

RVAAP-66 FACILITY-WIDE GROUNDWATER RAVENNA ARMY AMMUNITION PLANT RAVENNA, OHIO

Restoration Advisory Board Meeting

11 January 2012

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And

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Topics of Discussion

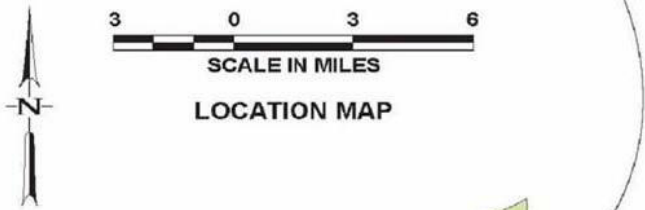
- Site Description
- Current Site Conditions – Groundwater
- Future Assessment Activities – Groundwater



Site Description

Ravenna Army Ammunition Plant (RVAAP)/Camp Ravenna is located in northeastern Ohio within Portage and Trumbull Counties, approximately 3 miles east/northeast of the City of Ravenna and approximately 1 mile northwest of the Village of Newton Falls. The RVAAP portions of the property are located completely within Portage County.

RVAAP/Camp Ravenna is a parcel of property approximately 11 miles long and 3.5 miles wide. The facility consists of 21,683.289 acres.



LOCATION MAP



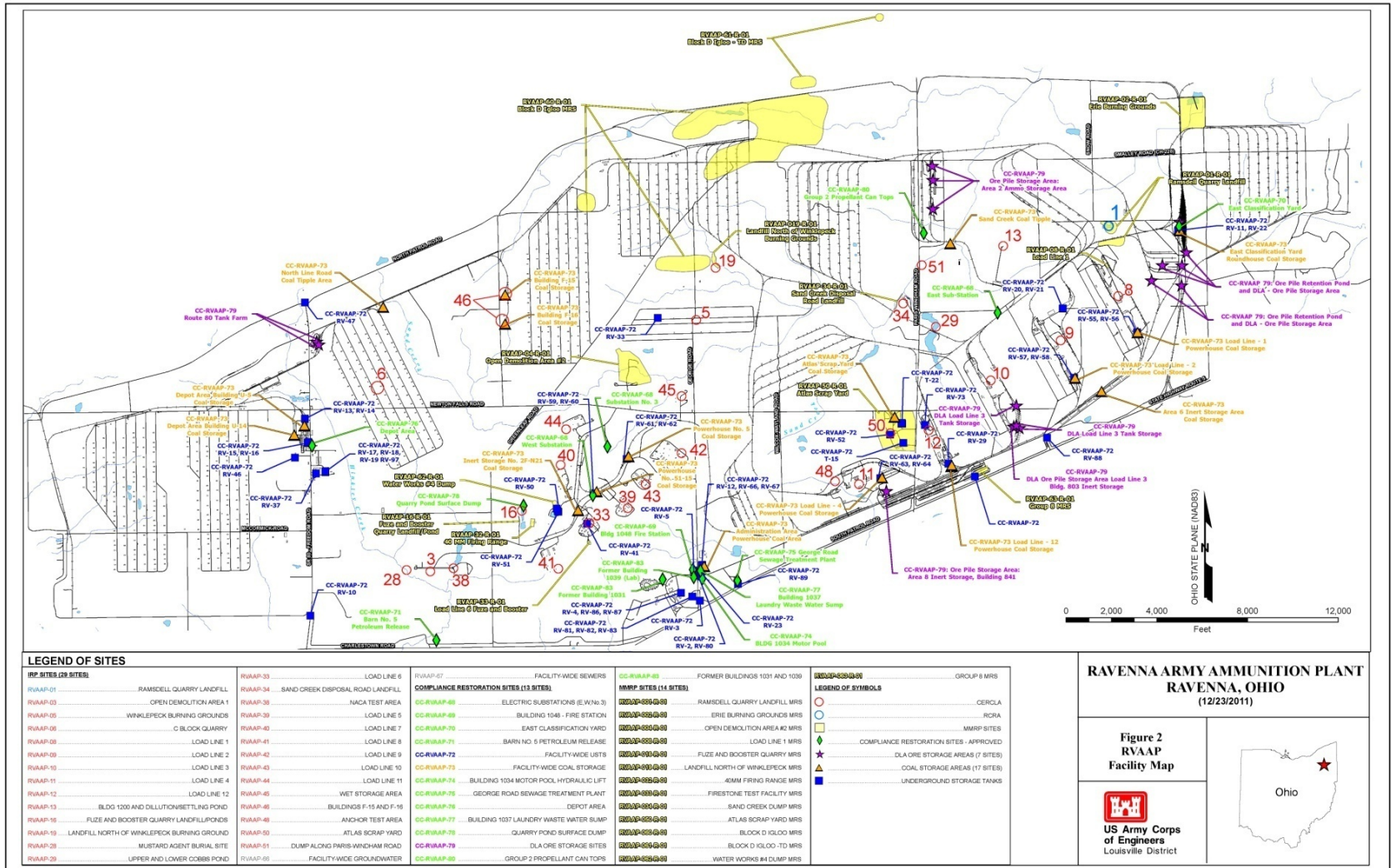
(NOT TO SCALE)



Site Description – Current AOCs

Active Areas of Concern (AOCs)

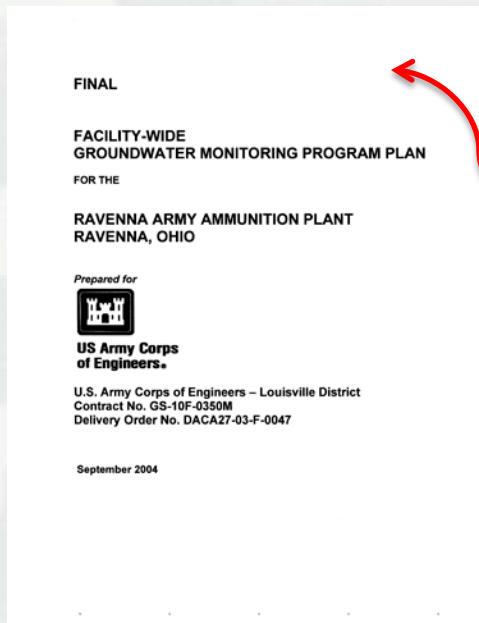
- 30 – Installation Restoration Program (IRP) Sites
- 14 – Compliance Restoration (CR) Sites
- 14 – Military Munitions Response Program (MMRP) Sites



Current Site Conditions – Groundwater

History of Groundwater Monitoring Program

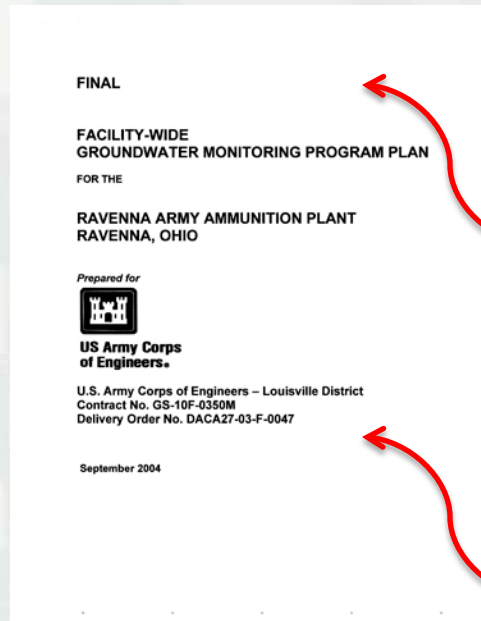
- Early Groundwater Monitoring – August 1996 through February 2005
- Director's Final Findings and Orders journalized in June 2004
- Final FWGWMP Plan Approved - September 2004, and FWGWMP Plan initiated in April 2005
- Wells sampled 27 quarterly monitoring events from April 2005 through October 2011
- January 2012 monitoring event currently underway
- 243 Total wells in monitoring well network



Current Site Conditions – Groundwater

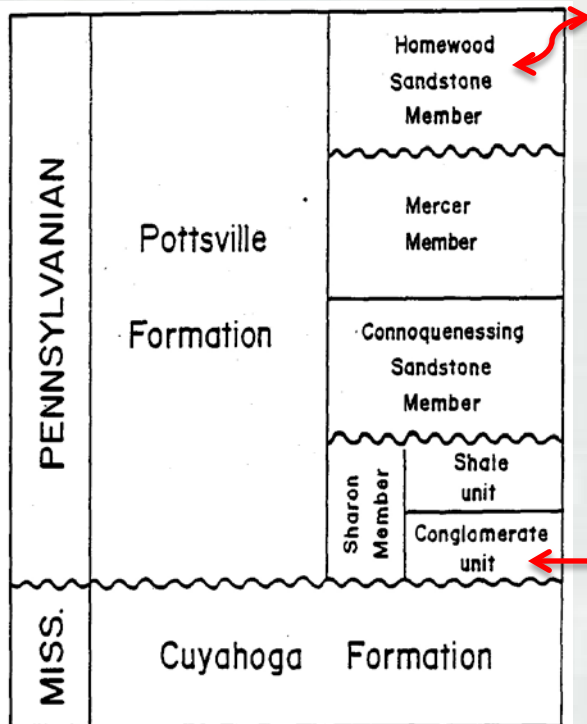
History of Groundwater Monitoring Program

- Early Groundwater Monitoring – Conducted 1990s through February 2005 in support of various environmental investigation activities prior to the Director’s Final Findings and Orders (DFFOs) and approved Facility-Wide Groundwater Monitoring Program (FWGWMP) Plan.
- Recent/Current Groundwater Monitoring – Conducted from April 2005 through October 2011 in conformance with the approved FWGWMP Plan. Groundwater monitoring conducted on a quarterly basis, and an AOC by AOC basis in support of the RI nature & extent study. Regional deep aquifer also initially assessed/monitored during this time period.
- Future Groundwater Monitoring – Beginning with the January 2012 monitoring event and going forward, the groundwater monitoring program will be conducted on a facility-wide basis (and not an AOC basis) in conformance with the approved FWGWMP Plan.



Groundwater Producing Formations

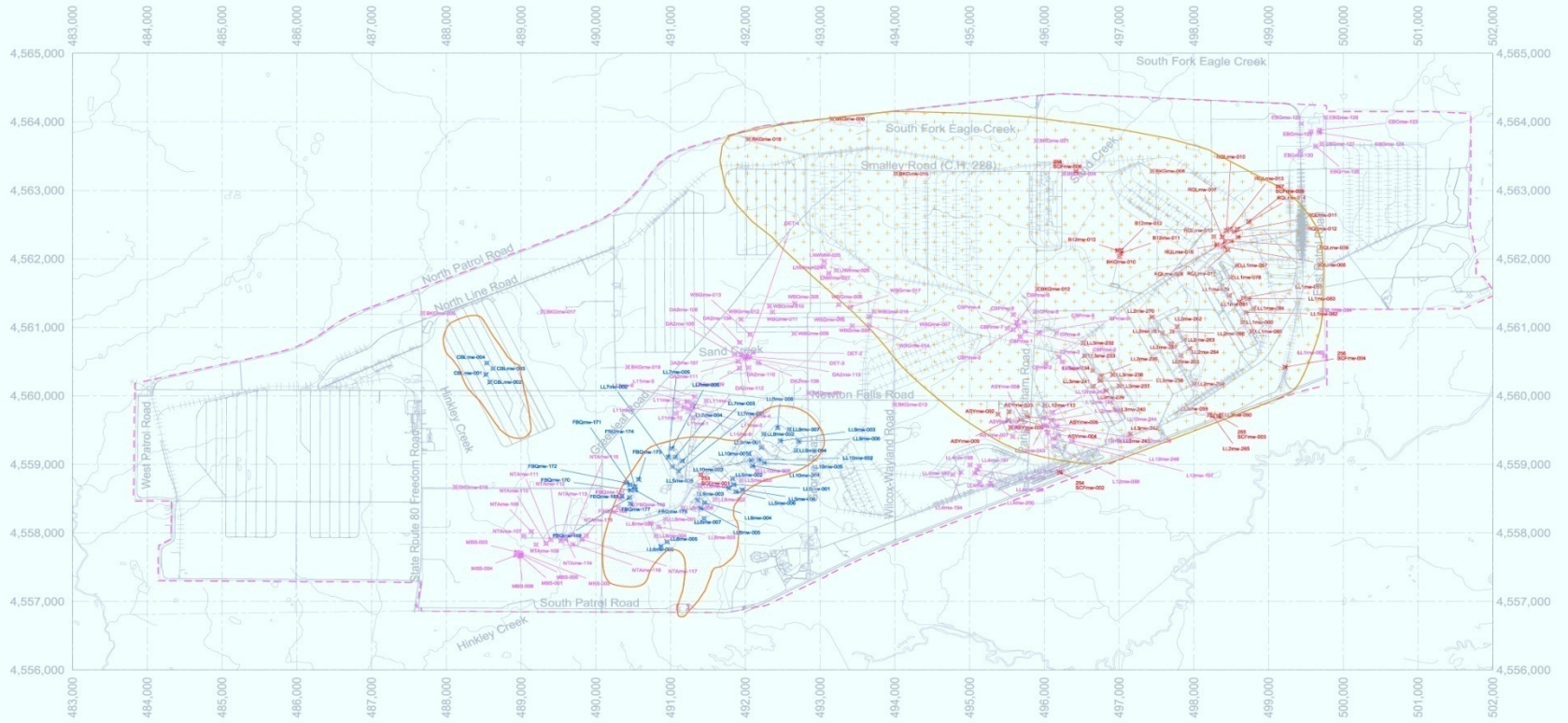
- The unconsolidated aquifer at the RVAAP/Camp Ravenna consists predominately of ground moraine, flood plain, and outwash glacial deposits from the Pleistocene age Wisconsin glaciation. These deposits typically consist of clay and gravel near ground surface, underlain by silt and alluvium containing sand and gravel. Groundwater yield is typically poor from near-surface materials (till); however, improves upon encountering underlying sand and gravel.



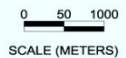
- The Homewood Sandstone Member may serve as a secondary bedrock aquifer on the western portion of the RVAAP/Camp Ravenna. The Homewood Sandstone has a maximum thickness of 70 feet locally, and may yield as much as 40 GPM.
- The Sharon Sandstone is the predominant bedrock aquifer at the RVAAP/Camp Ravenna. The Sharon Conglomerate unit is described as a conglomeritic, coarse to fine grained sandstone. The Sharon Member is the lower unit of the Pottsville Formation, and is lower Pennsylvanian in age. Local yield from this unit is as much as 150 GPM.



Current Site Conditions – Groundwater



- LEGEND**
- x UNCONSOLIDATED WELL
 - x HOMEWOOD MEMBER WELL
 - x SHARON MEMBER WELL
 - - - PROPERTY LINE
 - HOMEWOOD MEMBER
 - SHARON MEMBER



NOTE: THE UNCONSOLIDATED AQUIFER OVERLAYS THE HOMEWOOD AND SHARON MEMBERS, EXCEPT AS INDICATED ON PLATE 2

COORDINATE SYSTEM UTM NAD 83 ZONE 17

243 Groundwater Monitoring Wells - Total

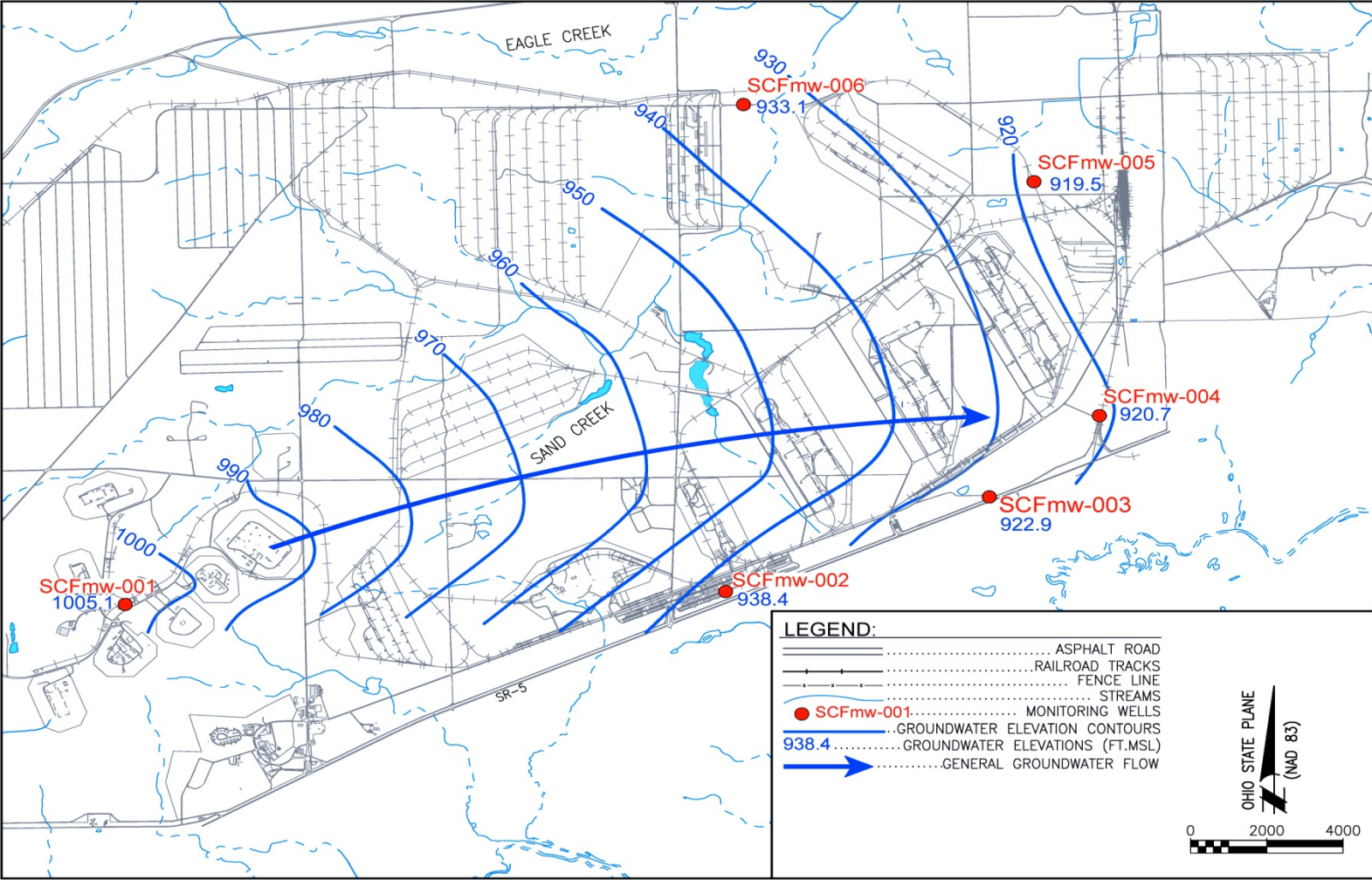
NO.	DESCRIPTION	DATE	APPROVED	SCALE	NOTE
1	ADDED NOTE	12-04-08	BT	John	D.TOMO 192297
2	ADDED SP Cmw-001 THRU 006	9-10-09	JM		
REVISIONS					

DESIGN	PROJECT NO.	DWG. NO.	REV.
E	030240.0006	PLATE 1	2

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MONITORING WELLS AT RVAAP

Potentiometric Map of Regional Aquifer



Potentiometric Surface Map Based on Average Water Levels in Basal Sharon Conglomerate Wells, April 2009 through January 2010

Current Site Conditions – Groundwater



PRGs – Preliminary Remediation Goals
MCLs – Maximum Contaminant Level

Sampled 112 wells during FY2011
(October 2010 and January, April,
and July 2011)

Constituents identified in
groundwater above site screening
levels (i.e., PRGs and/or MCLs)
included:

- Aluminum (10 wells)
- Arsenic (56 wells)
- Chromium (1 well)
- Iron (64 wells)
- Manganese (88 wells)
- Lead (2 wells)
- Nitrate as nitrite (2 wells)
- Vanadium (1 well)



Current Site Conditions – Groundwater

- Trichloroethene (2 wells)
- Carbon tetrachloride (1 well)
- Chloroform (1 well)
- Bis(2-ethylhexyl)phthalate (2 wells)
- Alpha-BHC (6 wells)
- Beta-BHC (3 wells)
- Heptachlor (1 well)
- 2,4,6-TNT (5 wells)
- 2-Nitrotoluene (3 wells)
- RDX (10 wells)

The identified COPCs were consistent with historical data.



Current Site Conditions – Groundwater



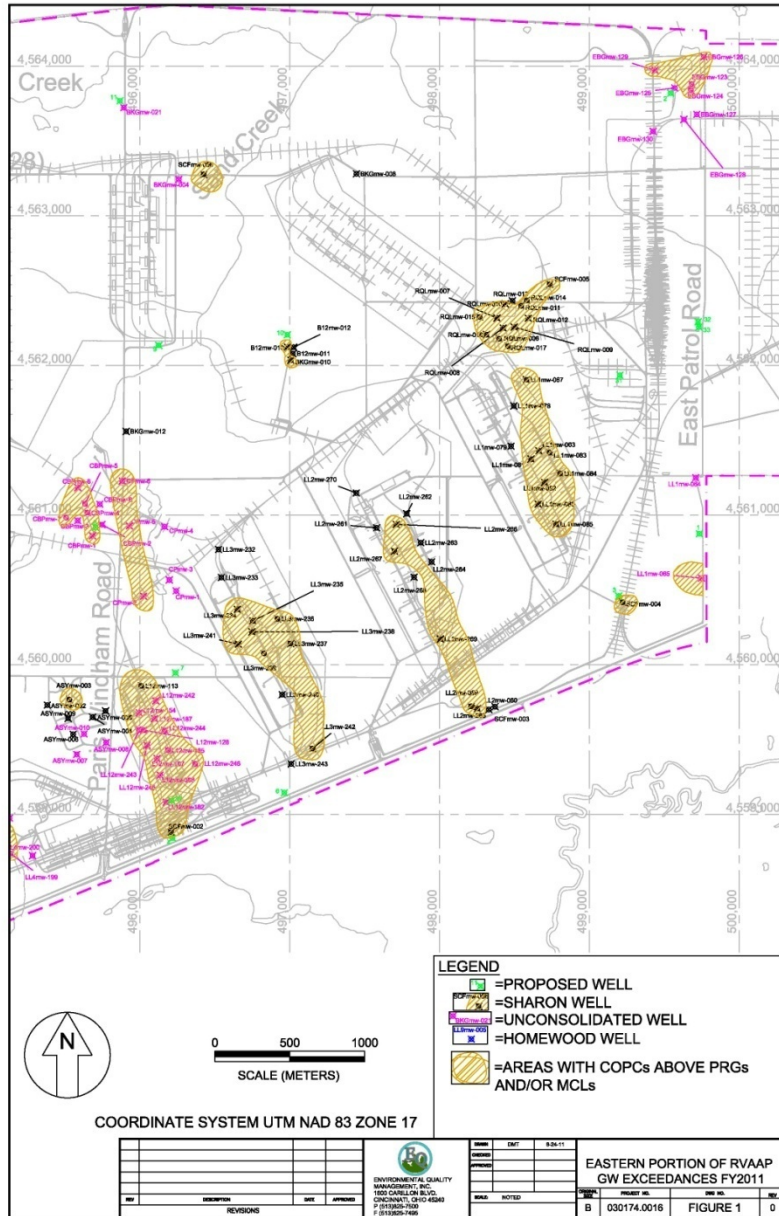
In October 2011, selected groundwater samples were collected for mustard agent degradation products in the suspected Mustard Agent Burial Site, and hexavalent chromium was analyzed from wells in Open Demolition Area (ODA) 2 and the Fuze and Booster load lines. No sulfur mustard degradation products or hexavalent chromium were identified in the groundwater samples from these areas.



Current Site Conditions – Groundwater

Eastern Portion of RVAAP
 Showing areas of contaminant concentrations in exceedance of applicable screening criteria

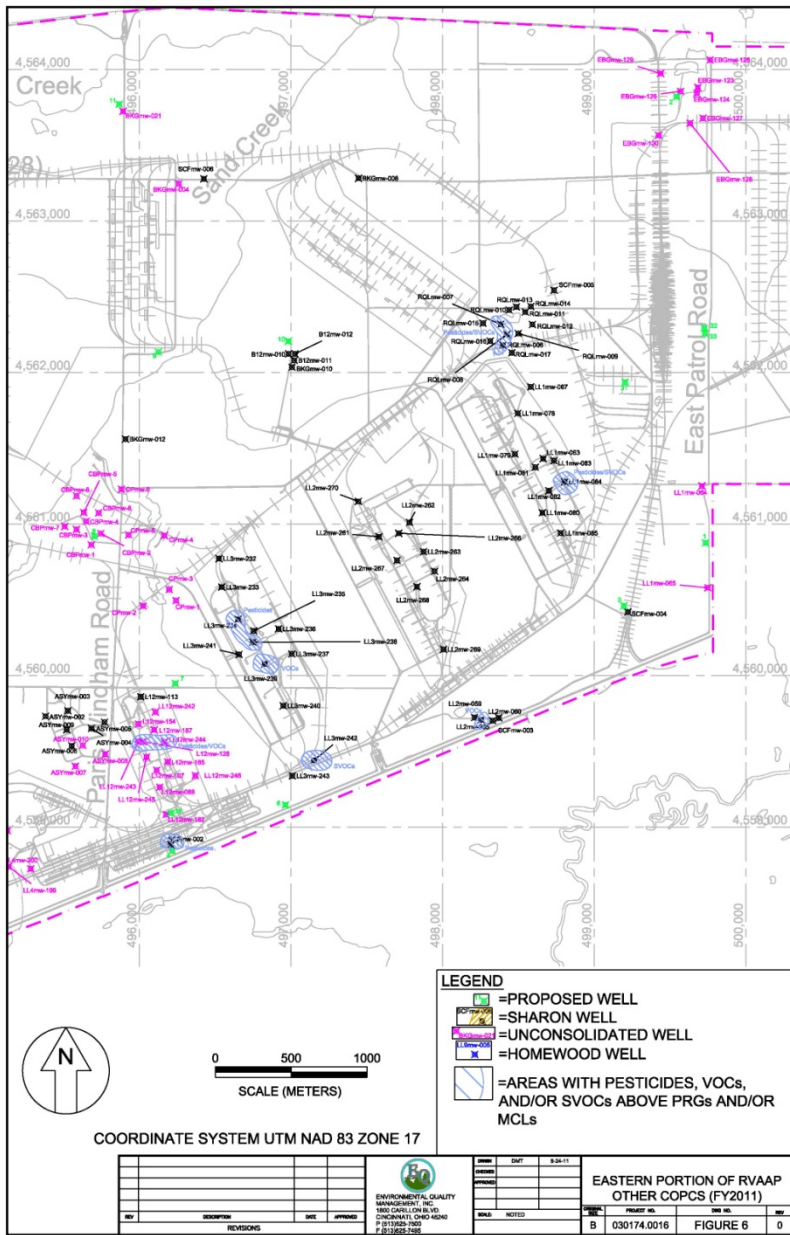
All Contaminants of Potential Concern (COPCs)



Current Site Conditions – Groundwater

Eastern Portion of RVAAP
 Showing areas of contaminant concentrations in exceedance of applicable screening criteria

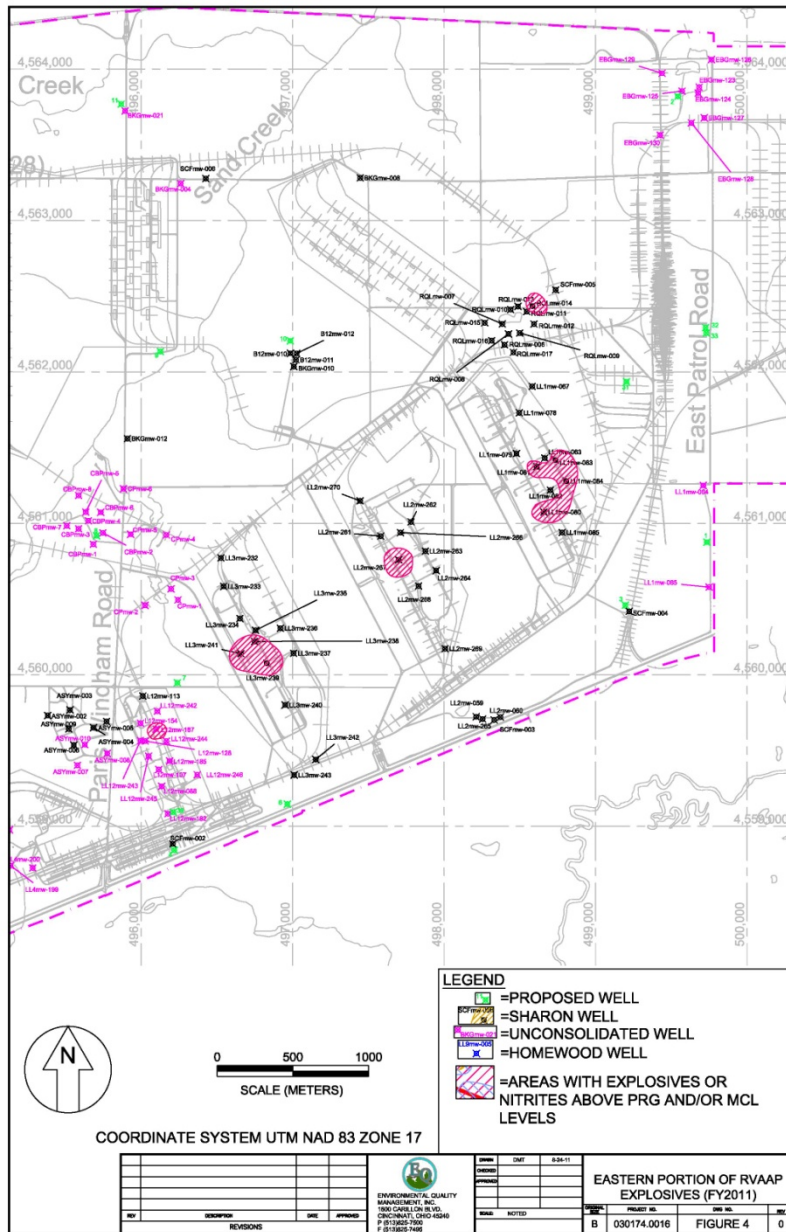
Volatile Organic Compounds
 Semi-Volatile Organic Compounds
 Pesticides



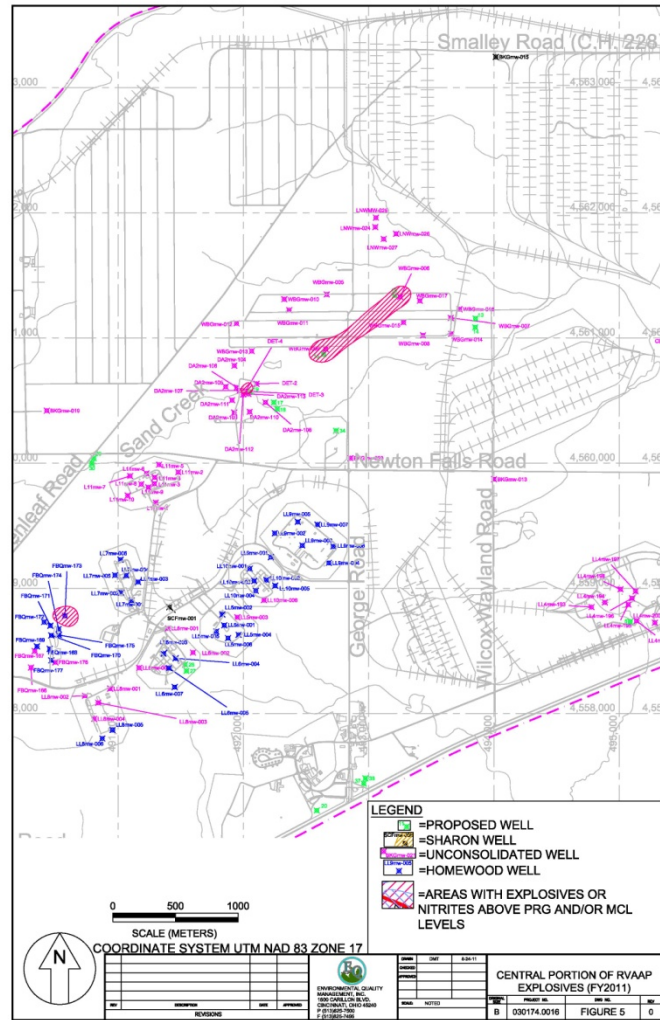
Current Site Conditions – Groundwater

Eastern Portion of RVAAP
Showing areas of contaminant concentrations in exceedance of applicable screening criteria

Explosives
Nitrates (as Nitrites)



Current Site Conditions – Groundwater



Central Portion of RVAAP
Showing areas of contaminant concentrations in exceedance of applicable screening criteria

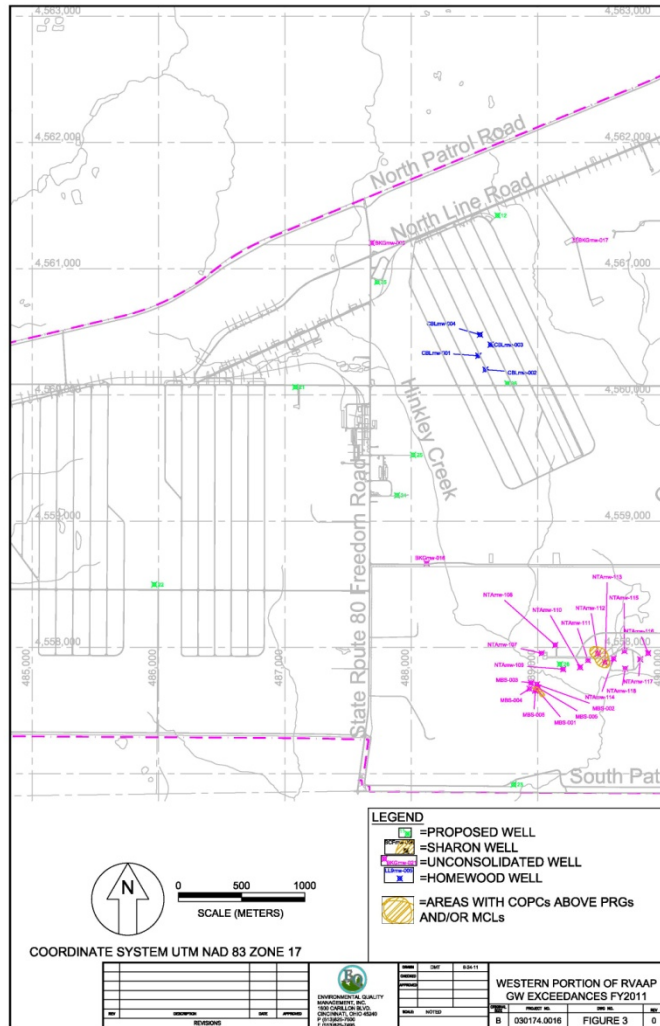
Explosives
Nitrates (as Nitrites)



Current Site Conditions – Groundwater

Western Portion of RVAAP
Showing areas of contaminant concentrations in exceedance of applicable screening criteria

All Contaminants of Potential Concern (COPCs)



Future Assessment Activities – Groundwater

NEW AWARD

August 2011 – The U.S. Army Corps of Engineers awards a new performance-based acquisition contract to Environmental Quality Management (EQM).



PERFORMANCE OBJECTIVES

Execute the Performance Work Statement (PWS) and achieve an approved ROD. Associated major tasks for attaining ROD include:

- Amendments to the FWGWMP SAP for Environmental Investigations
- Completion of RI/FS
- Completion of Proposed Plan
- Continued groundwater monitoring and reporting



Future Assessment Activities – Groundwater

INSTALLATION & SAMPLING OF NEW WELLS



PERFORMANCE OBJECTIVES

Install 39 new wells to complete the RI/FS.
The objectives of the new wells are to:

- Determine the nature and extent of contamination
- Delineate potential impacts from current Compliance Restoration (CR) sites
- Complete Hydrogeologic System Modeling
- Conduct Contaminant Fate-and-Transport Modeling



Future Assessment Activities – Groundwater

INSTALLATION & SAMPLING OF NEW WELLS

The new well locations are shown on the following site figures. Locations were chosen based on the following criteria:

- To assess potential contaminant migration
- To delineate potential impact from CR sites
- To delineate horizontal/vertical impact at specific AOCs (well pairs)
- To provide hydrogeologic data in western portion of RVAAP



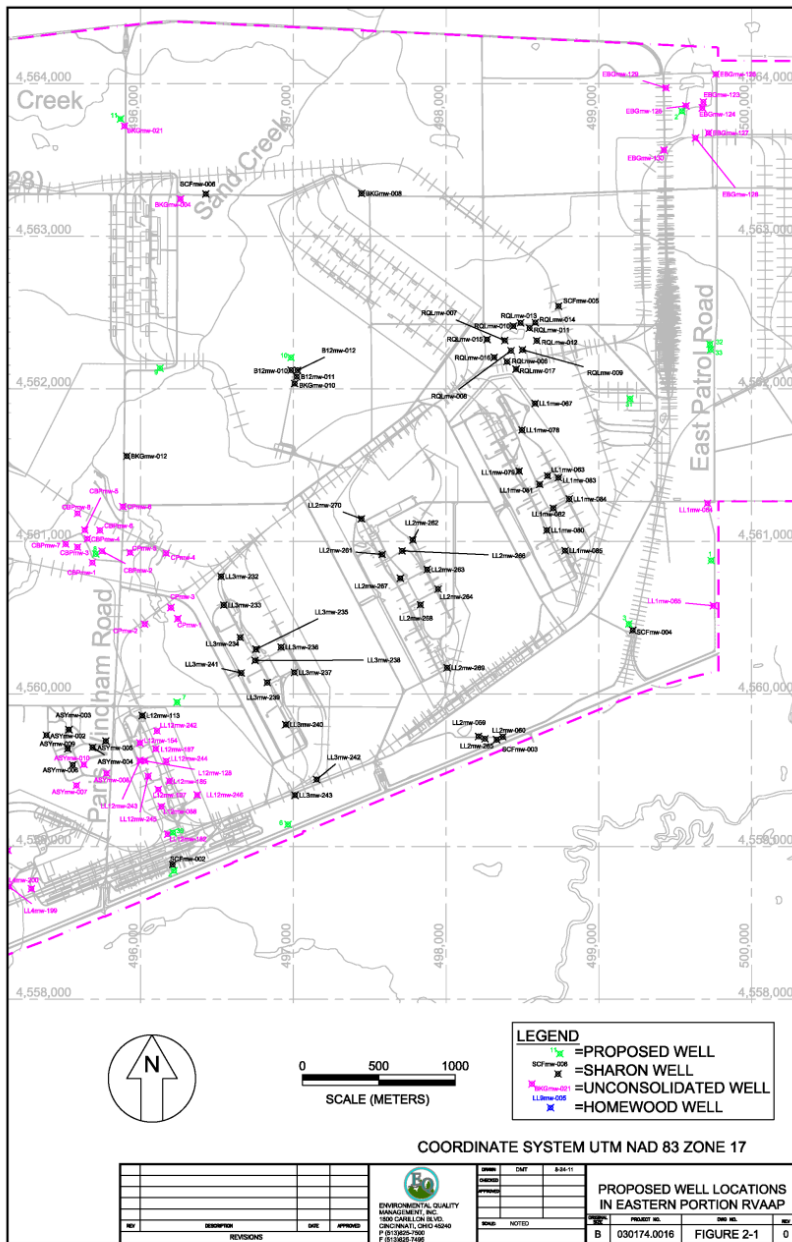
The new wells will be sampled quarterly for the current analytical suite of parameters, as well as hexavalent chromium and perchlorates (one quarter only for these two parameters). In addition, a new stainless steel well (#39) will be sampled for bis(2-ethylhexyl) phthalate only to assess this contaminant as a possible artifact associated with the well installations.



Future Assessment Activities – Groundwater

INSTALLATION & SAMPLING OF NEW WELLS

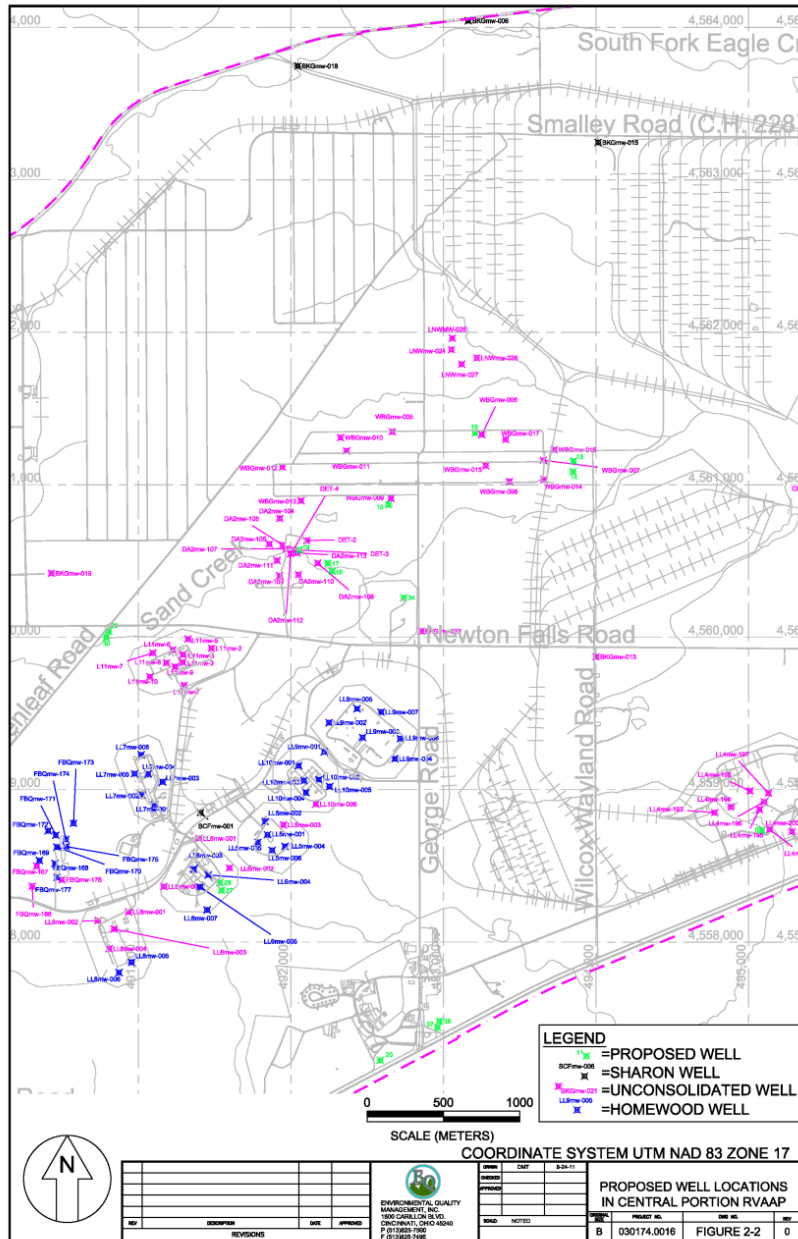
Eastern Portion of RVAAP



Future Assessment Activities – Groundwater

INSTALLATION & SAMPLING OF NEW WELLS

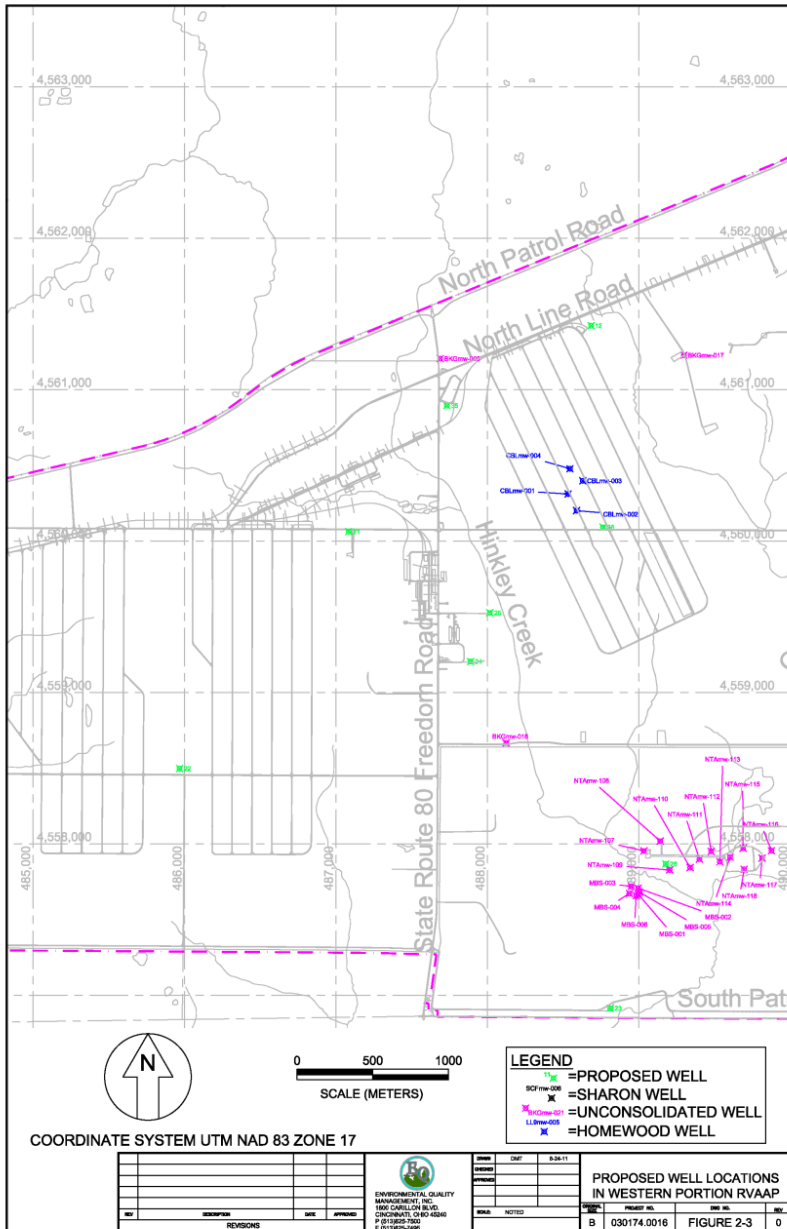
Central Portion of RVAAP



Future Assessment Activities – Groundwater

INSTALLATION & SAMPLING OF NEW WELLS

Western Portion of RVAAP



THE END

