FINAL DIGITAL GEOPHYSICAL MAPPING INVESTIGATION REPORT FOR MUNITIONS RESPONSE SITE 2 FIRE TRAINING AREA NWIRP CALVERTON NY

10/17/2013

RESOLUTION CONSULTANTS

DIGITAL GEOPHYSICAL MAPPING INVESTIGATION REPORT
Naval Weapon Industrial Reserve Plant
Calverton, New York
Munitions Response Site 02 – Fire Training Area

FINAL

Prepared for:

Department of the Navy
Naval Facilities Engineering Command, Mid-Atlantic
9742 Maryland Avenue, Bldg. Z-144
Norfolk, VA 23511-3095

Comprehensive Long-Term Environmental Action Navy
Contract Number N62470-11-D-8013

CTO WE32

Prepared by:

Resolution Consultants
A Joint Venture of AECOM & EnSafe
1500 Wells Fargo Building
440 Monticello Avenue
Norfolk, VA 23510

17 October 2013

This page intentionally left blank

Table of Contents

Tables

Figures

Appendices

Executive Summary

The scope of this Contract Task Order (CTO) involved conducting a Digital Geophysical Mapping (DGM) assessment of Naval Weapons Industrial Reserve Plant (NWIRP) Calverton, New York, Munitions Response Site (MRS) 02, Fire Training Area, to determine the spatial extent of subsurface metallic debris contamination beyond the preliminary MRS boundary.

The two primary objectives of the DGM survey were to:

1) Identify areas of concentrated subsurface metallic debris as indicated by an abundant series of high anomalous Electromagnetic Induction (EMI) readings within a localized area; and

2) Determine the areal extent of subsurface metallic debris as indicated by a significant reduction in the aforementioned high anomalous EMI readings.

These objectives were accomplished through implementation of the following field tasks:

1) Mobilizing qualified personnel and equipment to the site;

2) Conducting a Global Positioning System (GPS) site mark-out to identify the boundaries of the investigation area;

3) Preparing the site for DGM investigation by reducing/removing impeding vegetation and non-munitions metallic debris from the surface;

4) Using an EM61-MK2 to conduct 56 transect surveys extending up to 200 feet beyond the seven-acre preliminary MRS boundary;

5) Conducting daily quality control of geophysical data and positioning equipment; and

6) Identifying subsurface anomalies of interest through data processing and analysis.

A total of 294 targets were selected from DGM survey data. Of these 294 targets, five are suspected noise targets, as evidenced by suspect decay patterns of the data. Twenty four targets are suspected to be a result of surface/near surface cultural debris as evidenced by site observations during fieldwork. The remaining 265 targets represent subsurface metallic anomalies, some of which may be 20 millimeter (mm) projectiles. However; further investigation of a portion of the identified targets would be required to accurately define the anomalous sources.

The DGM results indicate a high concentration of anomalies located primarily along the perimeter of the seven-acre selected response area. This anomalous area extends an estimated 3.6 acres beyond the selected response area. For the most part, these anomalous areas correspond with topographic swales and surficial, and in some cases partially buried, metal debris observed during fieldwork.

List of Acronyms and Abbreviations

ASCII	American Standard Code for Information Exchange
AGVIQ-CH2M Hill	AGVIQ/CH2M Hill Constructors, Inc., Joint Venture III
Ch	Channel
CLEAN	Comprehensive Long-Term Environmental Action Navy
cm	Centimeter
CTO	Contract Task Order
DDESB	Department of Defense Explosives Safety Board
DGM	Digital Geophysical Mapping
EODMU12	Explosive Ordnance Disposal Mobile Unit 12
EMI	Electromagnetic Induction
ESS-DR	Explosives Safety Submission-Determination Request
ESTCP	Environmental Security Technology Certification Program
FTP	File Transfer Protocol
GIS	Geographic Information System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
HASP	Health and Safety Plan
Hz	Hertz
ID	Identification
ISO	Industry Standard Object
IVS	Instrument Verification Strip
MEC	Munitions and Explosives of Concern
mm	Millimeter
MPPEH	Material Potentially Presenting and Explosive Hazard
MRS	Munitions Response Site
msl	mean sea level
mV	millivolt
NAD83	North American Datum 1983
NRCS	Natural Resources Conservation Service
NWIRP	Naval Weapon Industrial Reserve Plan
OSHA	Occupational Safety and Health Administration
QC	Quality Control
SNR	Signal-To-Noise Ratio
TP	Technical Paper
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
VSP	Visual Sample Plan

This page intentionally left blank

1.0 INTRODUCTION

1.1 Purpose of Report

This report documents the implemented procedures and corresponding results of a Digital Geophysical Mapping (DGM) investigation conducted at the Naval Weapon Industrial Reserve Plant (NWIRP) Calverton New York, Munitions Response Site (MRS) 02 (Fire Training Area). This work was conducted by Resolution Consultants under Contract Task Order (CTO) WE32, Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N62470-11-D-8013.

1.2 Scope and Objectives

The CTO involved conducting a DGM survey to assess the subsurface of MRS 02 for anomalous regions indicative of metallic debris material. The two primary objectives of the DGM survey were to:

1) Identify areas of concentrated subsurface metallic debris as indicated by an abundant series of high anomalous Electromagnetic Induction (EMI) readings within a localized area; and

2) Determine the areal extent of subsurface metallic debris as indicated by a significant reduction in the aforementioned high anomalous EMI readings.

These objectives were accomplished through implementation of the following scope of work:

1) Mobilizing qualified personnel and equipment to the site;

2) Conducting a site mark-out to identify the boundaries of the investigation area;

3) Preparing the site for investigation by reducing/removing impeding vegetation and non-munitions metallic debris from the surface;

4) Performing 56 DGM transect surveys extending up to 200 feet beyond the previously defined seven-acre preliminary MRS boundary (AGVIQ-CH2M Hill, 2012);

5) Inspecting daily data quality of geophysical sensors and positioning instruments;

6) Identifying subsurface anomalies of interest through DGM data processing and analysis; and

7) Interpreting and reporting the results of the DGM survey.

1.3 Background

1.3.1 Project Location

NWIRP Calverton is located in central portion of Suffolk County, New York, approximately 70 miles east of New York City, NY, and a little over three miles west of Riverhead, NY. The NWIRP Calverton covers approximately 209 acres of the original 6,000-acre facility with the main entrance at the confluence of Grumman Boulevard and Burman Boulevard. The majority of the former facility currently consists of private businesses, primarily the executive airport, directly across the street from Swan Lake Golf Club and just north of McKay Lake. The general location of the facility is shown on Figure A-1 in Appendix A.

1.3.2 Facility History

NWIRP Calverton was used for the development, assembly, and testing of naval combat aircraft until 1996. The aircraft included the Grumman F-14 Tomcat, which used 20mm size aircraft gun systems. NWIRP Calverton contained a firing stop butt area for testing, sighting, and performing static target practice using aircraft firing systems. The aircraft would fire from a static position toward a stop butt located at a distance of approximately 200 feet from the firing position. The stop butt was lined with approximately 50 feet by 50 feet of sand from the floor to approximately 20 feet high within a covered and wood-lined revetment. The butt was reinforced with 12 inches of dense concrete on the floors and the walls.

Facility operations ended in February 1996. As the plant closed and the facilities were decommissioned, the aircraft firing stop butt was abandoned in place. The Phase II Environmental Baseline Survey for NWIRP (C.F. Braun, 1997) indicated the soil backstop had been moved but no documentation was apparent as to where the soil from the backstop had been relocated. In September 1998, the majority of land was transferred to the Town of Riverhead, NY, for redevelopment. The 30.56-acre Former Site 2, Fire Training Area, (depicted on Figure A-1, Appendix A) was not part of the land transfer.

In February 2010 the Navy began delineating petroleum-contaminated soils for a removal action within a 50 feet by 150 feet area of the Fire Training Area. During soil sampling activities, five remnants of 20mm projectiles were encountered on the ground surface at the site. The projectile remnants were encountered within a 30 feet by 30 feet area. In March 2010, personnel from Explosive Ordnance Disposal Mobile Unit 12 (EODMU12) inspected the projectiles and removed them from the site. A seven-acre area surrounding the location where the munitions were encountered was preliminarily designated as NWIRP Calverton MRS 02 - Fire Training Area (see attached Figure A-2, Appendix A).

1.4 MRS 02 – Fire Training Area

1.4.1 Site Description

Location

MRS 02, Fire Training Area, is located along Grumman Boulevard in the south-central portion of NWIRP Calverton (Figure A-2, Appendix A). It encompasses seven acres with the southern entrance approximately half a mile west of the executive airport's Burman Boulevard entrance. MRS 02 also has unnamed dirt road entrances from the east, west, and north, all of which are gated for safety.

Topography

Elevations at MRS 02 range from approximately 50 feet to 70 feet above mean sea level (msl). The topography is flat to gently sloping in the northern portion of the range and steeply sloping in the south-southeastern portion of the range. A selected response action conducted at the site resulted in grading seven acres located in the central portion of the site to approximately 60 feet msl. Thus, the overall topography of MRS 02 is slightly downward sloping from northwest to southeast. For the most part, the steepest slopes are man-made as a result of pushing/maneuvering soil piles using heavy earth moving equipment. The resulting soil piles are generally located within 50 feet of the MRS boundary.

Hydrology

There are no surface water bodies within the boundaries of MRS 02.

Site Geology

According to the Soil Survey of Suffolk County as captured by the U. S. Department of Agriculture, Natural Resources Conservation Service (NRCS), the native soils at MRS 02 are almost exclusively Carver and Plymouth sands (NRCS, 2012). However, previous activities have introduced a substantial amount of fill soil to the site. The fill is generally characterized as a sandy soil with a substantial amount of concrete and metallic debris present.

Vegetation

MRS 02 is nearly devoid of vegetation. Immediately beyond the seven-acre MRS 02 boundary, vegetation consists of a dense pine-oak forest with substantial grass and heath shrub ground cover.

1.4.2 Current and Projected Land Use

MRS 02 is presently closed and unused by the installation except for environmental assessment, investigation, monitoring, remediation and restoration field activities conducted by the Navy and its various contractors. Following remediation, the land may be transferred to the town of Riverhead,

New York for economic redevelopment; however, the specific type of land use is unknown at this time.

1.4.3 Previous Site Investigations

Prior to encountering munitions at the site, the Navy excavated a two-acre portion of the future MRS to address petroleum contamination. This excavation was conducted to a depth of approximately six feet, and was backfilled with imported fill. The location of the two-acre excavation area is depicted on Figure A-2 (Appendix A).

In 2012, AGVIQ-CH2M Hill Constructors, Inc., Joint Venture III, (AGVIQ-CH2M Hill) was contracted to conduct a selected response action on the seven acres of the MRS. The selected response action was conducted to a depth of 18 inches and resulted in the removal of over 34,000 pounds of scrap metal pieces and over 17,000 20mm projectiles and projectile-related debris. The two acres previously excavated to a depth of six feet are located within the seven-acre selected response boundary.

Further investigation by AGVIQ-CH2M Hill indicated a possibility that 20mm projectiles may be present in the areas immediately beyond the seven-acre boundary. This was based on visual evidence of construction and demolition debris that appears to be similar to the material encountered during the selected response.

1.4.4 Initial Summary of MEC Risk

The only reported Munitions of Explosive Concern (MEC) or Material Potentially Presenting an Explosive Hazard (MPPEH) encountered in MRS 02 are 20mm projectiles. During the March 2010 EODMU12 response, the specific nomenclature of the 20mm projectiles could not be determined because of the deteriorated condition of the projectiles. This condition was likely a result of weathering and physical damage from subsequent repeat impacts of the projectiles in the soil backstop. Approximately 8,000 of the 20mm projectiles recovered during the selected response action required destruction via explosive demolition. The remaining 9,000 projectiles were classified as Material Documented as Safe (i.e., not containing an explosive hazard). Based on the results of the demolitions, three of the 20mm projectiles were determined to contain an explosive hazard.

2.0 TECHNICAL APPROACH

2.1 Geophysical Investigation Equipment

2.1.1 Geonics EM61-MK2

The Geonics EM61-MK2 metal detector is a high-resolution time-domain electromagnetic induction sensor capable of detecting, with high spatial resolution, shallow ferrous and nonferrous metallic objects. The EM61-MK2 system consists of two 1.0 meter by 0.5 meter air-cored coils, a Juniper Allegro CX digital data logger (Allegro), batteries, and processing electronics. The system transmitter generates a pulsed primary magnetic field, which then induces eddy currents in nearby metallic objects. The receiver, housed in the bottom coil along with the transmitter, measures the eddy currents at four distinct time gates. Earlier time gates provide enhanced detection of smaller metallic objects. Secondary voltages are measured in millivolts (mV). When mounted on manufacturer-supplied wheels, the arrangement of coils is such that there is a vertical separation of 40 centimeters (cm) from the ground surface to the bottom coil. The instrument collects data at 10cm increments based on the triggering of the wheel odometer. Additional details on the Geonics EM61-MK2 can be obtained in the instrument's user manual (Geonics Limited, 2005).

2.1.2 Trimble GPS

The transect start and end point stakes were surveyed using a Trimble GeoXH 6000 dual frequency Global Navigation Satellite System (GNSS) receiver, enabled to use Virtual Reference Station through a cellular phone connection, while remaining stationary over each point. The GeoXH 6000 is a 220-channel dual frequency GNSS receiver that uses C/A, L2C, and L2E satellite frequencies. The GPS receiver accuracy is largely dependent on the number of satellites visible, which can be impeded by local features such as tree cover. GPS location data were recorded in North American Datum 1983 (NAD83)/Universal Transverse Mercator (UTM) zone 18N coordinate system for map presentation purposes.

2.2 Field Operations

Fieldwork occurred from 28 May to 5 June 2013, inclusive of mobilization and demobilization. Specific CTO fieldwork activities are outlined in greater detail below.

2.2.1 Mobilization, Site Set-Up, and Training

Resolution Consultants and subcontractor personnel and equipment mobilized to the site on 29 May 2013. All personnel mobilized to the site met the Occupational Safety and Health Administration (OSHA) training and medical surveillance requirements specified in the Health and Safety Plan (HASP). The Resolution Consultants' Unexploded Ordnance (UXO) Technician III and UXO Technician II also met the training and experience requirements of Department of Defense Explosives Safety Board (DDESB) Technical Paper 18 (TP-18) for their respective positions. Site-

specific training was conducted with all on-site personnel on 29 May 2013. This training included a review of the project Work Plan, HASP, Explosives Safety Submission Determination Request (ESS-DR), HASP, and applicable Standard Operating Procedures.

2.2.2 Anomaly Avoidance

Resolution Consultants provided anomaly avoidance services for the fieldwork in accordance with the approved ESS-DR. Anomaly avoidance consisted of providing one UXO Technician III and one UXO Technician II escort all field teams working within the investigation footprint. Additionally, the UXO Technicians provided all on-site personnel with a UXO Awareness Safety Brief prior to the start of fieldwork. During anomaly avoidance, UXO personnel conducted an instrument-aided visual survey using handheld Schonstedt GA-52Cx magnetometers. No MPPEH was identified during anomaly avoidance activities.

2.2.3 Transect Surveys

Transect survey activities began on 29 May 2013 following the site-specific training. Survey activities were completed on 30 May 2013. The daily transects survey schedule was as follows:

- Morning safety meeting;
- Equipment setup and 15-minute instrument warm-up;
- Verify GPS Quality Control (QC) points;
- Locate and stake transect end points;
- End of day GPS QC check; and
- Disassemble and store equipment.

Transect start and end point surveys were conducted using a Trimble GeoXH 6000 GPS system. Twelve inch wooden stakes were labeled with the transect identification (ID) to mark each point. Pink surveyors flagging tape was tied to tree branches to guide vegetation removal, and to maintain line of sight along the survey transects for the DGM survey. On a total of 10 transects (Transects 16 – 26 located on the northeast portion of the site), sections of the boundary fence intersected the proposed 200 foot transects, blocking access. When this occurred, the proposed transect paths were truncated, new start or stop points were established, and their locations were recorded with the GPS system.

2.2.4 Vegetation Clearance

After the transect locations were established, Resolution Consultants' UXO Technicians conducted vegetation clearance from 31 May to 3 June 2013 to remove any potential physical impediments that presented hazards to safety or data quality. Vegetation clearance was accomplished using

chain saws and hand-held weed whackers with brush cutting attachments. Vegetation clearance consisted of the following activities:

- Cutting the underbrush to a height of six inches above the ground surface;
- Relocating any deadfall presenting a tripping hazard outside of the transect paths; and
- Trimming branches and overhanging limbs that presented a head/eye hazard.

No trees were removed as part of these activities.

2.2.5 EM61-MK2 Survey

The EM61-MK2 survey was conducted on 4 June 2013 and consisted of the following activities:

- Morning safety meeting;
- Equipment setup and 15-minute instrument warm-up;
- Instrument calibration and verification;
- DGM using the EM61-MK2 in wheel-odometer dynamic mode;
- End of day instrument verification; and
- Disassemble and store equipment.

For the entirety of the survey area, the EM61-MK2 coils were hand-towed on manufacturer-supplied wheels and four-channel bottom coil data were recorded in wheel-mode with the odometer triggering the system at 10cm intervals. The orientation of collection was such that the one-meter axis of the EM61-MK2 was perpendicular to the path of travel. The geophysical data were recorded in local coordinates based on the positioning of the wheel odometer relative to the surveyed transect endpoints.

Data were collected in a single set containing all DGM transects. EM61-MK2 QC checks, including the Instrument Verification Strip (IVS), were performed at the beginning and end of each survey day.

2.2.6 Demobilization

Personnel and equipment were demobilized from the site on 5 June 2013. Prior to demobilization the IVS was removed; however, the transect survey stakes were left in place to provide location information for future activities that may be conducted at the site.

3.0 QUALITY CONTROL

3.1 EM61-MK2 Static Tests

3.1.1 Background and Spike Test

Static background and static standard response spike tests were conducted at the beginning and end of the EM61-MK2 survey day, during which readings were collected for a minimum of one minute. The background test data were monitored during collection for data spikes and noise level while the spike test data were monitored for consistent response of a medium industry standard object (ISO), a two inch diameter by eight inch long steel pipe nipple.

3.1.2 Cable Shake Test

A cable shake test was performed after the EM61-MK2 was assembled, at the beginning of the day. For this test, all cables of the system were shaken to simulate vibrations associated with data collection, while monitoring data for shake-induced spikes. This test serves to detect problems associated with damaged or loose connectors, twisted cables, and other defects.

3.1.3 Personnel Test

At the beginning of the workday a personnel test was performed and monitored for response variations and interference associated with the movements of the EM61-MK2 operator. Common sources of personnel interference may include metal items in pockets and steel-toed boots.

3.2 GPS QC Check

GPS QC checks were performed at the beginning and end of each survey day by comparing the measured GPS coordinates for two existing monitoring wells with coordinates installed during previous site groundwater investigation activities.

3.3 Instrument Verification Strip

The IVS was planned to be constructed within the boundary of the two acre area that had previously been excavated to a depth of six feet. Prior to seed burial, an initial reconnaissance survey was performed using a Schonstedt magnetometer to check for the presence of anomalies, the site noise level, and overall suitability of the intended location. The two-acre area demonstrated extremely high background noise making it unsuitable for the IVS. Several locations throughout the seven-acre selected response area were also surveyed for suitability of the IVS. Each of these locations demonstrated similar results. Therefore, Resolution Consultants relocated the IVS approximately 250 feet south of the MRS boundary to a location free of subsurface anomalies and background noise. This location is shown in Figure A-3 (Appendix A).

The IVS line was installed by the UXO Technicians employing anomaly avoidance procedures. It consisted of a 50-foot linear path with start and end points marked with non-metallic stakes. A rope was connected to the stakes to guide the DGM surveyors. The IVS was seeded with three medium-sized ISOs spaced approximately 15 feet apart. The first ISO was buried horizontally parallel to the line path at a depth of 12 inches below ground surface. The second ISO was buried horizontally, perpendicular to the line path at a depth of 10 inches below ground surface. The third ISO was buried vertically at a depth of five inches below ground surface. The seed item locations and placement are summarized in Table 4-1 and depicted in Figure 4-1 below. IVS endpoints and seed locations were marked with labeled non-metallic pin flags and recorded with the GeoXT GPS unit.

Table 3-1
IVS Seed Items

Item ID	Item Type	X (Easting) UTM (m)	Y (Northing) UTM (m)	Depth (in)	Orientation	Inclination
Seed 1	Medium ISO	685138.613	4530666.387	12	Parallel to Track Path	Horizontal (0^o)
Seed 2	Medium ISO	685143.010	4530665.462	10	Perpendicular to Track Path	Horizontal (0^o)
Seed 3	Medium ISO	685148.901	4530664.743	5	Not Applicable	Vertical (90^o)

Figure 3-1
IVS Seed Items

Seed 1

Seed 2

Seed 3

After seed burial, a three-line IVS survey was performed to demonstrate system detection and positioning capabilities. Daily start-of-day and end-of-day IVS surveys consisted of a line collected west to east centered over the seeds, a line collected east to west centered over the seeds, and a background line five feet from the seeded line. The purpose of these surveys is to verify that the items of interest could be detected and that no ambient equipment or operator-induced noise

issues will generate false positive readings. The centerline IVS surveys validated the abilities of both the operator and the equipment to accurately detect the ISOs at the given depths and site conditions. The background surveys demonstrated that minimal noise impacts were inherent to the EM61-MK2 equipment and the geophysical technician's operating procedures.

4.0 DATA PROCESSING

4.1 Raw Data Transfer

Digital geophysical and positional data were transferred from the Juniper Allegro data logger to a field computer for initial data quality assessments and editing. Using DAT61MK2 software, the EM61-MK2 data were positioned and exported to an American Standard Code for Information Exchange (ASCII) file. The raw data were then transferred to a File Transfer Protocol (FTP) site for processing, analysis, and QC using Geosoft's Oasis montaj software with the UX-Detect extension module.

4.2 EM61-MK2 Data Preprocessing

Converted raw data files were imported into Geosoft's Oasis montaj to perform the following activities:

- Review and finalize all QC tests (cable shake, personnel and static) prior to processing of the DGM data for that day;
- Convert local coordinates to projected NAD83/UTM Zone 18N;
- Evaluate data density;
- Apply auto leveling and instrument drift corrections;
- Apply default lag correction;
- Generate preliminary contour map(s) from gridded data;
- Generate preliminary original versus repeat profiles by dataset; and
- Generate formatted ASCII files containing preprocessed data by dataset.

4.3 EM61-MK2 Data Final Processing

Digital geophysical and positional data were transferred from field data loggers to a field computer for initial data quality assessments and editing. Using DAT61MK2 software, the EM61-MK2 data were positioned and exported to an ASCII file. The data were then transferred to the geophysical subcontractor's office for final processing and analysis using Geosoft's *Oasis montaj* software and the UX-Detect module. After completion of preprocessing, the data were further evaluated and processed to generate end-product data files in preparation for anomaly selection. Final processing steps included:

- Evaluation and refinement of auto leveling and instrument drift corrections in the channel selected for target analysis;
- Evaluation and refinement of lag correction in the channel selected for target analysis; and

- Additional digital filtering and enhancement, as necessary, in the channel selected for target analysis.

4.4 Anomaly Selection

In accordance with the approved Work Plan, targets were selected from the final processed geophysical data based on the peak anomaly threshold of 3 mV on the Channel (Ch) 2 profile data to maintain consistency with the methods implemented during the previous DGM investigation. (AGVIQ-CH2M Hill, 2012) The key steps of the anomaly selection process are listed below with further details provided in the following paragraph:

- Selection of target anomalies;
- Generation of formatted ASCII files containing processed data by dataset;
- Generation of final maps for each grid showing contoured gridded data, target locations, and culture; and
- Generation of final original versus repeat profiles by dataset.

The UX-Detect module identifies peak amplitude responses associated with, but not limited to, MEC items. Single-source anomalies may generate multiple target designations depending on shape and orientation. Initial target selections were auto-selected using a peak-picking algorithm based on the Ch2 profile data. Data profiles corresponding to the anomalies selected by Geosoft were then analyzed by trained geophysicists to evaluate the validity and positioning of the identified targets. Targets found to be invalid, incorrectly located, or unselected by the automated module were manually removed, adjusted, or selected via manual methods. Annotations were made in the target lists for anomalies with suspect decay patterns (e.g., Ch1 < Ch2, etc.) or anomalies documented to represent cultural influence (e.g., fences) based on field notes. The criteria for selecting and locating anomalies for the target list included the following items:

- Maximum amplitude of the response with respect to local background conditions;
- Down-line extent (width) of the response;
- Location of the response with respect to the edge of the survey area, inaccessible areas, land features, cultural features, or utilities within or adjacent to the survey area.

Upon completion of the anomaly selection process, each target was given a unique identification number and the list exported to a Microsoft Excel file.

4.5 Data Deliverables

Processed data deliverables include:

- Text file documenting project information and data processing parameters consistent for all included datasets;
- ASCII and Geosoft .GDB formats of processed data corrected for sensor offsets, latency/lag corrections, drift/leveling corrections and instrument bias;
- Data geo-referenced using NAD83/UTM Zone 18N;
- ASCII format delimited fields as ID, x, y, v1, v2, etc., (where x and y are project coordinates, and v1, v2, v3, etc., are Ch1, Ch2, Ch3, Ch4 instrument readings; transect ID, and Comments);
- Final target lists containing grid, x, y and targeted response value; and
- Composite mosaic in Adobe .PDF format.

Electronic copies of the processed data are included as Appendix B to this report.

5.0 DISCUSSION OF RESULTS

5.1 Quality Control

Background static tests were almost entirely within the range of ± 2 mV from mean value in all EM61-MK2 channels. During the start-of-day and end-of-day static tests, a small percentage of readings (0.495%) exceeded the 2mV threshold but were well within the accepted percentage tolerances (<5%) for these observations. Low amplitude cyclical noise was present in all of the static tests, but this noise was not apparent in any of the IVS tests or transect-pattern DGM data. Given the predictive and repeatable, cyclical nature of the noise observed during the Static Tests and the absence (or full dissipation) of this noise in all other data, the suspected source of the observed noise is the "mifi" associated with the Trimble GeoXH 6000 system, which was located near the EM61-MK2 during static tests but not during the other data collection activities.

Outside of the induced, low-level noise source discussed above, standard static test data showed responses from ISO items were consistently repeatable within ± 10%. The cable shake and personnel data exhibited no significant interference as a result of cable motion or proximity of personnel, respectively.

Analysis and contouring of background IVS data demonstrated the suitability of location for seeding and testing. The selected IVS location was relatively free of anomalies. The EM61-MK2 data clearly demonstrated detection of the buried seed items within the predicted response ranges. Daily start-of-day and end-of-day IVS data compared well, with all ISO seed items being detected with consistent amplitude (≥ 75 percent of the expected minimum value on all channels) characteristics and locations. The IVS test results are summarized in Table 5-1 with example figure representation of both Static Response and IVS Test results provided in Appendix C for reference.

GPS equipment checks exceeded expectations for a handheld system. The measured location for monitoring well MW03S was offset 6.2cm from the provided surveyed location. For monitoring well MW04S, the measured offset was 12.7cm. This increased offset distance was likely a result of MW04S being located below thick tree canopy. The GPS check results are provided in Table 5-2.

Table 5-1
IVS Seed Item EM61-MK2 Responses

Seed	Measurement Time	DGM Data (Date/File Name)	X (UTM)	Y (UTM)	CH2 Response (mV)	% Difference (Location)	% Difference (Response)	Depth (m)
1	Start of Day	0604IVS1	685138.61	4530666.39	45.66	-	-	0.3048
	End of Day	0604IVS2	685138.61	4530666.39	45.38285	0.00	0.62	0.3048
2	Start of Day	0604IVS1	658143.01	4530665.46	48.57	-	-	0.2540
	End of Day	0604IVS2	658143.01	4530665.46	46.72623	0.00	3.87	0.2540
3	Start of Day	0604IVS1	685148.90	4530664.74	316.93	-	-	0.1270
	End of Day	0604IVS2	685148.90	4530664.74	327.0544	0.00	3.14	0.1270
Bkgrd Line	Start of Day	0604IVS1	N/A	N/A	1.38 (mean)	N/A	Lag = 3.5	
	End of Day	0604IVS2	N/A	N/A	1.73 (mean)	N/A	Lag = 3	

Table 5-2
GPS QC Results

Monitoring Well	Reported Locations		Measured Locations		Difference X	Difference Y	Offset Distance (m)
	X (UTM)	Y (UTM)	X (UTM)	Y (UTM)			
FT-MW03S	685036.68	4530783.00	685036.69	4530783.07	-0.0021	-0.062	0.062
FT-MW04S	685232.4	4530799.83	685232.28	4530799.78	0.12	0.05	0.127

5.2 DGM Survey

Of the 56 transects, 45 transects were able to achieve the 200 feet of coverage proposed in the Work Plan. The remaining transects (Transects 16 through 26) were truncated due to the presence of a chain-link fence that blocked access. Truncating these transects had no impact on the ability to achieve the overall DGM survey objectives.

A total of 294 targets were selected from EM61-MK2 bottom coil Ch2 data. Of these 294 targets, five are suspected noise targets, as evidenced by suspect decay patterns of the data. Twenty four targets are suspected to be a result of surface/near surface cultural debris as evidenced by site observations during fieldwork. Notation of suspected cultural debris are found in the comments column of the transect target lists. A final mosaic of DGM coverage and selected targets is included as Figure A-4 (Appendix A).

Transects 12 through 40 are relatively free of subsurface anomalies, with few targets identified beyond approximately 20 meters of the previous selected response boundary. Transect 32 is an exception to this generalization, with targets scattered along its length. This transect is considered an isolated case and was not used in estimating the lateral extent of metallic debris. Metallic items are relatively abundant along Transects 41 through 48 and 51 through 54. A small chain-link swing gate was observed near the eastern ends of Transects 51 and 52. Variable exposures of reinforced concrete were observed along the eastern ends of Transects 53 through 55. No targets were selected on Transects 4 and 22.

Transects 7 through 11 appear to display a concentration of anomalies that define an area of metal debris separate from the debris associated with the main seven-acre area. Some photographs of debris in the area covered by Transects 7 through 11 are included in Figure 5-1.

Figure 5-1
Surface Debris in Transects 7 - 11

6.0 CONCLUSIONS

The Resolution Consultants geophysical investigation of the MRS 02, Former Fire Training Area, at NWIRP Calverton, met the objectives of the CTO scope of work. The geophysical data was successfully validated through the QC procedures. Project performance criteria and Data Quality Objectives were successfully met and maintained throughout the duration of the project. The threshold of 3 mV on Ch2 was adequate for detection of anomalies representing metallic debris with the potential to be 20mm projectiles or other infrastructure-related objects. The 200 foot transects (including the truncated transects) were sufficient for delineation of the subsurface anomalous areas immediately beyond the boundaries of the seven-acre selected response area. Based on Visual Sample Plan (VSP) statistical calculations, the survey coverage was sufficient to identify any additional potential, circular-shaped, 56-feet diameter areas of subsurface anomalies to a confidence level of 95%. Similarly, potential anomalous areas with diameters of 87 feet or greater would have been identified with 100% confidence based on the survey coverage.

Figure A-5 (Appendix A) includes a qualitative interpretation of the boundary of subsurface metallic debris based solely on the non-invasive geophysical investigation. The estimated boundary extends approximately 3.6 acres beyond the seven-acre selected response action boundary. The anomalies are primarily concentrated along the perimeter of the seven-acre selected response area, which appears to be consistent with previous DGM results. Furthermore, the topographic swales present in these anomalous areas suggest that soil and metal debris that had at one time occupied the central area may have been pushed out of the area using a bulldozer or similar mechanized means. Site observations indicate that surficial and, in some cases, partially buried metal debris is present throughout a large part of the identified anomalous areas.

Throughout the course of fieldwork, no MEC or MPPEH was encountered within the footprint of the investigation. This included observations from within the surveyed transects' footprints and along paths traversed between the transects.

This page intentionally left blank

7.0 REFERENCES

AGVIQ-CH2M HILL, 2011. *Final Explosives Safety Submission for Munitions Response Site 02 – Former Fire Training Area,* Naval Weapons Industrial Reserve Plant, Calverton, NY. May 2011.

AGVIQ-CH2M HILL, 2012. *Final Remedial Work Plan, Munitions Response Site 02 (Fire Training Area) Removal Action and Munitions Response,* Naval Weapons Industrial Reserve Plant, Calverton, NY. May 2012.

AGVIQ-CH2M HILL, 2013. *Final Summary Report, Munitions Response Site 02 (Fire Training Area) Removal Action and Munitions Response,* Naval Weapons Industrial Reserve Plant, Calverton, NY. TBD 2013.

C.F. Braun, 1997. *Phase II Environmental Baseline Study for NWIRP*. December, 1997.

DDESB, 2004. *Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel, Technical Paper (TP) No. 18*. Prepared by the Department of Defense Explosives Safety Board. 20 December 2004.

Environmental Security Technology Certification Program (ESTCP), 2009. *Geophysical System Verification (GSV): A Physics-Based Alternative to Geophysical Prove-Outs for Munitions Response*. July 2009.

Geonics Limited, 2005. *EM61-MK2 and EM61-MK2HP 4 Channel High Sensitivity Metal Detectors Operating Manual*, July 2005.

NAVFAC NE, 2012. *SOW for Munitions Response Site 02 (Fire Training Area),* Naval Weapons Industrial Reserve Plant, Calverton, NY. October 2012.

Naval Research Laboratory, 2008. *EM61-MK2 Response of Standard Munitions Items*, NRL/MR/6110-08-9155, October 2008.

NOSSA, 2013. *Approval Letter for Explosives Safety Submission Determination Request for Munitions Response Site 02 (Fire Training Area),* Naval Weapons Industrial Reserve Plant, Calverton, NY. Feb 2013.

Sovereign Consulting Inc., 2008. *Final Removal Action Work Plan for Installation Restoration (IR) Site 2 – Fire Training Area, Non-Time Critical Removal Action (NTCRA),* Naval Weapons Industrial Reserve Plant, Calverton, NY. October 2008.

Sovereign Consulting Inc., 2008-2009. *Field Efforts for Final Removal Action at Installation Restoration (IR) Site 2,* Naval Weapons Industrial Reserve Plant, Calverton, NY. October 2008 – December 2009.

Resolution Consultants, 2012. *POA/CE for Munitions Response Site 02 (Fire Training Area),* Naval Weapons Industrial Reserve Plant, Calverton, NY. November 2012.

Resolution Consultants, 2013. *Explosives Safety Submission Determination Request for Munitions Response Site 02 (Fire Training Area),* Naval Weapons Industrial Reserve Plant, Calverton, NY. January 2013.

Tetra Tech NUS, Inc., 2006. *Feasibility Study / Corrective Measures Study,* Naval Weapons Industrial Reserve Plant, Calverton, NY. May 2006.

Tetra Tech NUS, Inc., 2010. *Construction Oversight and Confirmation Soil Sampling Report at Site 2 – Fire Training Area,* Naval Weapons Industrial Reserve Plant, Calverton, NY. May 2010.

U.S. Department of Agriculture, 2012. *On-line Map Excerpt of Soil Survey of Suffolk County, New York*. Prepared, Natural Resource Conservation Service. December 2012.

Appendix A

Site Maps

This page intentionally left blank

L:_Common\GIS_Data\60283778_NWIRP_Calverton\MXDs\Figure_2-1_Location_MRS_02.mxd

Location Map of MRS 02 NWIRP Calverton
Calverton, NY

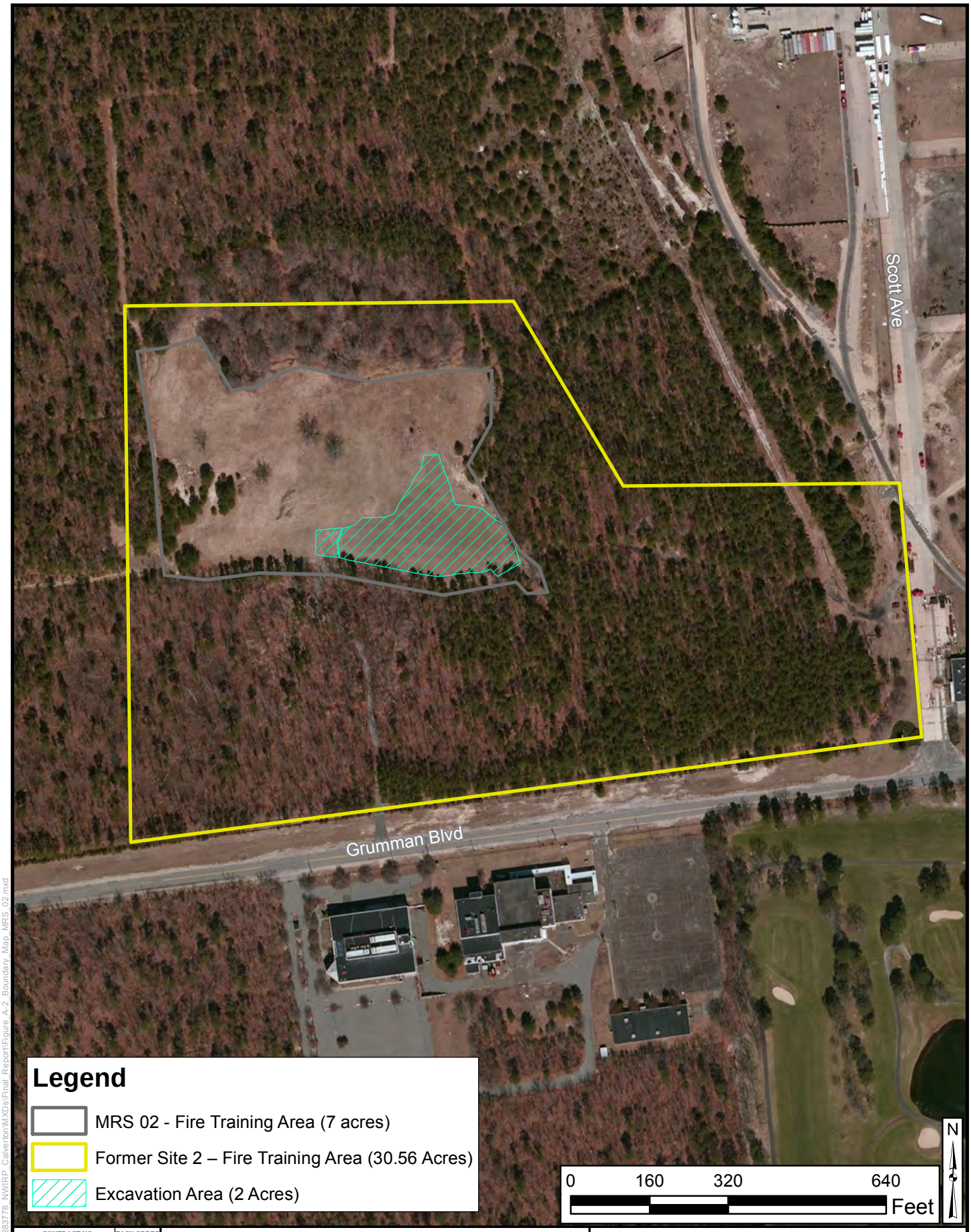
FIGURE A-1

NWIRP Calverton

CONTRACT NO	N62470-11-D-8013
TASK ORDER	WE52
DESIGNED BY	B. Perrigo
DRAWN BY	B. Perrigo
CHECKED BY	G. Quimby
DATE	August 2013
SCALE	1" = 1,27 mi
SHEET	1 of 1
Figure_A-1_Location_MRS_02.mxd	

Naval Facilities Engineering Command
NAVFAC
RESOLUTION CONSULTANTS

This page intentionally left blank



CONTRACT NO: N62470-11-D-8013	TASK ORDER: WE32
DESIGNED BY: B. Perrigo	DRAWN BY: B. Perrigo
CHECKED BY: G. Quimby	DATE: January 2013
SCALE: 1" = 260'	SHEET: 1 of 1
Figure_A-2_Boundary_Map_MRS_02.mxd	

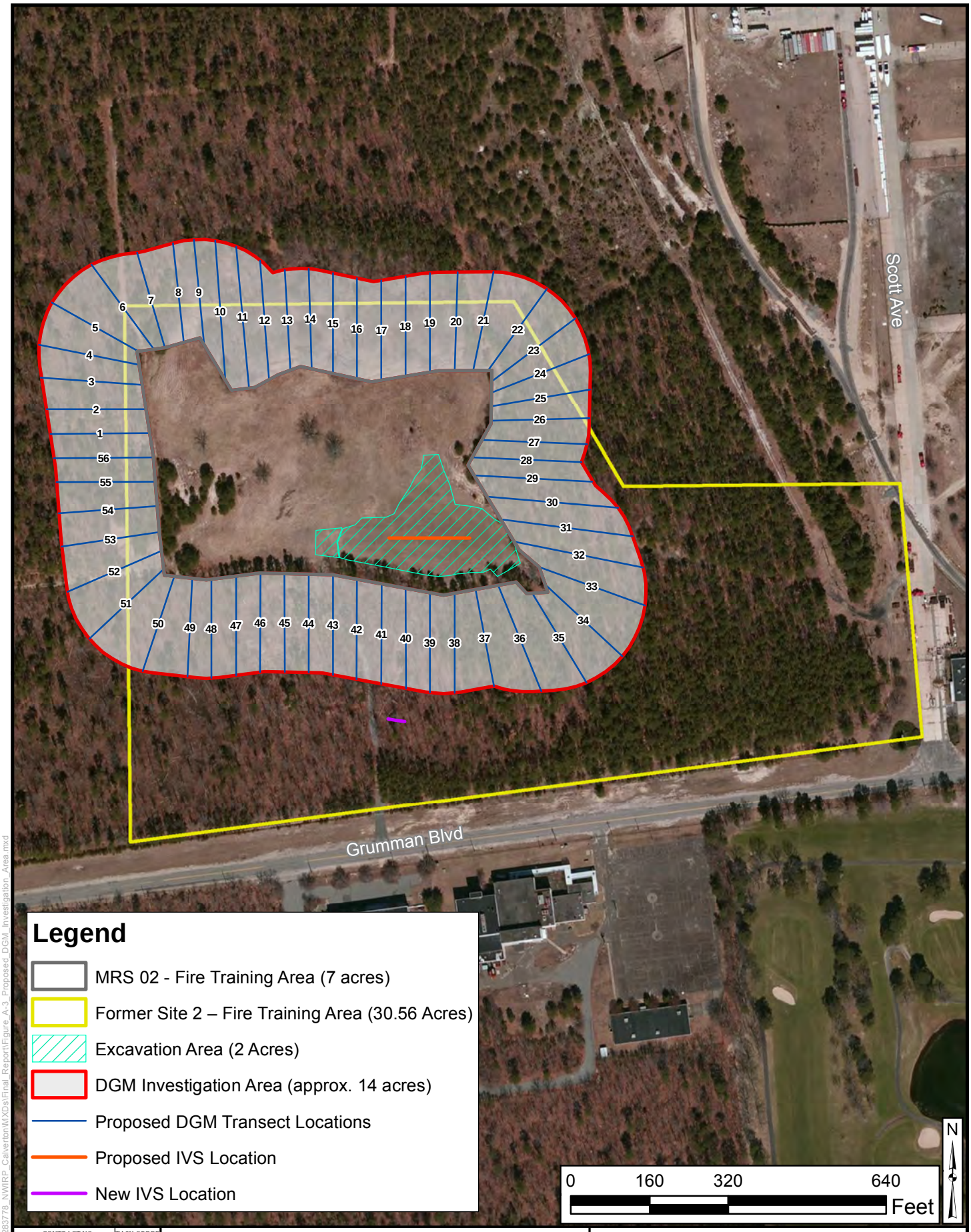
NWIRP Calverton

FIGURE A-2
Boundary Map of MRS 02
NWIRP Calverton
Calverton, NY

NAVFAC Naval Facilities Engineering Command
RESOLUTION CONSULTANTS

L:_Common\GIS_Data\60283778_NWIRP_Calverton\MXDs\Final_Report\Figure_A-2_Boundary_Map_MRS_02.mxd

This page intentionally left blank



CONTRACT NO: N62470-11-D-8013	TASK ORDER: WE32
DESIGNED BY: B. Perrigo	DRAWN BY: B. Perrigo
CHECKED BY: G. Quimby	DATE: August 2013
SCALE: 1" = 260'	SHEET: 1 of 1
Figure_A-3_Proposed_DGM_Investigation_Area.mxd	

NWIRP Calverton

FIGURE A-3
Proposed DGM Investigation Area
MRS 02 NWIRP Calverton
Calverton, NY

NAVFAC Naval Facilities Engineering Command
RESOLUTION CONSULTANTS

L:_Common\GIS_Data\60283778_NWIRP_Calverton\MXDs\Final_Report\Figure_A-3_Proposed_DGM_Investigation_Area.mxd

This page intentionally left blank

L:_Common\GIS_Data\60283778_NWIRP_Calverton\MXDs\Figure_2-1_Location_MRS_02.mxd

CONTRACT NO.
N62470-11-D-8013

TASK ORDER
WE32

DESIGNED BY
B. Perrigo

DRAWN BY
B. Perrigo

CHECKED BY
G. Quimby

DATE
August 2013

SCALE
As Shown

SHEET
1 of 1

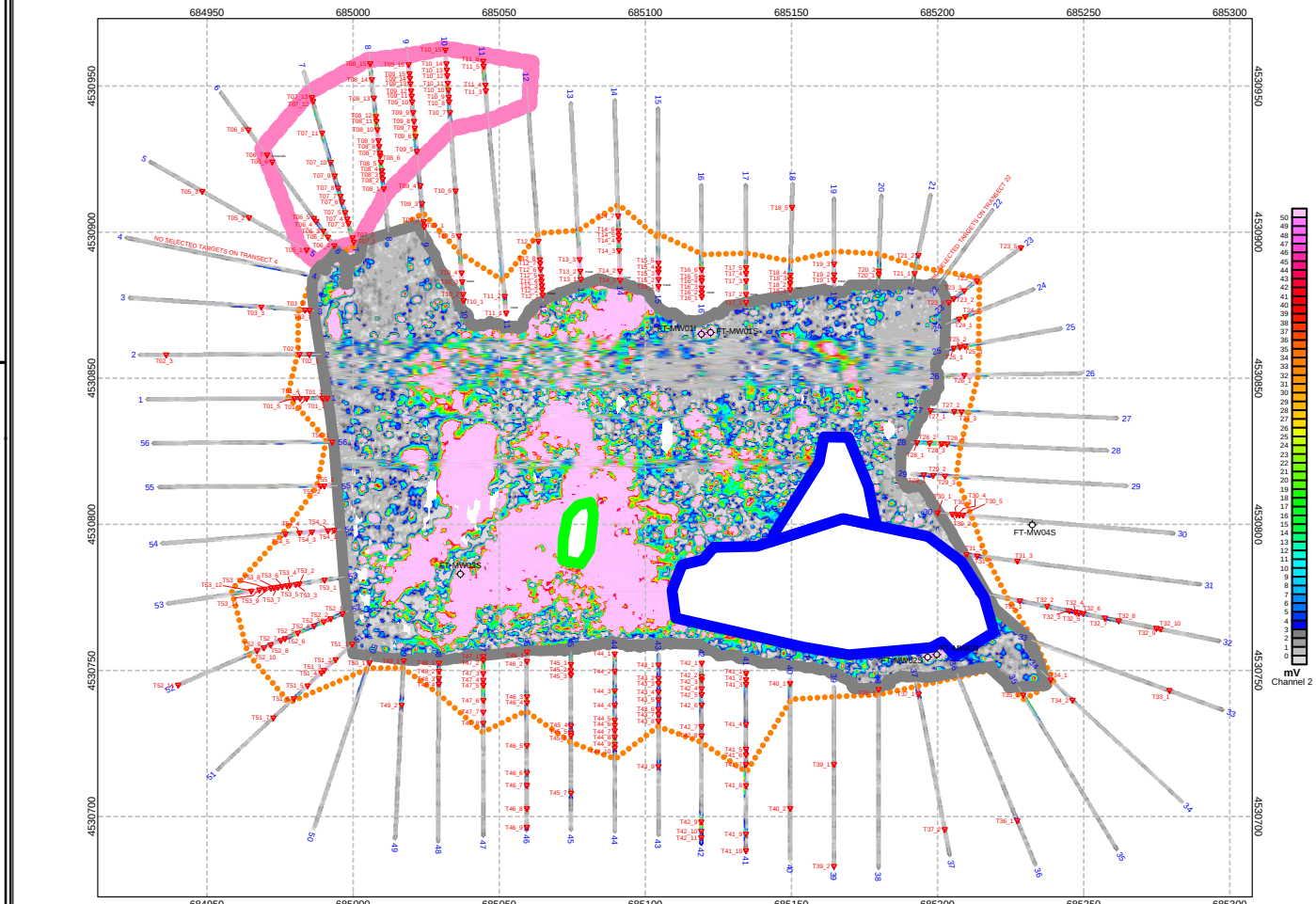
Figure_A-4_DGM_Results.mxd

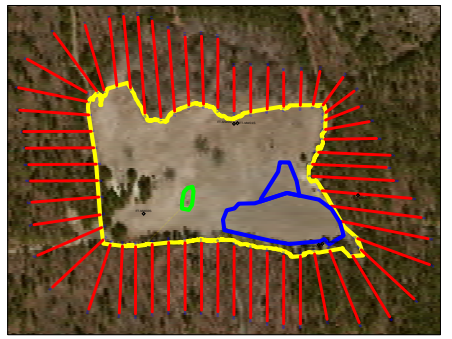
NWIRP Calverton

FIGURE A-4
DGM Results
MRS 02 NWIRP Calverton
Calverton, NY

NAVFAC Naval Facilities Engineering Command RESOLUTION CONSULTANTS

NAEVA GEOPHYSICS INC.
Subsurface Geophysical Surveys





Legend

- Selected Target with Unique Target ID
- Monitor Well
- Expanded Metal Debris Area (Interpreted by AECOM)
- Isolated Metal Debris Area (Interpreted by AECOM)
- Previous DGM Survey Area (30m x 30m Grids, Nov. 2010)
- Previous Excavation Area (from Nov. 2010 DGM Survey)
- Mound / Pile (from Nov. 2010 DGM Survey)

NOTES: 1) Only start and end locations were surveyed in with the GPS. The points in between are idealized.

2) See individual target pick lists for additional information.

20 0 20 40 60
(meters)
NAD83 / UTM zone 18N

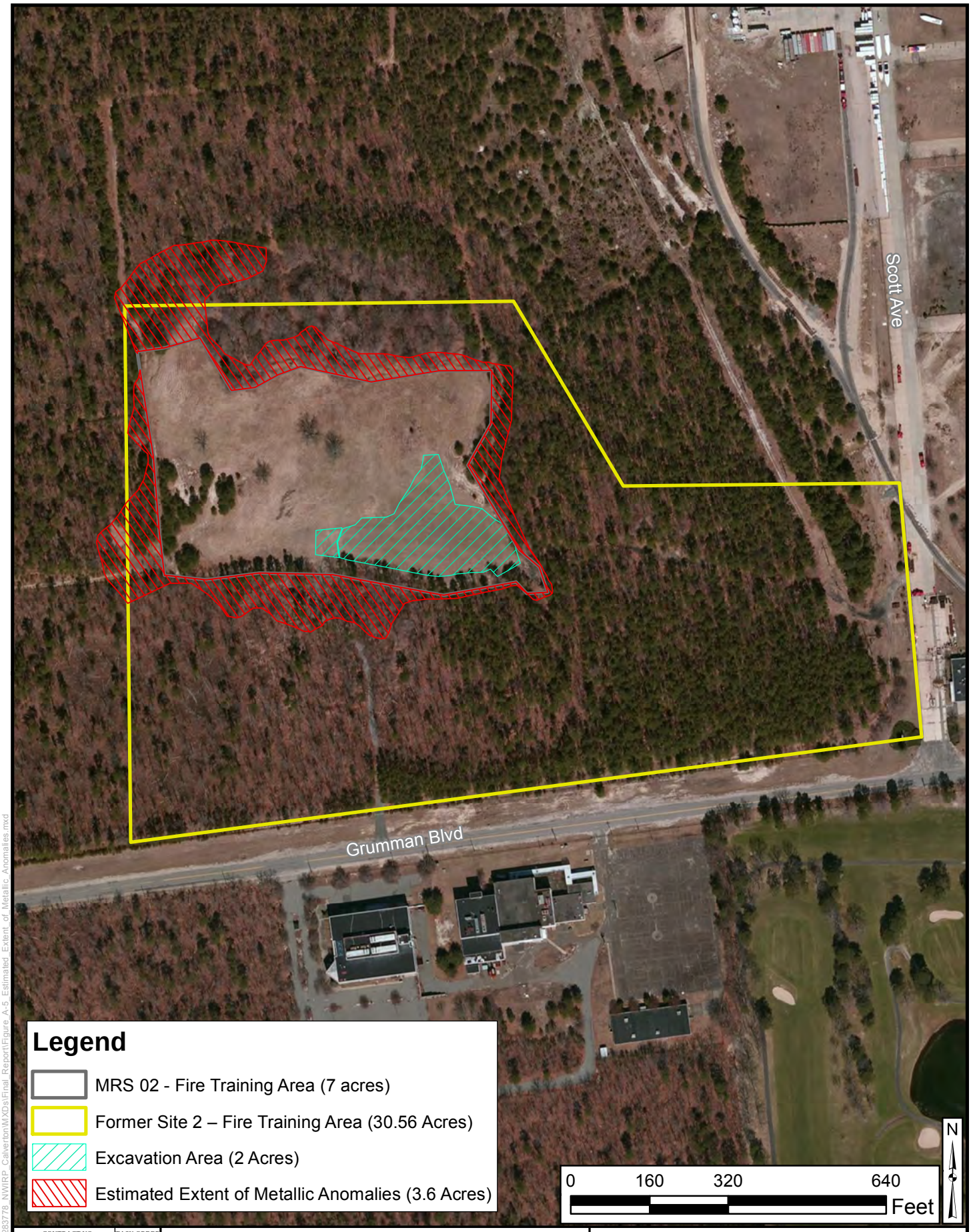
Client: AECOM

EM61MK2
Transects Mosaic - Transects 1 through 56
Site 2 - Fire Training Area
Former Naval Weapon Industrial Reserve Plant
Calverton, New York

Date of Survey: 06/04/2013
Date of Map Creation: 06/10/2013

Map Approver: J. Guillard

This page intentionally left blank



CONTRACT NO: N62470-11-D-8013	TASK ORDER: WE32
DESIGNED BY: B. Perrigo	DRAWN BY: B. Perrigo
CHECKED BY: G. Quimby	DATE: August 2013
SCALE: 1" = 260'	SHEET: 1 of 1
Figure_A-5_Estimated_Extent_of_Metallic_Anomalies.mxd	

NWIRP Calverton

FIGURE A-5
Estimated Extent of Metallic Anomalies
MRS 02 NWIRP Calverton
Calverton, NY

NAVFAC Naval Facilities Engineering Command
RESOLUTION CONSULTANTS

L:_Common\GIS_Data\60283778_NWIRP_Calverton\MXDs\Final_Report\Figure_A-5_Estimated_Extent_of_Metallic_Anomalies.mxd

This page intentionally left blank

Appendix B

Geophysical Data (electronic data provided on CD)

This page intentionally left blank

Appendix B - Geophysical Data

NWIRP-Calverton MRS02 DGM Investigation

Unique_Target_ID	X_UTM	Y_UTM	Ch1_level_lg	Ch2_level_lg	Ch3_level_lg	Ch4_level_lg	Transect	Comments
T01_1	684991.1566	4530843.189	6.36020848	3.630736363	2.616633092	1.206403302	T01	
T01_2	684989.4555	4530843.178	5.187291673	3.699493318	1.803729269	0.085501709	T01	
T01_3	684984.0686	4530843.143	224.4427226	163.751986	98.71100983	55.98846466	T01	
T01_4	684981.8004	4530843.128	7.986285388	4.23503048	0.741926049	0.29492141	T01	
T01_5	684979.9103	4530843.116	110.0898875	41.66030987	7.972666011	1.461642508	T01	
T02_1	684985.0041	4530858.184	44.23928693	30.42123717	14.03166921	4.345278542	T02	
T02_2	684981.648	4530858.176	5.541650563	4.276591834	2.664546567	1.948350162	T02	
T02_3	684936.005	4530858.07	6.00802353	3.352282098	3.076331363	2.529442664	T02	Suspected Noise (Instrument or Ambient)
T03_1	684985.0931	4530873.276	6.167104714	4.816577822	3.878022786	3.245905715	T03	
T03_2	684983.5709	4530873.381	18.29003156	13.12428832	7.798538195	3.797602704	T03	
T03_3	684968.5283	4530874.418	3005.449534	1851.680052	975.9220778	476.5894194	T03	Suspected Culture
							T04	No Selected Targets on Transect 04
T05_1	684984.0647	4530893.907	10.27039504	7.003012678	3.815570955	1.372127532	T05	
T05_2	684964.3224	4530905.024	3.951236895	3.258269907	1.726908518	1.652951723	T05	
T05_3	684948.352	4530914.017	4.144261214	3.49561558	2.638433462	2.272315076	T05	
T06_1	684993.5266	4530895.437	1214.86243	753.1234887	376.4068804	156.8094694	T06	
T06_2	684991.3638	4530898.357	118.1091451	73.38990371	34.19437029	13.27195291	T06	
T06_3	684989.8271	4530900.431	69.52891932	42.8663807	20.32026088	8.109531101	T06	
T06_4	684987.3798	4530903.734	19.24673115	12.97810498	5.887573667	2.920015227	T06	
T06_5	684986.583	4530904.81	7.280359075	5.0632427	1.496511233	0.339156367	T06	
T06_6	684972.2974	4530924.093	5.139818471	3.282279783	1.727559551	0.691296944	T06	
T06_7	684970.533	4530926.474	84.77815295	53.87038573	25.96376435	10.35147314	T06	Suspected Culture
T06_8	684964.1586	4530935.079	8.990451474	4.870336889	2.430364383	1.202211606	T06	
T07_1	685000.2553	4530896.607	227.7430384	141.2633411	71.38733233	30.87858491	T07	
T07_2	684999.8107	4530898.139	311.4318639	187.9534233	87.72756535	36.10012386	T07	
T07_3	684998.3984	4530903.003	494.8586228	360.820816	216.7327366	128.8836927	T07	
T07_4	684997.9537	4530904.534	17.44251705	13.11763041	8.655198198	4.683794486	T07	
T07_5	684997.2999	4530906.786	76.7945795	57.79938484	35.11743441	19.84264521	T07	
T07_6	684996.2537	4530910.389	7.378359075	3.822593016	0.848318184	0.245174305	T07	
T07_7	684995.6783	4530912.371	35.50270328	25.43242514	14.29243252	7.73559048	T07	
T07_8	684994.8675	4530915.163	8.854033016	6.221118933	2.788412535	1.051791353	T07	
T07_9	684993.6644	4530919.307	4.958882169	4.067986048	1.720881718	0.553952101	T07	
T07_10	684992.3044	4530923.991	35.48492222	26.37347536	15.7021671	8.749330355	T07	
T07_11	684989.4013	4530933.99	2088.293746	1511.016335	894.4068821	509.6311621	T07	
T07_12	684986.2627	4530944.799	366.4114494	241.7344265	114.6079606	43.35093665	T07	

Appendix B - Geophysical Data

NWIRP-Calverton MRS02 DGM Investigation

Unique_Target_ID	X_UTM	Y_UTM	Ch1_level_lg	Ch2_level_lg	Ch3_level_lg	Ch4_level_lg	Transect	Comments
T07_13	684985.8704	4530946.15	1533.501794	1005.077588	484.2372835	182.2154055	T07	
T08_1	685010.5013	4530914.885	82.39776333	30.98491897	4.874061222	0.111513682	T08	
T08_2	685010.1414	4530918.179	22.90001934	13.38158941	6.224426346	2.348519459	T08	
T08_3	685009.9769	4530919.685	12.07819352	8.524638748	6.053736116	5.422579243	T08	
T08_4	685009.8227	4530921.097	14.12773182	8.207497505	3.952464027	1.387010291	T08	
T08_5	685009.5143	4530923.921	1046.346808	589.573215	204.3599198	42.41587239	T08	
T08_6	685009.2675	4530926.18	189.8240697	112.417789	48.0738845	14.72696206	T08	
T08_7	685009.1647	4530927.121	172.7004285	110.6596949	49.37970311	14.98324943	T08	
T08_8	685008.9179	4530929.38	422.6576898	309.2942689	181.4236678	87.8443391	T08	
T08_9	685008.702	4530931.356	1347.889043	961.5982711	541.8358868	257.3565426	T08	
T08_10	685008.2908	4530935.121	147.7844789	93.19589449	46.72916127	21.90169203	T08	
T08_11	685007.9823	4530937.945	65.84355544	40.751612	18.32661709	6.580554125	T08	
T08_12	685007.7973	4530939.639	149.1090014	96.53504251	46.23709058	16.78387138	T08	
T08_13	685007.1084	4530945.945	6.177605764	4.317811626	2.356075244	1.138996728	T08	
T08_14	685006.4196	4530952.251	337.0362101	262.2805807	169.7350599	90.49412207	T08	
T08_15	685005.8233	4530957.71	6.427091535	3.781634599	1.818807829	0.662588792	T08	
T09_1	685024.3153	4530901.961	8.731626092	4.624571342	2.40131667	0.859528499	T09	
T09_2	685024.1533	4530903.646	3.777693394	3.225223963	2.086677299	1.087217526	T09	
T09_3	685023.5682	4530909.73	63.25849198	21.80480287	3.979368459	0.80053901	T09	
T09_4	685022.9741	4530915.908	23.77407209	14.74052915	8.689024098	4.42206544	T09	
T09_5	685021.8399	4530927.702	14.66654319	6.615097491	1.916548499	0.625888625	T09	
T09_6	685021.3448	4530932.85	60.90952661	47.24320272	28.45959486	16.84716065	T09	
T09_7	685021.0748	4530935.658	183.9729721	133.1476238	80.31852925	48.30330903	T09	
T09_8	685020.8497	4530937.998	199.99251	143.2713079	81.99264123	45.08843268	T09	
T09_9	685020.5617	4530940.993	49.29551857	25.90802372	5.91550457	0.730990945	T09	
T09_10	685020.2106	4530944.644	1627.491998	967.4977711	344.9671193	76.78098384	T09	
T09_11	685020.0216	4530946.609	247.2724096	182.8768658	101.3033733	43.9232877	T09	
T09_12	685019.8505	4530948.388	237.0232584	182.9736658	112.5956984	58.82918167	T09	
T09_13	685019.6165	4530950.821	1816.277578	1251.373497	722.9867749	393.3825103	T09	
T09_14	685019.4365	4530952.693	1064.943208	691.4564447	382.0260645	188.8466092	T09	
T09_15	685019.2834	4530954.284	1297.044494	849.1609499	468.8944606	232.9760933	T09	
T09_16	685018.9864	4530957.373	164.512284	114.4738131	61.95428846	32.34685648	T09	
T10_1	685037.7942	4530876.646	9.221785153	5.276602484	2.066032139	0.684224091	T10	
T10_2	685037.6388	4530878.786	7.81563057	3.476350798	0.677874839	0.07507887	T10	
T10_3	685037.3281	4530883.065	869.5733214	626.2458474	378.9515602	190.3867884	T10	Suspected Culture

Unique_Target_ID	X_UTM	Y_UTM	Ch1_level_lg	Ch2_level_lg	Ch3_level_lg	Ch4_level_lg	Transect	Comments
T10_4	685037.1051	4530886.136	1809.620143	1113.419834	497.6285519	162.5923627	T10	Suspected Culture
T10_5	685036.1931	4530898.696	6.595322712	4.717052501	4.088063435	3.606075506	T10	Suspected Noise (Instrument or Ambient)
T10_6	685035.0716	4530914.14	9.668728766	5.087409896	4.963536832	4.274418691	T10	Suspected Noise (Instrument or Ambient)
T10_7	685033.1191	4530941.027	23.38574292	15.00989958	8.102342926	4.310811345	T10	
T10_8	685032.8556	4530944.656	13.75835037	8.226429328	3.752424025	1.329217274	T10	
T10_9	685032.7407	4530946.238	17.76641002	9.593634603	3.771177325	0.897240371	T10	
T10_10	685032.5651	4530948.656	40.12814832	26.89465444	14.87456472	7.849510991	T10	
T10_11	685032.3962	4530950.982	166.070589	98.92525043	50.18743722	22.06130966	T10	
T10_12	685032.207	4530953.587	617.6709225	387.9771179	204.4518544	101.0445242	T10	
T10_13	685032.0651	4530955.541	516.9461727	333.7360186	179.3026673	80.73443506	T10	
T10_14	685031.9098	4530957.681	775.1700181	573.0957669	357.60451	195.1152898	T10	
T10_15	685031.5652	4530962.426	11.57419709	5.537382717	2.540769922	1.479359132	T10	
T11_1	685052.4011	4530872.373	1845.0234	941.4833712	377.5393083	151.3328972	T11	Suspected Culture
T11_2	685051.8773	4530878.078	13.05321258	7.800098472	3.988300486	1.740126052	T11	
T11_3	685045.4194	4530948.406	10538.45985	9964.062536	5981.146865	2924.929879	T11	Suspected Culture
T11_4	685045.2394	4530950.367	252.6177734	164.8781301	87.35007619	37.68202847	T11	
T11_5	685044.6419	4530956.874	104.1375689	67.05936338	32.4919972	11.64629333	T11	
T11_6	685044.4864	4530958.568	232.2404779	161.3696138	91.8873942	47.64634591	T11	
T12_1	685064.8173	4530878.502	359.3974266	184.3652763	71.8980949	25.38546121	T12	Suspected Culture
T12_2	685064.6825	4530880.288	293.8847253	180.9347246	82.21512565	24.78591626	T12	
T12_3	685064.576	4530881.699	452.2283822	255.8500785	105.458571	35.87206498	T12	
T12_4	685064.4554	4530883.297	165.06386	108.8474796	55.53380903	21.05036687	T12	
T12_5	685064.3419	4530884.801	109.2284274	76.40385709	45.77815072	23.85759218	T12	
T12_6	685064.1503	4530887.339	1828.72301	1245.261494	656.3823523	278.3966599	T12	Suspected Culture
T12_7	685064.0013	4530889.313	346.9621294	233.7929896	126.9711758	64.8892681	T12	
T12_8	685063.902	4530890.63	173.2148759	123.5473199	68.64372477	34.68434024	T12	
T12_9	685063.4266	4530896.928	5.82587663	3.865900604	2.973780593	2.976471218	T12	Suspected Noise (Instrument or Ambient)
T13_1	685077.894	4530883.883	243.9544708	106.1886937	27.27118282	7.385633948	T13	
T13_2	685077.7379	4530886.693	231.5789685	163.221345	97.65374998	53.89101982	T13	Suspected Culture
T13_3	685077.5172	4530890.666	2656.787051	1921.713369	1184.769793	681.6569102	T13	Suspected Culture
T14_1	685091.3729	4530883.613	975.1797289	642.0092135	355.5824054	173.6333278	T14	
T14_2	685091.2766	4530886.777	10434.10452	10868.29942	7663.731271	3776.094573	T14	Suspected Culture
T14_3	685091.0638	4530893.772	6.814072377	4.623024691	2.694026344	1.484168192	T14	
T14_4	685090.9524	4530897.436	1059.413836	725.7806287	440.6116601	256.3982418	T14	
T14_5	685090.9043	4530899.018	99.82123334	57.51573048	26.71109291	10.47886445	T14	

Unique_Target_ID	X_UTM	Y_UTM	Ch1_level_lg	Ch2_level_lg	Ch3_level_lg	Ch4_level_lg	Transect	Comments
T14_6	685090.8587	4530900.517	290.5361365	185.3279321	87.68739764	36.1673491	T14	
T14_7	685090.7042	4530905.596	4.188308207	3.074837732	1.81820813	0.947769283	T14	
T15_1	685104.4783	4530881.471	234.8040671	147.4289428	71.83903291	29.54097493	T15	
T15_2	685104.4777	4530883.869	1125.426807	814.7112343	493.7828263	258.7780037	T15	
T15_3	685104.477	4530886.268	5118.849548	3558.483526	2002.51662	1043.465032	T15	Suspected Culture
T15_4	685104.4767	4530887.511	2356.08282	1641.655084	1002.653772	566.6390473	T15	Suspected Culture
T15_5	685104.4761	4530889.465	1112.496535	757.0132477	447.9750108	228.2510707	T15	
T16_1	685119.3066	4530877.958	1631.551492	1269.676996	783.7576395	387.1397823	T16	Suspected Culture
T16_2	685119.3015	4530879.323	131.1414918	61.01699648	23.04763947	9.139782321	T16	
T16_3	685119.2955	4530880.961	94.74149184	67.12699648	40.28763947	20.46978232	T16	
T16_4	685119.2868	4530883.327	665.8014918	419.9369965	200.5476395	81.63978232	T16	
T16_5	685119.2824	4530884.51	383.8414918	261.7869965	136.9676395	52.57978232	T16	
T16_6	685119.2724	4530887.24	70.97149184	48.49699648	28.69763947	16.51978232	T16	
T17_1	685134.4782	4530875.973	6.816817551	2.997051023	1.378615822	0.587889015	T17	
T17_2	685134.4775	4530878.785	823.6068176	347.857051	90.81861582	21.21788902	T17	Suspected Culture
T17_3	685134.4763	4530883.386	285.4168176	208.507051	120.4086158	59.28788902	T17	
T17_4	685134.4757	4530885.942	561.0968176	320.947051	120.9186158	28.54788902	T17	
T17_5	685134.4752	4530887.902	156.4768176	112.737051	65.71861582	33.02788902	T17	
T18_1	685149.5229	4530880.378	116.4553967	67.01914418	27.0970373	7.745868261	T18	Suspected Culture
T18_2	685149.5739	4530882.475	78.77539671	53.87914418	30.2270373	16.07586826	T18	
T18_3	685149.6072	4530883.843	36.62539671	24.81914418	13.7270373	6.255868261	T18	
T18_4	685149.6449	4530885.393	18.71539671	11.19914418	5.487037297	2.755868261	T18	
T18_5	685150.2084	4530908.554	4.065396712	3.759144176	2.687037297	2.205868261	T18	
T19_1	685164.5645	4530883.688	3487.082254	2361.731719	1330.980535	726.9716471	T19	Suspected Culture
T19_2	685164.5641	4530885.472	15.37326338	10.12207131	5.764591139	2.360507774	T19	
T19_3	685164.5633	4530889.134	8.9895468	6.683321763	4.303444105	3.32816911	T19	
T20_1	685179.8834	4530885.493	126.7633046	89.74829992	53.37753086	29.98771606	T20	
T20_2	685179.9249	4530886.783	105.2448169	48.03326609	12.33095353	3.350450838	T20	
T21_1	685192.141	4530885.882	209.272841	155.7728306	100.0674755	62.03126346	T21	
T21_2	685193.4143	4530892.105	13.06405862	9.501624556	5.005816415	3.357578118	T21	
							T22	No Selected Targets on Transect 22
T23_1	685203.7997	4530875.981	13.11978611	6.758197073	2.413399648	0.478010395	T23	
T23_2	685205.5254	4530877.287	11.07329426	4.504100355	1.504424044	0.42949068	T23	
T23_3	685209.1269	4530880.012	273.6027895	194.656855	117.2126489	63.55605823	T23	
T23_4	685213.4787	4530883.305	9.634679612	6.264350263	3.331753868	1.550660684	T23	

Unique_Target_ID	X_UTM	Y_UTM	Ch1_level_lg	Ch2_level_lg	Ch3_level_lg	Ch4_level_lg	Transect	Comments
T23_5	685228.5598	4530894.717	7.298815992	5.364635468	3.602445326	2.523162296	T23	
T24_1	685207.3627	4530870.305	44.83728349	31.25718736	19.10053075	10.70871455	T24	
T24_2	685209.506	4530871.153	53.59692075	37.41275711	23.1232243	15.06580966	T24	
T25_1	685205.5507	4530860.38	10.97463595	8.271789092	3.61971006	1.518527403	T25	
T25_2	685207.6276	4530860.755	4.366495364	3.534031634	1.90459456	0.958382963	T25	
T25_3	685209.3268	4530861.061	46.96737657	32.10381487	15.19693394	4.416016234	T25	
T26_1	685209.146	4530851.055	2676.986618	1806.639915	987.1449131	420.8818193	T26	
T27_1	685197.5924	4530838.985	34.59707512	25.67148643	15.47451365	9.750512531	T27	
T27_2	685205.6955	4530838.651	10.58813132	6.031450112	1.606130854	0.489774145	T27	
T27_3	685208.2036	4530838.547	445.2208086	297.3505714	137.8177693	46.24053582	T27	
T28_1	685192.9678	4530828.028	38.77501229	20.57454679	8.408350232	2.966518874	T28	
T28_2	685197.2787	4530827.847	80.40249356	46.43637446	19.67340753	6.947992973	T28	
T28_3	685201.4021	4530827.674	120.7475647	70.58362736	32.0877927	12.34184127	T28	
T28_4	685203.2764	4530827.595	51.16009443	35.14511009	18.52141182	7.465763075	T28	
T29_1	685195.2888	4530816.982	11.98470657	5.96172228	1.933927853	0.710281577	T29	
T29_2	685198.4703	4530816.811	13.28917175	7.293112266	3.51997051	1.266652842	T29	
T29_3	685202.5194	4530816.593	23.17190818	14.01150644	7.077960577	3.307028813	T29	
T30_1	685200.027	4530803.951	3.927801936	3.259999759	2.893106442	2.130339046	T30	
T30_2	685205.0594	4530803.519	139.8148872	75.78918502	27.27862525	6.190704122	T30	
T30_3	685206.4837	4530803.397	5926.841596	4262.686831	2252.234578	827.1714939	T30	Suspected Culture
T30_4	685207.4332	4530803.315	1922.545073	1416.928147	910.5603467	567.9435617	T30	
T30_5	685208.6676	4530803.209	544.2922857	413.7162638	262.5765371	160.5745875	T30	
T31_1	685209.9021	4530789.711	16.91777004	9.874548001	4.604405803	1.734895424	T31	
T31_2	685213.4963	4530789.254	16.25650055	11.84561649	7.520453994	3.549338298	T31	
T31_3	685227.3055	4530787.496	4.248058117	3.777178608	2.607723348	2.465319454	T31	
T32_1	685228.1767	4530773.872	14.40044688	10.51767161	6.854381755	2.925324594	T32	
T32_2	685237.498	4530772	281.061782	210.0082824	130.3273401	78.63268237	T32	
T32_3	685245.0482	4530770.483	9.766719298	5.480533634	2.250903517	0.835730989	T32	
T32_4	685247.0989	4530770.071	7.911792568	5.048027223	2.891249874	1.499014019	T32	
T32_5	685248.4039	4530769.809	10.16300235	6.091106797	3.498218123	1.727082306	T32	
T32_6	685249.8953	4530769.51	26.41416561	16.34887875	7.985144341	3.021142598	T32	
T32_7	685257.2591	4530768.031	9.198002162	5.889448777	2.928003831	1.149248702	T32	
T32_8	685262.0129	4530767.076	9.398860219	5.715725648	3.945251673	3.206839753	T32	
T32_9	685274.8763	4530764.493	29.59123585	9.648806819	1.948635077	1.062101702	T32	
T32_10	685276.2745	4530764.212	5.227127533	3.306944374	1.587722826	1.16296172	T32	

Unique_Target_ID	X_UTM	Y_UTM	Ch1_level_lg	Ch2_level_lg	Ch3_level_lg	Ch4_level_lg	Transect	Comments
T33_1	685279.3642	4530743.193	4.93262567	4.063780874	2.775587708	2.364207583	T33	
T34_1	685238.725	4530746.819	5141.885461	3082.385665	1200.195597	307.7876531	T34	Suspected Culture
T34_2	685246.1994	4530739.884	10.64940314	5.92096812	2.789378966	0.899006066	T34	
T35_1	685229.3376	4530741.619	61.87102138	44.43374283	26.17279123	13.98427414	T35	
T36_1	685227.2805	4530698.672	17.34174104	12.16407362	6.990078747	2.996396149	T36	
T37_1	685193.5378	4530741.962	22.04811978	11.40755741	4.145503319	2.690420963	T37	
T37_2	685202.4535	4530695.66	4.945259187	3.964757725	4.109459232	2.542403816	T37	Suspected Noise (Instrument or Ambient)
T38_1	685179.8104	4530743.557	8.161527922	4.396392337	3.196189386	1.157682898	T38	
T39_1	685164.5593	4530717.88	5.881453711	4.610684133	3.09292113	1.391462875	T39	
T39_2	685164.5234	4530683.006	4.841698853	3.7256771	2.452390884	1.065898692	T39	
T40_1	685149.5188	4530745.566	100.975851	69.26446362	34.63866145	16.71763264	T40	
T40_2	685149.5438	4530702.843	6.426770178	3.269811977	1.336145632	0.160731888	T40	
T41_1	685134.495	4530749.086	21.57465001	17.00978134	11.30166787	5.651544202	T41	
T41_2	685134.4925	4530746.885	431.9305501	317.5905403	194.4463748	104.7791912	T41	
T41_3	685134.4908	4530745.325	34.26285517	25.89489839	15.81979579	6.824945884	T41	
T41_4	685134.4754	4530731.66	26.77176813	13.89540359	4.807243825	1.633424257	T41	
T41_5	685134.4659	4530723.13	7.977301139	5.906557517	3.055589557	3.10341636	T41	
T41_6	685134.4636	4530721.112	6.247490378	4.382155446	2.827526264	1.449273275	T41	
T41_7	685134.46	4530717.902	5.432598323	3.420608061	2.439872196	1.776041621	T41	
T41_8	685134.4519	4530710.657	156.3075398	113.1568584	68.79438987	40.71971987	T41	
T41_9	685134.4333	4530694.056	45.81695657	31.23443909	14.63801501	4.131231332	T41	
T41_10	685134.4269	4530688.37	4.288618739	3.732692759	2.766208771	1.977403315	T41	
T42_1	685119.2987	4530752.568	1349.299951	1007.236081	659.925452	397.9449981	T42	
T42_2	685119.2863	4530748.017	8.698332171	6.281211182	2.261735142	1.058537652	T42	
T42_3	685119.2831	4530746.834	7.012512343	5.396728407	1.955696794	2.585799502	T42	
T42_4	685119.2749	4530743.83	1570.692772	660.490307	144.0434156	17.56682251	T42	
T42_5	685119.2695	4530741.828	11.54713218	7.882710889	3.757179168	2.642624827	T42	
T42_6	685119.2596	4530738.187	155.508558	49.35364062	9.154834589	1.074601428	T42	
T42_7	685119.2398	4530730.906	12.20000505	5.23101124	1.081207249	0.250519953	T42	
T42_8	685119.2312	4530727.721	8.108376524	5.30513598	3.338846701	2.34179412	T42	
T42_9	685119.1511	4530698.231	246.1518471	159.9648364	76.7961265	28.88646641	T42	
T42_10	685119.1425	4530695.046	17.13839879	9.47761832	4.492366862	0.825251098	T42	
T42_11	685119.1365	4530692.861	7.875953369	5.876295735	3.549695992	1.599837279	T42	
T43_1	685104.5066	4530751.945	29.93649725	20.5724504	9.885992007	2.952157138	T43	
T43_2	685104.5061	4530747.323	7.2279614	5.868272178	3.376786283	2.128211503	T43	

Unique_Target_ID	X_UTM	Y_UTM	Ch1_level_lg	Ch2_level_lg	Ch3_level_lg	Ch4_level_lg	Transect	Comments
T43_3	685104.5059	4530745.589	39.13976046	28.10545534	17.14208414	10.07923189	T43	
T43_4	685104.5056	4530742.701	5.67942555	3.024093955	2.067580558	0.324265867	T43	
T43_5	685104.5053	4530740.004	19.96777964	13.59415666	7.128043885	3.916964247	T43	
T43_6	685104.5049	4530736.827	9.334411241	6.025659129	4.01108995	2.605501623	T43	
T43_7	685104.5047	4530734.997	20.3118658	10.47713025	4.32890435	2.627689809	T43	
T43_8	685104.5045	4530732.686	4.387597876	3.810041138	2.059301488	0.985716992	T43	
T43_9	685104.5027	4530717.183	19.35813388	13.27040168	7.68446562	3.983732674	T43	
T44_1	685089.5135	4530755.734	237.1389829	167.836169	100.3703338	54.23962416	T44	
T44_2	685089.5157	4530749.761	4.020935212	3.682632202	2.628996411	1.389015479	T44	
T44_3	685089.5182	4530743.115	58.36804317	41.84082963	23.54085413	9.306164894	T44	
T44_4	685089.52	4530738.202	20.00774248	14.62415496	8.195328928	3.893290904	T44	
T44_5	685089.5219	4530733	46.48412491	27.57585753	11.73304637	4.09471693	T44	
T44_6	685089.5225	4530731.266	63.68910967	37.38117403	14.00615202	2.698137747	T44	
T44_7	685089.5232	4530729.435	271.1647979	201.7590029	119.0867736	67.06238366	T44	
T44_8	685089.524	4530727.22	19.86947885	6.364363257	2.47164912	0.751854595	T44	
T44_9	685089.5249	4530724.812	29.83794082	22.2295706	13.79474608	7.551443522	T44	
T44_10	685089.5254	4530723.559	25.52476983	18.823888	11.2401861	7.210347237	T44	
T45_1	685074.5217	4530752.158	835.9874464	202.1121507	17.99694116	1.450418226	T45	
T45_2	685074.5236	4530750.049	9.152550328	3.040090499	1.626073721	0.753884849	T45	
T45_3	685074.5249	4530748.515	9.679341533	4.206317357	1.625229884	1.690102346	T45	
T45_4	685074.5403	4530731.065	21.42619839	15.1537012	8.427960529	3.248606088	T45	
T45_5	685074.5424	4530728.668	30.95785422	22.10783066	13.62457479	6.664520577	T45	
T45_6	685074.5432	4530727.71	43.61069497	32.26482381	20.01666231	12.27321	T45	
T45_7	685074.5606	4530708.055	50.29962392	27.2427867	8.933356673	2.289587425	T45	
T46_1	685059.5023	4530756.345	32.34483025	18.80718358	8.934902876	3.501986282	T46	
T46_2	685059.4994	4530753.154	103.2393108	10.12221883	0.753630773	0.005928106	T46	
T46_3	685059.4884	4530741.067	120.1920435	85.28411805	48.33662147	24.54140614	T46	
T46_4	685059.4865	4530739.036	119.30623	62.50644449	18.57638901	2.853273291	T46	
T46_5	685059.4731	4530724.338	4.679300152	3.401459322	2.011816252	1.333655999	T46	
T46_6	685059.4645	4530714.959	35.22526001	26.08311533	16.29808069	7.779144985	T46	
T46_7	685059.4606	4530710.704	14.56279433	7.295824091	3.602008033	0.895917893	T46	
T46_8	685059.4533	4530702.775	7.080558427	4.070121016	2.132788942	1.786947849	T46	
T46_9	685059.4475	4530696.393	22.11577867	9.971295378	4.043910096	1.259413676	T46	
T47_1	685044.5187	4530754.857	20.19744098	13.70832878	7.389181592	2.658486513	T47	
T47_2	685044.5193	4530753.516	40.69749741	28.2778262	15.1389622	6.899143126	T47	

Unique_Target_ID	X_UTM	Y_UTM	Ch1_level_lg	Ch2_level_lg	Ch3_level_lg	Ch4_level_lg	Transect	Comments
T47_3	685044.5214	4530749.016	216.9198297	140.9968532	64.97893997	17.63563319	T47	
T47_4	685044.5225	4530746.718	154.8142122	84.64742022	31.71999245	7.785330239	T47	
T47_5	685044.5233	4530744.994	176.329999	92.13534546	30.50828181	6.387603028	T47	
T47_6	685044.5257	4530739.824	89.79735951	67.02912119	41.65314988	19.79442139	T47	
T47_7	685044.5276	4530735.802	2581.717529	1793.277613	1042.562492	557.7363912	T47	
T47_8	685044.5294	4530731.972	5.584832888	4.211891753	2.83757918	1.472552989	T47	
T48_1	685029.3346	4530752.585	13.77085279	8.993534182	4.53874964	2.437561509	T48	
T48_2	685029.331	4530749.791	143.480959	109.3669279	73.72525606	48.77482482	T48	
T48_3	685029.3277	4530747.285	16.91574161	4.012054734	1.292100165	0.521946106	T48	
T48_4	685029.3251	4530745.358	12.2097415	6.263185435	1.988165663	1.01939488	T48	
T49_1	685017.3229	4530753.359	8.803132228	5.101451472	2.517929136	1.219009066	T49	
T49_2	685016.6076	4530738.142	23.74370574	18.91458357	12.79568432	8.666823774	T49	
T50_1	685005.5664	4530752.674	90.92387131	66.60200868	38.91249831	24.05020243	T50	
T51_1	684999.6618	4530759.055	3.940631854	3.246952267	0.778224152	0.68330402	T51	
T51_2	684993.9863	4530753.749	8.569158394	6.190998743	2.92809312	2.159713368	T51	
T51_3	684990.0412	4530750.061	4589.867807	3128.814886	1772.380195	920.9557099	T51	Suspected Culture
T51_4	684989.1414	4530749.22	6366.065217	4466.873255	2691.108494	1389.821566	T51	Suspected Culture
T51_5	684984.4349	4530744.82	5.594335663	3.919729703	2.356129384	0.855673847	T51	
T51_6	684979.7284	4530740.42	122.0731783	70.81262295	24.0890062	4.087036265	T51	
T51_7	684972.6686	4530733.821	6.790319365	4.073486989	2.541737505	1.596864578	T51	
T52_1	684996.3482	4530769.515	13.17256436	8.854718285	4.252377873	2.617551566	T52	
T52_2	684992.3317	4530767.767	57.51352877	37.16179592	19.04676328	8.224634675	T52	
T52_3	684989.9389	4530766.726	129.8298802	91.41333593	52.36891964	28.06425537	T52	
T52_4	684986.606	4530765.276	13.96339874	9.603279065	4.553014331	2.723863409	T52	
T52_5	684981.0513	4530762.859	276.9112536	179.263781	90.88264522	39.23937083	T52	
T52_6	684976.693	4530760.963	5.715674146	5.149250489	2.583245065	1.033812093	T52	
T52_7	684975.2402	4530760.331	10.41037565	8.007213541	3.684287322	2.693562815	T52	
T52_8	684971.7364	4530758.806	18.34823983	13.28471353	7.498550604	3.396346948	T52	
T52_9	684969.4291	4530757.802	10.35662108	6.099074936	1.643417985	-0.00163851	T52	
T52_10	684967.1217	4530756.799	1319.968688	904.0963957	494.1259354	255.294175	T52	
T52_11	684940.1172	4530745.049	9.417293878	3.689658511	1.494270898	0.407774422	T52	
T53_1	684990.1897	4530780.981	841.5247635	576.7256081	305.3684553	128.9292131	T53	
T53_2	684981.5844	4530779.691	1057.747129	767.1640112	467.3924239	260.4995718	T53	
T53_3	684980.3815	4530779.511	848.9889648	596.2759385	348.5295378	178.4424176	T53	
T53_4	684978.3459	4530779.206	1206.82361	835.2699694	471.7754228	231.3772336	T53	

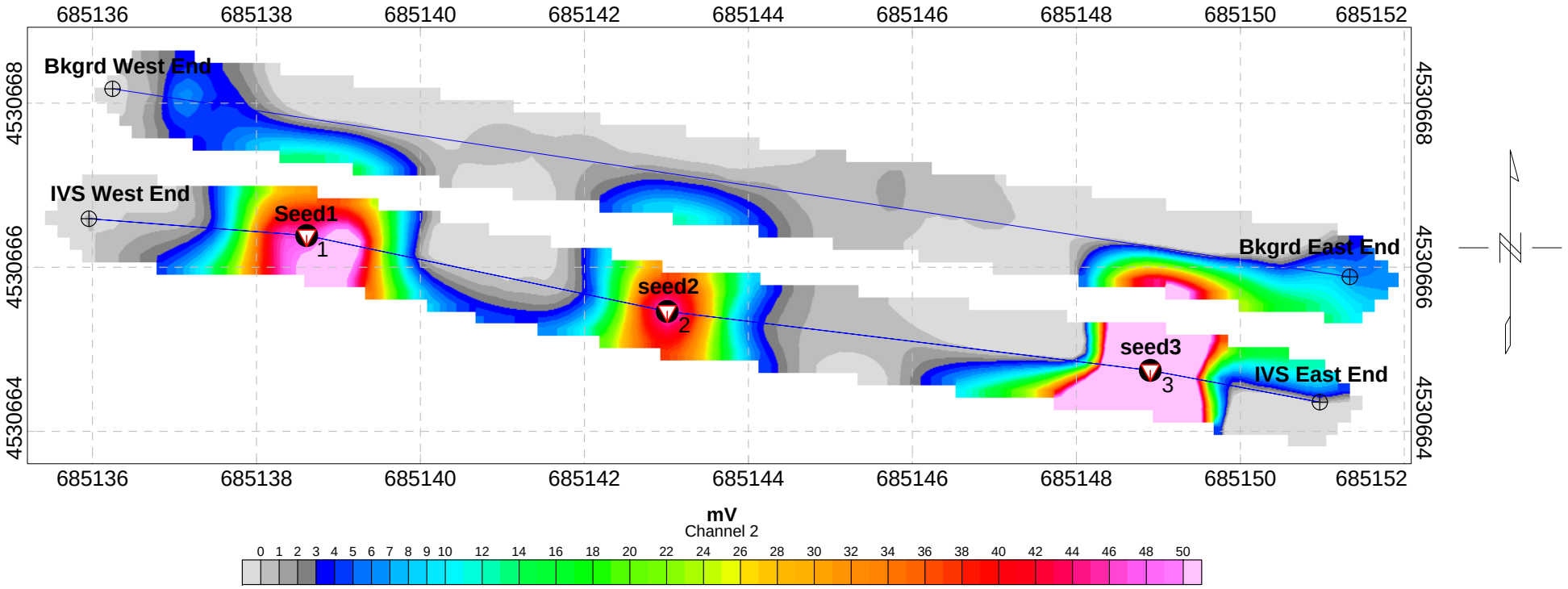
Unique_Target_ID	X_UTM	Y_UTM	Ch1_level_lg	Ch2_level_lg	Ch3_level_lg	Ch4_level_lg	Transect	Comments
T53_5	684977.2355	4530779.039	1502.65069	1059.529441	569.430451	236.7098605	T53	
T53_6	684975.6625	4530778.804	1721.721552	1171.921192	663.5759076	312.973582	T53	
T53_7	684974.2746	4530778.596	2317.332901	1541.548031	819.5371929	337.8568657	T53	
T53_8	684972.8866	4530778.388	1464.034251	1038.00487	617.6984782	333.0901493	T53	
T53_9	684971.8688	4530778.235	1323.776574	905.1518858	501.5214207	245.2425573	T53	
T53_10	684969.6481	4530777.902	567.8807323	401.6308285	233.3114771	117.3178111	T53	
T53_11	684967.89	4530777.639	454.441108	316.5674915	177.6311051	80.49197044	T53	
T53_12	684965.1141	4530777.223	2581.043806	1782.29117	1059.623676	589.2585377	T53	
T54_1	684993.4954	4530798.039	6222.59463	4104.805307	2006.15316	859.7411207	T54	Suspected Culture
T54_2	684991.3762	4530797.876	784.8321938	591.2784388	367.7608734	202.7294458	T54	
T54_3	684985.8855	4530797.453	9510.789819	8173.343954	6042.679002	4280.689472	T54	Suspected Culture
T54_4	684981.647	4530797.127	290.7628865	122.3926006	27.35412885	3.475188636	T54	
T54_5	684976.8306	4530796.757	96.06303131	67.38836266	35.19744606	14.73742338	T54	
T55_1	684990.0708	4530813.188	1771.958231	1311.377702	836.1430414	488.0566206	T55	
T55_2	684988.8524	4530813.181	2911.301615	2162.268416	1423.225787	849.6219899	T55	Suspected Culture
T56_1	684992.853	4530828.201	8.579222556	5.545261102	2.9637735	1.495948033	T56	
1	685138.613	4530666.387	72.31277822	45.66442927	24.64522452	10.13573054		IVS1 - Seed 1
2	685143.01	4530665.462	79.38655869	48.56994591	22.93328956	9.947840806		IVS1 - Seed 2
3	685148.901	4530664.743	436.5975817	316.9322407	186.8596277	100.1484235		IVS1 - Seed 3
1	685138.613	4530666.387	74.12174647	45.38284696	23.54478056	11.68897118		IVS2 - Seed 1
2	685143.01	4530665.462	78.40585906	46.72623141	21.92220357	10.9988956		IVS2 - Seed 2
3	685148.901	4530664.743	449.1056318	327.0544235	192.7138213	101.2087964		IVS2 - Seed 3

This page intentionally left blank

Appendix C

Geophysical QC Data

This page intentionally left blank



Seed_ID	Description	Orientation	Depth (meters)
1	2" x 8" pipe	Parallel	0.3048
2	2" x 8" pipe	Perpendicular	0.254
3	2" x 8" pipe	Vertical	0.127

Legend

- Selected Target (See target list for locations and mV responses)
- Survey Point
- Seed Location
- Line Path

1 0 1 2 3

(meters)

NAD83 / UTM zone 18N

NAVFAC Naval Facilities Engineering Command — RESOLUTION CONSULTANTS

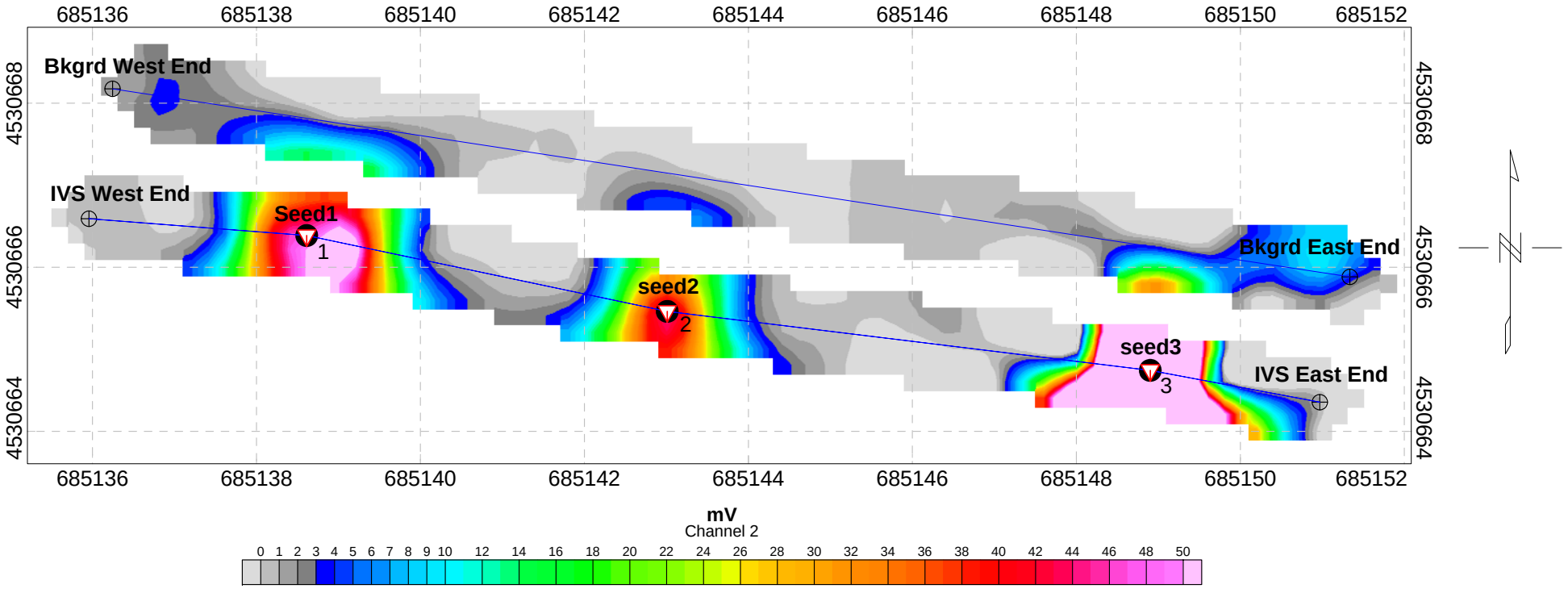
NAEVA GEOPHYSICS INC. — THE LEADER IN SUBSURFACE DETECTION

Subsurface Geophysical Surveys

Client: AECOM

EM61 MK2 IVS
IVS - 0604IVS1
Site 2 - Fire Training Area
Former Naval Weapon Industrial Reserve Plant
Calverton, New York

Date of Survey: June 04, 2013



Seed_ID	Description	Orientation	Depth (meters)
1	2" x 8" pipe	Parallel	0.3048
2	2" x 8" pipe	Perpendicular	0.254
3	2" x 8" pipe	Vertical	0.127

Legend

- Selected Target (See target list for locations and mV responses)
- Survey Point
- Seed Location
- Line Path

1 0 1 2 3

(meters)

NAD83 / UTM zone 18N

NAVFAC Naval Facilities Engineering Command — RESOLUTION CONSULTANTS

NAEVA GEOPHYSICS INC. — THE LEADER IN SUBSURFACE DETECTION

Subsurface Geophysical Surveys

Client: AECOM

EM61 MK2 IVS
IVS - 0604IVS2
Site 2 - Fire Training Area
Former Naval Weapon Industrial Reserve Plant
Calverton, New York

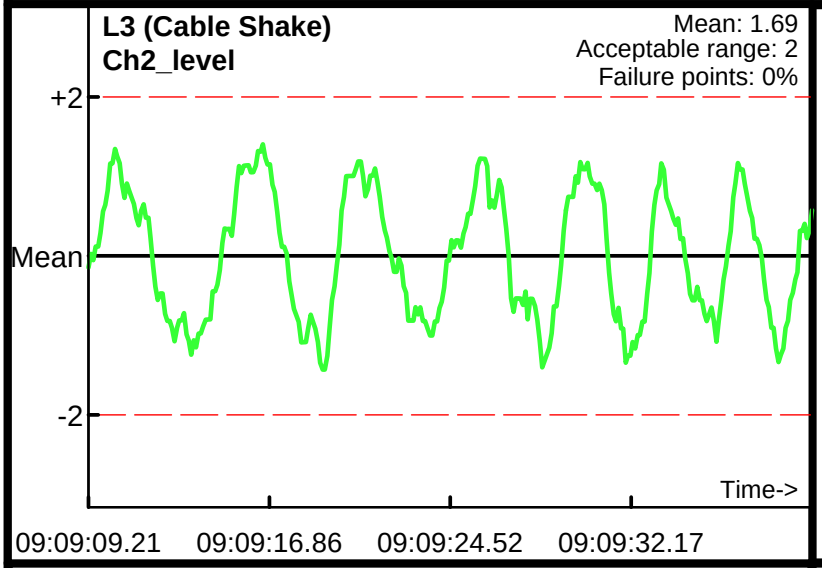
Date of Survey: June 04, 2013

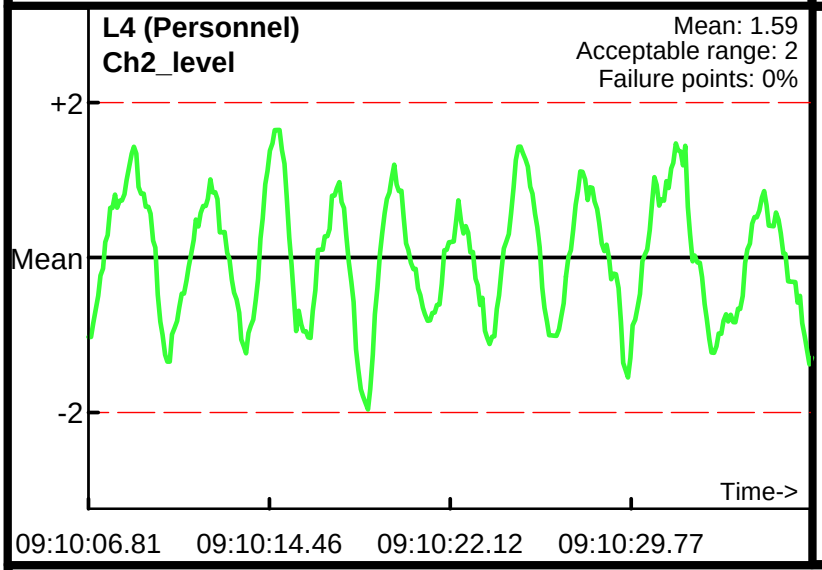
Cable Shake & Personnel Test

Project: Site 2 - Fire Training Area, NWIRP, Calverton, NY
Equipment: EM-61 Mark II
Grid/Location: Localized QC Area

Outside range
Acceptable limits

ST1 test
Operator: GeoA
Date: 06/04/2013





Database: q:\virginia office\AECOM\nwirp calverton\Data\Geosoft\QC\0604QC\0604ST1.gdb
Line Name: L3 L4 L4

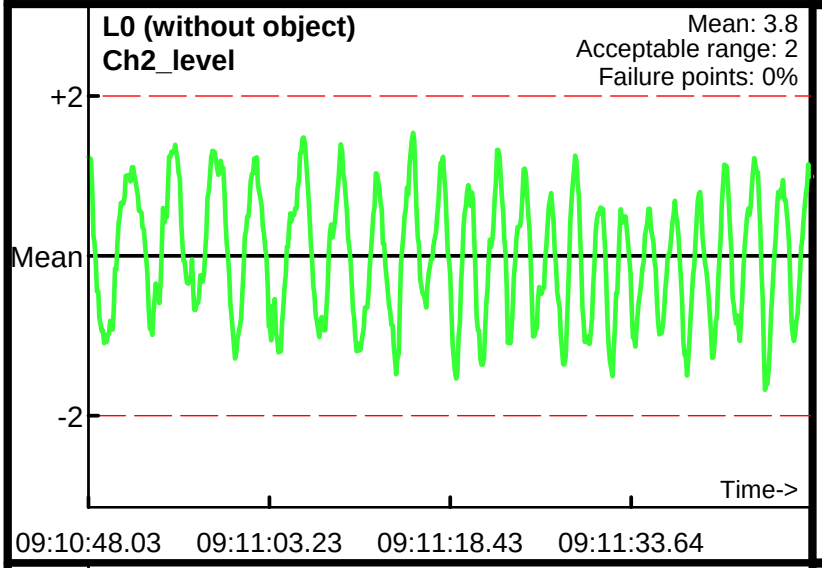
Static Calibration Test

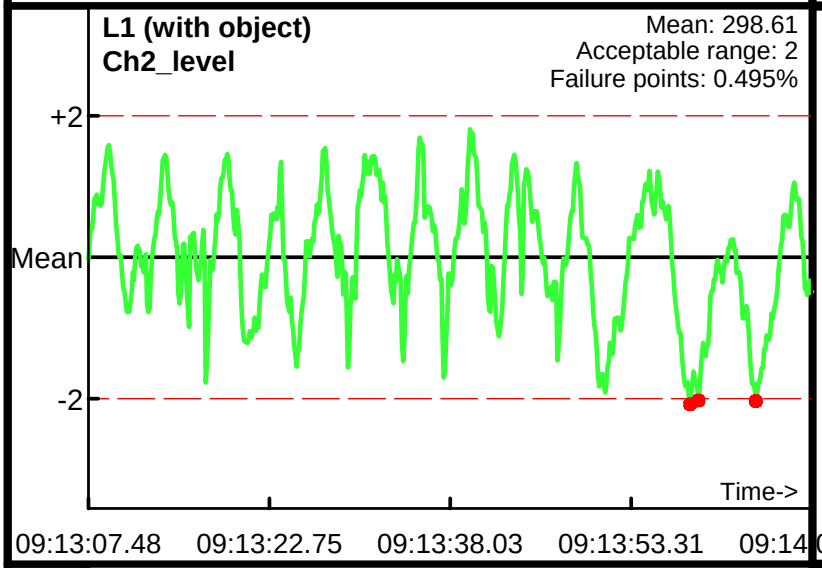
Mean Response Values
Ch2_level Without Object: 3.27
Ch2_level Signal Strength With Object: 295.34

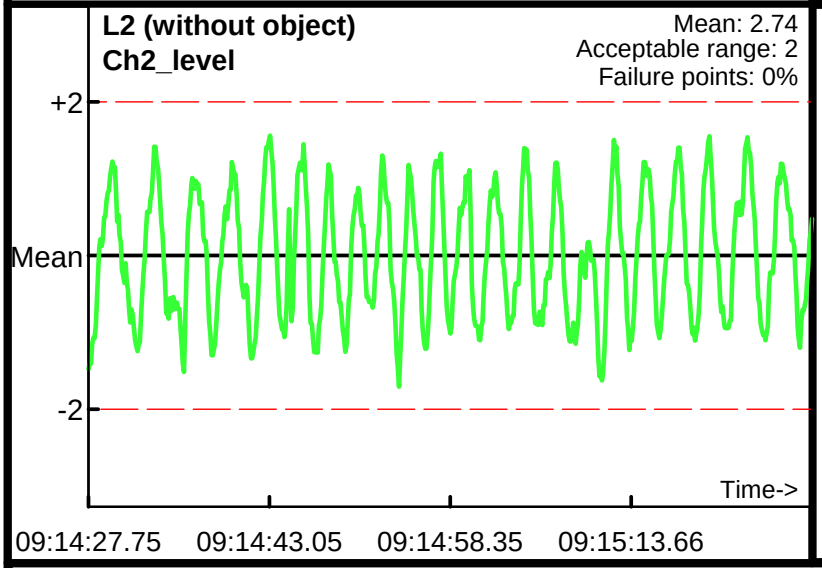
Project: Site 2 - Fire Training Area, NWIRP, Calverton, NY
Equipment: EM-61 Mark II
Grid/Location: Localized QC Area

Outside range
Acceptable limits

ST1 test
Operator: GeoA
Date: 06/04/2013







Database: q:\virginia office\AECOM\nwirp calverton\Data\Geosoft\QC\0604QC\0604ST1.gdb
Line Name: L0 L1 L2

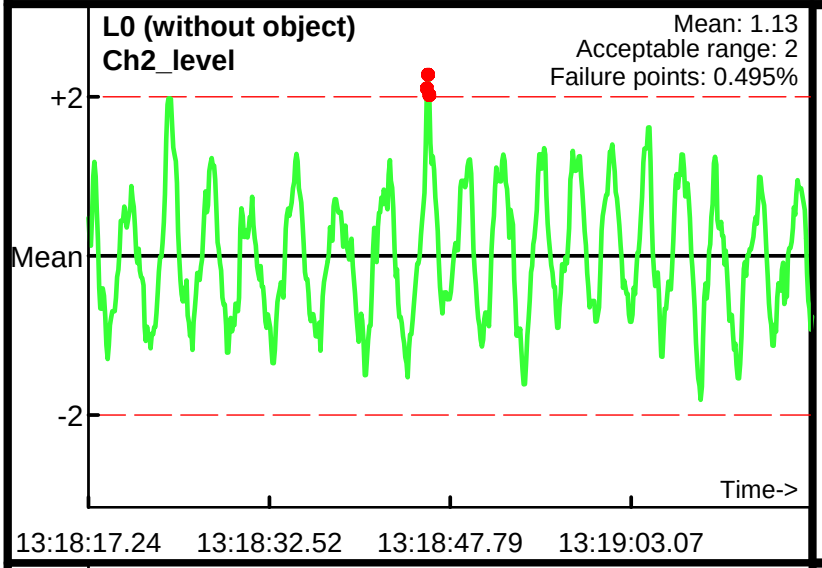
Static Calibration Test

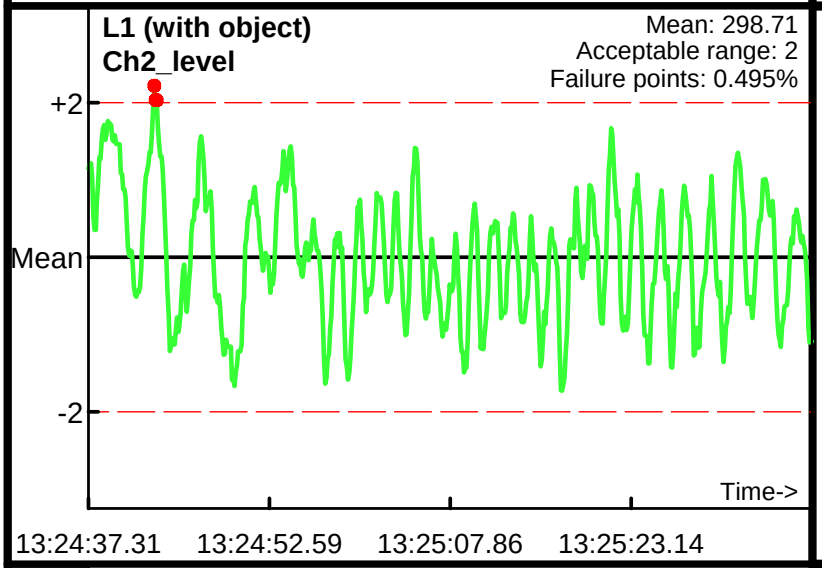
Mean Response Values
Ch2_level Without Object: 0.61
Ch2_level Signal Strength With Object: 298.10

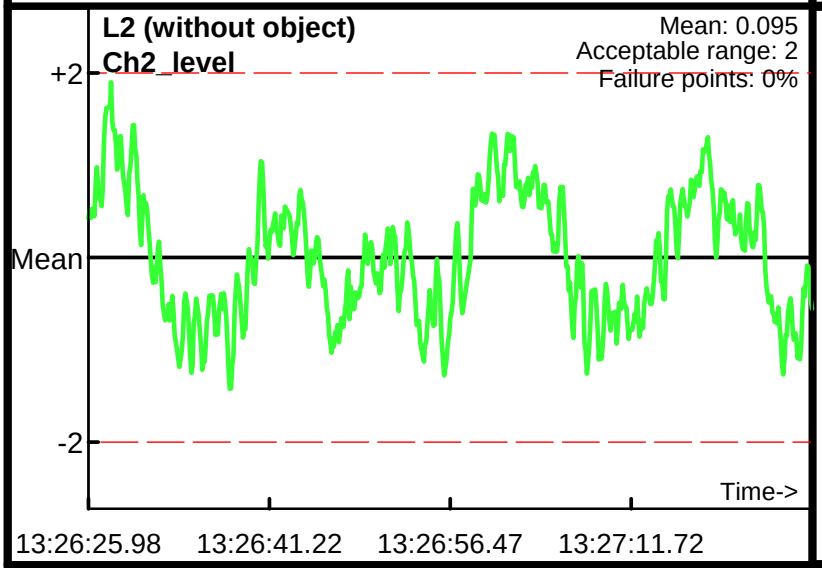
Project: Site 2 - Fire Training Area, NWIRP, Calverton, New York
Equipment: EM-61 Mark II
Grid/Location: Localized QC Area

Outside range
Acceptable limits

ST2 test
Operator: GeoA
Date: 06/04/2013







Database: q:\virginia office\AECOM\nwirp calverton\Data\Geosoft\QC\0604QC\0604ST2.gdb
Line Name: L0 L1 L2

This page intentionally left blank