INSTALLATION RESTORATION PROGRAM

NAVAL SUPPORT FACILITY
INDIAN HEAD
3838 STRAUSS AVENUE
INDIAN HEAD, MARYLAND
20640-5133

RESTORATION ADVISORY BOARD (RAB) MEETING MINUTES

Date of Meeting: October 19, 2017, 6:00 pm

RAB Member Attendees:
Mr. Joseph Rail (N) *
Mr. Curtis Detore (S)

Additional Attendees:

Ms. Tara Carlson (C)	Mr. Jim Long (C)
Mr. Andrew Louder (N)	Ms. Jeron Hayes (N)
Mr. Robert Thomson (F)	Mr. Dan Bragunier (N)
Ms. Tara Meadows (N)	Ms. Emily Keane (K)

RAB Members Not in Attendance:
Ms. Karen Wiggen (L)
Ms. Lisa Laschalt (L)
Mr. Fred Pinkney (F)

* Co-chair

C= Community
F= Federal Official
K= Contractor
L= Local Official
N= Navy Official
R= Newspaper Reporter
S= State Official

Topics Discussed:

1. Arrival/Welcome

Mr. Joseph Rail of the Naval Facilities Engineering Command, Washington (NAVFAC Washington) began the meeting by conducting introductions and welcoming everyone to the Indian Head Senior Center. Copies of RAB presentations and the agenda were offered to anyone in attendance. Mr. Rail then presented the meeting agenda, which is included in Attachment A.

2. RAB Presentations

Presentations and updates were given by Mr. Rail of NAVFAC Washington and Mr. Louder of Naval Support Facility Indian Head. Mr. Rail presented the FY18 Budget Update, Site 38 Remedial Action Update, and Stump Neck MRP RI Update. Mr. Louder presented the Site 17 Pilot Study Update and Site 43 Pre-Design Investigation Update. Copies of all presentations are included in Attachment D.

3. Comments, Questions and Answers

Numerous comments were made and questions asked during the meeting. These comments, questions and answers are provided in Attachment B. Additional correspondence concerning the Installation Restoration Program (IRP) or the Munitions Response Program (MRP) at the facility can be directed to:

Public Affairs Officer
Naval Support Facility South Potomac
Attn: Public Affairs Officer, Code 00P
6509 Sampson Rd.
Dahlgren, VA 22448-5108
PHONE: (540) 284-0129
FAX: (540) 653-4269
Email: jeron.hayes@navy.mil

4. Meeting Adjourn

Mr. Rail presented the tentative agenda for the next RAB meeting, which is scheduled for April 19, 2018. A copy of the draft agenda is included in Attachment C. Mr. Rail then concluded the meeting at 7:00 pm and thanked everyone in attendance.

NAVAL SUPPORT FACILITY INDIAN HEAD
INSTALLATION RESTORATION (IR) PROGRAM
RESTORATION ADVISORY BOARD (RAB) MEETING AGENDA

October 19, 2017

6:00 - 6:05 pm	**ARRIVAL/WELCOME** Mr. Joseph Rail Naval Facilities Engineering Command, Washington (NAVFACWASH) Remedial Project Manager
6:05 – 6:20 pm	**FY18 BUDGET UPDATE** Mr. Joseph Rail
6:20 – 6:40 pm	**SITE 38-RUM POINT LANDFILL REMEDIAL ACTION UPDATE** Mr. Joseph Rail
6:40 – 7:00 pm	**STUMP NECK 9 SITE MRP REMEDIAL INVESTIGATION UPDATE** Mr. Joseph Rail
7:00 – 7:15 pm	**SITE 17 PILOT STUDY FIELDWORK UPDATE** Mr. Andrew Louder
7:15 – 7:30 pm	**SITE 43 PRE-DESIGN INVESTIGATION UPDATE** Mr. Andrew Louder
7:30 pm	**ADJOURN**

Attachment A

INSTALLATION RESTORATION PROGRAM

NAVAL SUPPORT FACILITY
INDIAN HEAD
3838 STRAUSS AVENUE
INDIAN HEAD, MARYLAND
20640-5133

RESTORATION ADVISORY BOARD (RAB) MEETING
COMMENTS, QUESTIONS AND ANSWERS
October 19, 2017

Arrival/Welcome

No questions were asked nor comments made during this topic.

FY18 BUDGET UPDATE

Question: Does the FY18 budget that was presented cover the salaries of the Indian Head team members?

Answer: No, salaries are paid through a separate fund.

Question: How are percentages of the DoD budget determined that are spent on environmental projects?

Answer: Each year, funds are appropriated by Congress for Superfund projects and allocated to the Department of Navy. The Navy distributes those funds across all of its FECs (Facility Engineering Commands) and attempts to address the highest priority sites first. Therefore, a set percentage is difficult to identify. Each FEC takes their portion of funding and divides it among their bases or sites. Funding can vary from year to year, but Indian Head is typically budgeted $3-5 mil each fiscal year.

SITE 38-RUM POINT LANDFILL REMEDIAL ACTION UPDATE

Question: How was the MPPEH (Material Potentially Presenting an Explosive Hazard) disposed of?

Answer: MPPEH was inspected and secured by UXO (unexploded ordnance) technicians and later transported to a recycling yard where it was processed through a smelter. Following that, a certificate of destruction was signed and issued.

Attachment B

Question: What was the purpose of the detonation trench event?

Answer: Some potential munitions items had cavities that could not be fully inspected to determine that they were inert. If determined safe to move, these items were buried in an approved detonation trench and shape charges were used for perforation. Following a detonation, the items were excavated, inspected, and certified to be inert.

STUMP NECK MRP RI UPDATE

Question: Is the process of using trasects to investigate the sites the same as an archeological survey?

Answer: Yes, it is similar in approach in that transects are spaced to get a high level of site coverage and not miss potential subsurface anomalies.

Question: What is the ultimate goal of this Remedial Investigation work?

Answer: The goal of the work is to complete an intrusive investigation and define the nature and extent of subsurface anomalies.

Question: When did the EOD school leave the Stump Neck Annex?

Answer: Most of the EOD school functions were transferred to Pensacola, Fl in 1998.

Question: Why are transects used for the investigation?

Answer: Transects are used to adequately cover large areas of land and identify all subsurface anomalies with a high level of confidence.

SITE 17 PILOT STUDY UPDATE

Question: Why was the latest work considered a pilot study?

Answer: It was a pilot study because it was funded and implemented by the DoD’s ESTCP (Environmental Security Technology Certification Program) which conducts demonstrations using innovative technologies.

Question: What is an amendment?

Attachment B

Answer: An amendment is a material that is used to stimulate degradation processes of contamination. At site 17, the amendment was ZVI (zero valent iron) and vegetable oil.

Question: How does the amendment break down TCE contamination in groundwater?

Answer: Up to 800 closely-spaced vertical reaction columns were installed and the amendment was then injected. The ZVI amendment has particles that are highly reactive and perform as a long-term electron donor to promote anaerobic (without oxygen) degradation. What that means is that the iron comes into contact with TCE and a chemical reaction occurs that breaks down the contamination.

Question: How deep were the injection or reaction columns?

Answer: Reaction columns were up to 30 feet deep.

Question: Does someone inspect the injection work to ensure it's done correctly?

Answer: Yes, an engineer from the prime contractor (GSI Environmental) was onsite at all times to monitor fieldwork.

Question: How many CMTs (continuous multichannel tubing) sampling ports were installed and will sampling of them show that the pilot study is working?

Answer: Five CMT wells were installed and sampling them will indicate how effective the grout bomber injection work was since samples will be analyzed for CVOCs, dissolved gases, metals, and biological indicators.

Question: How would you have remediated the site without the pilot study?

Answer: A potential remediation for the north plume could have been soil mixing to deliver an amendment as was done for the south plume of contamination in 2012.

SITE 43 PRE-DESIGN INVESTIGATION UPDATE

Question: Has contamination been an issue at Site 43 since 1993?

Answer: While parts cleaning operations ended in 1989 at Building 1040 and 1041, the exact date of when the contamination became an issue isn’t known. However, planning for a Site Screening Investigation and sampling began around 2004.

Question: The site is called “Toluene Disposal Area”, but you didn’t find any toluene?

Answer: Correct. While it was reported that toluene may have improperly been disposed at the base of a pole and draingage ditch, the primary contaminants ended up being TCE and cobalt in groundwater.

Attachment B

NAVAL SUPPORT FACILITY INDIAN HEAD
INSTALLATION RESTORATION (IR) PROGRAM
RESTORATION ADVISORY BOARD (RAB) DRAFT MEETING AGENDA

April 19, 2018

6:00 - 6:05 pm	**ARRIVAL/WELCOME** Mr. Joseph Rail Naval Facilities Engineering Command, Washington (NAVFACWASH) Remedial Project Manager
6:05 – 6:30 pm	**STUMP NECK SMALL ARMS/SKEET RANGE REMOVAL ACTION UPDATE** Mr. Joseph Rail
6:30 – 6:45 pm	**UXO 9-PROPELLANT GRAIN SPILL RI/FS UPDATE** Mr. Joseph Rail
6:45 – 7:00 pm	**SITE 17 LONG-TERM MONITORING UPDATE** Mr. Joseph Rail
7:00 – 7:15 pm	**SITE 57-BUILDING 292 TCE CONTAMINATION OPTIMIZATION UPDATE** Mr. Andrew Louder
7:15 – 7:30 pm	**SITE 66-TURKEY RUN DISPOSAL AREA BASELINE ECOLOGICAL RISK ASSESSMENT** Mr. Andrew Louder
7:30 – 7:45 pm	**SITE 67-HOG-OUT FACILITY FEASIBILITY STUDY UPDATE** Mr. Alex Scott
7:45 – 8:00 pm	**SITE 69-BUILDING 1018 REMEDIAL INVESTIGATION UPDATE** Mr. Alex Scott
8:00 pm	**ADJOURN**

Tentative FY18 RAB Dates:

April 19, 2018
October 18, 2018

Attachment C

Attachment D- RAB Presentations

FY18 BUDGET & SCHEDULE UPDATE

Presented By
Joseph Rail
Naval Facilities Engineering Command (NAVFAC)
Washington

10/19/17

FY18 Budget & Schedule Update

Approximate budget for FY 2018:

- $640K for Installation Restoration Program (IRP)
- $2.4 mil for Munitions Response Program (MRP)

Planned work includes:

- Preliminary Assessment (PA)
- Remedial Investigation (RI)/Feasibility Study (FS)
- Proposed Plan (PP)/Record of Decision (ROD)/Remedial Design (RD)
- Remedial Action-Operation (RA-O)
- Long-Term Monitoring (LTM)

FY18 Budget & Schedule Update

- **PA for:**
  - Base wide PFC (Perfluorinated Chemicals) investigation

- **RI/FS for:**
  - UXO 6- NG Slums Burning Ground
  - UXO 13- FDR Skeet Range
  - UXO 26- The Valley Impact Area

FY18 Budget & Schedule Update

- **PP, ROD, RD for:**
  - UXO 1- Air Blast Pond
  - UXO 2- Area 8
  - UXO 4- Basic IED Area
  - UXO 5- Advanced IED Area
  - UXO 10- Stump Neck Impact Area
  - UXO 12- Torpedo Burial Site
  - UXO 21- Test Area 1
  - UXO 23- Torpedo Casing Disposal Area
  - UXO 28- EOD School Demo Area

- **RA-O/LTM for:**
  - Site 17- Disposed Metal Parts Along Shoreline
  - Site 38- Rum Point Landfill
  - Site 47- Mercuric Nitrate Disposal Area

Contacts and Questions

Points of Contact:

- **NAVFAC Washington:** Joseph Rail
- **NAVFAC Washington (Base RPM):** Andrew Louder

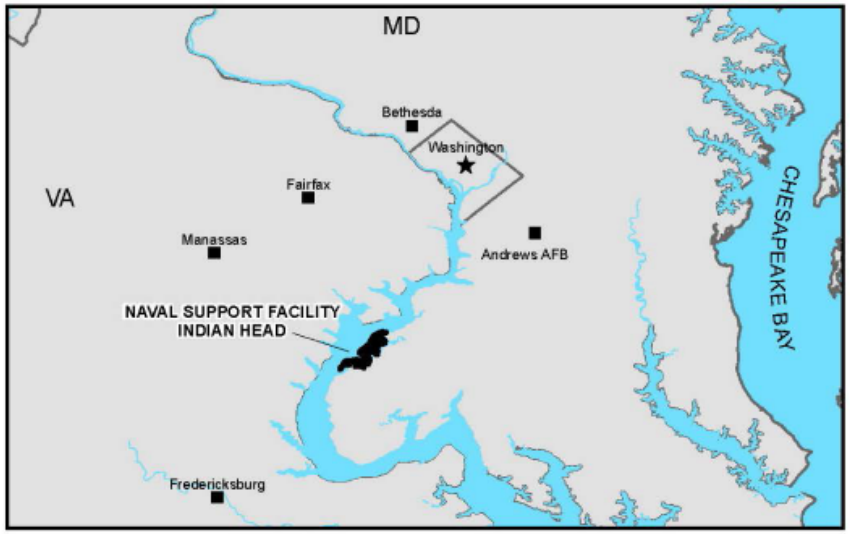
Questions ?

SITE 38- RUM POINT LANDFILL REMEDIAL ACTION UPDATE

Presented By
Joseph Rail
Naval Facilities Engineering Command (NAVFAC)
Washington

10/19/17

Site 38-Rum Point Landfill Location



Project Overview

Site Background:

- Located on Stump Neck Annex, 2 acres in size, inactive since 1989
- Record of Decision (ROD) signed in 2014
- Final remedy of landfill removal, monitoring, and land use controls
- Wastes include scrap metal, tires, wood, concrete, and potential munitions items

Sequence of Fieldwork:

- Excavation of landfill completed down to native soil and no wastes remain
- All Munitions and Explosives of Concern/Material Potentially Presenting an Explosive Hazard (MEC/MPPEH) removed
- Soil, construction debris, and scrap metal disposed off site
- Clean soils used to backfill borrow source area
- Site restoration completed (topsoil, seeding, and planting)
- Demobilization of equipment and personnel

Borrow Source Area

U.S. Navy

Before

U.S. Navy

U.S. Navy

After

Restoration Completion- October 2017

U.S. Navy

Before

U.S. Navy

After

Restoration Completion- October 2017

U.S. Navy

Site 38 Remedial Action Summary

Project Cost/Length:

- Approximately $6 mil total
- 22 months to complete RA

Project Successes:

- Potential for site to be unlimited use/unrestricted exposure (UU/UE)
- Considerable savings for future long-term monitoring (LTM) (cost reduction potential of $750K or more)
- 18,921 tons soil re-used in borrow pit (provided $900K cost avoidance)
- 7,710 tons soil disposed offsite
- 63,760 lbs. MDAS recovered from site
- 3,594 lbs. MPPEH recovered
- 46,100 lbs. of general trash and construction debris collected
- 53,820 lbs. metal recycled
- 835 tons concrete processed

Contacts and Questions

Points of Contact:

- **NAVFAC Washington:** Joseph Rail
- **NAVFAC Washington (Base RPM):** Andrew Louder

Questions ?

MRP Remedial Investigation Update

NSF-IH, Stump Neck Annex, Sites
UXO 1, 2, 4, 5, 10, 12, 21, 23, and 28

October 3, 2017

RESOLUTION CONSULTANTS

Fieldwork Overview

- Site surveying conducted May-June
- Site preparation activities began in June
- Intrusive investigation activities began in July
- Preliminary Investigation Results are available for:
  - UXO 2
  - UXO 4
  - UXO 5
  - UXO 12
  - UXO 23
  - UXO 28

RESOLUTION CONSULTANTS

Locations of RI Sites

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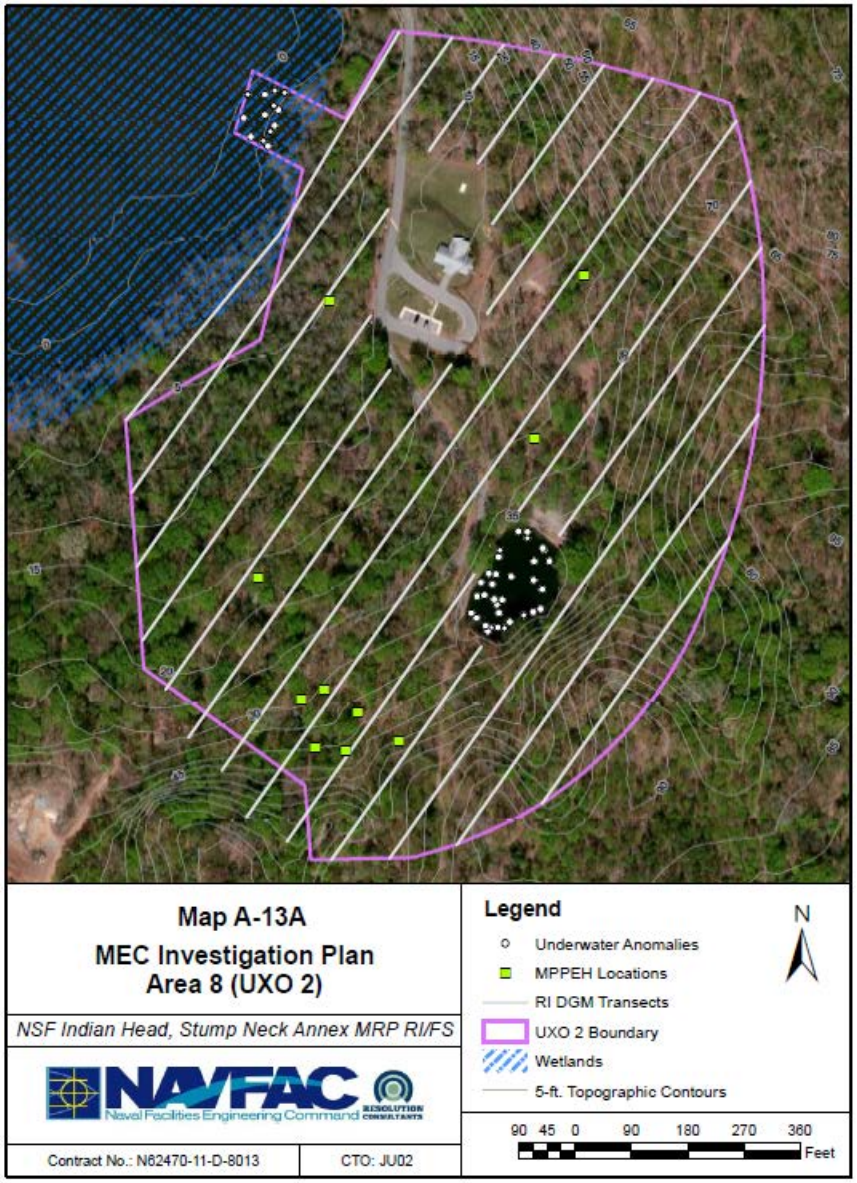
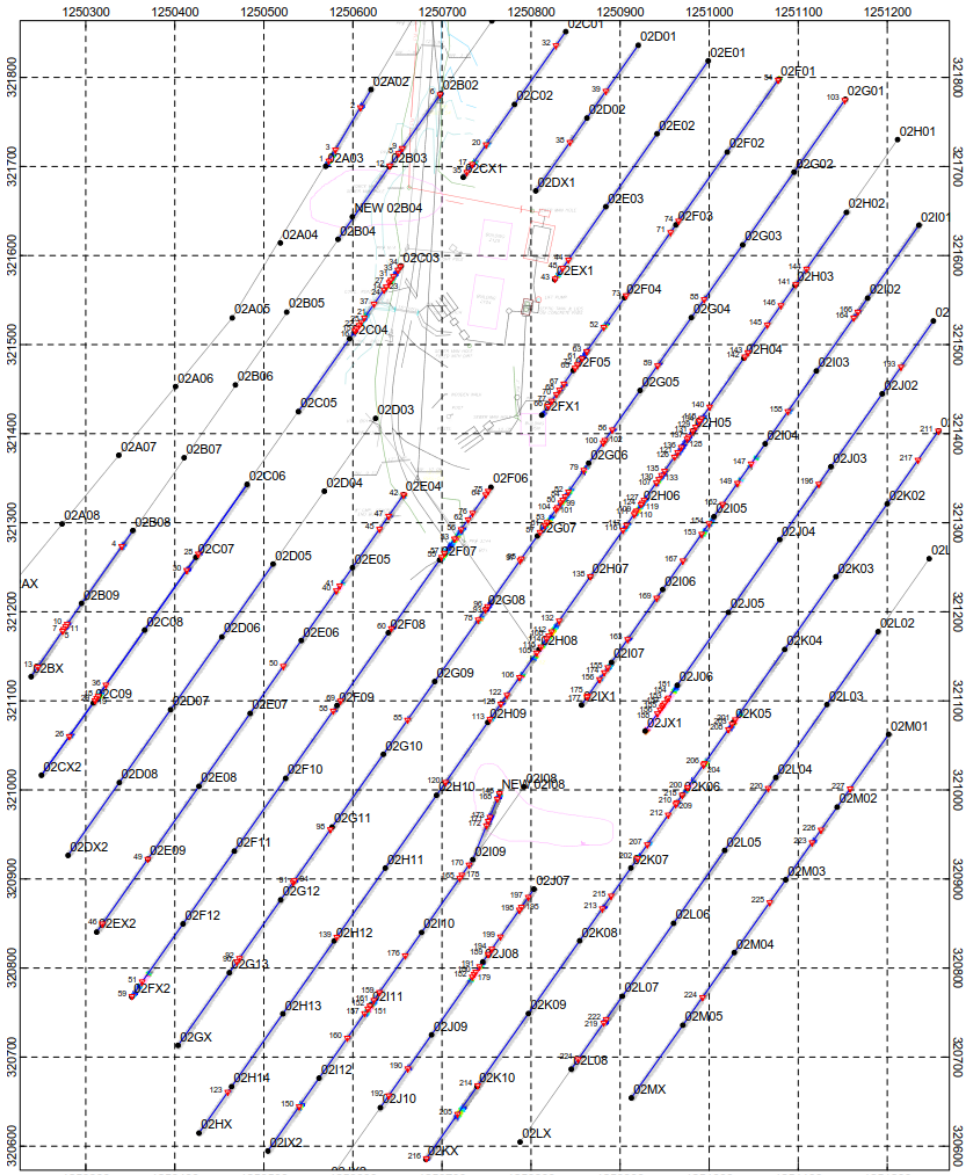
MEC RI Approach – Area 8 (UXO 2)

- RI Goal:
  - Characterize spatial and vertical distribution and nature of hazardous munitions items
  - Characterize nature of underwater anomalies in pond and creek
- RI Approach:
  - Land-based DGM on statistical transect design
  - Removal of underwater anomalies via magnet



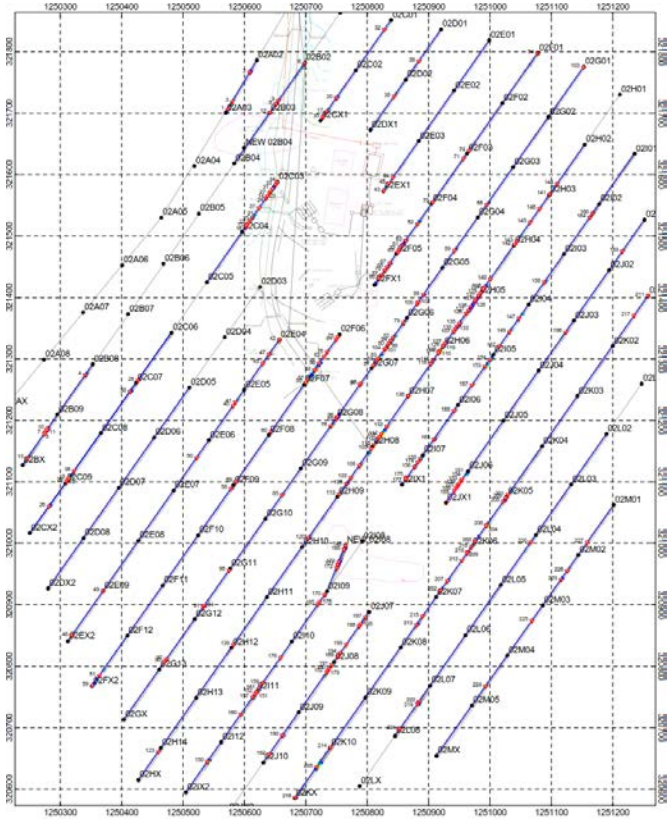
Preliminary MEC RI Results – UXO 2



RESOLUTION CONSULTANTS

Preliminary MEC RI Results – UXO 2

- RI Results:
  - DGM survey resulted in 227 identified anomalies requiring investigation
  - Nine munitions-related debris items encountered
  - Items included:
    - Mine components/parts
    - Torpedo warhead, empty
    - Projectile parts
    - Fragment
    - 57mm AP projectile
  - No items contained explosive hazards
  - 93% of targets were cultural debris (i.e., not munitions-related)



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Preliminary MEC RI Results – UXO 2

U.S. Navy

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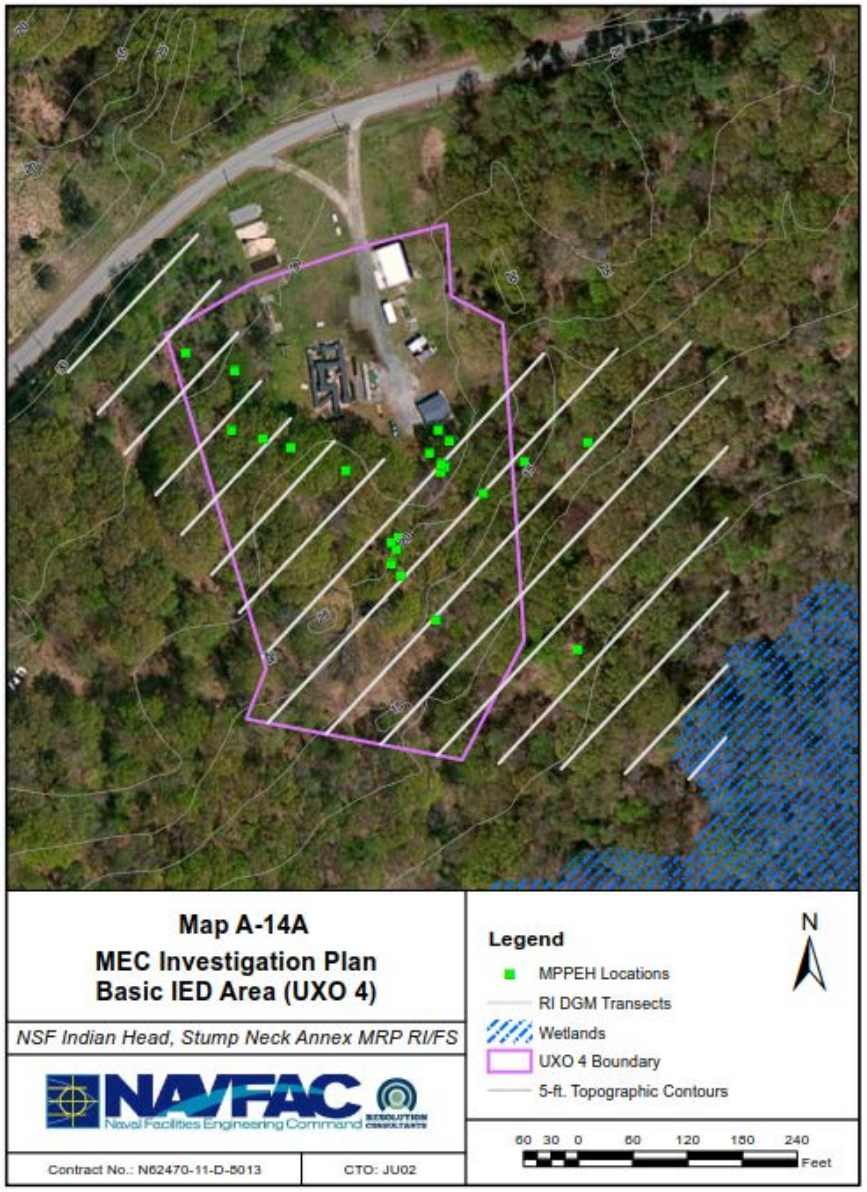
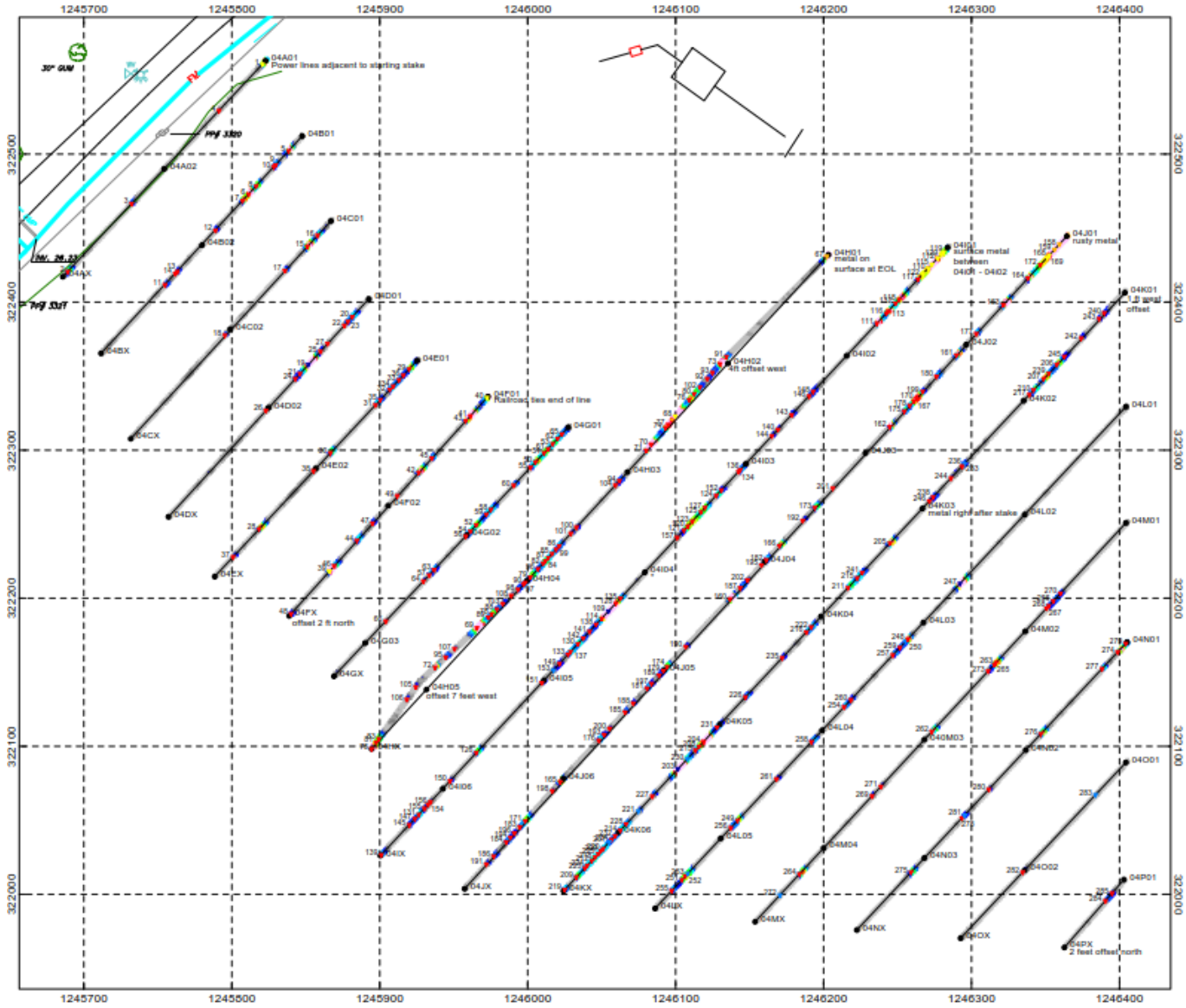
MEC RI Approach – Basic IED Area (UXO 4)

- RI Goal:
  - Characterize spatial and vertical distribution of hazardous munitions items
- RI Approach:
  - DGM on statistical transect design



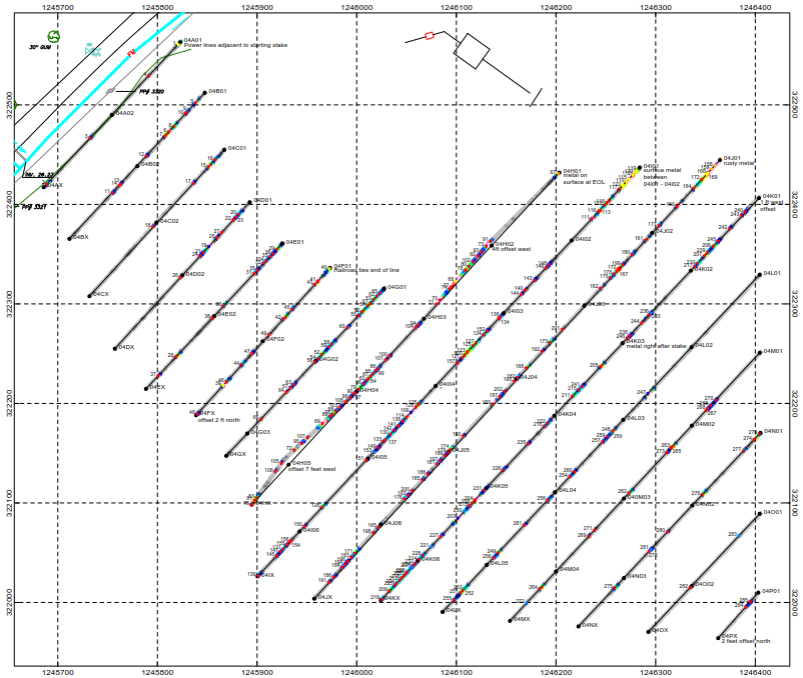
Preliminary MEC RI Results – UXO 4



RESOLUTION CONSULTANTS

Preliminary MEC RI Results – UXO 4

- RI Results:
  - DGM survey resulted in 285 identified anomalies requiring investigation
  - 35 munitions-related debris items encountered
  - Items included:
    - Practice mines/mine components
    - 75mm projectiles, shrapnel (empty)
    - Fuzes
    - 500lb Bomb (empty)
    - 2.75in Rocket fins
    - Practice grenade
    - 60mm & 81mm Mortars (empty)
  - No items contained explosive hazards
  - 84% of targets were cultural debris (i.e., not munitions-related)



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Preliminary MEC RI Results – UXO 4

All Photos by U.S. Navy

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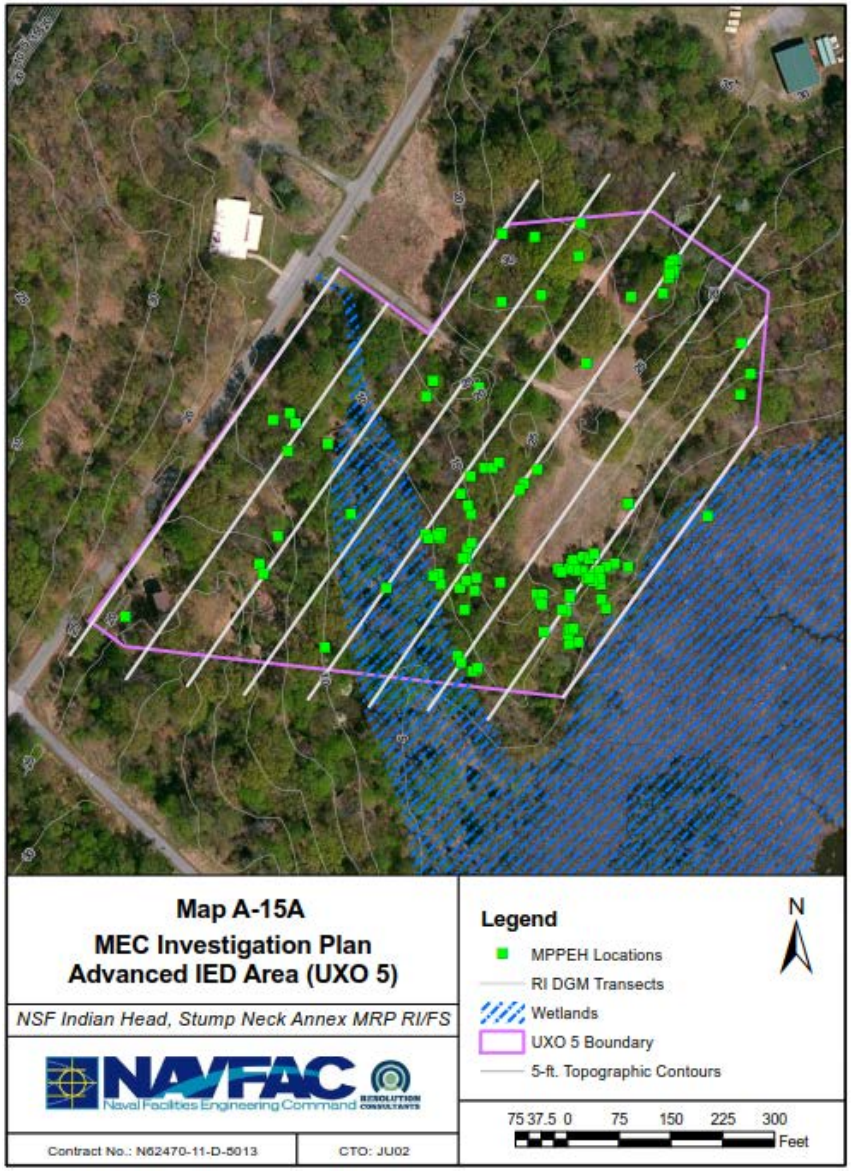
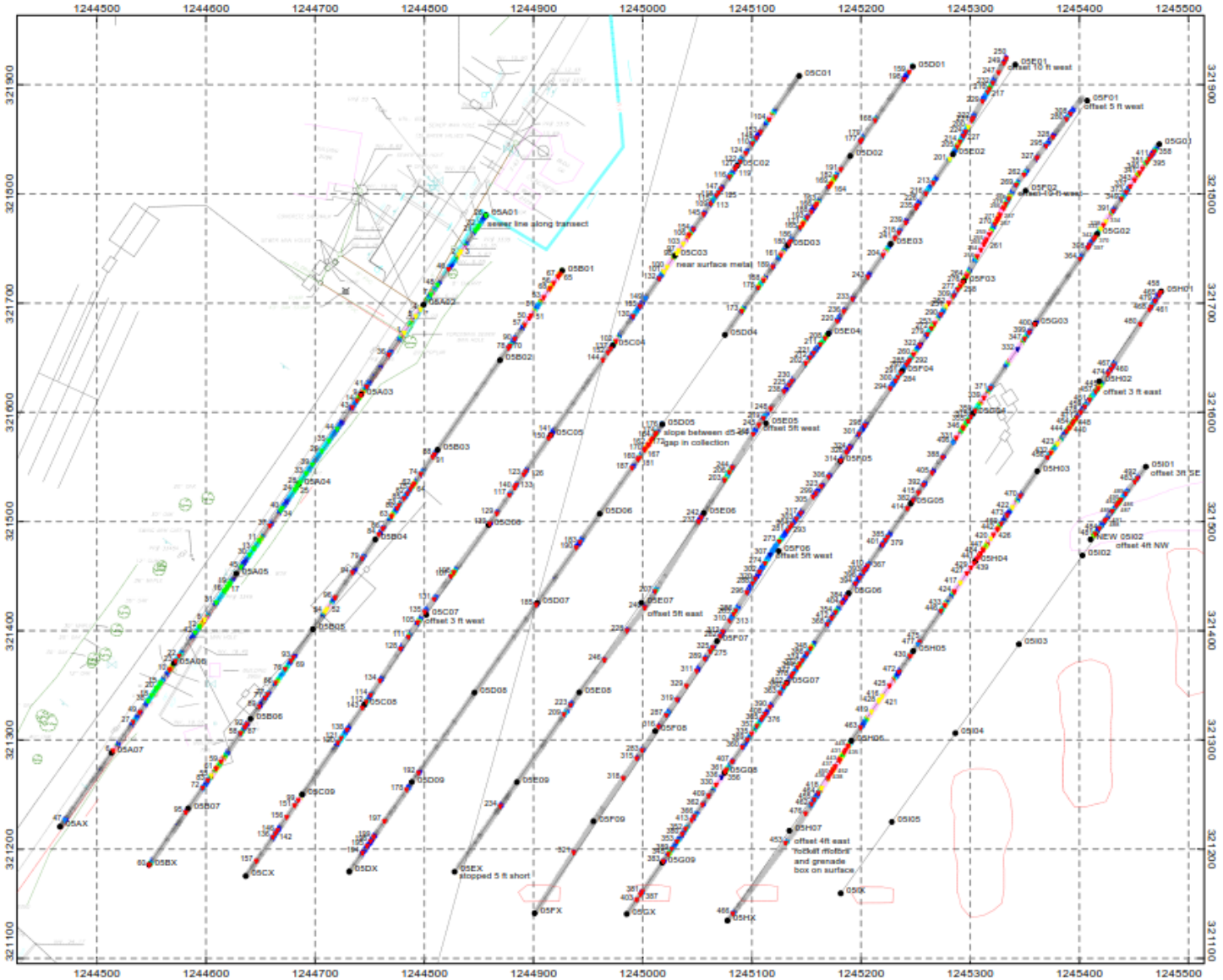
MEC RI Approach – Advanced IED Area (UXO 5)

- RI Goal:
  - Characterize spatial and vertical distribution of hazardous munitions items
- RI Approach:
  - DGM on statistical transect design



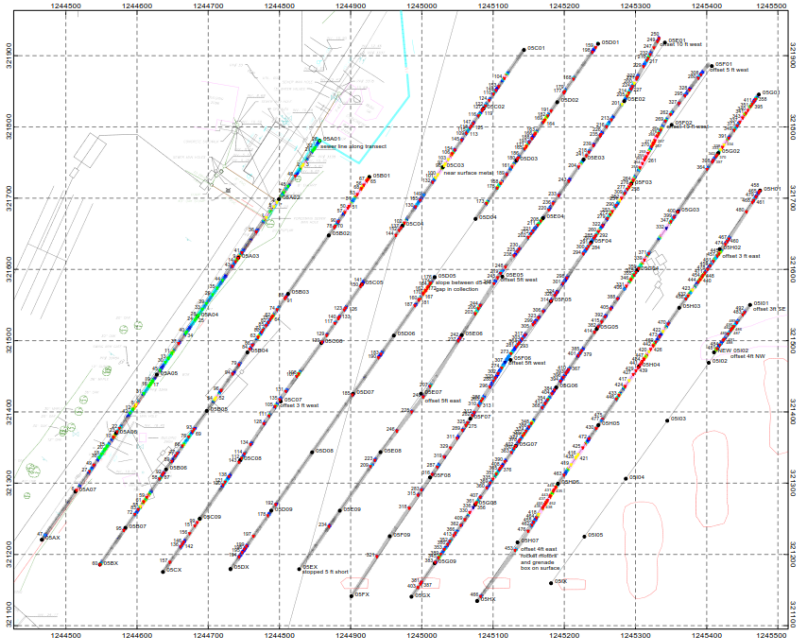
Preliminary MEC RI Results – UXO 5



RESOLUTION CONSULTANTS

Preliminary MEC RI Results – UXO 5

- RI Results:
  - DGM survey resulted in 492 identified anomalies requiring investigation
  - 169 munitions-related debris items encountered
  - Items included:
    - Fuzes/fuze parts (mostly M100)
    - 5in Rocket warhead (inert)
    - 2.75in Rocket motor component
    - 20lb Bombs (empty)/bomb parts
    - 100lb Bomb (inert)
    - BDUs 28 (inert)
    - BLUs 7 (inert)
    - BLU 36 (inert)
    - CS Smoke canister (inert)
    - 105mm projectile (inert)
    - 75mm projectile, shrapnel (empty)
    - 20mm cartridge (inert)
    - Practice mine
  - No items contained explosive hazards



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Preliminary MEC RI Results – UXO 5

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MEC RI Approach – UXO 5 Bunker

- RI Goal:
  - Characterize nature of munitions items deposited in bunker
- RI Approach:
  - Remove top of concrete, excavate exposed munitions items, and remove munitions encased in concrete from bunker for inspection

U.S. Navy

U.S. Navy

Preliminary MEC RI Results – UXO 5 Bunker

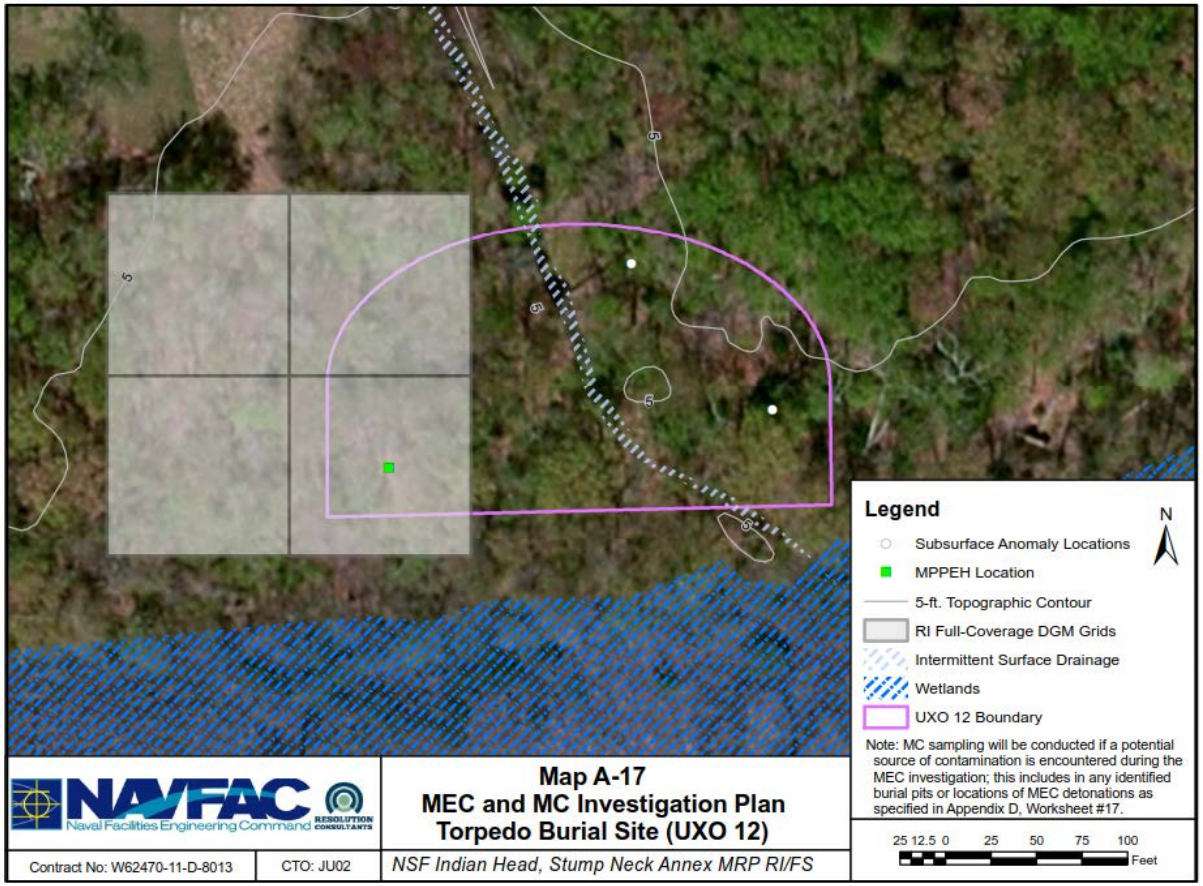
- RI Results:
  - Recovered over 2,000 lbs of munitions debris
  - Items consisted of pieces/parts of munitions and inert ordnance items
  - No items have contained explosive hazards
  - Some items remain encased in concrete

All Photos by U.S. Navy

MEC RI Approach – Torpedo Burial Site (UXO 12)

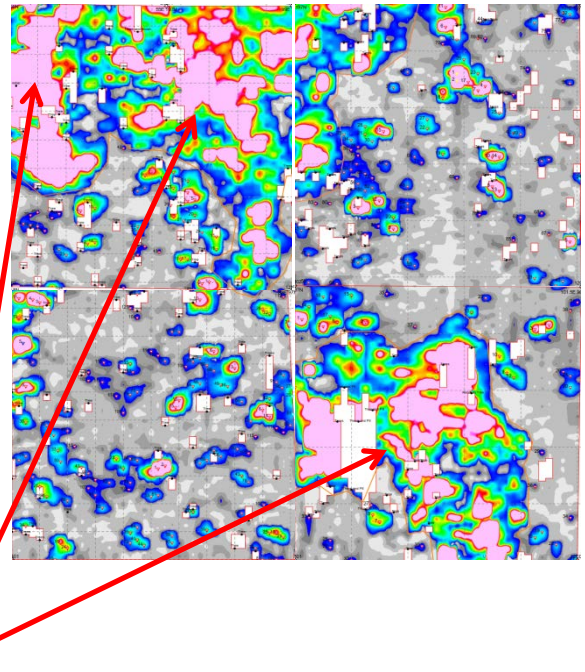
- RI Goal:
  - Identify/characterize munitions items associated with the identified subsurface anomalies
- RI Approach:
  - Full-coverage

    DGM (1 ac)



Preliminary MEC RI Results – UXO 12

- RI Results:
  - DGM identified several potential burial areas
  - Investigation revealed that no burial pits are present
    - Various debris appears to have been deposited on the surface
      - Deepest anomaly was recovered at a depth of 18 inches
    - 99% of anomalies were cultural debris (i.e., not munitions-related)
  - Non-hazardous munitions-related items included:
    - 57mm projectile
    - Igniter
    - Sea mines (empty)



Identified Locations Indicative of Potential Disposal Areas

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Preliminary MEC RI Results – UXO 12

All Photos by
U.S. Navy

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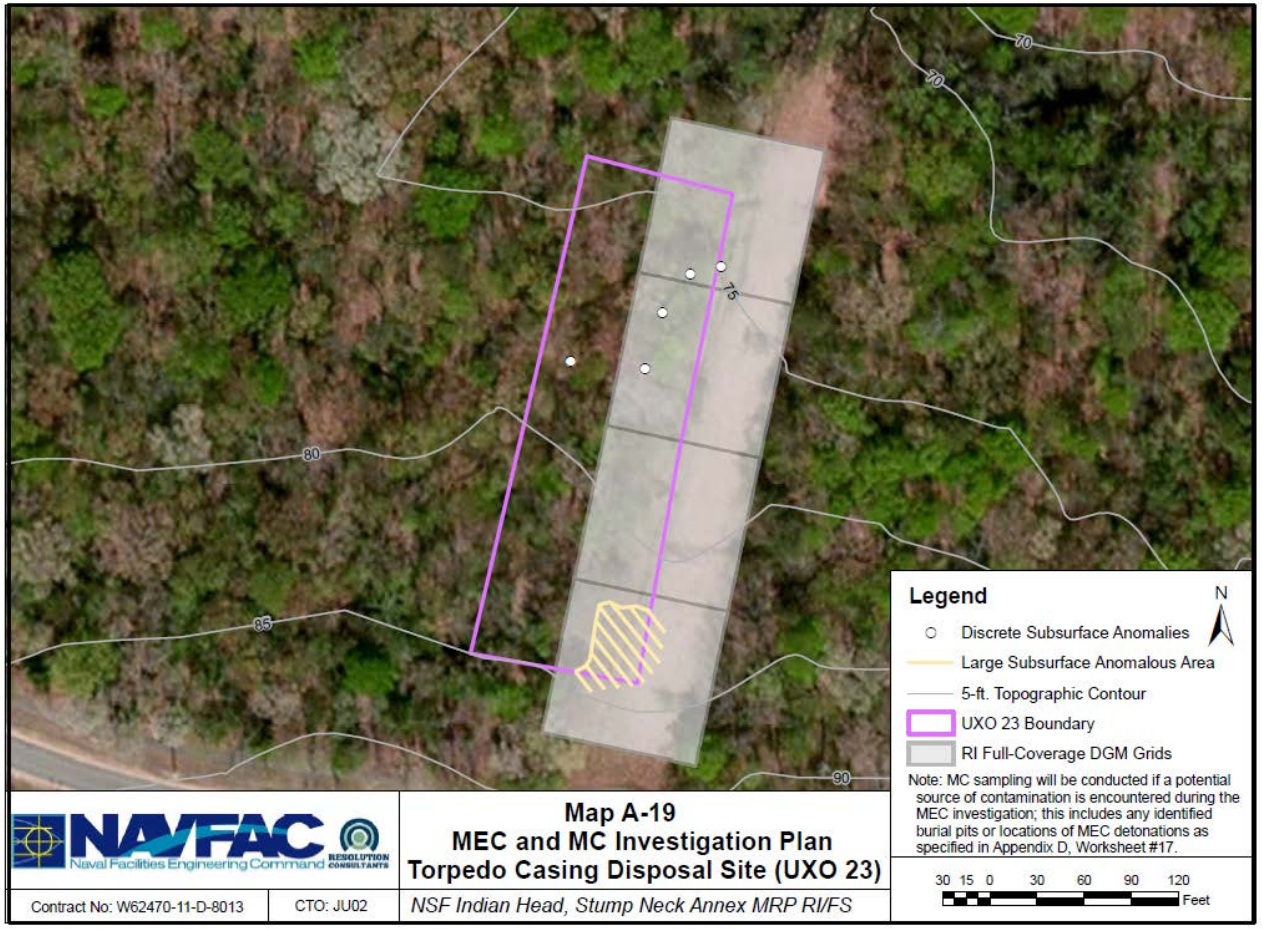
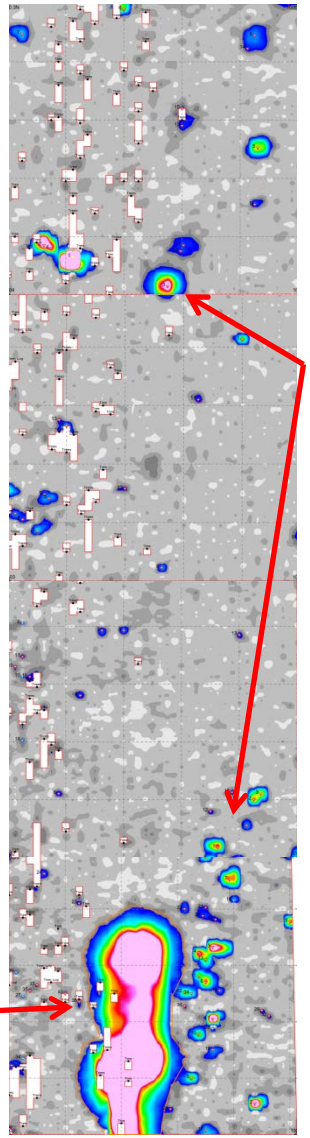
MEC RI Approach – Torpedo Casing Disposal Site (UXO 23)

- RI Goal:
  - Identify/characterize munitions items associated with the identified subsurface anomalies
- RI Approach:
  - Full-coverage DGM (1 ac)



Preliminary MEC RI Results – UXO 23

- RI Results:
  - DGM identified a burial pit and several isolated anomalies
  - Burial pit:
    - Depth exceeds 11 feet
    - Removed numerous large pieces of Naval materiel
      - None contain explosive hazards
    - No torpedo casings identified
  - Isolated anomalies:
    - Included 90mm projectiles and practice bombs
      - None contained explosive hazards



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Preliminary MEC RI Results – UXO 23

All Photos by U.S. Navy

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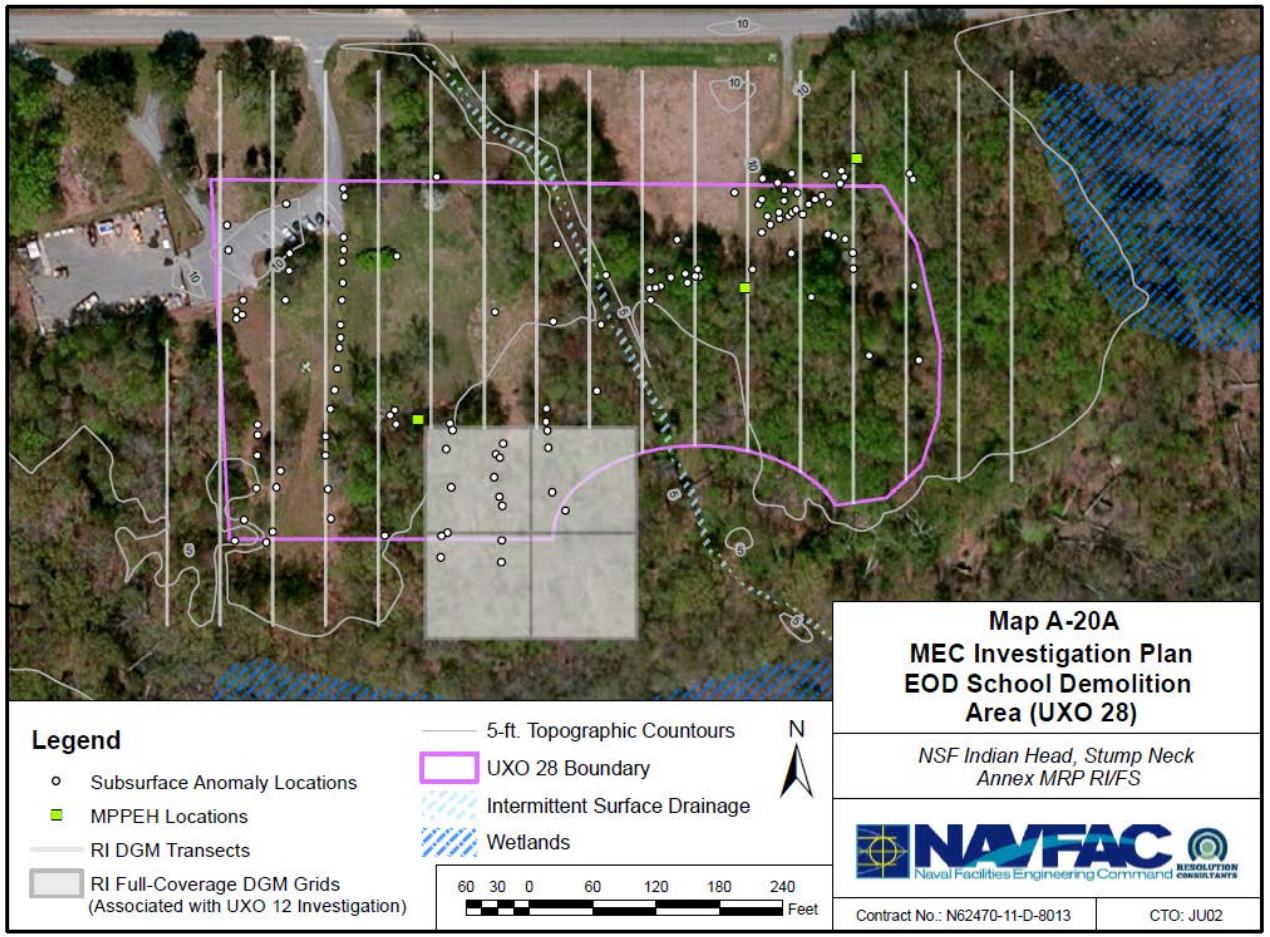
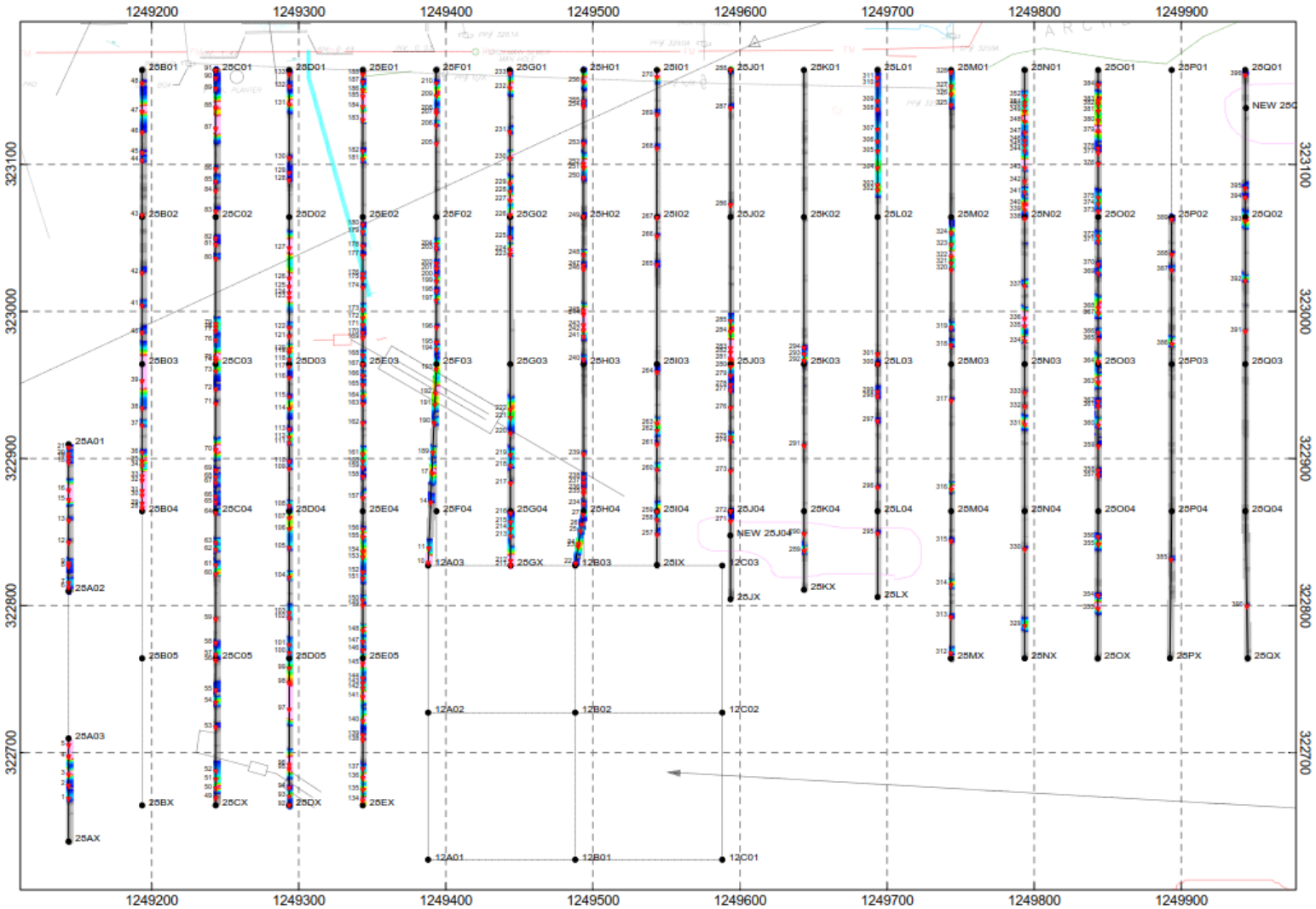
MEC RI Approach – EOD School Demolition Area (UXO 28)

- RI Goal:
  - Characterize spatial and vertical distribution of hazardous munitions items
- RI Approach:
  - DGM on statistical transect design



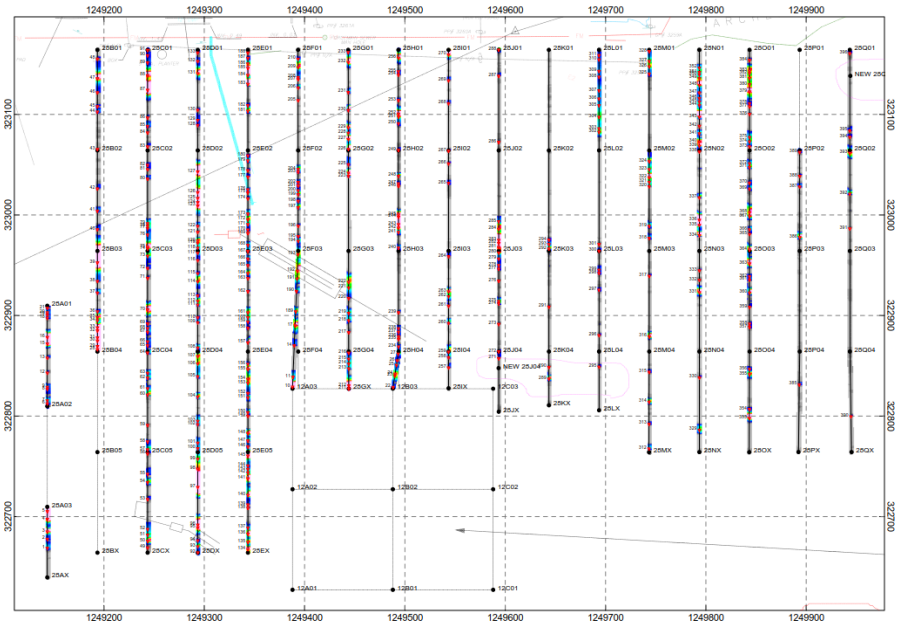
Preliminary MEC RI Results – UXO 28



RESOLUTION CONSULTANTS

Preliminary MEC RI Results – UXO 28

- RI Results:
  - DGM survey resulted in 396 identified anomalies requiring investigation
  - Seven munitions-related debris items encountered
  - Items included:
    - M4 magazine
    - Flares, empty
    - Bomb fuze, British
    - Projectile base, 57mm
    - Fuze pieces/parts
  - No items contained explosive hazards
  - 68% of targets were identified as ‘scrap metal’



RESOLUTION CONSULTANTS

Preliminary MEC RI Results – UXO 28

U.S. Navy

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Demolition Event

- Demolition conducted on 27 September to perforate non-hazardous munitions items prior to sending them to the processing facility
  - Ensured processing facility's workers can readily identify the items as non-hazardous
  - Items perforated with commercial explosives
  - Post-detonation soil samples were collected from the trench

All Photos by U.S. Navy

Questions/Discussion

RESOLUTION CONSULTANTS

IR 17- Disposed Metal Parts Along Shoreline
ESTCP Pilot Test Update

Presented By
Andrew Louder-IR/MRP Manager
Naval Facilities Engineering Command (NAVFAC)
Washington

10/19/2017

Presentation Objectives

Objective:

- Discuss upcoming pilot study of the North Plume at IR Site 17 at Naval Support Facility, Indian Head, MD
  - Background of IR 17
  - Pilot Study Technology
  - Preliminary Results

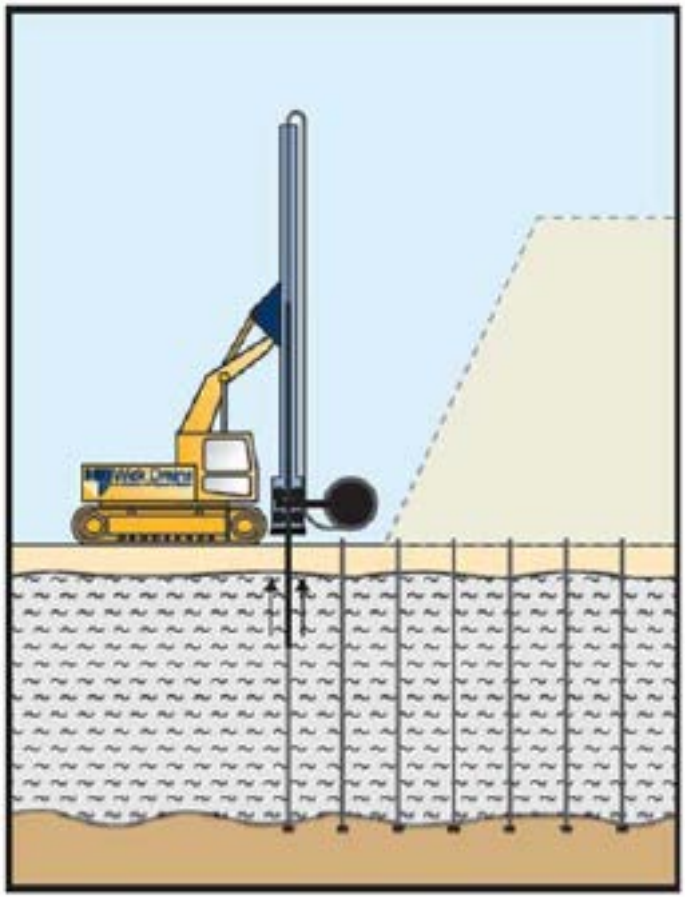
IR Site 17-Disposed Metal Parts Along Shoreline

IR Site 17-Background

- 1,000-ft stretch of shoreline located along the Mattawoman Creek in Indian Head, Maryland
- From the 1960s until the early 1980s, metals parts were discarded at the site, including shipping containers, empty drums, and motor casings
- Site 17 consists of two shallow groundwater plumes (North and South Plumes) with concentrations of TCE, *cis*-1,2-dichloroethene (*cis*-1,2-DCE), and vinyl chloride (VC) above respective MCLs
- In 2012, in-situ chemical reduction via soil mixing was performed at the south plume. To date, no remedial activities have been performed at the North Plume, which is the focus of the Pilot Study.

IR Site 17-Technology

- Installing closely-spaced (2-3 ft.) vertical conduits to shorten contaminant diffusion pathways in low permeability zones
- Improvement of delivery methods
- Creation of hundreds of vertical reaction zones to degrade Chlorinated Volatile organic compounds (CVOCs)
- Zero Valent Iron (ZVI) amendment has been shown to promote effective degradation of CVOCs in groundwater



Field Demonstration

- Install reaction columns on 2-ft by 2-ft centers in ~2,500 ft^2 treatment area, to a total depth of 30 ft
- ZVI and sand are batch-mixed on site and pumped to the stitcher for delivery into the subsurface
- Electrical resistivity imaging will verify emplacement of ZVI and track any changes in CVOC distribution
- Groundwater and soil vapor sampling from select reaction columns to quantify CVOCs and abiotic degradation products.

IR Site 17-The “Bomber” Method

- The “Bomber” is a soil stabilization technology that delivers cement grout into subsurface voids
- Specialized equipment quickly injects grout into fill or natural soil via a direct push technique

100+ installs per day	**X**
Close spacing (2-3 ft)	**X**
Depths > 50 ft	**X**
Low costs (< $1 per foot)	**X**

IR Site 17-**The "Bomber" Method**

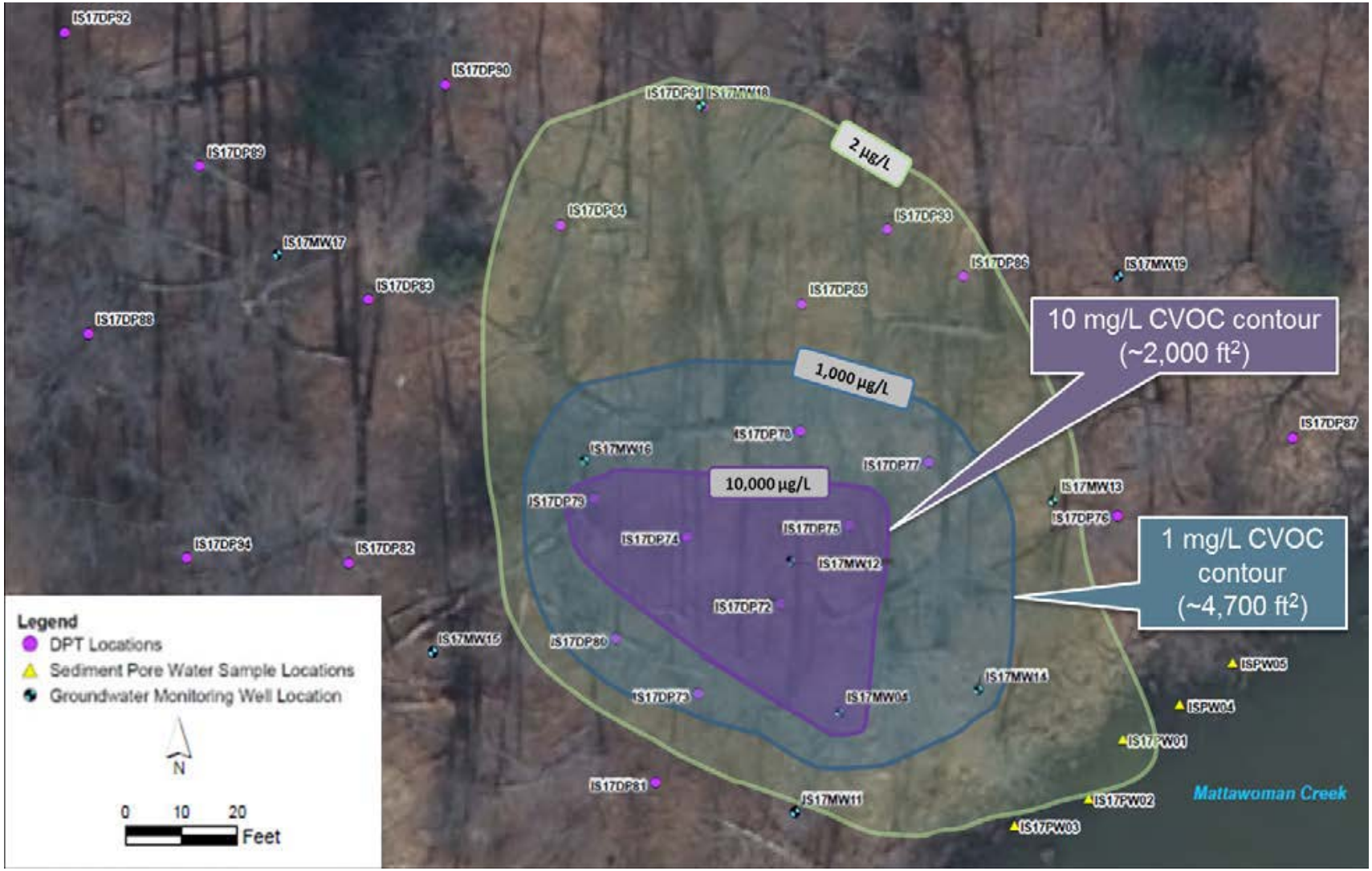
How does it work?

Batch-mix amendment ingredients in Elkin Mixer

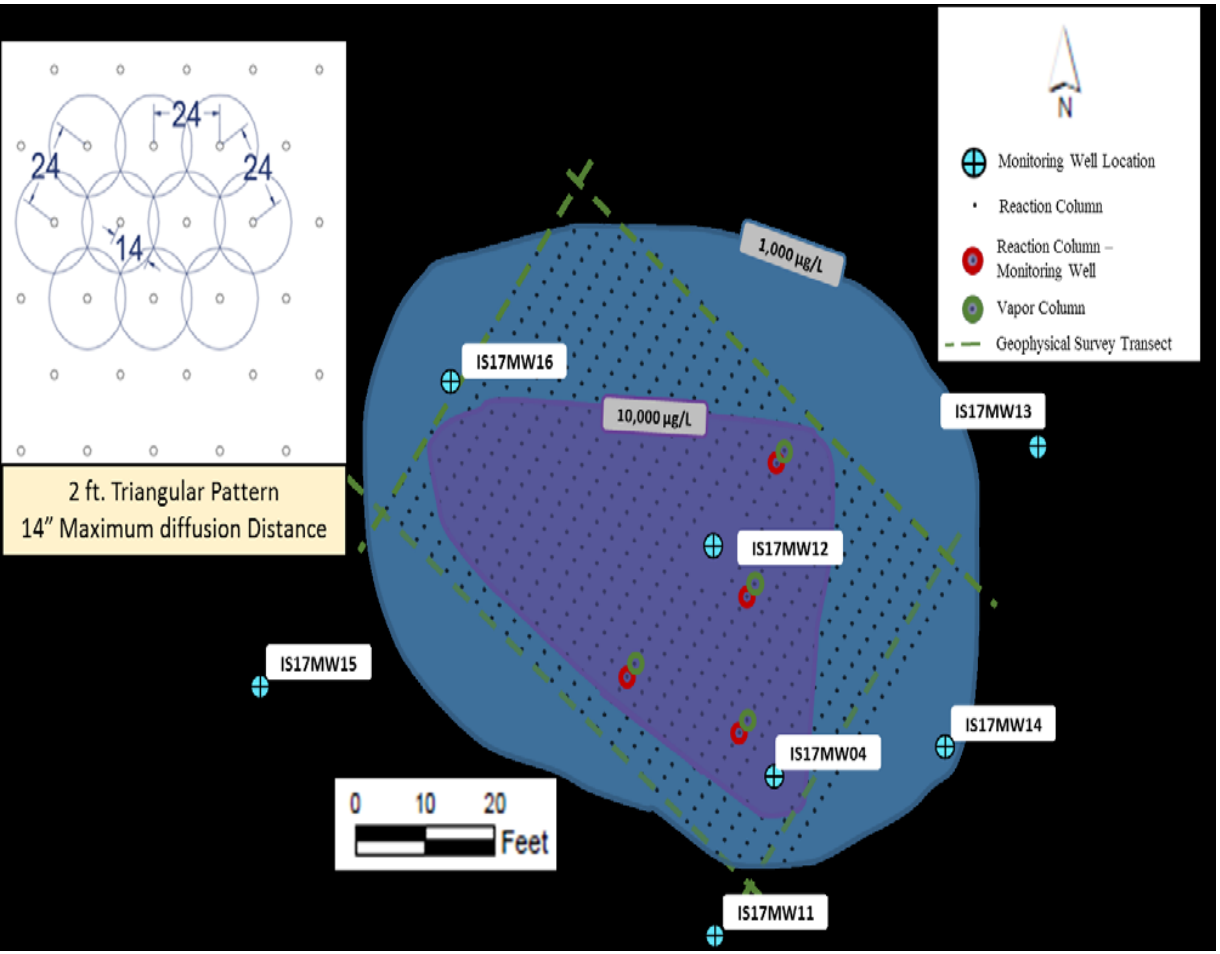
Deliver amendment into hopper and displacement pump

Pump amendment up mast and into mandrel for injection

IR Site 17-North Plume

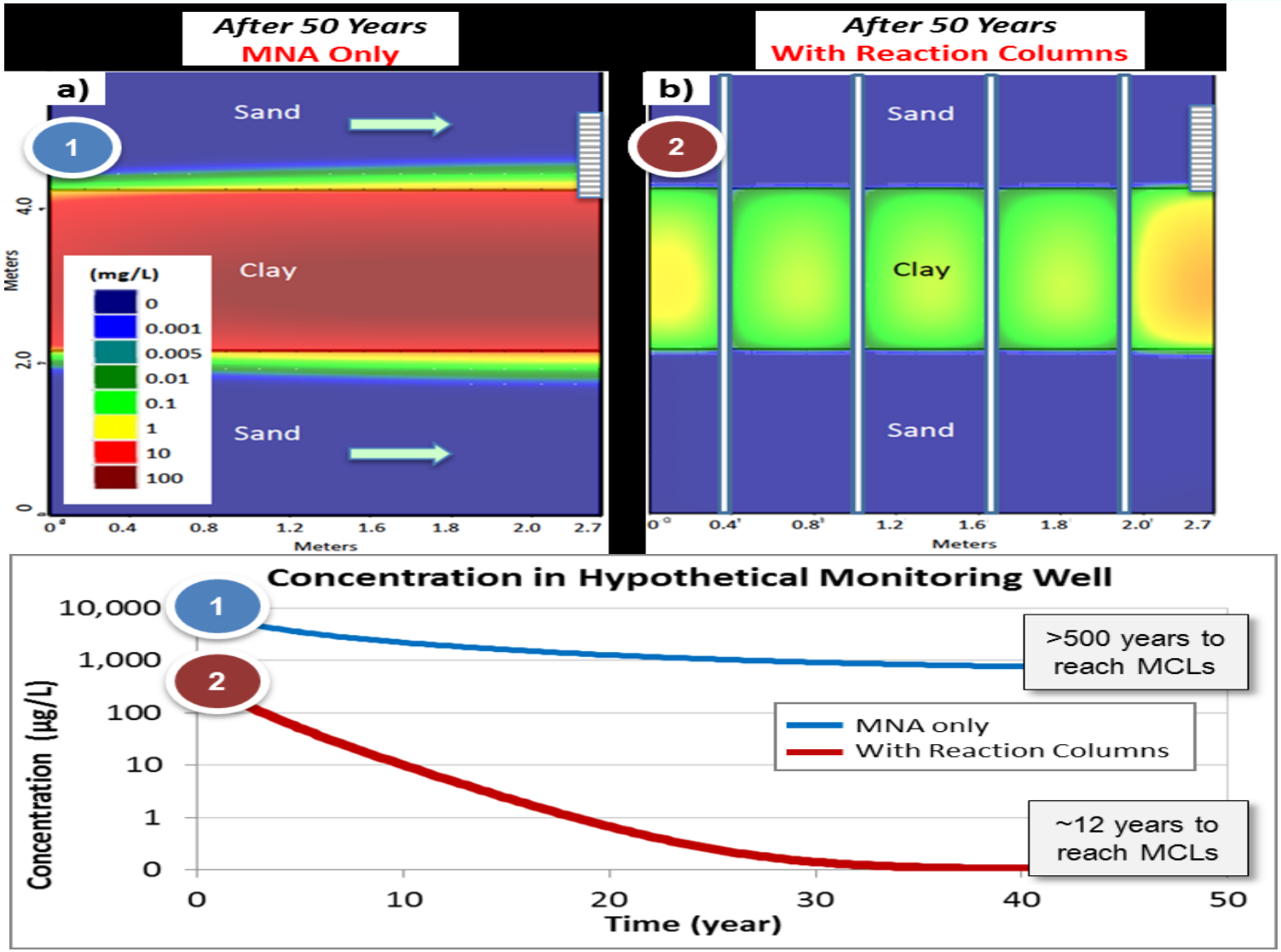


IR Site 17-North Plume



- **Install ~700 reaction columns to depth of 30 ft bgs using Bomber**
- **100+ holes per day**

IR Site 17-North Plume



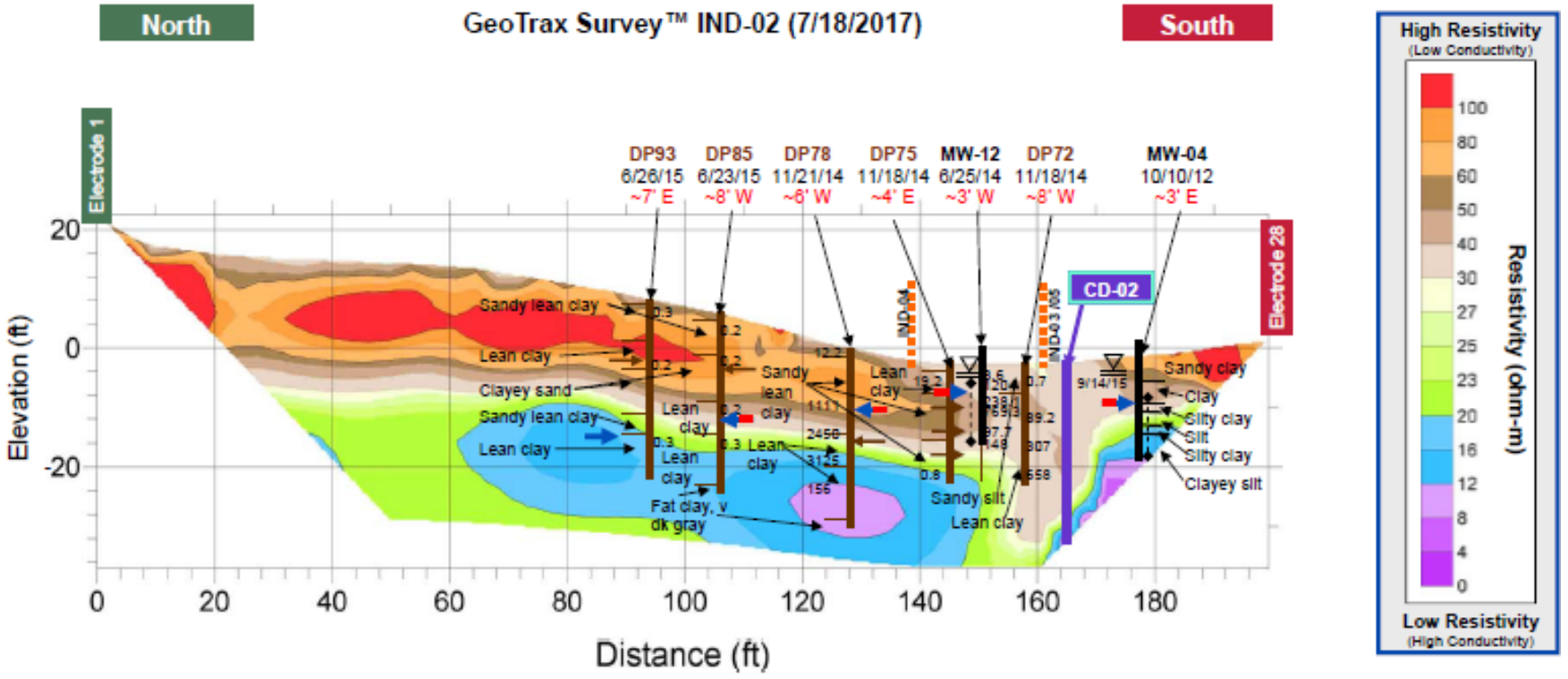
IR Site 17-North Plume

- **Vegetation removal**

Before

After

IR Site 17-North Plume
Preliminary Resistivity Results



IR Site 17-North Plume

Erosion control tubing was placed along the edge of the site to prevent runoff during rain events.

Column Installation

IR Site 17-North Plume

Accomplishments:

- Installed 600 reaction columns over the two weeks (delays due to weather)
- One reaction column installed every 1.5 minutes during operation.
- Installation of Continuous Multilevel Tubing (CMT) sampler within the reaction column to a depth of 25 ft.

Lessons Learned:

- The bomber requires a full day of assembly
- Hose clogged at the 90 degree fitting near the top of the mast
- Weather

IR Site 17-North Plume Column Installation

Contacts and Questions

Points of Contact:

- **NAVFAC Washington:** Joseph Rail
- **NAVFAC Washington (Base RPM):** Andrew Louder

Questions ?

IR Site 43- Toluene Disposal Site

Presented By
Andrew Louder-IR/MRP Manager
Naval Facilities Engineering Command (NAVFAC)
Washington

10/19/2017

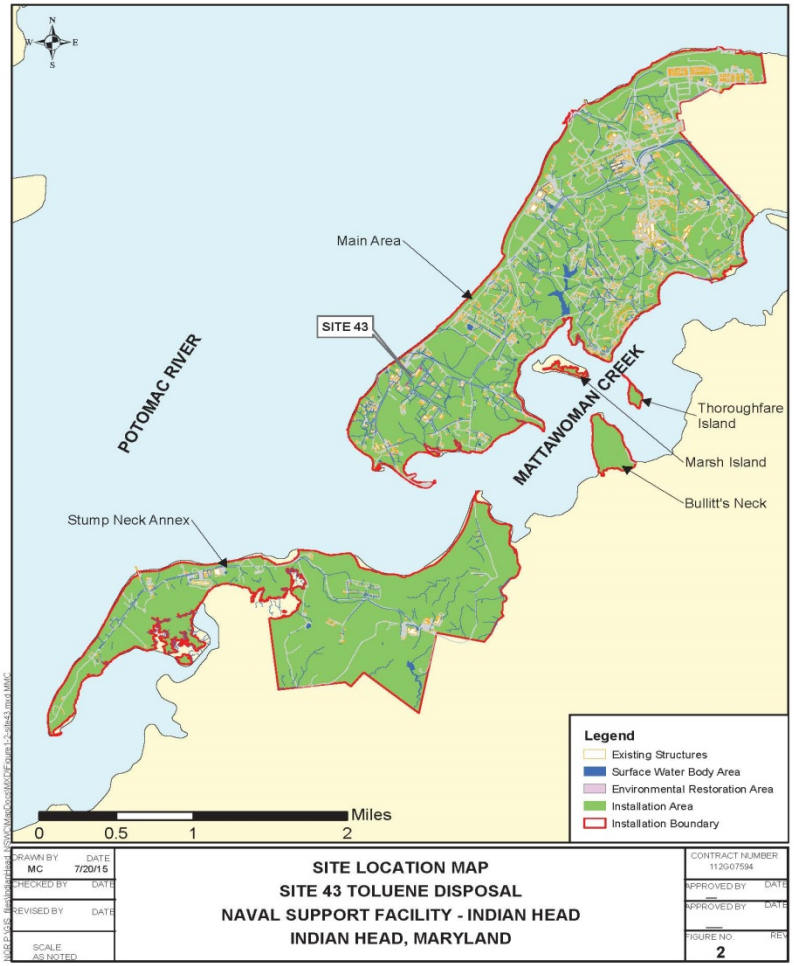
Presentation Objectives

Objective:

- Discuss the results of the Pre-Design investigation
  - Background of IR 43
  - Fieldwork conducted
  - Path Forward

IR Site 43-Toluene Disposal Site

- Site 43 comprises two original study areas separated by approximately 700 feet (ft) along Gallery Road in the southwestern portion of the installation.
- The first study area is near the northern corner of Building 1040 near the intersection of Gallery and Schuyler Roads. The second study area is near a utility pole approximately 30 ft northwest of and across Gallery Road from Building 1041.
- Reportedly, for a period of more than 2 years during mechanical parts-cleaning operations, unknown quantities of spent organic solvents were improperly disposed in the drainage swale outside the door of Building 1040 (acetone), and at the base of the utility pole near Building 1041 (acetone and toluene).
- Contaminants present in the waste could have migrated to downstream areas of the drainage swales present at both areas, and/or could have migrated to shallow groundwater.



IR Site 43-Previous Investigations

- A Site Inspection (SI) was performed in 1993 in the Building 1041 area (Ensafe/Allen & Hoshall [E/A&H], 1994).

- 2005 conducted a Site Screening Process (SSP) to verify the necessity of an RI. Prior to the SSP, no
- environmental sampling had been conducted at the site.

- Based on the original and supplemental SSP investigations at Site 43 (Tt, 2009b), the Navy concluded that prior activities resulted in the release of hazardous substances or other potentially hazardous constituents at concentrations of potential environmental concern.

- A multi-phase-RI was performed from 2011 to 2013 to characterize the nature and extent of contamination, perform a baseline human health risk assessment (HHRA) (including the potential for vapor intrusion [VI]), and help determine remedial action requirements at Site 43.

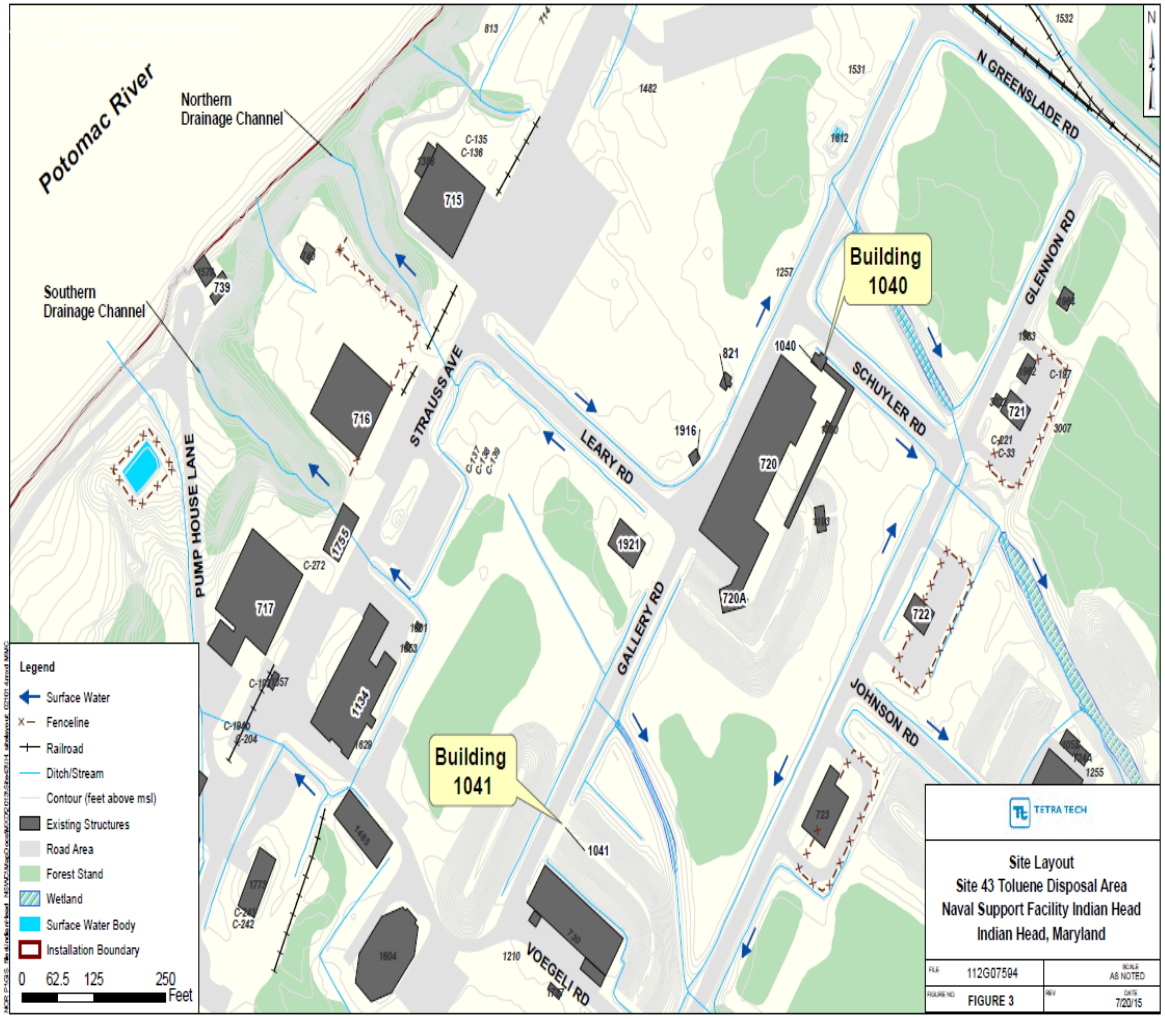
- Investigation of potential soil source areas of TCE; delineation of a volatile organic compound (VOC) groundwater plume; evaluation of the potential for VI into buildings; and determination of human health risks from exposure to VOCs and metals in groundwater.

- The soil source area for TCE groundwater contamination was identified along the ditch at the south side of Schuyler Road. VOCs and metals were evaluated as Chemicals of Potential Concern (COPCs) in the HHRA.

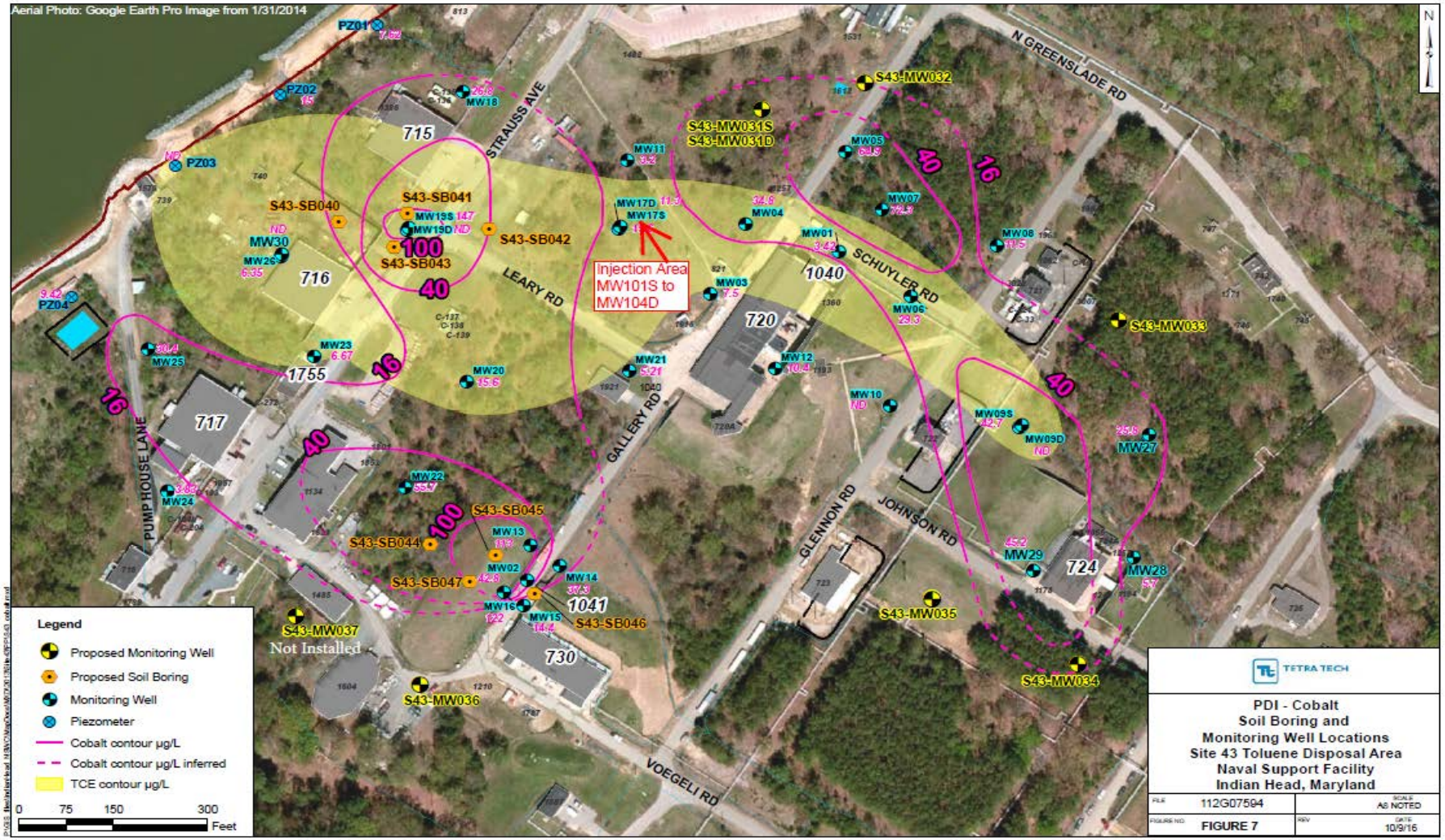
- Based on the conclusions of the RI, metals (arsenic, cobalt, and iron) and VOCs (TCE, cis-1,2-dichloroethene [DCE], and vinyl chloride [VC]) were retained as COCs for site groundwater because of risks identified for the hypothetical future child and adult residents and the current/ future construction worker. The FS further evaluated these COCs, and identified the three VOCs and cobalt as the groundwater COCs to be addressed by a remedial action.

IR Site 43-PDI Fieldwork

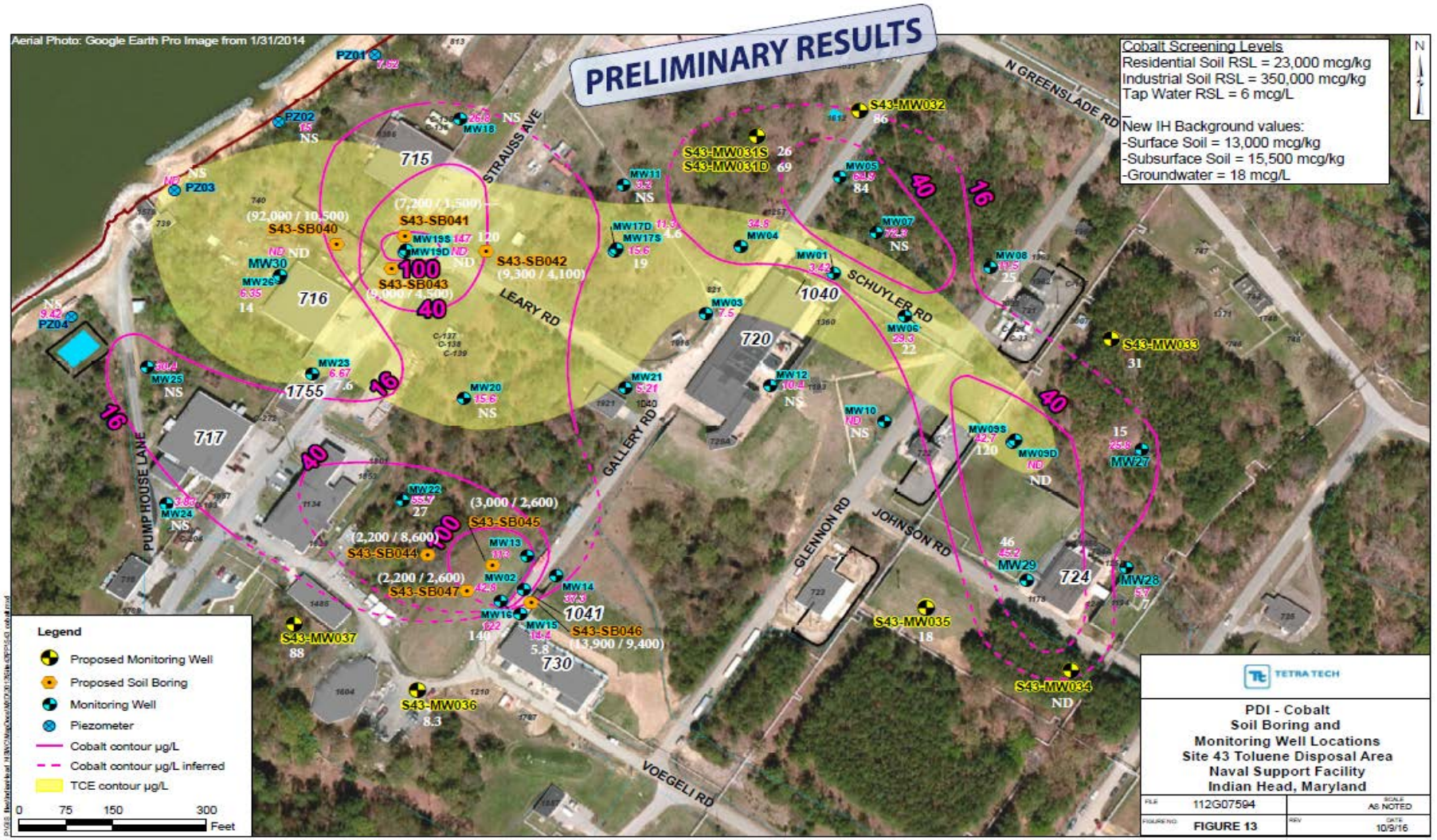
- Further delineate TCE concentrations in soil greater than the site-specific Preliminary Remediation Goal (PRG) of 300 micrograms per kilogram (µg/kg) in order to support the remedial design.
- Evaluate geotechnical conditions to support the remedial design in the source area by obtaining physical soil data near the large blast wall and Building 1040.
- Determine whether VI is a current concern at Buildings 715, 717, and 721, and whether active or passive mitigation should be required as a part of the remedy at Site 43.
- Investigate potential soil sources of cobalt, adequately delineate cobalt concentrations above background (39.6 µg/L) in groundwater, and conclude if cobalt is a site-related contaminant.
- Determine the maximum radial distribution for injections in the surficial aquifer and the effective mobile porosity of organic substrate to be injected in order to support the remedial design.



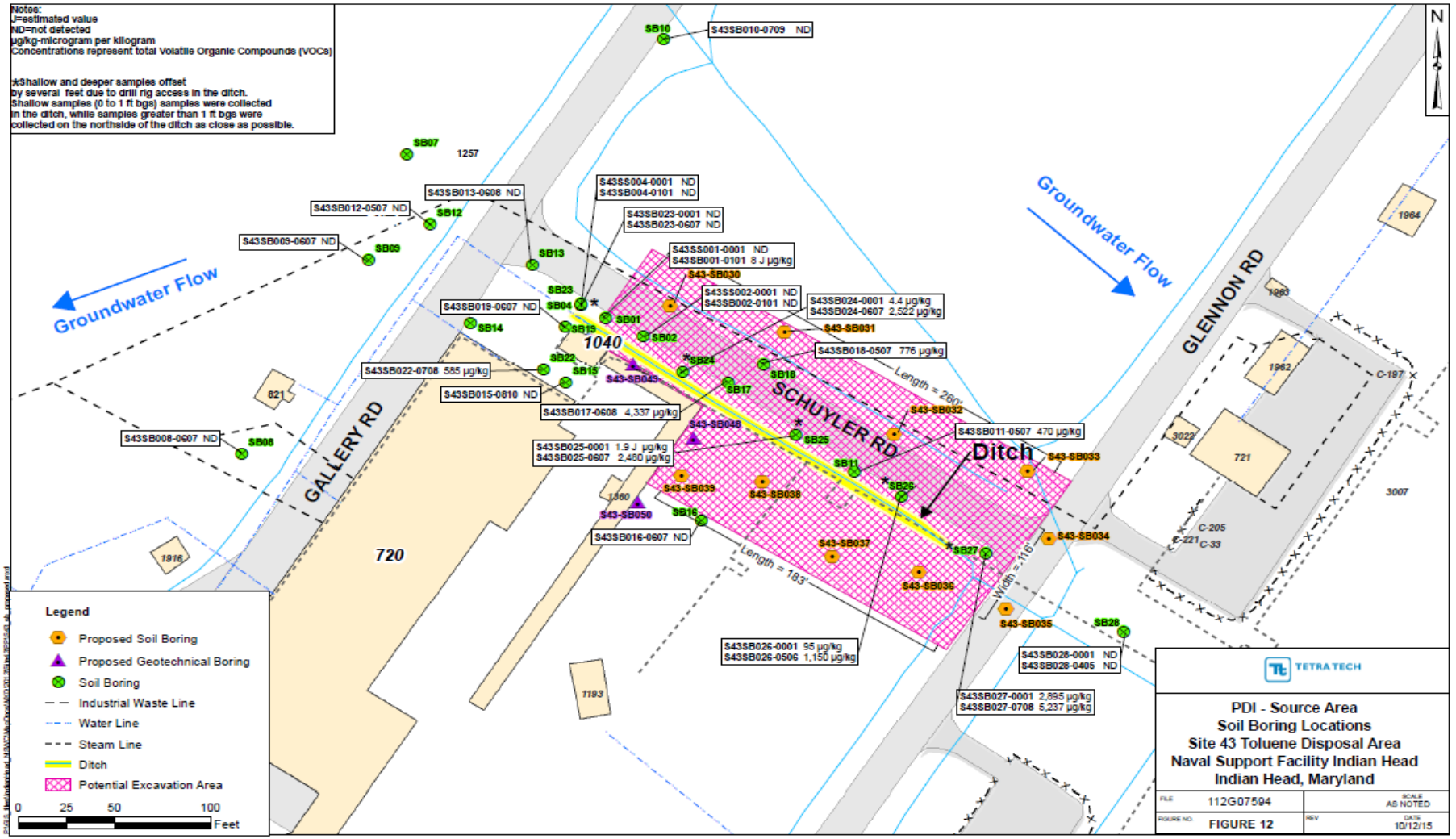
IR Site 43-Well Installation



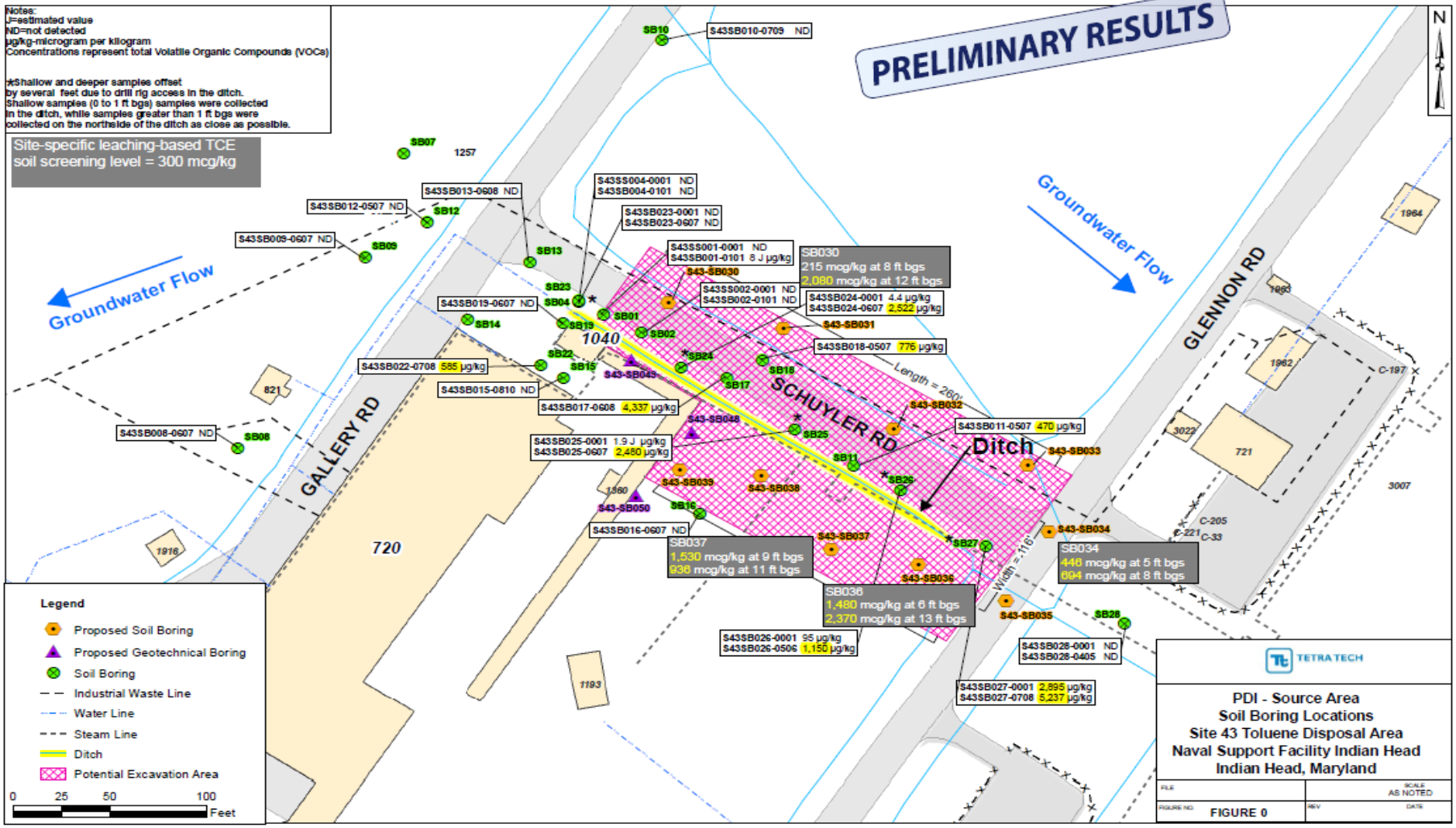
IR Site 43- GW Preliminary Results



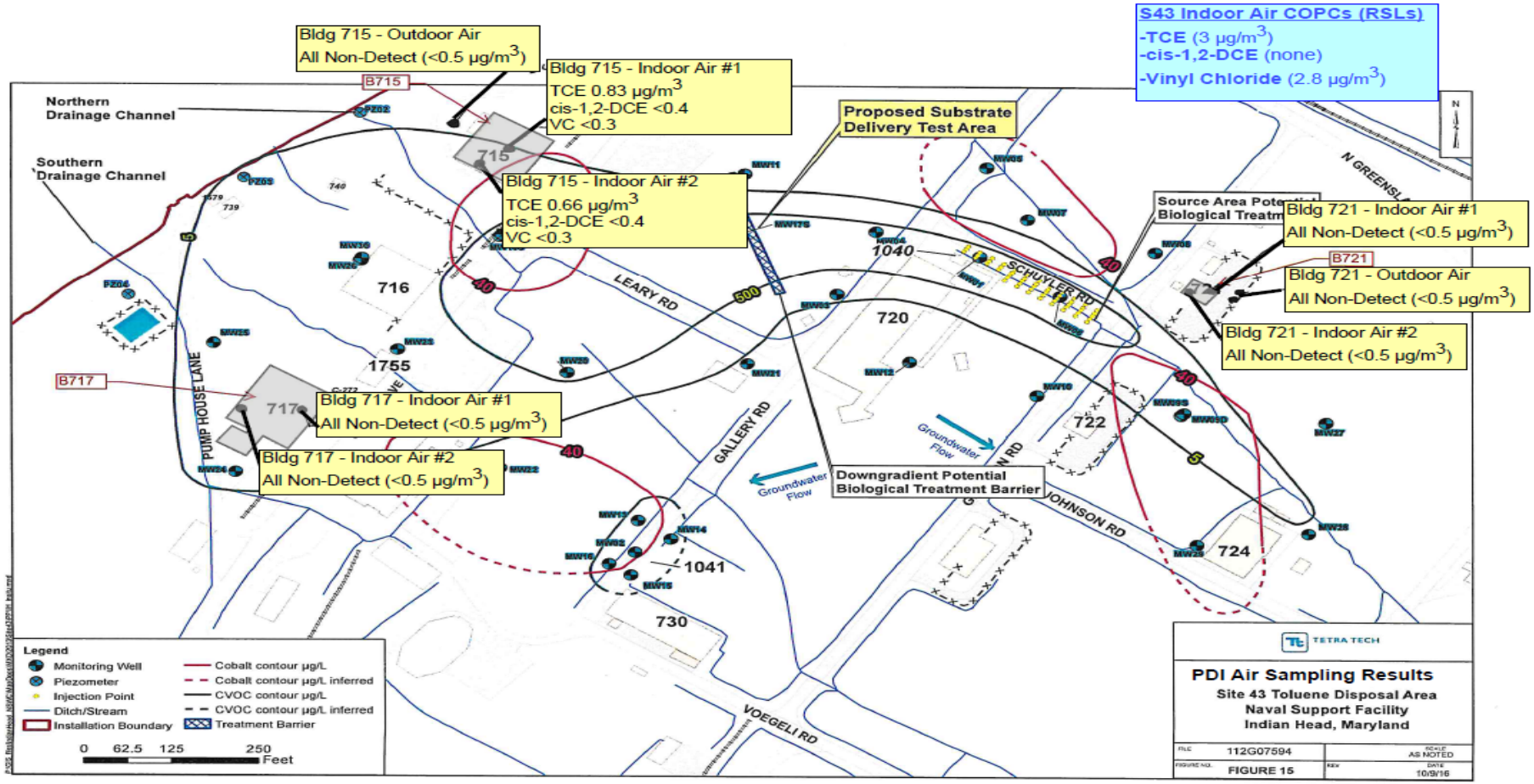
IR Site 43-Soil Sample Locations



IR Site 43- Preliminary Soil Sample Results



IR Site 43- Air Sample Results



IR Site 43- Air Sample Results

Site 43 Air Sampling Results (June 2017)
Pre-Design Investigation
NSF Indian Head, Maryland

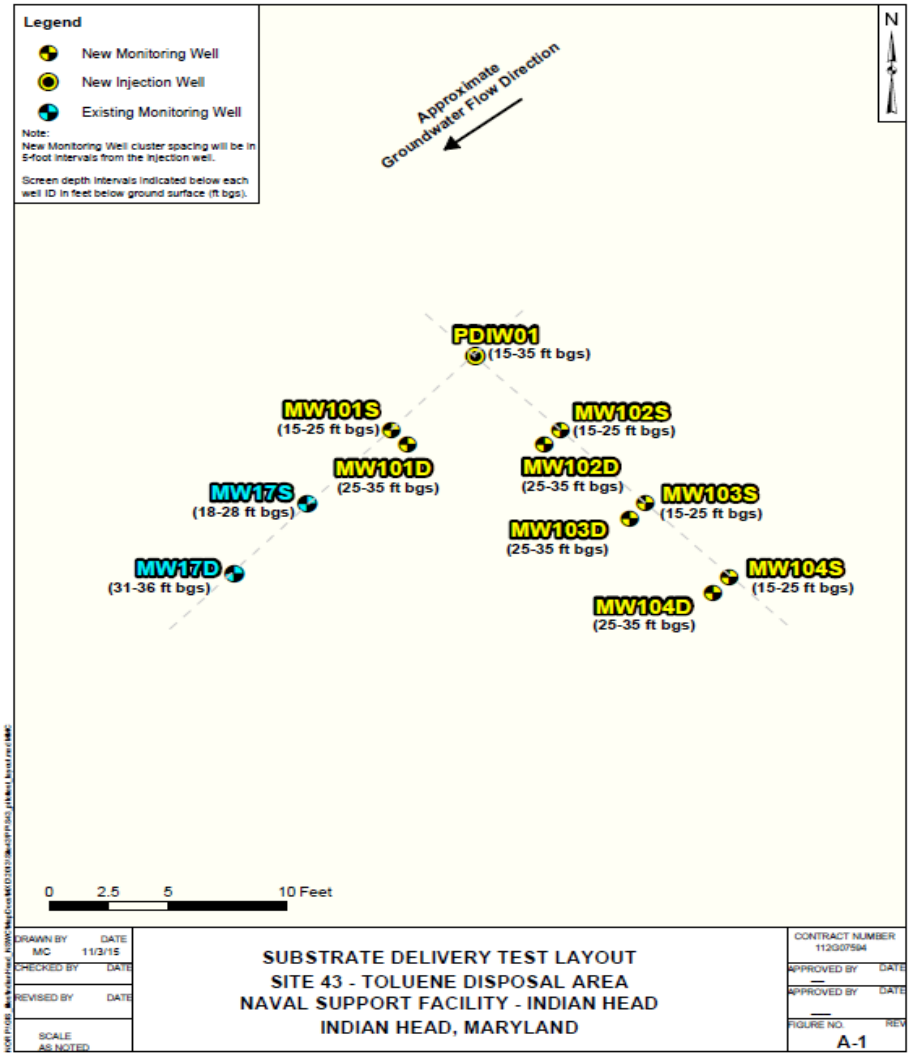
Location / Building	Industrial RSL ($\mu g/m^3$)	Building 715				Building 717		Building 721			
Indoor / Outdoor		Outdoor Air	Indoor Air			Indoor Air		Outdoor Air		Indoor Air	
Description			No. 1	No. 2		No. 1	No. 2			No. 1	No. 2
Sample ID		S43-715-ODA01-061417	S43-715-IND01-061417	S43-715-IND02-061417	S43-715-IND02P-061417 *(duplicate)*	S43-717-IND01-061417	S43-717-IND02-061417	S43-721ODA01-061417	S43-721-ODA01P-061417 *(duplicate)*	S43-721-IND01-061417	S43-721-IND02-061417
Sample Date		6/14/2017	6/14/2017	6/14/2017	6/14/2017	6/14/2017	6/14/2017	6/14/2017	6/14/2017	6/14/2017	6/14/2017
VOCs ($\mu g/m^3$)											
TCE	3	0.50 U	0.83 J	0.66 J	0.64 J	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U
cis-1,2-DCE	none	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U
Vinyl Chloride	2.8	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U

Units are micrograms per cubic meter ($\mu g/m^3$) J - estimated between the MDL and PQL
Detections are bold font. No exceedances of EPA Indoor Air RSLs (no shading). U - value not detected above respective value (PQL)
RSLs based on TCR = 1E-6.
*Note: Indoor Air sample frequency (2 per bldg) was appropriate for each respective building, per field survey/observations and building area/layouts.

IR Site 43- Next Steps

Injection Substrate Distribution Test

- The test will be conducted by injecting sodium bromide and EOS (emulsified soybean oil, lactate, and micronutrients) concentrate/water mixture at PDIW01.
- EOS was chosen for the Site 43 injection due to its demonstrated success and cost-effectiveness in treating chlorinated solvent contamination at Navy and other Department of Defense (DoD) restoration sites (ESTCP, 2008 and 2010).
- EOS also can be used to generate optimal redox conditions to address other potential site Chemicals of Concern (COCs) such as cobalt.
- The electron donor injection will specifically target groundwater within the soils/sediments of the
- shallow, unconfined aquifer. The thickness of the contaminated aquifer in the test area treatment zone
- is approximately 20 feet and extends from below the water table to the top of the underlying basal clay
- aquitard (approximately 15 to 35 feet bgs).



Contacts and Questions

Points of Contact:

- **NAVFAC Washington:** Joseph Rail
- **NAVFAC Washington (Base RPM):** Andrew Louder

Questions ?