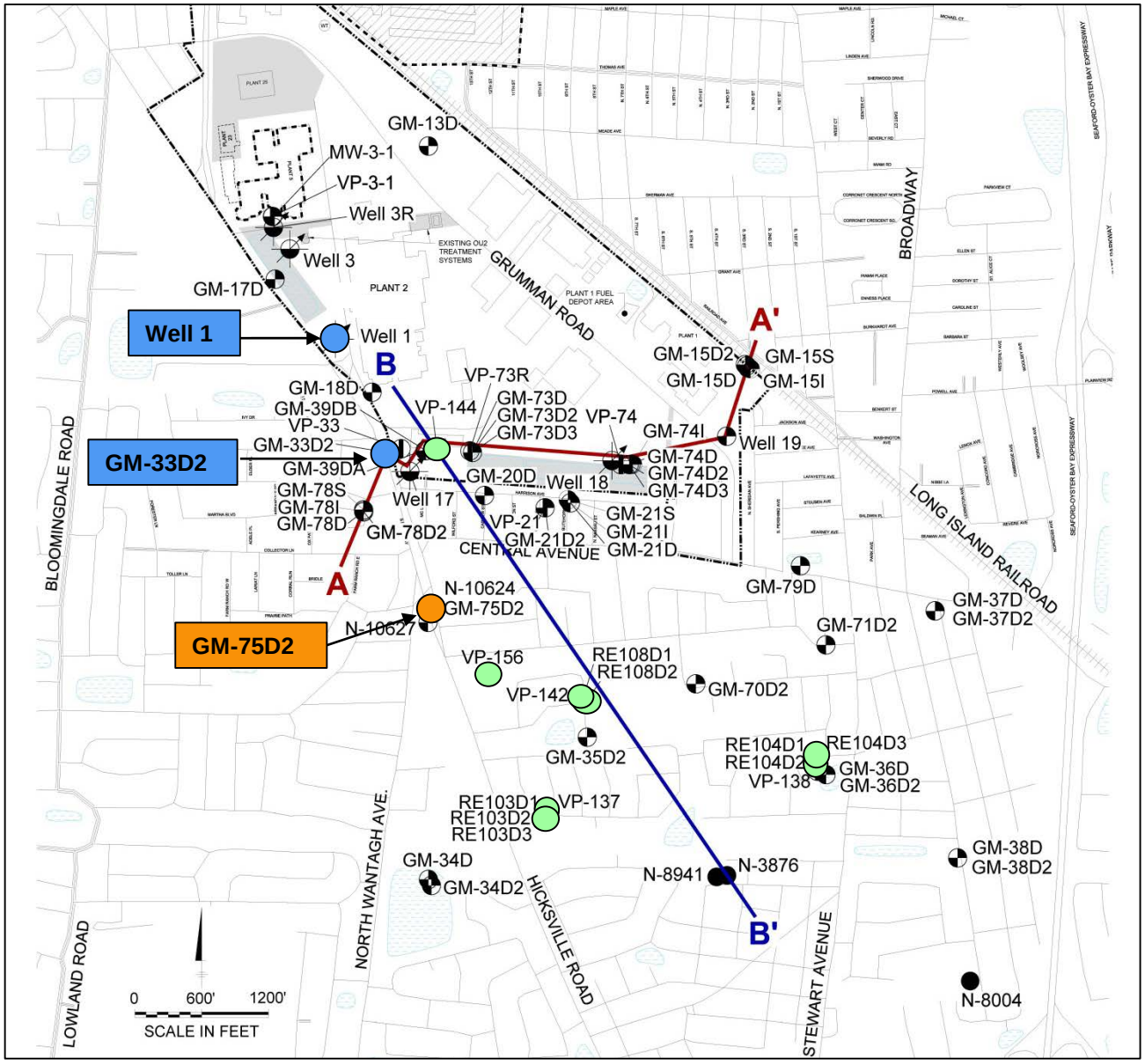

Well and Cross-section Locations

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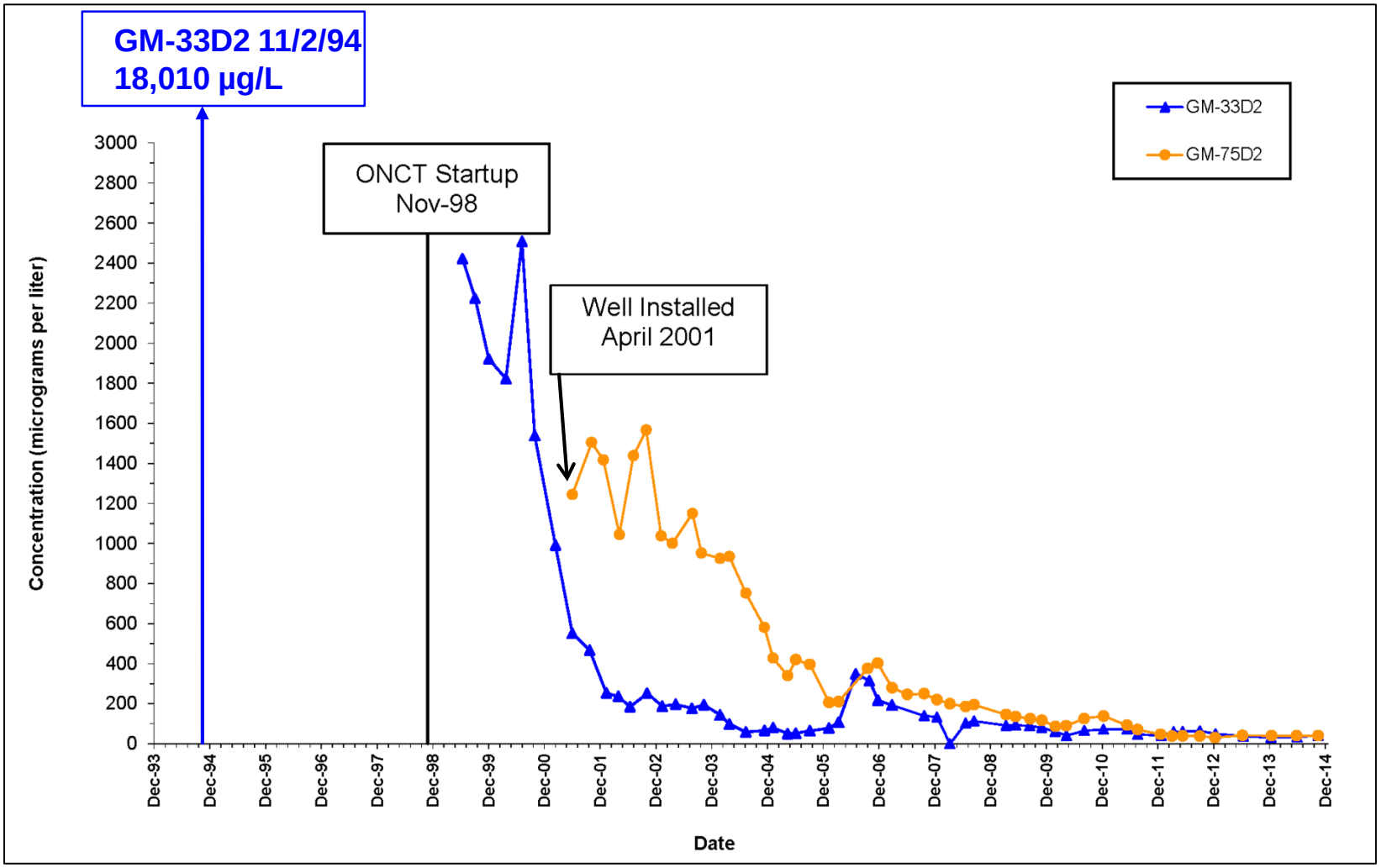
Historical TVOC Concentrations and Reductions over Time Related to the ONCT System Operation

Well ID	Historical TVOCs (µg/L)	Concentrations (2014) TVOCs (µg/L)	Percentage Reduction
Well 1	14,300 (maximum) (1980-1989)	750	>94
Well 17	7,200 (1998)	240	>96

Decreases in Total VOC Concentrations in Monitoring Wells

GM-33D2 and GM-75D2



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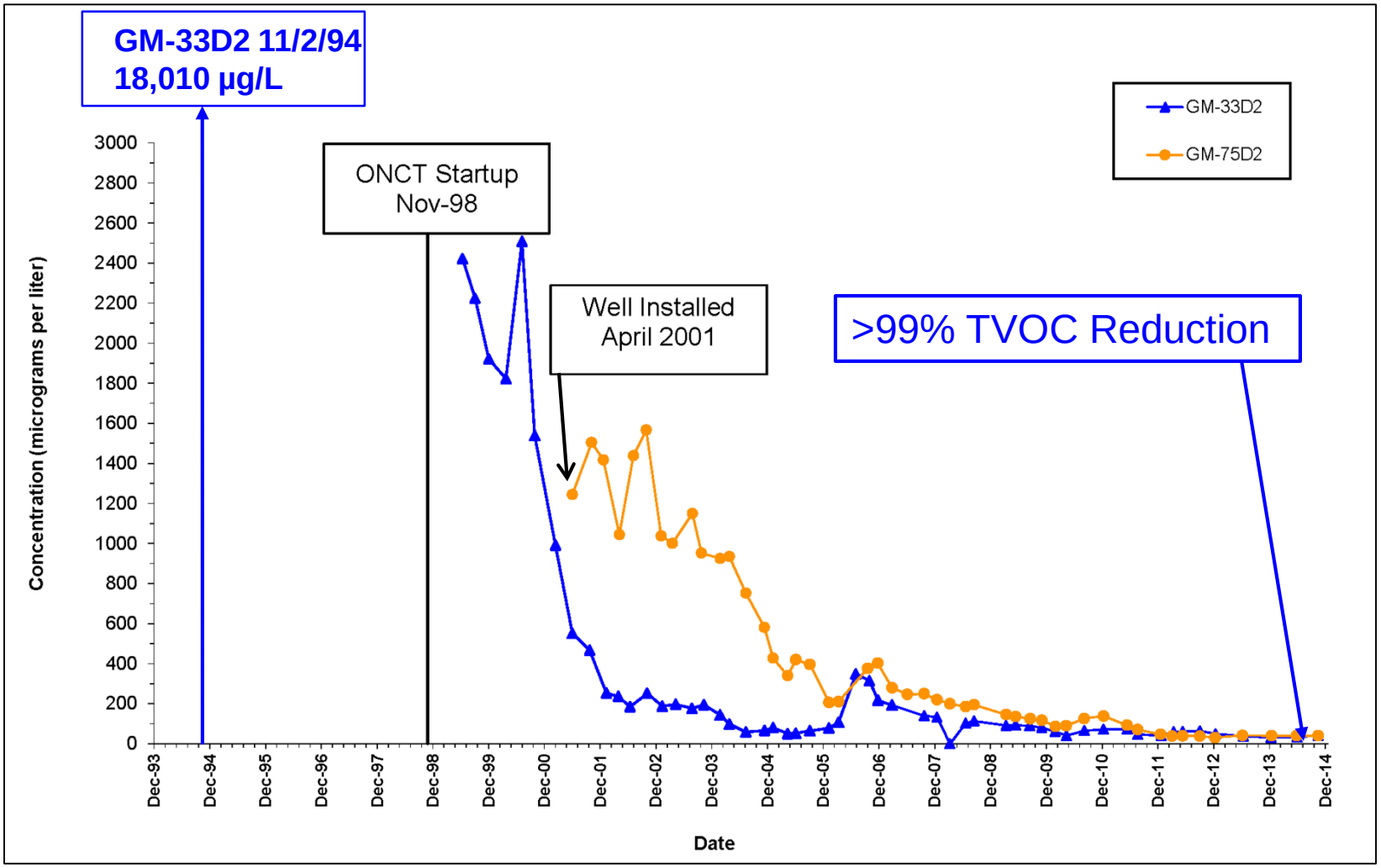
Decreases in Total VOC Concentrations in Monitoring Wells

GM-33D2 and GM-75D2



- VOC Decreases Indicate ONCT Effectiveness
- VOC Sources to Wells have been Cut Off

Imagine the result

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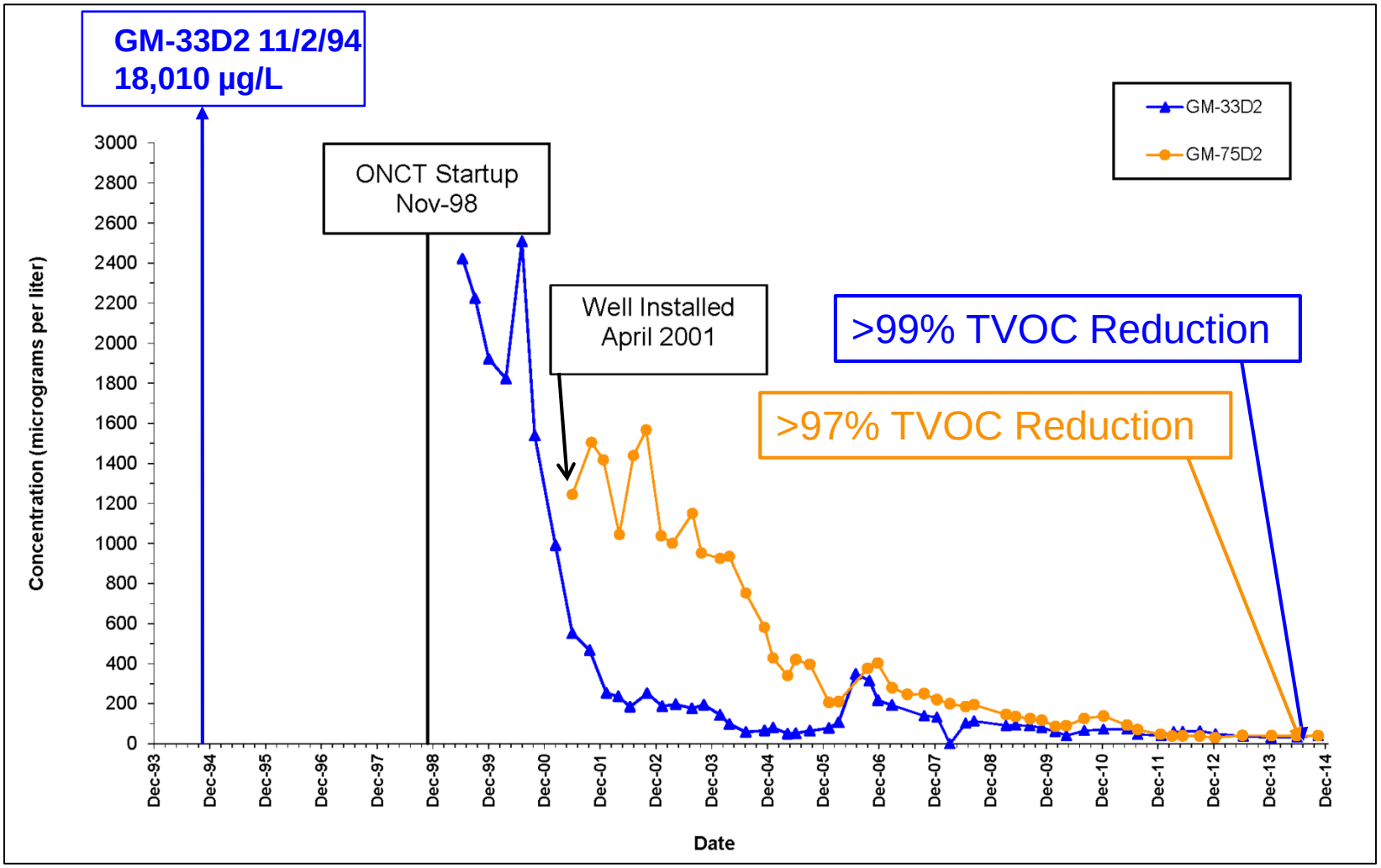
Decreases in Total VOC Concentrations in Monitoring Wells

GM-33D2 and GM-75D2



- VOC Decreases Indicate ONCT Effectiveness
- VOC Sources to Wells have been Cut Off

Imagine the result

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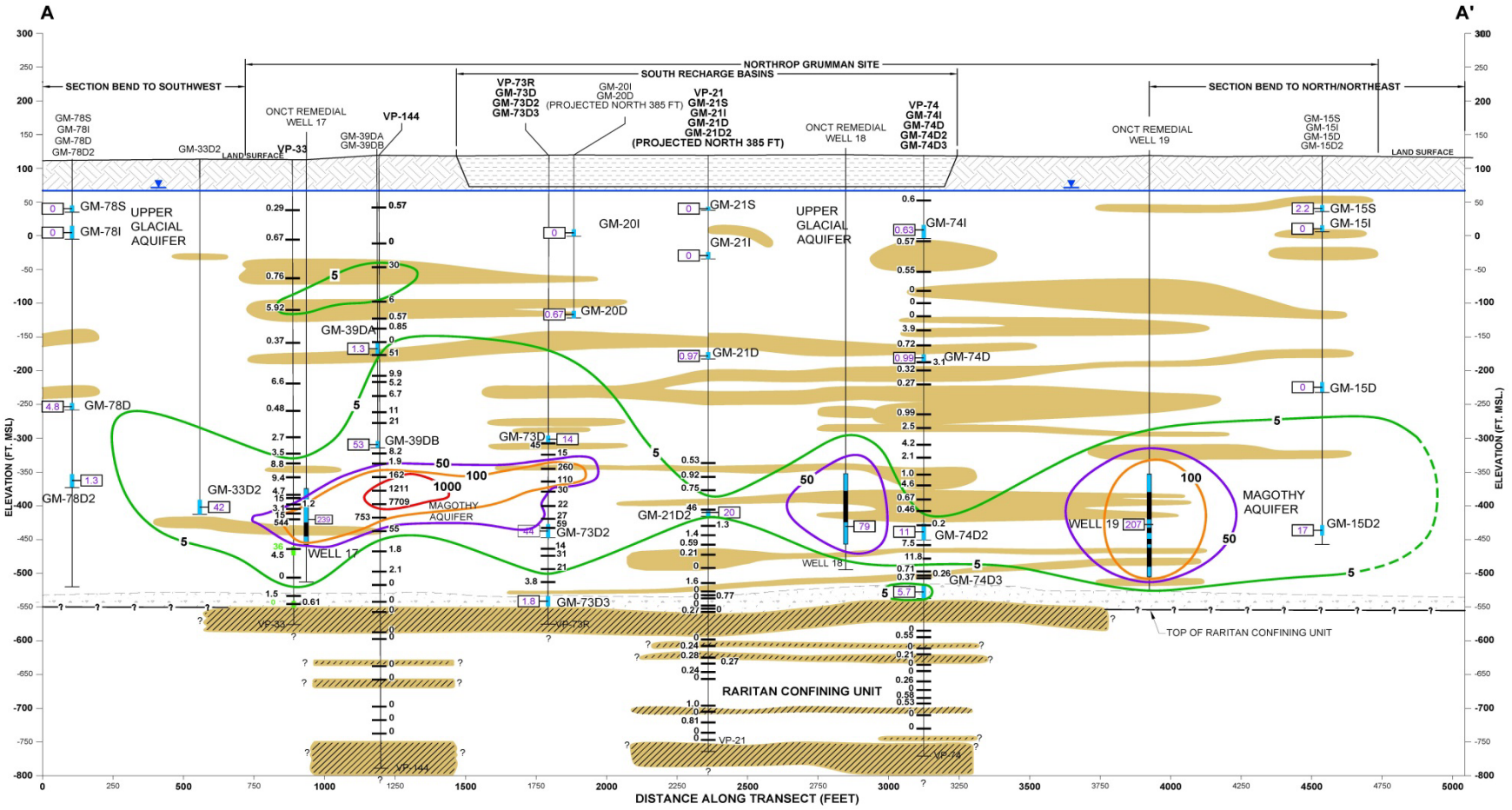
ONCT Update (2014)

The following data was added:

- 2014 data (Northrop Grumman 2014 Annual Report)
- Navy data:
  - VPBs: 137, 138, 142, 144, 156
  - Monitoring Well Clusters: RE103, RE104, RE108
- North-South Cross-Section (contains Northrop Grumman and Navy Data)
- TVOC Concentrations in Deep3 zone (contains Northrop Grumman and Navy Data)



A-A’ West to East TVOC Cross-Section

- ONCT System Captures All VOC Impacted Groundwater Above the “600 Foot” Clay

Imagine the result

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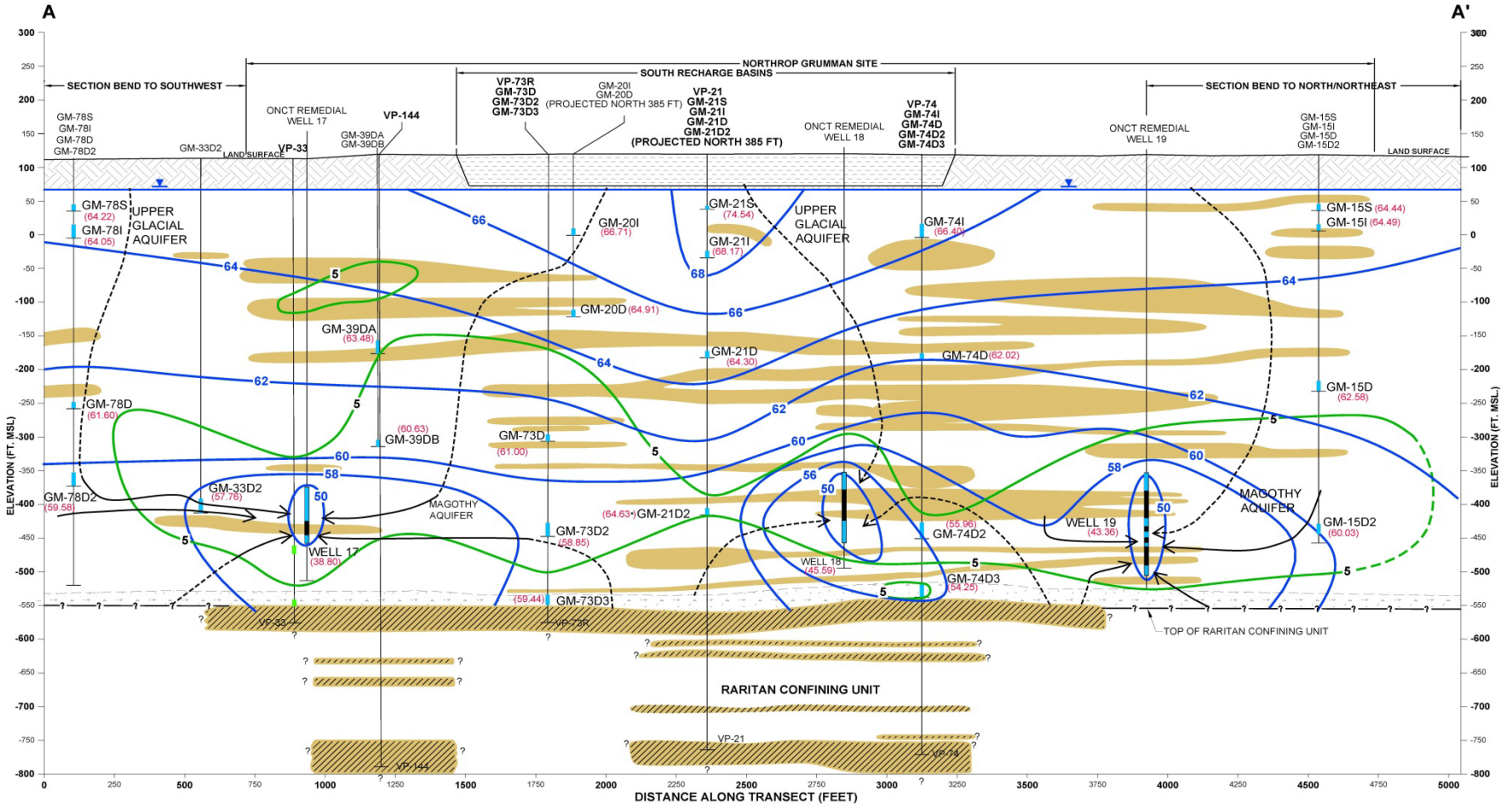

A-A' West to East Groundwater Flow Cross-Section

- Generally Groundwater has been Remediated Down to 300 ft bls

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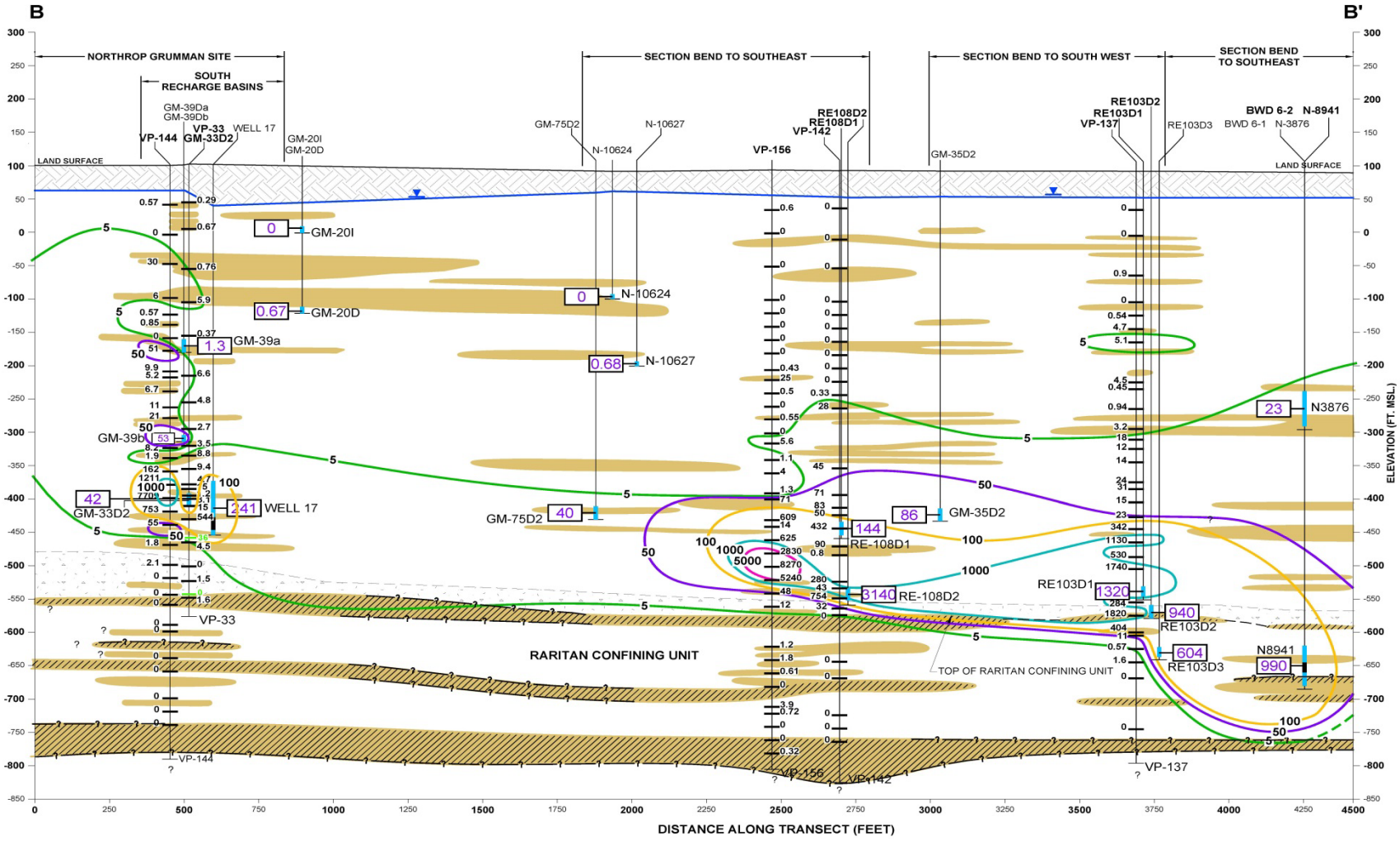

B-B’ Northwest-Southeast TVOC Cross-Section

- Plume Bifurcation is Occurring which indicates ONCT System Effectiveness

Imagine the result

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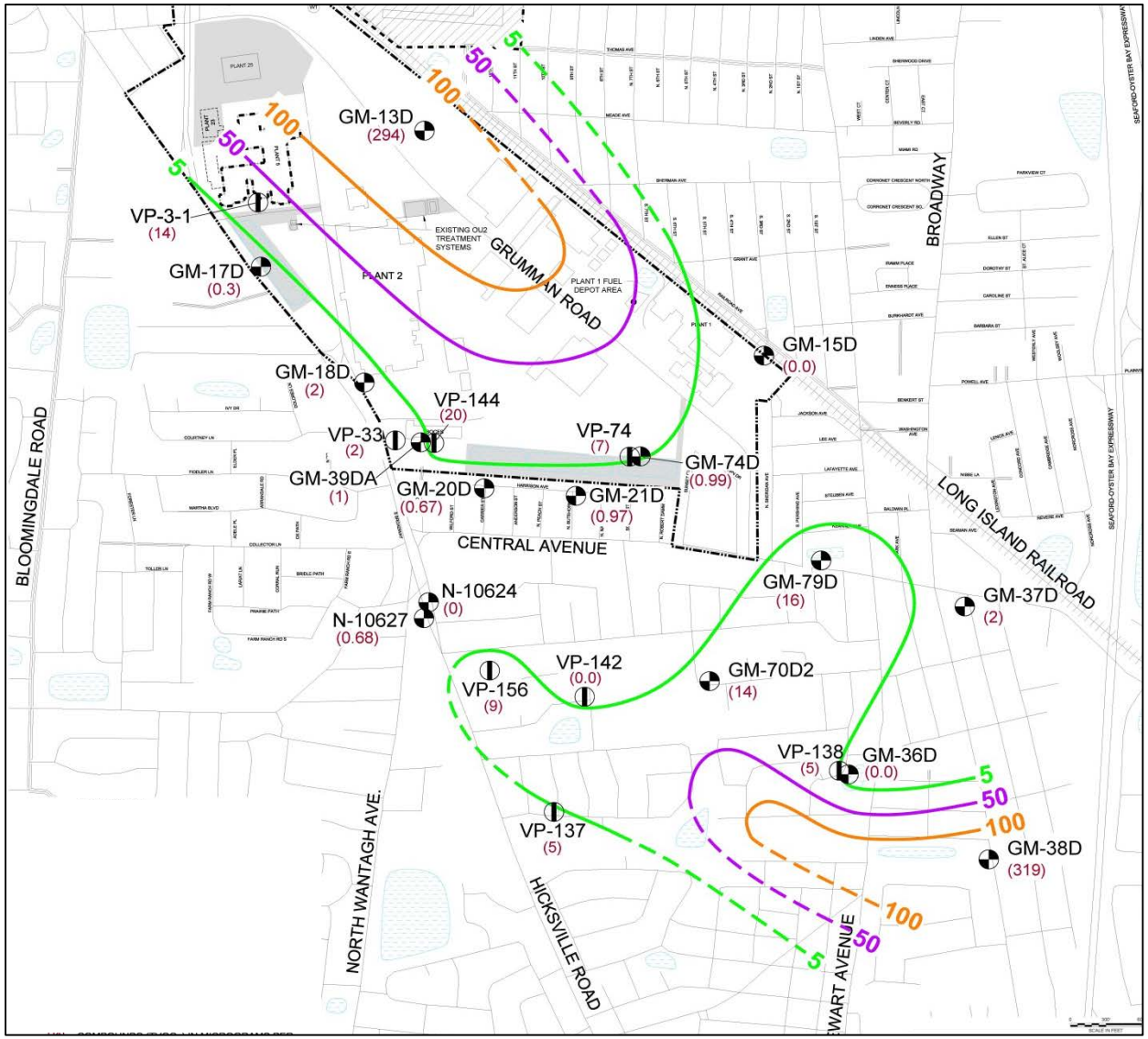

TVOCs in Deep Zone

PLUME BIFURCATION IS OCCURING

Imagine the result

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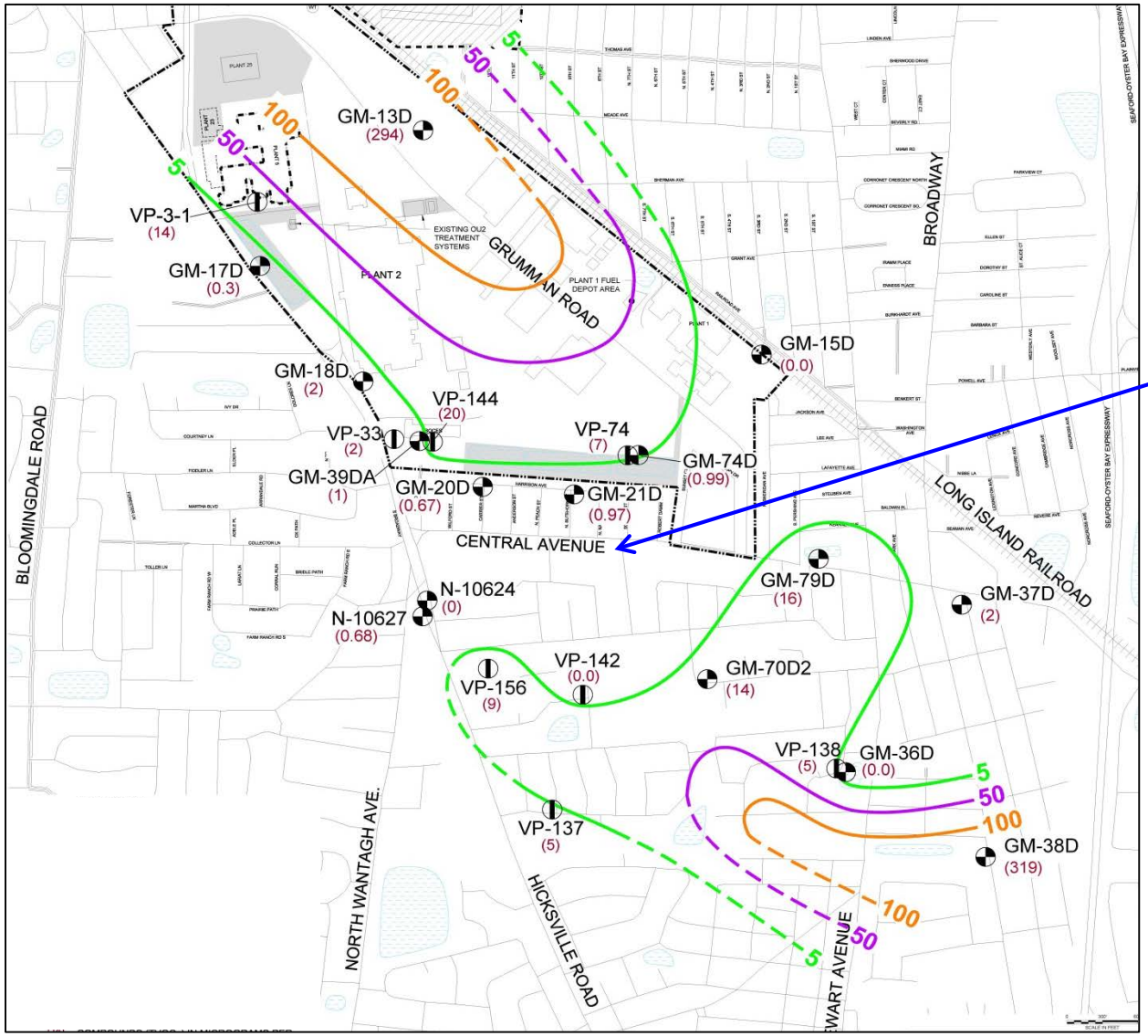

PLUME BIFURCATION IS OCCURING

INDICATES ONCT SYSTEM EFFECTIVENESS

TVOCs in Deep Zone

Imagine the result

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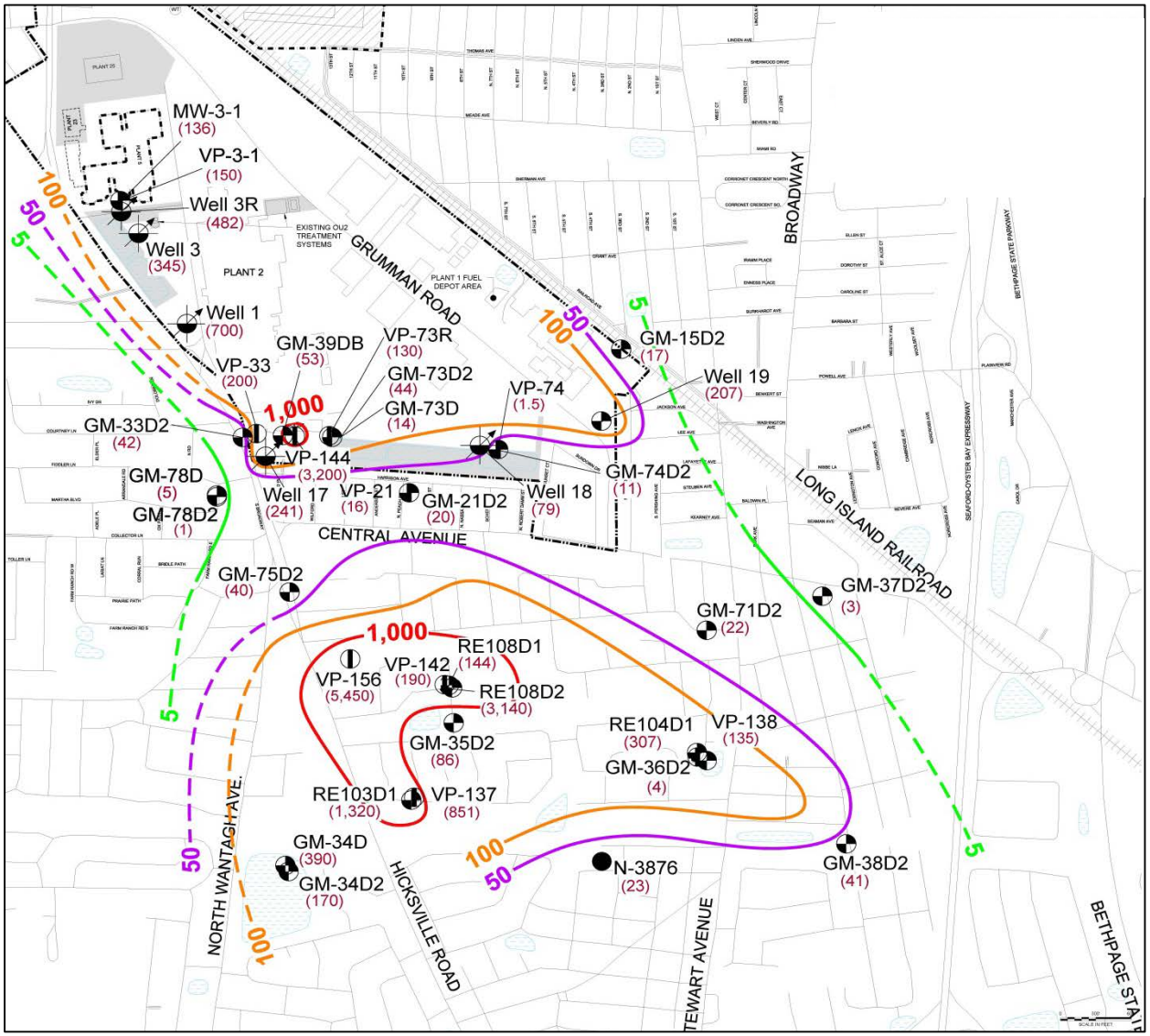

PLUME BIFURCATION IS OCCURING

TVOCs in Deep 2 Zone

Imagine the result

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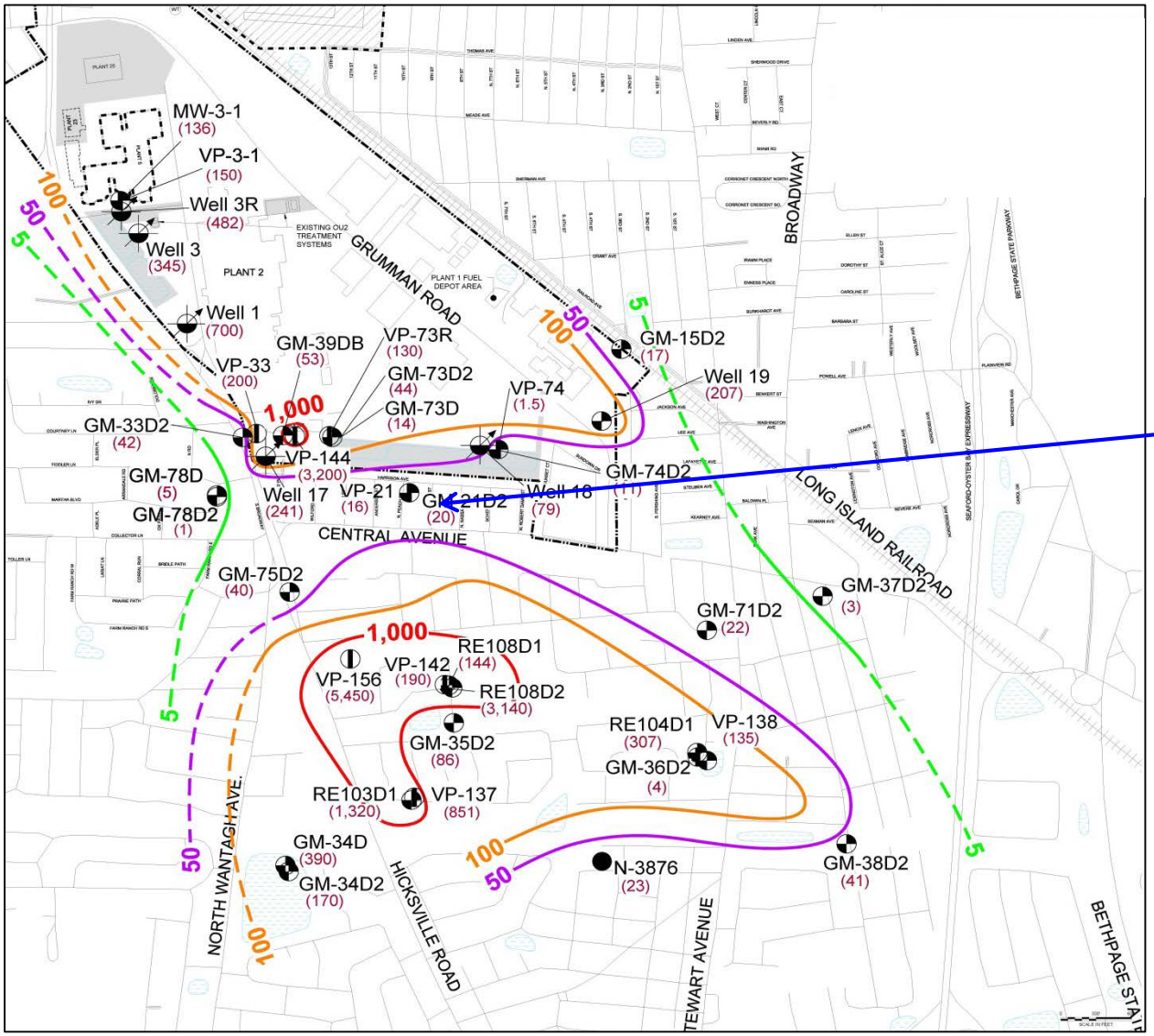

PLUME BIFURCATION IS OCCURING

INDICATES ONCT SYSTEM EFFECTIVENESS

TVOCs in Deep 2 Zone

Imagine the result

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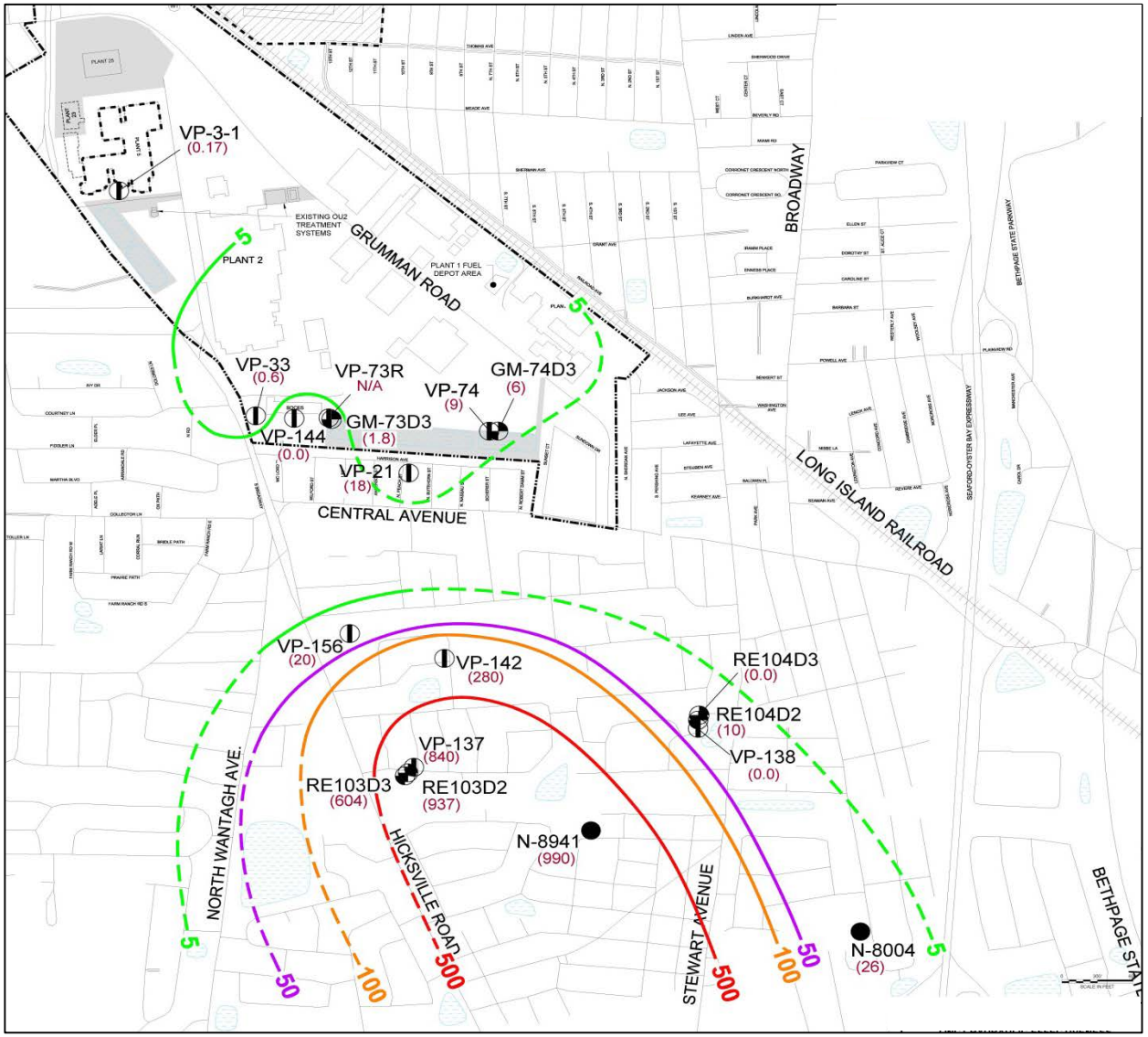

PLUME BIFURCATION IS OCCURING

TVOCs in Deep 3 Zone

Imagine the result

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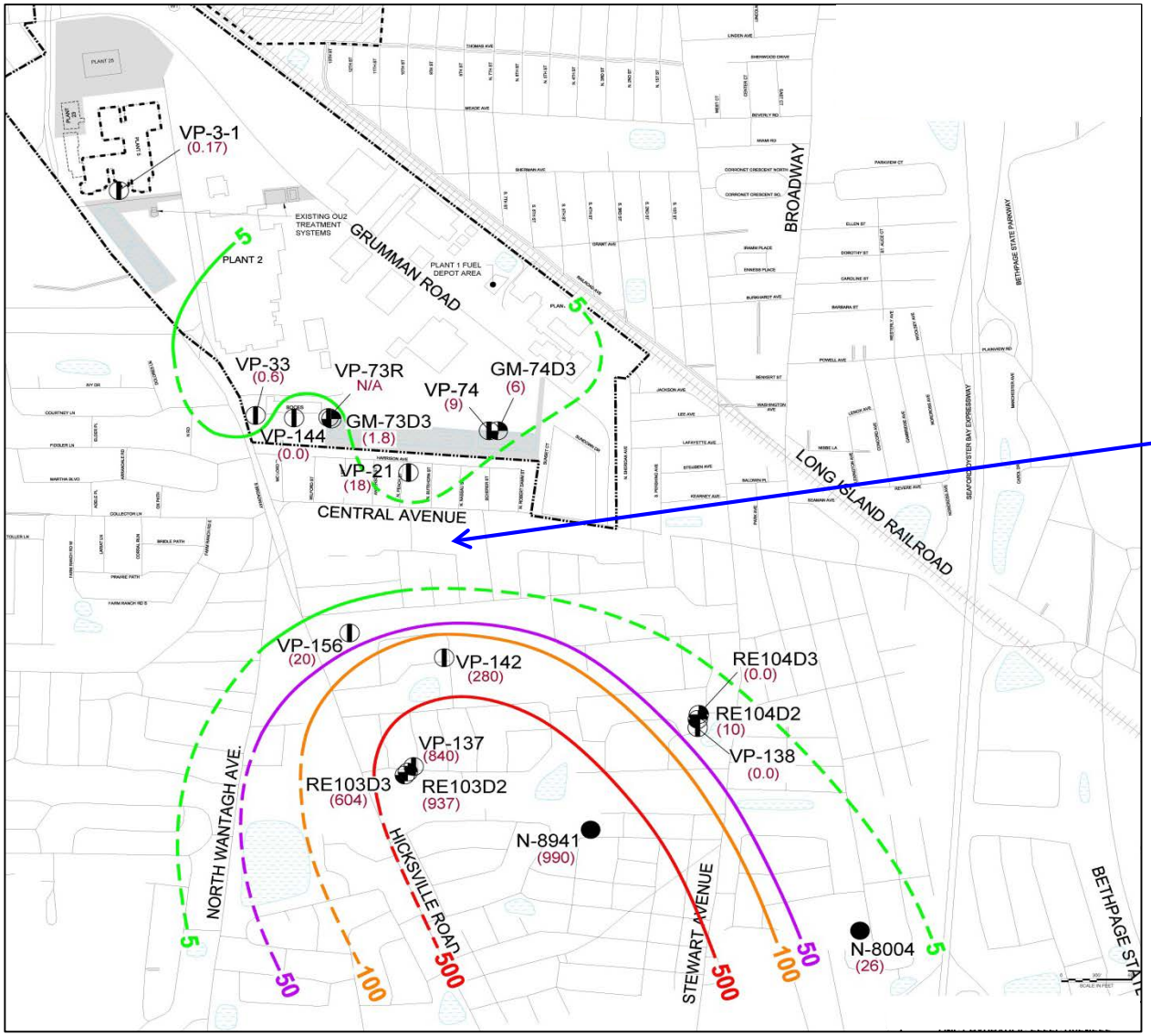

PLUME BIFURCATION IS OCCURING

INDICATES ONCT SYSTEM EFFECTIVENESS

TVOCs in Deep 3 Zone

Imagine the result

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Status of Northrop Grumman Consent Order Submittals

- Citizen Participation Plan
  - Due to NYSDEC: May 21, 2015
  - Status: Submitted May 21, 2015
- 2011-2013 ONCT Effectiveness Study
  - Due to NYSDEC: June 1, 2015
  - Status: Submitted May 26, 2015 to DEC (October 2014 report resubmitted as a standalone)
  - Standalone report update in progress (2014 data)
- Remedial Design/Remedial Action (RD/RA) Work Plan
  - Due to NYSDEC: June 30, 2015
  - Status: In progress

Status of Northrop Grumman Consent Order Submittals

- RD/RA Work Plan includes:
  - OM&M Plan
    - Status: May 2014 OM&M Plan submitted and under review by NYSDEC
  - Groundwater Monitoring Plan (Appendix A of OM&M Plan)
    - Status: Update in progress (Addendum to May 2014 submittal)
  - Plan for Cooperation with Navy on RE108D2 Hot Spot
    - Status: in progress