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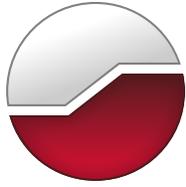


# MRS

Munitions Response Services

## **UXO Survey and Clearance Navy Island**

**Dartmouth, Nova Scotia**



# GEMTEC

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# MRS

Munitions Response Services

Submitted to:

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**UXO Survey and Clearance  
Navy Island**

**Dartmouth, Nova Scotia**

January 31, 2022  
Project: 100051.030

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GIS Standards	DCC Geospatial Data Standard V1.07
MEC Layering & Attributes	DND MEC Field Data Layering and Attribute Database, V2.3
DGM Standards	DGM Standards For Munitions Response Projects, V3.0
Work Plan	GEM_WP_Geophysical Survey Plan
Work Plan	GEM_WP_Quality Control Plan
Report	GEM_RPT_Daily Geophysical Report
Report	GEM_RPT_Daily Operations Report
Report	GEM_RPT_Daily Quality Control Report
Standard Operating Procedure	GEM_SOP_Construction Support
Standard Operating Procedure	GEM_SOP_Detector Clearance
Standard Operating Procedure	GEM_SOP_High Density Anomalous Area Characterization

Reference Documents	
Document	Title
Standard Operating Procedure	GEM_SOP_MS Screening and Handling
Standard Operating Procedure	GEM_SOP_Subsurface Investigation

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File: 100051.030 – R3

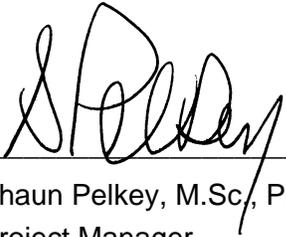
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Attention: Kyle Jarvis

**Re: FINAL REPORT - UXO Survey and Clearance – Dartmouth, Nova Scotia**

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Please find enclosed the final report for the above mentioned project. If you have any questions do not hesitate to contact the undersigned.



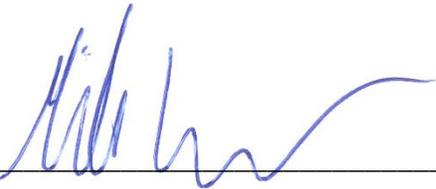
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## EXECUTIVE SUMMARY

Fisheries and Oceans Canada retained GEMTEC Consulting Engineers and Scientists Limited (GEMTEC) and MRS Management Limited (MRS) under Contract 4500015119 to carry out a survey for Unexploded Explosive Ordnance (UXO) at the site of a fishing vessel (Hydra Mariner) that ran aground on Navy Island in Dartmouth, Nova Scotia. The all-steel 38 metre vessel was moored in Wright's Cove for the last number of years with no ongoing maintenance. During adverse weather conditions experienced on January 17, 2021, the vessel broke free of its mooring and ran aground on the eastern side of Navy Island. Prior to commencing removal operations, Canadian Coast Guard (CCG) required a UXO survey of the area around the vessel to ensure the removal operation could be completed safely. Navy Island is considered a federally contaminated site due to the possible presence of UXO's caused by a battery explosion in 1945.

Following the initial geophysical survey by the project team, the original scope of work (Phase One: Survey) was expanded to include investigation and clearance of the identified geophysical targets. During the period from November 30, 2021 to December 14, 2021, GEMTEC / MRS provided equipment and personnel to carry out the fieldwork, which included: UXO avoidance & escort, IVS construction and instrumentation verification, geophysical surveys (land and marine), detector-aided clearance (DAC), subsurface clearance; MEC handling (Screening, Packaging and Transporting); and a final report and GIS deliverables.

The project methodology, results, and conclusions are detailed in this report. All work followed the submitted Work Plan. Key project findings are summarized as follows:

- Digital Geophysical Mapping (DGM) – 0.19 ha of DGM was completed using an electromagnetic geophysical system (EM61 cart) and 0.27 ha was completed using a fluxgate marine magnetic array (Vallon);
- Geophysical Targets – 104 EM targets and 52 Mag (marine) targets were investigated;
- Detector Aided Clearance (DAC) risk reduction of vegetated areas on the island and around the boat (marine) – 0.26 ha (land & water) were covered, with 58 DAC land targets and 8 marine targets investigated;
- Two UXOs were recovered and turned over to the Fleet Diving Unit (FDU) for offsite disposal (one 5-inch HE projectile; one 4-inch HE projectile – no fuze);
- Quality Control – 2 geophysical seeds were recovered (1 land and 1 marine), equipment checks and IVS results passed, and no quality issues were identified;
- Potential for UXO immediately adjacent to and under the vessel was noted; and,
- All MS was Level 3 screened and Chain of Custody forms were completed for 2 separate deliveries, totalling 80 kg, to CFAD Bedford, NS.

The UXO Survey and clearance activities within the project site reduced the UXO risk for the future salvage / boat removal operations.

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## GLOSSARY

Acronym	Description
ASIG	Analytic Signal
DAC	Detector-Aided Clearance (DAC)
DGM	Digital Geophysical Mapping
EM	Electromagnetic
EMP	Environmental Management Plan
EO	Explosive Ordnance
EOD	Explosive Ordnance Disposal
FS	Field Supervisor
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GSP	Geophysical Survey Plan
HAB	Hazard Awareness Briefings
HDAA	High-Density Anomalous Areas
HE	High Explosive
ISO	Industry Standard Object
IVS	Instrument Verification Strip
MEC	Munitions of Explosive Concern
MS	Munitions Scrap
MWP	Master Work Plan
NMS	Non-Munitions Scrap
PL	Project Leader
QC	Quality Control
QCI	Quality Control Inspections
QCP	Quality Control Plan
QCS	Quality Control Specialist
RTK	Real-Time Kinematic
SOP	Standard Operating Procedure

SOW	Statement Of Work
UXO	Unexploded Explosive Ordnance
T	Technician
TS	Technical Supervisor

## **1.0 INTRODUCTION**

GEMTEC Consulting Engineers and Scientists Limited (GEMTEC) and MRS Management Limited (MRS) were retained by Fisheries and Oceans Canada under Contract 4500015119 to provide Unexploded Explosive Ordnance (UXO) services in the vicinity of a fishing vessel (the Hydra Mariner) that ran aground on the east side of Navy Island in Dartmouth, Nova Scotia. The work is required to reduce the risk of encountering a UXO prior to issuing a removal contract for the vessel.

This report is presented in seven main sections. Section 1, the Introduction, includes a description of the project site and historical background. The Methodology for the project is presented in Section 2 including a summary of each project task. The Quality Control Plan is discussed in Section 3 followed by Materials Management in Section 4, Lessons Learned in Section 5, and the Results and Conclusions are presented in Section 6. Section 7 outlines the limitations of the work.

### **1.1 Site Specifics**

#### **1.1.1 Location**

The project area encompassed an approximate 46 metre radius around a grounded vessel (the Hydra Mariner), which is situated on the eastern side of Navy Island, near Wrights Cove in the Bedford Basin, Nova Scotia. The island consists of two sections that are connected by a narrow sand and gravel spit that is submerged at high tide. The project work was completed on the smaller southern portion of the island. Refer to attached drawings in Appendix A. A seasonal dock is present near the southern end of the island and was used for access to the work site.

#### **1.1.2 Background**

During adverse weather conditions experienced on January 17, 2021, the fishing vessel the Hydra Mariner broke free of its mooring and ran aground on the eastern side of Navy Island. The all-steel 38 metre vessel was moored in Wright's Cove for the last number of years with no ongoing maintenance. Prior to commencing removal operations, the Canadian Coast Guard (CCG) required a UXO survey of the area around the vessel to ensure the operation could be completed safely. Navy Island is considered a federally contaminated site due to the possible presence of UXO's caused by a battery explosion in 1945.

#### **1.1.3 Site Conditions**

The southern portion of Navy Island is approximately 0.7 ha in size and rises 3 to 5 metres above sea level. The eastern shore rises steeply up 1 to 3 metres from the high tide level. The island is covered with mixed vegetation including mature trees, light to dense shrubbery, grasses and areas of thick undergrowth. The beach on the eastern shore is covered with sand and gravel, and occasional boulders. The exposed western shore of the island is rocky and boulder strewn.

A photographic log of the project work is included in Appendix B.

#### 1.1.4 Initial UXO Risk Summary

Sections of past documents relating to UXO were provided by the CCG / DFO to the project team for review. Most of the citations relate to past environmental studies and broader UXO studies / reviews, Navy Island is only mentioned in a peripheral manner, with the exception of a 2002 study by *Dillon Consulting Ltd. 2002. Unexploded Ordnance (UXO) Survey - Phase I Area, Canadian Forces Ammunition Depot (CFAD) Bedford, Nova Scotia.*

There is considerable uncertainty surrounding the distribution of munitions into the Bedford Basin from the 1945 magazine explosion and the potential presence of munitions on the shorelines of Wrights Cove from Rent Point to Navy Island. Navy Island is located within 1 mile (1.6 kilometers) of the epicentre of the 1945 explosion and documents suggest that the potential for encountering UXO within this area is high. In addition, past ordnance recovery exercises in this area were limited to Level 1 clearances, essentially involving the recovery of ordnance related to materials present on the surface of the ground. The conclusions of the 2002 magnetic sensor survey performed on Navy Island by Dillon Consulting Ltd. are presented below:

- *On Navy Island, 64 anomalies investigated by Dillon, 36 were found to be the result of UXO, including one live 20mm shell. The ordnance was destroyed on site by Fleet Diving Unit (FDU), according to project requirements. The geophysical anomalies investigated represents approximately 2% of the total number anomalies identified. Approximately 2% of the anomalies excavated on Navy Island were UXO. Linear extrapolation implies 66 UXO to exist within the 2.2 hectare area of Navy Island.*

Based on information provided and the limitations of the past clearance activities (i.e., Level 1 – surface clearances), it is our opinion that the UXO risk for Navy Island should be considered high.

## 1.2 Scope of Work

Activities performed under this contract were outlined in the Statement of Work (SOW) in Solicitation No 30001288 as well as through additional consultation with CCG. Based on the SOW and further consultation with the CCG the contract includes three separate phases that are summarized as follows:

### Phase One: Survey

- Conduct a preliminary geophysical survey in the vicinity of the vessel, Hydra Mariner. The survey will need to include all areas within a 46 metre (150 foot) radius of the vessel, both on land and waterside. Survey must be conducted to assess the presence of UXO on Navy Island prior to vessel removal operations.
- Conduct a safety briefing with all non-UXO Specialists prior to commencing operations.
- Provide CCG with a written report of findings. Department of National Defense will have to be notified immediately if any UXO are found during the survey.

## Phase Two: Consultation (CCG Optional, dependant on findings from Phase One.)

- UXO Specialist will be required to periodically attend planning meetings with CCG, Environmental response and contractors throughout the planning phase of the operation. The UXO Specialist will be required to attend the meeting and provide input as to whether or not specific vessel removal options are feasible as per the results of the survey.
- The UXO Specialist will consult with CCG ER upon receiving final vessel disposal plans to ensure risks posed by UXO's are mitigated.

## Phase Three: Oversight (CCG optional, dependant on findings from first 2 phases)

- UXO Specialist may be required to provide oversight of the project and have personnel on site throughout the duration of the operation.
- For the operational phase of the project, daily presence may not be required.
- Conduct surveys of the operational area and ensure there is no presence of UXO.
- Conduct a safety briefing with all non-UXO experts prior to commencing operations.
- Provide daily reports to the CCG Incident Commander, or designate.
- Upon completion of the project provide CCG Technical Authority with a final written report.

Potential activities under this Contract may also include: UXO avoidance, signage installation, UXO investigation activities including wide area assessments and hard prove outs, geophysical surveys, communication and institutional control, risk reduction, subcontracted consultant support for UXO services and general UXO support.

This report includes the results of Phase One (Geophysical Survey) and elements of Phases Two and Three (i.e., safety briefings, UXO investigation/clearance and risk reduction, and consultation).

### 1.3 Deliverables

Below is a list of all digital deliverables:

**Table 1: Summary of Digital Deliverables**

Description	Format	Schedule
Daily Operations Report	PDF	The next business day
Daily Quality Control Report	PDF	The next business day
Daily Geophysical Report	PDF	The next business day
Health, Safety and Environmental Plan	PDF	Prior to work commencement
Photo Documentation	Photos of interest in	Demobilization

Description	Format	Schedule
	Report Appendix	15 business days
GIS & Database (incl. Raw and Processed Data)	Data upon request (USB or portable drive)	Demobilization + 15 business days
Letter and Map Confirming Clearance / Risk Reduced Areas	Draft and Final PDF	Immediately Following Clearance
Draft Report (incl. all Appendices)	PDF	Demobilization + 15 business days
Final Report (incl. Raw and Processed Data)	PDF	Within 10 business days of receipt of comments

## 2.0 METHODOLOGY

This section presents the methodology employed for work activities that were carried out as part of the project. A general description of each work activity can be found in the project work plan, UXO Survey, Navy Island – Work Plan, dated November 29, 2021.

### 2.1 Mag and Flag Surveys

Hand-held detectors were employed to survey the vegetated areas of the island and the area close to the hull of the vessel. Each anomaly was pinpointed by a UXO technician using a hand-held detector (Schonstedt and DML2000-XR,) and the anomaly position was recorded by the field geophysicists using a Real-Time Kinematic Global Positioning System (GPS). This work was performed following standard operating procedures outlined in **GEM\_SOP\_Detector Clearance**. All anomalies were subsequently investigated as described in Section 2.3.

### 2.2 Geophysical Surveys

Geophysical surveying was carried out as per the Geophysical Survey Plan (**GEM\_WP\_Geophysical Survey Plan**) and in accordance with the DCC DGM Standards. Two different technologies were employed to complete the geophysical survey. On land, the survey was performed using a Geonics Limited Electro-Magnetic (EM) cart – the EM61. For the marine survey, a fluxgate gradiometer (Vallon VXV16 magnetometer array) was used. A combination of configurations (wheeled cart, pontoon boat, and kayak suspended system) were used as the tow vehicle for the marine survey. Up to sixteen (16) probes were used for the marine survey.

An instrument verification strip (IVS) was constructed to demonstrate that on a daily basis the geophysical systems performed as expected.

### 2.2.1 Positioning System

Positioning of the geophysical survey data collected by the geophysical platform was achieved using a Real-Time Kinematic (RTK) Global Navigation Satellite System (GNSS). GNSS technology uses line-of-sight satellites to triangulate the X, Y, and Z positions of the GNSS antenna. To increase spatial accuracy, a Network Base Station was used to transmit differential corrections to the mobile unit. The corrections were applied to compensate for atmospheric distortions and significantly increase positional accuracy.

### 2.2.2 Survey Execution

Survey execution was carried out in accordance with the Geophysical Survey Plan (**GEM\_WP\_Geophysical Survey Plan**).

Daily functional tests were conducted and results compared to established thresholds to ensure Data Quality Objectives (DQO) were met throughout the project. DQO's assigned to each test were noted in the Daily Geophysical Reports.

### 2.2.3 EM61 Data Processing

Electromagnetic data responses are commonly affected by numerous factors including the temperature of the coils and the air during data acquisition. Variations in temperature throughout the course of a survey and during the warm-up of the coils can cause what is known as instrument drift. At the beginning of each data file, the system was nulled to effectively force all EM data traces to zero in an area with no external response. This nulling procedure establishes a baseline during the data collection for a given survey session. By the end of the session, the EM data traces (all time channels) may have drifted from this baseline and require correction during post processing. The drifting is more pronounced in the early time gates. There are many methods of correcting data drift, but one method is to use a linear or polynomial multi-point selection along interpreted zero points to restore data to the established baseline.

As discussed above, the first step of processing the EM61 data required a multi-point, linear offset correction to remove the instrument drift from the data.

Following the multi-point leveling/drift correction, a secondary statistical leveling routine was completed on the data to remove background effects likely originating from geology or due to subtle variations caused by a de-coupling of the receiver coils within the primary field. The routine for this correction applied the following boundaries in order to subtract background noise while preserving any real target responses expected for the scope of this project:

- A. A median filter was applied across each profile and over each EM data channel (this characterized the trend but skips over low wavelength features typical of real targets).

- B. The filtered channel is then dummed to an amplitude threshold (typically 3 to 5 mV in Ch1). This way any long wavelength features exceeding this range mV would not get leveled.
- C. Lastly a bleed limit was applied in order to preserve the edges of the targets. Whenever the threshold was reached, a bleed limit of up to 20 to 30 samples on each side of the anomaly is applied. This preserves long wavelength features that exceed the threshold (prevents destruction of anomaly edges) and also prevents sub-baseline leveling effects in high density anomalous areas.
- D. With the above steps, only low wavelength features would be leveled out entirely.

Following these data processing steps, the data was lag corrected by 3 samples and gridded using a grid cell size of 0.5 metres and a blanking distance of 1.0 metre.

#### **2.2.4 Magnetic Data Processing**

Data from the Vallon magnetic array was stored on a local computer during data acquisition. Once surveying was complete, data was transferred from the acquisition computer to the Project Geophysicist. Initial processing on the survey data was conducted using the following steps:

- A. Data processing began with converting the RAW files to ASCII XYZ for import into Geosoft Oasis Montaj;
- B. Positional data was projected into the coordinate system using the NAD83 datum;
- C. Raw magnetic data was lag corrected to adjust for system latency;
- D. Due to an inherent drift in the magnetic data from diurnal, regional geology and other large nearby metal (primarily the Hydra Mariner hull), a manual drift correction routine was used to straighten the baseline of the data while minimizing the effects on anomalous responses. This profile was called the Mag Trend and was subtracted from the raw magnetic data. This trend was calculated by first using a non-linear rolling statistics filter followed by a low-pass filter.
- E. The magnetic analytic signal (ASIG) was then calculated from the drift corrected gradient data to assist with target selection.
- F. Grids were generated using a 0.5 metre cell size and a blanking distance of 1.0 metre.

#### **2.2.5 GPS Processing**

All EM data was collected using RTK positioning and GPS scatter tests confirmed that the data accuracy offset was met during each day of survey. Test results are included Appendix C.

### **2.2.6 Anomaly Selection**

The purpose of the target selection was to identify a subset of geophysical anomalies that exhibited a response expected from a wide range of ordnance items to a maximum depth of investigation (DOI) of 0.75 metres.

The EM platform generates a primary field and receives secondary responses in the Z-axis that is perpendicular to the horizontal plane. This means for any conductor related to ordnance, the measured response will peak over the target body. Generally speaking, conductors with better coupling to the primary field produce stronger secondary fields. Also, strong conductors (e.g. thick walled iron) produce stronger late time amplitudes versus weak conductors (e.g. thin walled aluminum). The spatial extent of the EM response is a good indication of the size of the item and the amplitude is closely related to depth and composition.

### **2.2.7 Target Selection**

The target selection method for both the EM and magnetic data consisted of a few steps. The entire databases were gridded and profiled, and analyzed in a plan map view. The entire picking process was manually conducted with automation only used as a first pass assessment of the data.

The results of the geophysical survey were compiled in a Geosoft database. All EM targets were selected starting at an amplitude of approximately 2 mV. All magnetic targets exhibiting any form of dipole response, which were not likely the result of a distant response were also selected.

### **2.2.8 Target Attributes**

All target picks had associated EM or ASIG response amplitudes to loosely define their size and depth extent. The EM channel three (3) response value was assigned to each target pick for future removal/disposal in order to provide a general reference for re-acquisition and confirmation of removal. Although the early time gate EM channel values were not associated to each target, these values were referenced during the target selection to identify potential false positives and the presence of rapidly decaying (weak) conductors.

All target picks were based on a combination of profile and 2D-plan map peaks. The response value associated with each target was assigned directly from the gridded data.

The results are summarized in the attached Dig Sheet, Appendix D.

## **2.3 UXO Investigation and Clearance**

All anomalies that were identified through the detector-aided (hand-held) and geophysical surveys were investigated, and items causing the responses were removed or positively identified and left in place.

### **2.3.1 Detector Aided Clearance (DAC)**

On land, the detector-aided clearance (DAC) team typically consisted of four personnel (1 UXOFS, 1 UXOQCS, 1 UXOTS and 1 UXOT). The team completed 0.22 ha of risk reduction work on the island and 0.04 ha in the water. The team utilized hand-held detectors and maintained survey lanes as well as marked progress using visual markers. Vegetation was not cut, therefore areas of thick underbrush may not be fully cleared in these locations. The depth of clearance was 45 centimetres although small munitions may not be detected at shallower depths. The DAC was conducted in accordance with the team SOPs.

The DAC work in the water adjacent to the vessel was performed by a three person crew in accordance with SOPs. All DAC areas are shown in the Site Overview Map in Appendix A. All dig sheets are included in Appendix D.

### **2.3.2 Subsurface Clearance**

Subsurface clearance activities were carried out on discrete geophysical targets, and also on high-density anomalous areas (HDAA) where target responses were not able to be discerned on land and in the water around the vessel. The dig team typically consisted of four personnel (1 UXOFS, 1 UXOTS, 1 UXOTs, and the UXOQCS) with assistance from the PL as required.

Discrete geophysical targets were re-acquired using hand-held detectors and investigated using the standard offset method – dig adjacent to the target and use hand-held detectors to approach the target from the side. This step-down approach was used when excavating targets in order to avoid accidentally interacting with the item. Digging on the side of the item proceeds until the target is detected along the side wall of the hole. The earth between the hole and side wall is slowly removed using precision tools until some part of the item is exposed and identification can be made.

The HDAA on land were cleared using the EM61 to pinpoint targets, which were subsequently investigated and removed until the area was cleared. The land HDAA were situated just above the high tide mark and resulted from high amounts of metal fragmentation (frag) from detonated munitions. Based on the frag distribution (very localized) it appears to be from the in-situ detonation of high explosive munitions that were possibly found on the island or in the surrounding area and brought to the island for disposal.

One HDAA in the water was identified as a result of large concrete blocks with rebar, which ultimately were left in place. All other removed targets were verified by a QC survey using the same equipment as the original survey.

### 3.0 QUALITY CONTROL PLAN

The Quality Control Plan (QCP) section describes all quality objectives adhered to during the course of the call-up in accordance with the Quality Control Plan (**GEM\_WP\_Quality Control Plan**).

The QC authority is responsible for ensuring that personnel accomplish all equipment quality checks and that the appropriate logbook entries are made. The QC authority performs internal auditing at a random unscheduled time to ensure that personnel accomplish all work specified in the task plan. The following section details some of the QC processes followed throughout the project.

#### 3.1 UXO Clearance DQO's

Quality control objectives were established and recorded as per the GEMTEC Daily Quality Report (100051.030\_RPT Daily Quality Control Report) in order to ensure data quality throughout the course of the project, the following functional tests related to the UXO clearance were also performed at various intervals:

- GPS Accuracy Test
- Instrument Response Test

The above items were analyzed in accordance with the specifications determined prior to survey commencement. Table 2 shows each test and the frequency at which they were performed. The daily QC results were reported in the Daily Geophysical Report (100051.030\_RPT\_Daily Geophysical Report). An example of this form can be found in Appendix C.

**Table 2: Quality Control Test Frequencies**

QC Action	Daily		Start of Project	Non-Conformances
	Morning	Evening		
GPS Accuracy Test	•		•	None
Instrument Response Test	•	•	•	None

##### 3.1.1 Accuracy Test

To evaluate the positional accuracy of the GPS rover used during target layout, accuracy tests of the equipment were conducted daily. The GPS receiver was positioned overtop a known control point at the project site. A single position was acquired daily. Accuracy tests were evaluated to ensure the equipment was operating within specifications (< 5 centimetres).

### 3.1.2 Instrument Response Test

In order to ensure the power output of the EM equipment remains constant throughout the course of the project, an instrument response test was conducted against a known object each day the EM61 cart assembly was used. The EM61 supplemented hand-held detectors to clear target locations after each dig, and was also used as a QC check on 100% of dig locations to ensure target locations were cleared (< 5 mV signal response, where applicable).

To facilitate this measurement, a standardized item was secured to the system each day (when in use), and responses were evaluated based on the system's repeatability against the baseline value established at the beginning of the project. During tests, the measured response offset was determined from the 3rd EM time gate and the difference between the baseline (without the item) and the peak response (with item) was evaluated as the measured offset.

### 3.1.3 QC Seeding

Validation of the geophysical survey and subsurface investigation is accomplished with a quality control seeding program. A total of two (2) QC seed items were buried randomly within the property footprint including one on land and one marine. Both QC seeds were successfully located during the geophysical survey program and recovered during UXO clearance activities. See Table 3 below for seed detection details.

**Table 3: Seed Item Results**

Item No.	Item Description	Depth to the Top (m)	Grid Value		Actual Position (NAD83)		Interp. Position (NAD83)		Offset (m)
			EM 61	Vallon	X(m)	Y(m)	X(m)	Y(m)	
1	Small ISO	0.1	60.3 mV	N/A	451089.209	4,949,473.308	451,089.27	4,949,473.28	0.064
2	Medium ISO	0.0	N/A	9.1 nT	451,080.44	4,949,515.29	451,080.41	4,949,515.24	0.058

### 3.2 Site Specific Training Process

Upon project commencement, a brief training session was given to all members of the project team to ensure that each team member had a thorough understanding of project objectives, the importance of quality control, what constitutes a failure, how to communicate issues of concern, and their individual roles and responsibilities.

Site-specific safety training included:

- Hazards associated with possible Munitions of Explosive Concern (MEC) items;
- Actions to take if MEC items are discovered;
- Contact Information and route to Hospital; and
- Location of emergency equipment.

All onsite personnel and subcontractors attended a Safety Briefing presented by the UXOFS prior to gaining access to the site.

### 3.3 Daily Quality Control Inspection Process

All instruments and equipment were checked prior to the start of each workday, batteries were replaced as needed, and instruments requiring calibration were checked against a known source. Table 4 below describes the frequency and personnel responsible for various checks and briefs during the project.

The UXOFS and Project Geophysicist were responsible for ensuring that personnel accomplished all equipment quality checks and that the appropriate records were maintained. QC authorities perform random, unscheduled Quality Control Inspections (QCI) to ensure that personnel accomplish all work specified in the project SOW.

**Table 4: Project Related Checks & Frequencies**

Task	Responsible Person	Frequency
Personnel Qualifications	UXOPL	Project Commencement / Personnel Changes
Communications Equipment	UXOFS	Daily
Geophysical Functional Tests	P.Geo.	Daily
Geophysical DQO Verification	P.Geo.	Daily
Safety Inspection Fire Fighting	UXOFS	Daily
Safety Briefings	UXOFS	Daily
Safety and Health Program	UXOPL	Weekly
Current On-Site Work Plan	UXOPL	Weekly
Visitor Briefings	UXOFS	As required
Hazard Assessment	UXOFS	Project Commencement / Personnel Changes
Site Specific Training	UXOFS	Project Commencement / Personnel Changes

## 4.0 MATERIAL MANAGEMENT

### 4.1 Munition Scrap

During the UXO clearance, 80.0 kg of Munition Scrap (MS) items were recovered from the project site. All MS was Level 3 screened and disposed of at the Canadian Forces Ammunition Depot (CFAD) in Bedford. Included in the MS was a base plate from a 6-pounder (bomb) and fragmentation from miscellaneous detonations. Most of the fragmentation appears to be from Explosive Ordnance Disposal (EOD) procedures that were performed on previously found munitions. Chain of Custody documentation were completed upon the release of the MS to the CFAD Representative (see Appendix F).

### 4.2 Non-Munitions Scrap

Non-Munition Scrap (NMS) was Level 3 screened prior to being recognized as being safe-to-transport on public roads. Collected NMS was disposed of in accordance with the local disposal procedures. NMS included scrap metal, nails, bolts, tires, chains, and minor amounts of garbage (refer to the attached Dig Sheet in Appendix D).

## 5.0 LESSONS LEARNED

The main lesson that was learned during the project is outlined below:

### **Topic #1: Multiple Geophysical Platforms Required to Complete Beach and Near Shore Marine Surveys**

**Problem:** High winds prevented the boat that was deploying the Vallon mag system from tracking properly. The system is normally attached to the front of the survey boat. Due to tight project timelines it wasn't possible to wait for the winds to abate. The system had to be reconfigured twice to complete the marine survey. For near shore projects, the transition from beach to shallow water and then deeper water is challenging, and tides and winds have to be taken into account in choosing the optimal geophysical platform for the conditions.

**Solution:** Arrive at the project site with multiple deployment options for the geophysical survey gear.

## 6.0 RESULTS AND CONCLUSIONS

GEMTEC/MRS and their subcontractors carried out the fieldwork for the Navy Island project (Fisheries and Oceans Canada Contract 4500015119) between November 30 and December 14, 2021. The following results and conclusions for the project are presented:

- The project area was divided into four zones where different risk reduction strategies were employed to mitigate the risk of encountering a UXO: Zone 1- island above the high tide mark (hand-held detectors); Zone 2- beach area down to low tide (EM61 Mk2); Zone 3 -

marine excluding area immediately adjacent to the grounded vessel (Vallon mag array); and, Zone 4 - within 3 metres of the vessel hull (underwater hand-held detectors).

- Approximately 0.46 ha of Digital Geophysical Mapping (DGM) was completed as follows: 0.19 ha of DGM was completed using an EM61 cart (beach) and 0.27 ha using a marine magnetometer sensor array (Vallon Mag array). The depth of investigation (DOI) was 0.75 metres. Sediments transition from sand and gravel with occasional boulders along the shore to soft silt and clay in the deeper water approximately 8 metres from the low tide mark measured on December 8, 2021. In total 104 EM61 targets and 52 Vallon Mag targets were selected by the project geophysicists for follow up investigation.
- All high priority targets were investigated during the subsurface clearance. In addition, 1 HDAA along the high tide mark was cleaned up using the EM61 to aid in locating the items for removal.
- Anomalies that were identified using hand-held detectors were marked using high precision RTK GPS and pin flags were inserted adjacent to target locations for follow up investigation. In the water, long poles were used to mark target locations.
- Two UXOs were recovered during the investigation and clearance activities, and both were turned over to the Fleet Diving Unit (FDU) for offsite disposal (one 5-inch HE projectile; one 4-inch HE projectile – no fuze).
- Approximately 80 kg of munitions scrap (MS) was recovered during the UXO subsurface clearance activities and turned over to ammo section at CFAD under signed Chain of Custody.
- A Quality Control Plan (QCP) was implemented to cover all geophysical and MEC processes. The results of the QCP indicated that all activities provided reliable and defensible results.

The risk reduction methodology and limitations for each zone is summarized on the attached drawing, UXO Investigation – Clearance Areas, Appendix A.

## 6.1 Recommendations

As part of future vessel recovery operations, GEMTEC / MRS recommends that UXO construction support be put in place to help guide recovery efforts. UXO personnel will provide Hazard Awareness Briefings (HAB) to all personnel on site, including any new personnel arriving after project initiation. A salvage plan for the vessel may also require review by GEMTEC / MRS prior to the commencement of salvage operations. If required, the review would be used to determine if salvage efforts require modification (if possible), and/or additional UXO work/consultation. While every effort should be made to limit ground disturbance at the site, ground disturbance will likely be unavoidable to fully remove the vessel. When ground disturbance is required, GEMTEC / MRS may be called upon to review the risk associated with the task Activities that should be avoided or require UXO consultation during salvage operations include the following:

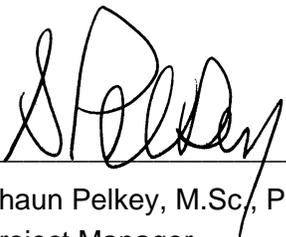
- Cutting and dropping of salvage material into the soft sediments around the vessel;
- Cutting torches used within 0.5 metres of the ground surface or on the inside of the ship where the hull is in contact with the ground/seafloor;
- Any form of ground disturbances in the soft sediments and immediately adjacent to the vessel where only handheld clearance was conducted including spuds, anchoring systems and excavation; and
- Working outside of the surveyed locations as described in Appendix A. If required, work outside of these areas would only allow for non-intrusive surface activities with escort by onsite UXO personnel.

## 7.0 STATEMENT OF LIMITATIONS

The site conditions described in this report are based on information obtained during the completed assessment and are based solely on the condition of the site at the time of the survey and clearance work. The results may not be relied upon by any third parties without consent from GEMTEC and our client, Fisheries and Oceans Canada and the Canadian Coast Guard.

The findings and conclusions documented in this report have been prepared for the specific application to this project, and have been developed in a manner consistent with the level of care normally exercised by professionals currently practicing under similar conditions in the jurisdiction. If new information is discovered during future work, GEMTEC reserves the right to re-evaluate and amend the conclusions of this report, as required, prior to any reliance upon the information presented herein.

We trust this report provides sufficient information for your present purposes. If you have any questions concerning this report, please do not hesitate to contact our office.



---

Shaun Pelkey, M.Sc., P. Eng.  
Project Manager



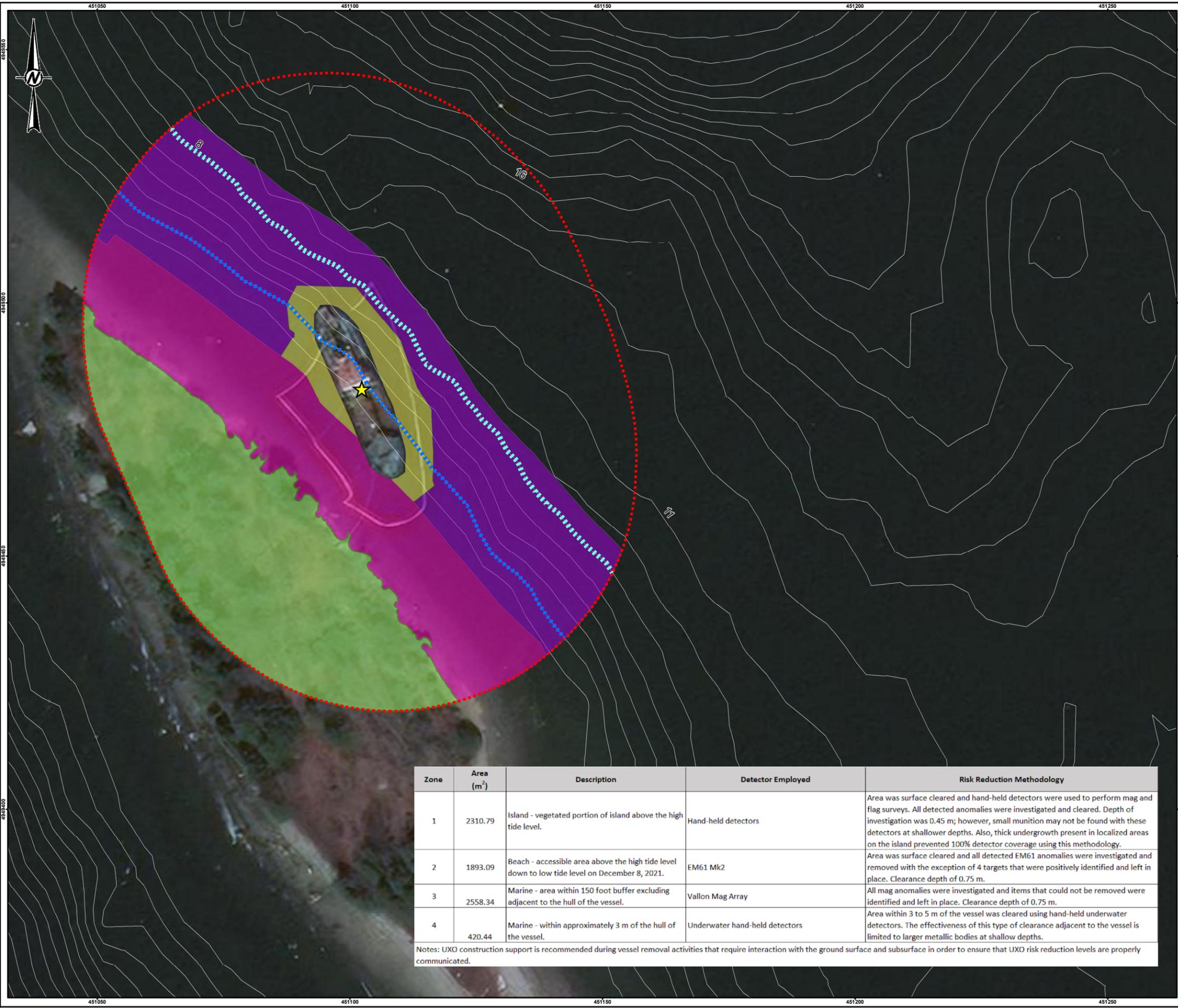
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Sean Scrivens, P. Geo.  
Senior Geophysicist



## **APPENDIX A**

### Navy Island Drawings

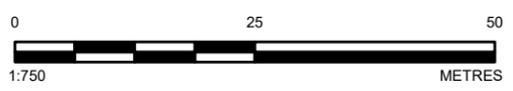


**LEGEND**

- ★ HYDRA MARINER
- WATER DEPTH
- 8 FEET - PROJECT EXTENT
- TRANSITION - HARDPACK TO SOFT SEDIMENT
- FOOTPRINT BUFFER

**WORK AREA**

- ZONE 1 - RISK REDUCTION
- ZONE 2 - CLEARANCE
- ZONE 3 - CLEARANCE
- ZONE 4 - RISK REDUCTION



**NOTE(S)**

- CONTOUR LINES ARE DERIVED AT 0.5M INTERVALS AND THEN MULTIPLIED BY 3.281 FOR AN APPROXIMATE FOOT VALUE.
- WATER DEPTH MEASURED IN FEET

**REFERENCE(S)**

- WORK AREAS DERIVED BY MRS MANAGEMENT/GEMTEC, 2021
- CANADIAN HYDROGRAPHIC SERVICE NON-NAVIGATIONAL (NONNA 10) BATHYMETRIC DATA OBTAINED FROM FISHERIES AND OCEANS CANADA, 2020.
- HYDRA MARINER DIGITIZED BY CONSULTANT USING ARCGISONLINE.COM ARCGIS MAP SERVICES, WORLD IMAGERY.

BASEMAP REFERENCE: ESRI ARCGISONLINE.COM ARCGIS MAP SERVICES, WORLD IMAGERY  
MAP PROJECTION: NAD83 UTM20N

CLIENT  
**FISHERIES AND OCEANS CANADA** Fisheries and Oceans Canada Pêches et Océans Canada

PROJECT  
**NAVY ISLAND UXO SURVEY**

TITLE  
**UXO INVESTIGATION - CLEARANCE AREAS**

CONSULTANT	YYYY-MM-DD	2021-12-23
GEMTEC CONSULTING ENGINEERS AND SCIENTISTS	DESIGNED	SEAN SCRIVENS
MRS Munitions Response Services	PREPARED	LINDSAY LEWIN
	REVIEWED	SEAN SCRIVENS
	APPROVED	SHAUN PELKEY

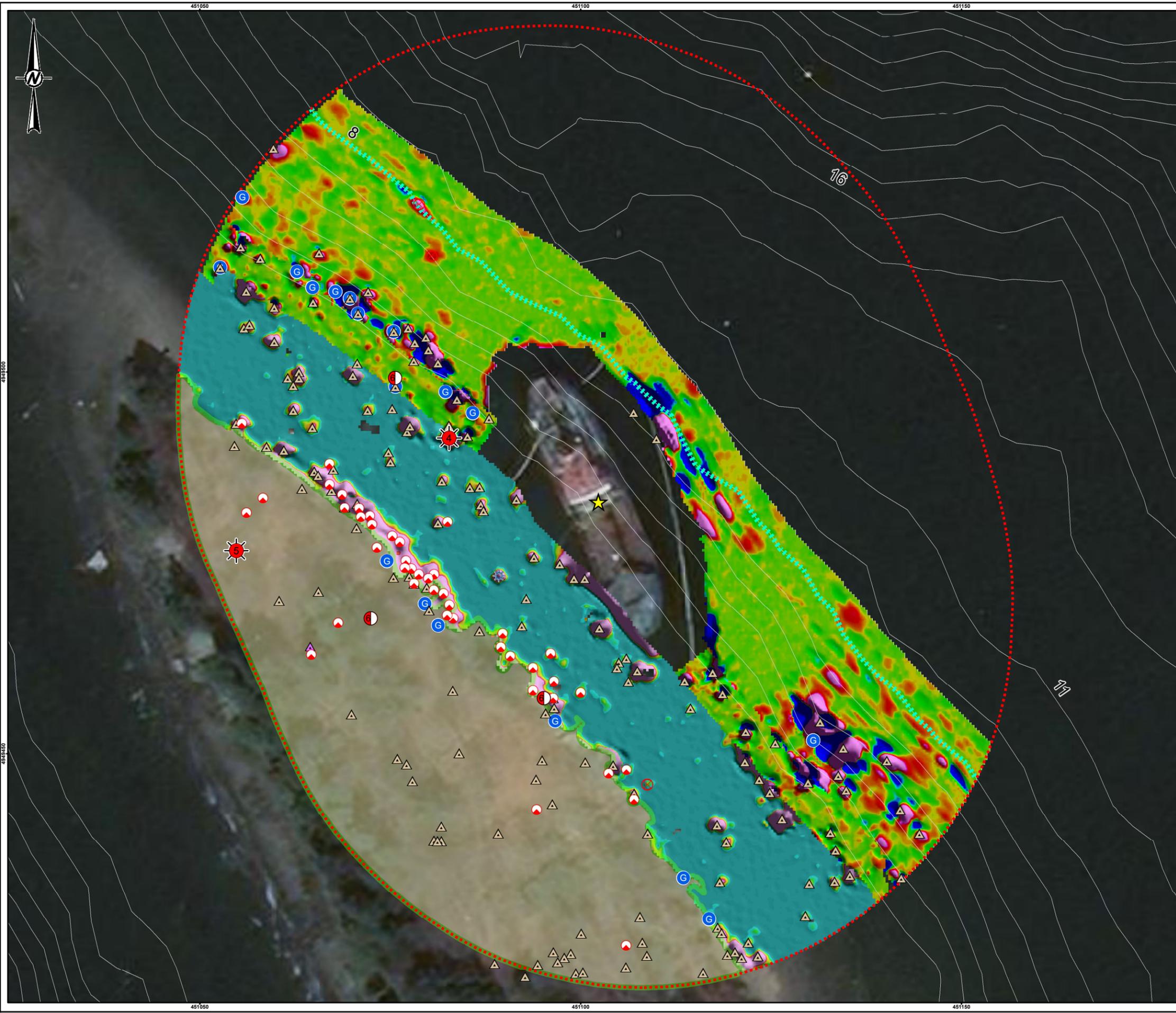
PROJECT 0396-0601 REV. 1

Zone	Area (m <sup>2</sup> )	Description	Detector Employed	Risk Reduction Methodology
1	2310.79	Island - vegetated portion of island above the high tide level.	Hand-held detectors	Area was surface cleared and hand-held detectors were used to perform mag and flag surveys. All detected anomalies were investigated and cleared. Depth of investigation was 0.45 m; however, small munition may not be found with these detectors at shallower depths. Also, thick undergrowth present in localized areas on the island prevented 100% detector coverage using this methodology.
2	1893.09	Beach - accessible area above the high tide level down to low tide level on December 8, 2021.	EM61 Mk2	Area was surface cleared and all detected EM61 anomalies were investigated and removed with the exception of 4 targets that were positively identified and left in place. Clearance depth of 0.75 m.
3	2558.34	Marine - area within 150 foot buffer excluding adjacent to the hull of the vessel.	Vallon Mag Array	All mag anomalies were investigated and items that could not be removed were identified and left in place. Clearance depth of 0.75 m.
4	420.44	Marine - within approximately 3 m of the hull of the vessel.	Underwater hand-held detectors	Area within 3 to 5 m of the vessel was cleared using hand-held underwater detectors. The effectiveness of this type of clearance adjacent to the vessel is limited to larger metallic bodies at shallow depths.

Notes: UXO construction support is recommended during vessel removal activities that require interaction with the ground surface and subsurface in order to ensure that UXO risk reduction levels are properly communicated.

PATH: C:\Users\lindsay.lewin\Desktop\ROOT\ACTIVE PROJECTS\0396-0601\_Navy\_Island\Map\GIS\3\_Maps\MRS-0602-GS-MD-0031\_UXO\_Investigation\_ClearanceAreas.mxd

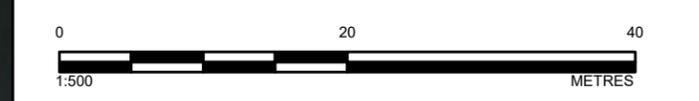
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B



**LEGEND**

**INVESTIGATIVE RESULTS**

- UXO 4" PROJECTILE FULL-BODY
- UXO 5" PROJECTILE FULL-BODY
- 6 LB PROJECTILE COMPONENT HE
- FRAGMENTATION
- SMALL ARMS AMMUNITION
- NON-MUNITION SCRAP
- FALSE POSITIVE
- ISO SEED ITEM
- GEOLOGIC
- HYDRA MARINER
- WATER DEPTH
- 8 FEET - PROJECT EXTENT
- EM61 - DETECTOR AIDED CLEARANCE
- PROJECT FOOTPRINT



**NOTE(S)**

1. **CONTOUR LINES** ARE DERIVED AT 0.5M INTERVALS AND THEN MULTIPLIED BY 3.281 FOR AN APPROXIMATE FOOT VALUE.
2. **WATER DEPTH** MEASURED IN FEET

**REFERENCE(S)**

1. **INVESTIGATIVE RESULTS** PROVIDED BY MRS MANAGEMENT/GEMTEC, 2021
2. **GEOPHYSICAL MAPPING** DERIVED BY P.GEO USING GEOSOFTE SOFTWARE, 2021, MRS MANAGEMENT
3. **CANADIAN HYDROGRAPHIC SERVICE NON-NAVIGATIONAL (NONNA 10) BATHYMETRIC DATA** OBTAINED FROM FISHERIES AND OCEANS CANADA, 2020.
4. **WORK AREA BOUNDARIES** DIGITIZED BY CONSULTANT BASED ON A 300 FT BUFFER SURROUNDING THE SHIPWRECK FOOTPRINT AND A WATER DEPTH OF 8FT.
5. **HYDRA MARINER** DIGITIZED BY CONSULTANT USING ARCGISONLINE.COM ARCGIS MAP SERVICES, WORLD IMAGERY.

BASEMAP REFERENCE: ESRI ARCGISONLINE.COM ARCGIS MAP SERVICES, WORLD IMAGERY  
 MAP PROJECTION: NAD83 UTM20N

CLIENT  
**FISHERIES AND OCEANS CANADA** Fisheries and Oceans Canada Pêches et Océans Canada

PROJECT  
**NAVY ISLAND UXO SURVEY**

TITLE

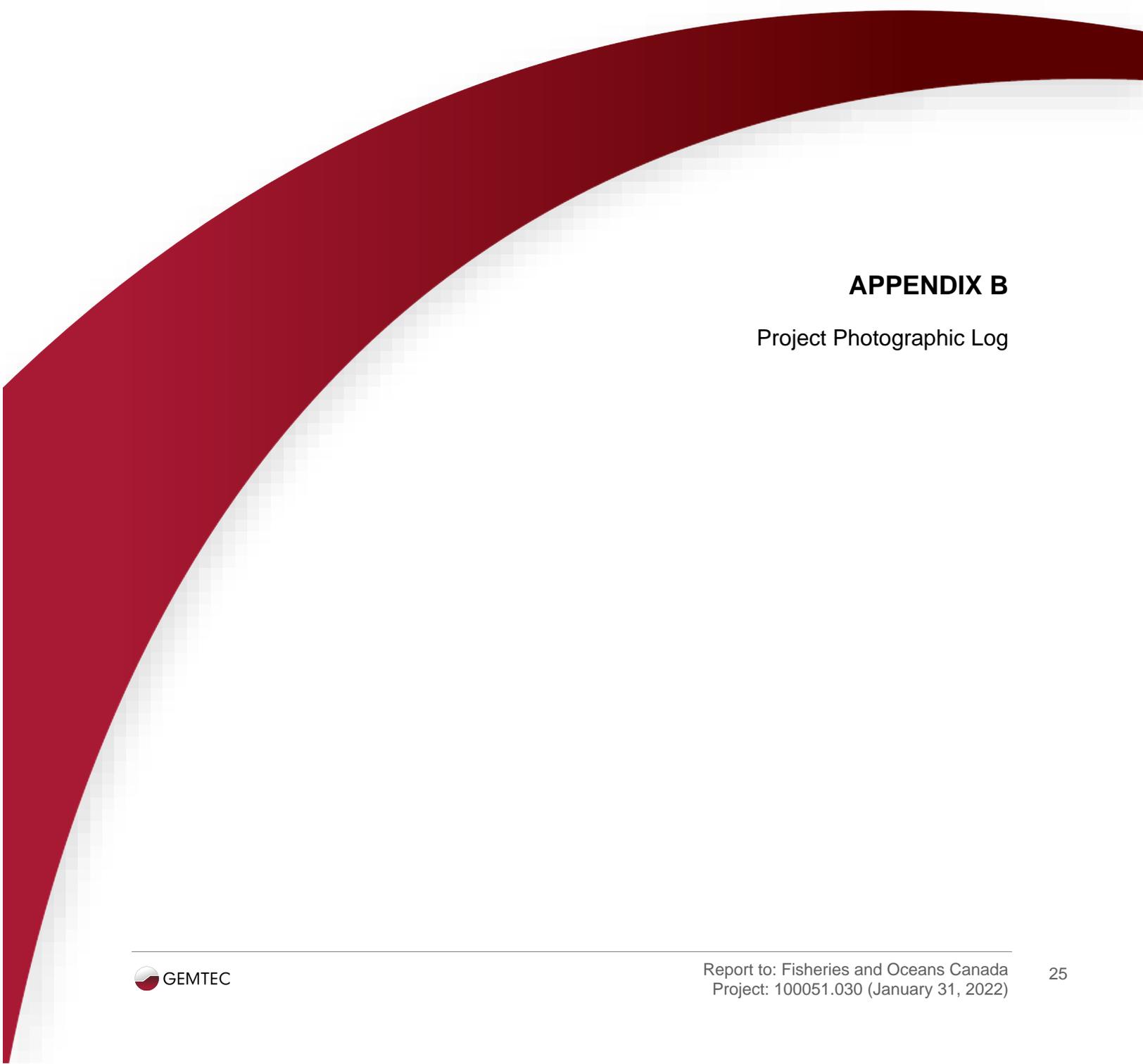
**UXO INVESTIGATION - INVESTIGATIVE RESULTS**

CONSULTANT	YYYY-MM-DD	2021-12-23
<b>GEMTEC</b> CONSULTING ENGINEERS AND SCIENTISTS	DESIGNED	SEAN SCRIVENS
	PREPARED	LINDSAY LEWIN
<b>MRS</b> Munitions Response Services	REVIEWED	SEAN SCRIVENS
	APPROVED	SHAUN PELKEY

PROJECT 0396-0601 REV. 1

PATH: C:\Users\lindsay\OneDrive\Work\PROJECTS\0396-0601\_Navy\_Island\Map\_0396-0601\_UXO\_Investigative\_Results.mxd  
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IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B  
 20mm



## **APPENDIX B**

### Project Photographic Log



View of Navy Island and grounded vessel from Dartmouth Yacht Club (top). View of vessel from dock on Navy Island, looking north (bottom left). Dock on Navy Island (bottom right).



32 Steacie Drive, Ottawa, ON K2K 2A9  
 T: (613) 836-1422 | www.gemtec.ca | ottawa@gemtec.ca

Mobilizing to Navy Island starting at Dartmouth Yacht Club (top left), during voyage (top right), and arriving at the dock on the island (bottom).

Project

UXO Survey, Navy Island

Project No.

100051.030

**FIGURE B2**



32 Steacie Drive, Ottawa, ON K2K 2A9  
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Detector aided clearance (DAC) activities on Navy Island: using a metal detector to pinpoint and flag anomalies (top left); recording anomaly locations using a RTK GPS (top right); and, re-acquiring and investigating targets (bottom).

Project

UXO Survey, Navy Island

Project No.

100051.030

**FIGURE B3**



32 Steacie Drive, Ottawa, ON K2K 2A9  
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EM61 Mk2 survey activities: Instrument Verification Strip (IVS) survey (top left); instrument function tests (top right) ; and, beach survey (bottom).

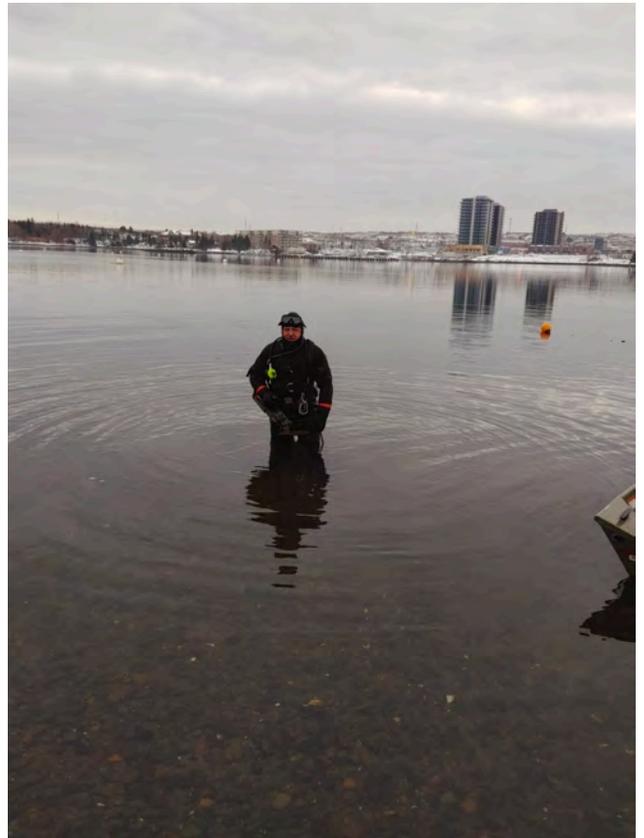
Project

UXO Survey, Navy Island

Project No.

100051.030

**FIGURE B4**



32 Steacie Drive, Ottawa, ON K2K 2A9  
 T: (613) 836-1422 | www.gemtec.ca | ottawa@gemtec.ca

Marine survey: setup of Vallon mag array (top); flagging and investigating mag anomalies / targets (bottom left); and, preparing for search around vessel hull (bottom right).

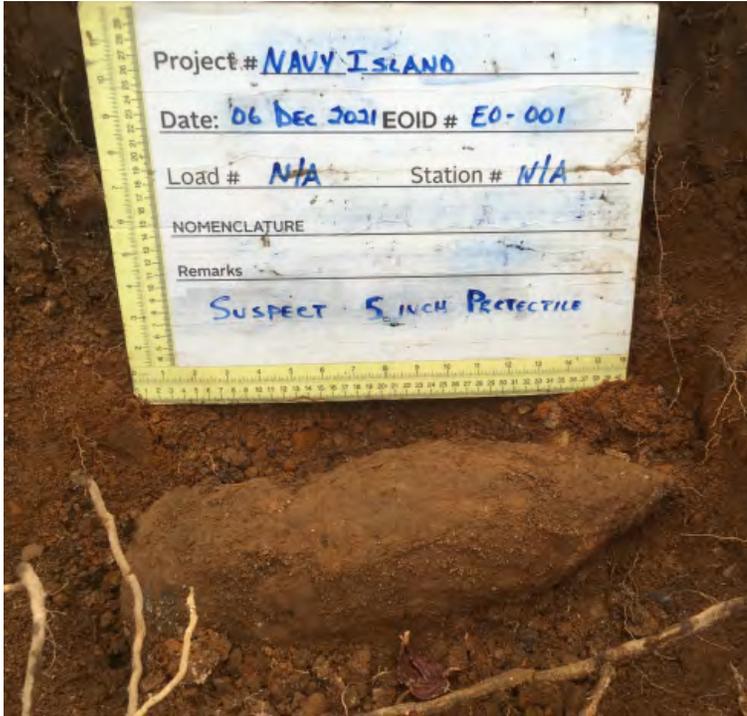
Project

UXO Survey, Navy Island

Project No.

100051.030

**FIGURE B5**



32 Steacie Drive, Ottawa, ON K2K 2A9  
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UXO found: 5-inch projectile (top left) and 4-inch projectile (top right).  
Munitions scrap (MS) from high-density anomalous areas (HDAA)  
and various other locations (bottom).

Project

UXO Survey, Navy Island

Project No.

100051.030

**FIGURE B6**



32 Steacie Drive, Ottawa, ON K2K 2A9  
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Examples of Non-Munitions Scrap (NMS) recovered from surveys.

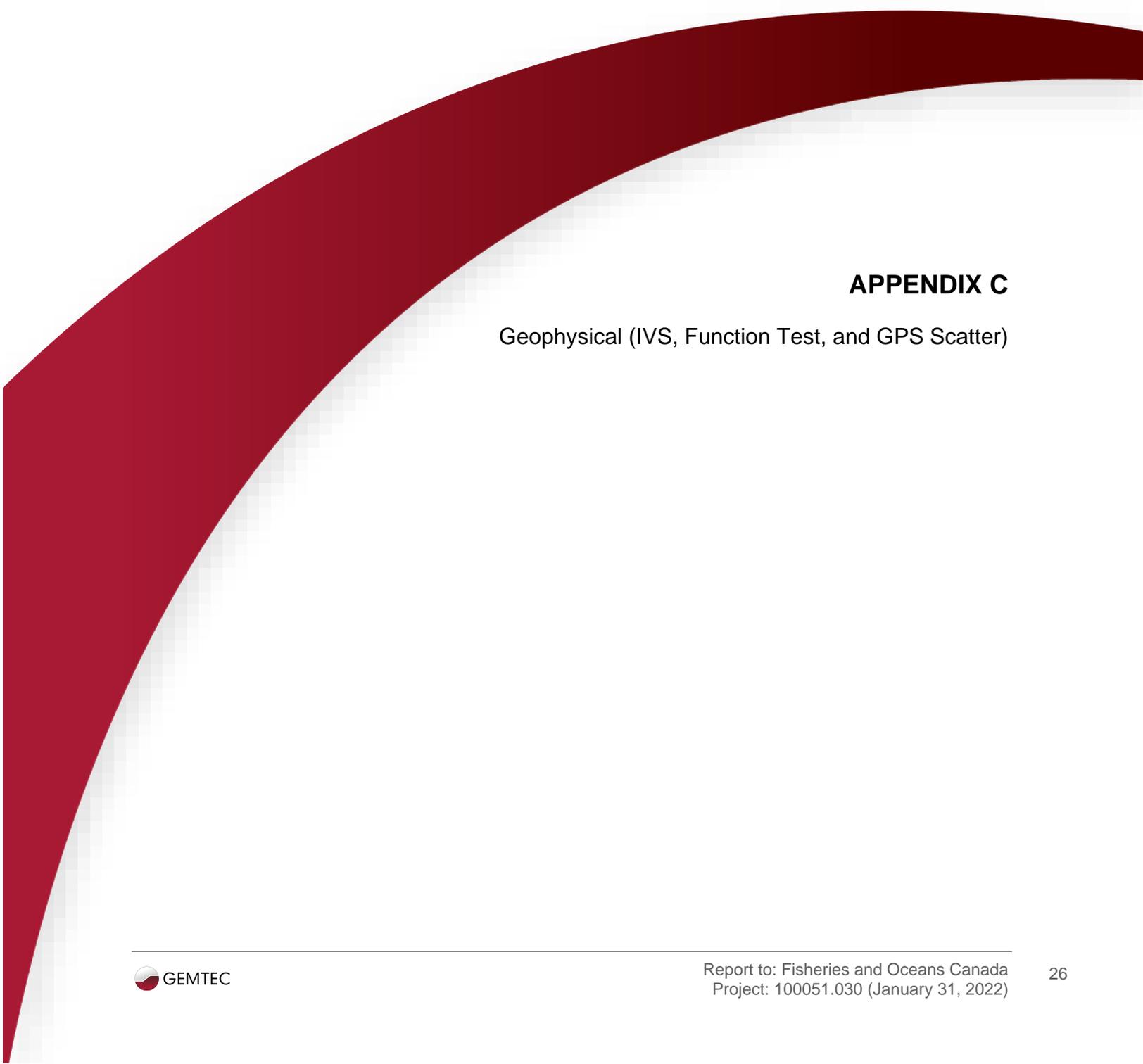
Project

UXO Survey, Navy Island

Project No.

100051.030

**FIGURE B7**



## **APPENDIX C**

Geophysical (IVS, Function Test, and GPS Scatter)

**Project Details**

Project Name:	UXO Survey, Navy Island
Project Number:	100051.03
Contract Number:	4500015119

Prepared By:	Mike West
Date (YYYY-MM-DD):	2021-11-30
Task Number:	EM61 Beach Survey

**Daily / Overall Progress**

Survey Type:	EM61 Cart
Date of Last SPO or IVS:	2021-11-30
Current Work Area:	Beach

Total Survey Progress (Ha):	0.158
Daily Progress (Ha):	0.158
Percent Complete (%):	Approximately 85%

**Project Equipment Baselines**
**EM SENSORS**

	EM61-mk2	EM63 Rx1	EM63 Rx2	EM63 Rx3	EM63 Rx4
Instrument Response Base Values (mV):	80.5	N/A	N/A	N/A	N/A
Static Background Noise Threshold (mV):	1.5	N/A	N/A	N/A	N/A
Responses During Cable Shake Test:	No	No	No	No	No
Responses During Personnel Test:	No	No	No	No	No

 Positional Lag (samples): 
**GPS Control Point:**

451130.690 E	4949365.730 N
--------------	---------------

**Project Data Quality Objectives**
**EM SURVEY SYSTEM DQO's**

	Limit/DQO
Instrument Response Diff.:	10%
Static Test Background Noise Levels:	95% less than mV threshold
Detectable Response During Cable Shake Test:	No
Detectable Response During Personnel Test:	No

\*Note: All EM tests conducted on Channel 3 data

**GPS EQUIPMENT DQO's**

	Limit
GPS Positional Accuracy:	5 cm
GPS Positional Scatter:	95% within 5 cm
Target Accuracy:	70 cm

**Data Quality Control Results**

EM61-mk2 (Ch3)	EM63 EM Coils (Ch3)				
	Rx1	Rx2	Rx3	Rx4	
<b>AM FUNCTIONAL TESTS</b>					
Instrument Response Diff (mV/%):	0/0	N/A	N/A	N/A	N/A
Static Background Noise (%>DQO):	0	N/A	N/A	N/A	N/A
Response During Cable Shake Test?	No	No	No	No	No
Response During Personnel Test?	No	No	No	No	No
<b>PM FUNCTIONAL TESTS</b>					
Instrument Response Diff (mV/%):	0.7/0.9	N/A	N/A	N/A	N/A
Static Background Noise (%>DQO):	0	N/A	N/A	N/A	N/A
Response During Cable Shake Test?	No	No	No	No	No

**GPS ROVERS**

	GS14	GS18
<b>AM Functional Tests</b>		
Accuracy Offset (cm):	N/A	0
Data Scatter > DQO (%):	N/A	0
<b>PM Functional Tests</b>		
Data Scatter > DQO (%):	N/A	0

**General Comments**

The initial function and accuracy tests are the established baselines moving forward. The GPS control point for this report also refers to the accuracy check point, which was established using a GPS network rover (without the need for a base). The "percent complete" EM61 survey coverage is based on an estimated survey area that can be covered next week when low tides are even lower.

**Root Cause Analysis & Authorization**

Problems Encountered:	Root Cause:	Corrective Action:

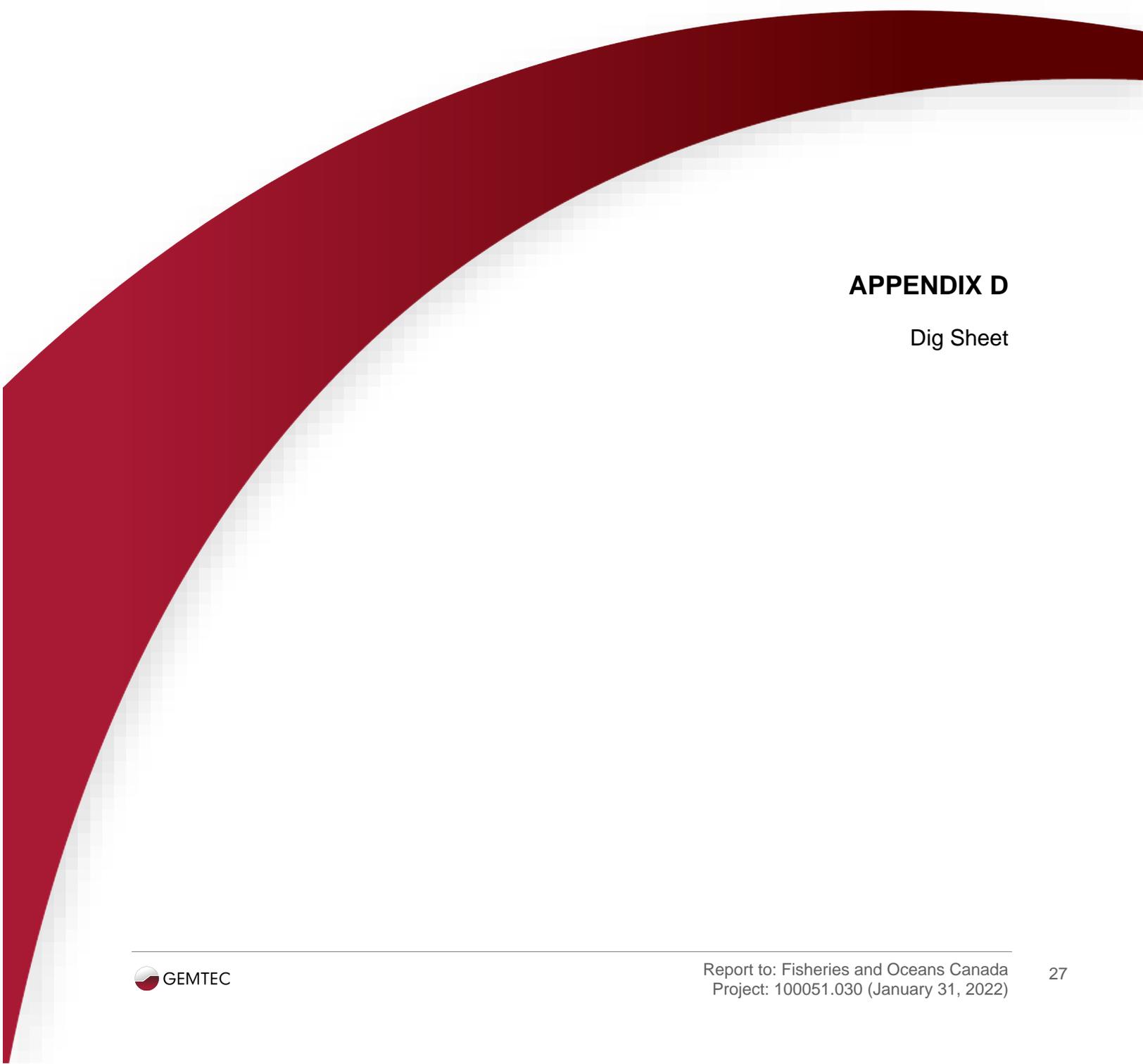
Date (YYYY-MM-DD): 30-11-21

Reviewed By: Mike West

Signature:







## **APPENDIX D**

### Dig Sheet



### Discrete Target Dig Sheet



Date:	December 10, 2021	Area:	Navy Island
Location:	Dartmouth, NS	Status:	Final EM61 Mk2
Type: MEC	Type: RS	Type: Other	Desposition: BIP, LIP, Moved, N/A
SubTypes: UXO, DMM, MC	SubTypes: MS-E, MS-F, HT, TD, SAA, PM, NMS	SubTypes: SEED, FP, GEO, FN, NC, BCD	

Target ID	Ch3	Easting (m)	Northing (m)	Type	SubType	Quantity	Depth (m)	Disposition	Comments	QC Check	Date of QC	Team Members	Recovered Date	QC
NAV_EM_001	6.12	451055.75	4949505.75	RS	NMS	1	0.10	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_002	9.63	451056.50	4949506.25	RS	NMS	1	0.05	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_003	42.30	451059.75	4949504.00	RS	NMS	1	0.05	Moved	Bar	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_004	26.68	451063.00	4949500.00	RS	NMS	1	0.05	Moved	Same as TGT 5	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_005	86.93	451063.00	4949499.25	RS	NMS	1	0.05	Moved	Bar same as	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_006	8.59	451061.50	4949499.25	RS	NMS	1	0.10	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_007	10.80	451062.25	4949498.25	RS	NMS	1	0.05	Moved	Spike	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_008	20.30	451062.25	4949495.00	RS	NMS	4	0.05	Moved	Piece of Chan	Pass	14-Dec-21	Trey / Mitch	06-Dec-21	1
NAV_EM_009	40.73	451055.50	4949493.25	RS	MS-F	1	0.10	Moved	Frag	Pass	14-Dec-21	Trey / Mitch	06-Dec-21	1
NAV_EM_010	16.40	451054.75	4949493.25	RS	NMS	1	0.10	Moved	Scrap Metal	Pass	14-Dec-21	Trey / Mitch	06-Dec-21	1
NAV_EM_011	12.89	451058.75	4949490.25	RS	NMS	2	0.35	Moved	Scrap Metal / Board with Nails	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_012	185.45	451061.00	4949489.75	RS	NMS	1	0.00	Moved	Spike	Pass	14-Dec-21	Trey / Mitch	06-Dec-21	1
NAV_EM_013	8.85	451064.75	4949492.75	RS	NMS	5	0.15	Moved	Chain Pieces	Pass	14-Dec-21	Trey / Mitch	06-Dec-21	1
NAV_EM_014	10.15	451072.00	4949495.00	RS	NMS	1	0.10	Moved	Scrap Metal	Pass	14-Dec-21	Trey / Charles	14-Dec-21	1
NAV_EM_015	3.65	451074.75	4949489.50	RS	NMS	1	0.05	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_016	9.24	451075.00	4949488.25	RS	NMS	3	0.10	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_017	6.90	451067.50	4949487.25	RS	NMS	1	0.15	Moved	Spike	Pass	14-Dec-21	Trey / Mitch	06-Dec-21	1
NAV_EM_018	9.50	451067.00	4949488.00	RS	MS-F	1	0.10	Moved	Frag	Pass	14-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_019	25.38	451065.00	4949487.00	RS	NMS	1	0.10	Moved	Spike	Pass	14-Dec-21	Trey / Mitch	06-Dec-21	1
NAV_EM_020	48.54	451065.50	4949486.50	RS	NMS	2	0.20	Moved	Scrap Metal	Pass	14-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_021	32.28	451067.00	4949485.25	RS	MS-F	1	0.20	Moved	Frag	Pass	14-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_022	60.91	451068.66	4949483.99	RS	MS-F	64	0.25	Moved	Frag	Pass	14-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_023	7500.48	451069.00	4949482.25	RS	NMS	1	0.00	Moved	Anchor Chain	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_023	7500.48	451069.00	4949482.25	RS	MS-F	17	0.20	Moved	Frag	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_024	682.01	451070.90	4949482.17	RS	MS-F	10	0.10	Moved	Frag	Pass	14-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_025	89.18	451072.30	4949481.19	RS	MS-F	25	0.10	Moved	Frag	Pass	14-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_026	11.97	451081.75	4949485.75	RS	NMS	1	0.55	LIP	Scrap Metal under Rock	N/A		Trey / Mitch	07-Dec-21	1
NAV_EM_027	3.78	451082.53	4949480.38	RS	MS-F	1	0.10	Moved	Frag	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_028	25.12	451081.25	4949480.25	RS	NMS	1	0.10	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_029	11.19	451075.25	4949478.50	RS	MS-F	9	0.20	Moved	Frag Pit	Pass	14-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_030	28.11	451076.25	4949477.75	RS	MS-F	15	0.30	Moved	Frag, possible Demo pit shock tube resent	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_031	18.11	451077.03	4949475.31	RS	MS-F	8	0.25	Moved	Frag, possible Demo pit shock tube resent	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_032	21.60	451077.75	4949474.25	RS	MS-F	9	0.25	Moved	Frag, possible Demo pit shock tube resent	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_033	19.13	451078.75	4949473.50	RS	MS-F	8	0.25	Moved	Frag, possible Demo pit shock tube resent	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_034	22.91	451080.75	4949473.50	RS	MS-F	6	0.20	Moved	Frag Pit	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_035	28.11	451080.00	4949473.00	RS	MS-F	25	0.25	Moved	Frag Pit	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_036	39.56	451079.75	4949471.75	RS	NMS	2	0.05	Moved	Wire, 2ft	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_037	36.96	451082.00	4949471.00	RS	MS-F	38	0.20	Moved	Frag Pit	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_038	28.76	451082.75	4949469.50	RS	MS-F	35	0.25	Moved	Frag Pit	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_039	32.93	451083.25	4949467.75	RS	MS-F	39	0.30	Moved	Frag Pit	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_040	5.34	451089.75	4949465.75	RS	MS-F	3	0.10	Moved	Frag	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_041	8.85	451092.25	4949466.75	RS	NMS	1	0.10	Moved	Spike	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1



## Discrete Target Dig Sheet



Date:	December 10, 2021	Area:	Navy Island
Location:	Dartmouth, NS	Status:	Final EM61 Mk2
<b>Type: MEC</b>	<b>Type: RS</b>	<b>Type: Other</b>	<b>Disposition: BIP, LIP, Moved, N/A</b>
SubTypes: UXO, DMM, MC	SubTypes: MS-E, MS-F, HT, TD, SAA, PM, NMS	SubTypes: SEED, FP, GEO, FN, NC, BCD	

NAV_EM_042	13.80	451089.50	4949464.00	RS	MS-F	9	0.15	Moved	Frag Pit	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_043	12.37	451090.75	4949462.75	RS	MS-F	11	0.20	Moved	Frag Pit	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_044	13.28	451093.75	4949461.25	RS	MS-F	3	0.10	Moved	Frag	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_045	8.07	451096.06	4949463.14	RS	MS-F	1	0.10	Moved	Frag	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_046	8.59	451096.50	4949459.50	RS	MS-F	1	0.05	Moved	Frag	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_047	49.19	451093.75	4949458.25	RS	MS-F	23	0.25	Moved	Frag Pit	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_048	278.36	451096.50	4949456.00	RS	NMS	1	0.00	Moved	Chain	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_049	6.90	451100.00	4949458.00	RS	MS-F	1	0.15	Moved	Frag	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_050	534.73	451102.44	4949466.47	RS	NMS	1	0.00	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_051	6.77	451106.00	4949462.50	RS	NMS	1	0.10	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_052	1.82	451105.00	4949462.00	RS	NMS	1	0.05	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_053	2.08	451104.75	4949461.25	RS	NMS	1	0.00	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_054	63.51	451107.43	4949460.88	RS	NMS	1	0.00	Moved	Spike	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_055	2.48	451106.25	4949459.50	RS	NMS	1	0.00	Moved	Bolt	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_056	1187.10	451104.25	4949448.50	RS	NMS	1	0.00	Moved	Anchor for the containment boom	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_057	7.41	451106.03	4949447.92	RS	MS-F	1	0.00	Moved	Frag	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_058	22.26	451107.00	4949444.75	RS	NMS	1	0.00	Moved	Spike	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_059	18.35	451107.00	4949444.00	RS	MS-F	2	0.00	Moved	Frag	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_060	1.95	451108.75	4949446.00	Other	FP	N/A	N/A	N/A	Nothing Found	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_061	70.02	451117.90	4949440.66	RS	NMS	1	0.10	Moved	Bolt	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_062	11.44	451119.11	4949438.42	RS	NMS	1	0.10	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_063	4.82	451118.25	4949433.25	RS	NMS	1	0.10	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_064	5.99	451113.50	4949433.75	Other	GEO	1	0.00	LIP	Magnetic Rock	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_065	8.20	451118.00	4949427.25	RS	NMS	4	0.10	Moved	Scrap Metal/ Nails	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_066	15.10	451118.50	4949426.50	RS	NMS	1	0.15	Moved	Spike	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_067	172.56	451120.25	4949424.00	RS	NMS	6	0.10	Moved	Spike / Nails / Fire Pit	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_068	4.82	451122.00	4949425.25	RS	NMS	4	0.00	Moved	Bricks	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_069	5.34	451130.00	4949433.00	RS	NMS	1	0.05	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_070	10.93	451129.50	4949428.75	RS	NMS	1	0.10	Moved	Nail	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_071	26.68	451123.25	4949423.50	RS	NMS	1	0.10	Moved	Scrap Metal	Pass	14-Dec-21	Trey / Mitch	08-Dec-21	1
NAV_EM_072	659.76	451056.09	4949510.59	RS	NMS	2	0.10	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_073	44.08	451059.77	4949508.52	RS	NMS	1	0.05	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_074	165.33	451070.08	4949499.57	RS	NMS	1	0.10	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_075	322.75	451077.56	4949492.95	RS	NMS	1	0.00	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_076	416.32	451082.72	4949491.38	MEC	UXO	1	0.05	Moved	EOID-002 - 4" Projectile	Pass	14-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_077	8.63	451085.45	4949484.91	RS	NMS	1	0.10	Moved	Large Spike (Same as Target 78)	Pass	14-Dec-21	Trey / Charles	14-Dec-21	1
NAV_EM_078	9.50	451086.72	4949484.95	RS	NMS	1	0.10	Moved	Large Spike (Same as Target 77)	Pass	14-Dec-21	Trey / Charles	14-Dec-21	1
NAV_EM_079	26.62	451086.87	4949482.63	RS	NMS	1	0.15	Moved	Spike	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_080	24.30	451087.21	4949481.84	RS	NMS	1	0.15	Moved	Same as TG7 79	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_081	22.67	451091.55	4949483.34	RS	NMS	1	0.00	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_082	60.35	451089.27	4949473.28	Other	SEED	1	0.10	Moved	QC Seed	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_083	18.11	451093.87	4949475.75	RS	NMS	1	0.25	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_084	24.37	451097.23	4949474.89	RS	NMS	1	0.10	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_085	67.12	451099.10	4949472.98	RS	NMS	2	0.10	LIP	Scrap Metal / Chain	N/A		Trey / Mitch	07-Dec-21	1



## Discrete Target Dig Sheet



Date:	December 10, 2021	Area:	Navy Island
Location:	Dartmouth, NS	Status:	Final EM61 Mk2
<b>Type: MEC</b> SubTypes: UXO, DMM, MC	<b>Type: RS</b> SubTypes: MS-E, MS-F, HT, TD, SAA, PM, NMS	<b>Type: Other</b> SubTypes: SEED, FP, GEO, FN, NC, BCD	<b>Desposition:</b> BIP, LIP, Moved, N/A

NAV_EM_086	215.06	451100.52	4949472.98	RS	NMS	4	0.05	LIP	Chain Wrapped around rock	N/A		Trey / Mitch	07-Dec-21	1
NAV_EM_087	5.60	451092.86	4949470.29	RS	NMS	1	0.10	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_088	11.87	451114.40	4949455.93	RS	NMS	1	0.00	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_089	148.38	451121.54	4949448.93	RS	NMS	1	0.10	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_090	18.29	451123.41	4949446.65	RS	NMS	1	0.05	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_091	82.01	451124.83	4949444.93	RS	NMS	1	0.05	Moved	Rod, 3'	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_092	376.90	451126.44	4949441.49	RS	NMS	1	0.05	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_093	36.05	451135.34	4949434.05	RS	NMS	1	0.05	Moved	Spike	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_094	26.19	451133.32	4949433.30	RS	NMS	1	0.05	Moved	Scrap Metal	Pass	07-Dec-21	Trey / Mitch	07-Dec-21	1
NAV_EM_095	9.56	451067.29	4949484.47	RS	NMS	8	0.05	Moved	Nails x 5, Scrap Metal x3	Pass	14-Dec-21	Trey / Charles	14-Dec-21	1
NAV_EM_096	8.26	451071.14	4949481.07	RS	MS-F	15	0.10	Moved	Frag x 14, Scrap Metal	Pass	14-Dec-21	Trey / Charles	14-Dec-21	1
NAV_EM_097	4.85	451072.58	4949480.07	RS	MS-F	25	0.10	Moved	Frag 13 x 6cm, Frag x 24	Pass	14-Dec-21	Trey / Charles	14-Dec-21	1
NAV_EM_098	5.18	451076.90	4949474.34	RS	MS-F	36	0.15	Moved	Frag	Pass	14-Dec-21	Trey / Charles	14-Dec-21	1
NAV_EM_099	6.71	451080.73	4949471.45	RS	MS-F	8	0.20	Moved	Frag	Pass	14-Dec-21	Trey / Charles	14-Dec-21	1
NAV_EM_100	8.91	451103.68	4949447.46	RS	MS-F	3	0.20	Moved	Frag 14 x 7cm	Pass	14-Dec-21	Trey / Charles	14-Dec-21	1
NAV_EM_101	53.86	451121.11	4949423.27	RS	NMS	5	0.20	LIP	Fire Pit - Nails, Scrap Metal x 4	N/A		Trey / Charles	14-Dec-21	1
NAV_EM_102	4.15	451070.66	4949482.74	RS	NMS	1	0.00	Moved	Spike	Pass	14-Dec-21	Trey / Charles	14-Dec-21	1
NAV_EM_103	4.70	451082.47	4949468.14	RS	MS-F	3	0.00	Moved	Frag	Pass	14-Dec-21	Trey / Charles	14-Dec-21	1
NAV_EM_104	4.44	451096.38	4949457.26	RS	MS-F	2	0.10	Moved	Frag	Pass	14-Dec-21	Trey / Charles	14-Dec-21	1
NAV_EM_104	4.44	451096.38	4949457.26	RS	NMS	1	0.15	Moved	Chain Link	Pass	14-Dec-21	Trey / Charles	14-Dec-21	1



### Discrete Target Dig Sheet



Date:	December 10, 2021	Area:	Navy Island
Location:	Dartmouth, NS	Status:	Final Vallon Mag Array
Type: MEC	Type: RS	Type: Other	Disposition: BIP, LIP, Moved, N/A
SubTypes: UXO, DMM, MC	SubTypes: MS-E, MS-F, HT, TD, SAA, PM, NMS	SubTypes: SEED, FP, GEO, FN, NC, BCD	

Target ID	ASIG	Easting (m)	Northing (m)	Type	SubType	Quantity	Depth (m)	Disposition	Comments	QC Check	QC Comments	Date of QC	Team Members	Recovered Date	QC
NAV_MAG_001	424.67	451052.66	4949513.72	RS	NMS	1	0.00	Moved	Degraded Sheet Metal	N/A			Mine EOD	09-Dec-21	1
NAV_MAG_001	424.67	451052.66	4949513.72	Other	Geo	1	0.00	LIP	Magnetic Concrete (some was moved)	N/A			Mine EOD	09-Dec-21	1
NAV_MAG_002	909.39	451055.34	4949516.46	RS	NMS	2	0.00	Moved	Pipes	N/A		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_002-QC1	909.39	451055.34	4949516.46	RS	NMS	2	30.00	LIP	Sheet Metal & Metal Mixed in Conrete	N/A			Mine EOD	12-Dec-21	1
NAV_MAG_003	213.27	451064.84	4949509.13	RS	NMS	2	0.20	Moved	Scrap Metal, 10cm in diameter / Steel Pipe	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_004	167.78	451075.62	4949499.22	RS	RS-E	1	0.00	Moved	Baseplate	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_005	158.48	451075.66	4949498.12	Other	Geo	1	0.00	Moved	Magnetic rock	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_005	158.48	451075.66	4949498.12	RS	NMS	2	0.00	Moved	Metal Bar, 20cmx3cm	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_006	3600.88	451083.72	4949496.41	RS	NMS	1	0.00	Moved	Metal cable, 40cm	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_007	1107.55	451085.13	4949491.62	RS	NMS	1	0.10	Moved	Metal spike 40cm	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_008	1622.45	451113.65	4949459.52	RS	NMS	1	0.10	Moved	Steel Bar 60cm	N/A	Inaccessible for QC		Mine EOD	09-Dec-21	1
NAV_MAG_009	1412.82	451117.33	4949460.66	RS	NMS	1	0.30	Moved	Steel Bar 30cm	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_010	496.89	451118.64	4949457.91	RS	NMS	1	0.00	Moved	Metal Spike 30cm	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_011	954.80	451121.69	4949452.93	RS	NMS	1	0.00	LIP	Scrap metal, big	N/A			Mine EOD	09-Dec-21	1
NAV_MAG_012	2558.03	451129.85	4949446.23	RS	NMS	1	0.00	LIP	Anchor for dock	N/A			Mine EOD	09-Dec-21	1
NAV_MAG_013	221.63	451133.47	4949437.36	RS	NMS	1	0.30	Moved	Metal	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_014		451142.11	4949433.71	RS	NMS	1	0.15	Moved	Nail 15cm	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_015		451144.47	4949439.55	RS	NMS	1	0.20	Moved	Large Chain	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_016	17.62	451141.93	4949442.66	RS	NMS	1	0.00	Moved	Tire	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_017	26.30	451140.19	4949449.07	RS	NMS	1	0.30	Moved	100 x 15cm Metal Scrap	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_018	22.69	451134.85	4949445.28	RS	NMS	1	0.40	Moved	Scrap Metal, 50cm in diameter	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_019	26.61	451133.81	4949447.17	RS	NMS	1	0.00	Moved	Steel Box, 12cmx12cm	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_020	47.05	451130.55	4949451.74	Other	Geo	1	0.00	LIP	Magnetic Concrete Block	N/A			Mine EOD	09-Dec-21	1
NAV_MAG_021	113.71	451125.56	4949451.44	RS	NMS	1	0.00	LIP	Spill Kit Chain for Hydra Mariner	N/A			Mine EOD	09-Dec-21	1
NAV_MAG_022	108.48	451087.95	4949493.90	RS	NMS	1	0.50	Moved	Log wth Nails	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_023	131.18	451085.84	4949494.66	Other	Geo	1	0.30	Moved	Magnetic Rock, large flat	N/A			Mine EOD	09-Dec-21	1
NAV_MAG_024	55.83	451082.23	4949497.41	Other	Geo	1	0.00	LIP	Magnetic Rock	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_025	192.00	451081.27	4949501.18	RS	NMS	1	0.50	Moved	45cm Metal Scrap	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_026	31.33	451078.09	4949501.49	RS	NMS	1	0.10	Moved	U-Bolt, Matal Scrap	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_027	112.41	451079.99	4949502.91	RS	NMS	1	0.30	Moved	30cm Metal Scrap	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_028	10.21	451079.68	4949504.59	RS	NMS	1	0.00	Moved	Small Tire	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_029	39.73	451078.20	4949503.88	RS	NMS	1	0.00	Moved	Nail 15cm	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_030	27.51	451075.44	4949505.33	Other	Geo	1	0.00	Moved	Pipe, small	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_030	27.51	451075.44	4949505.33	RS	NMS	1	0.00	Moved	Magnetic rock, 15cm in diameter	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_031	19.98	451077.32	4949505.80	RS	NMS	2	0.30	Moved	Metal Scrap	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_032	3.76	451080.41	4949515.24	Other	FP	N/A	N/A	N/A	8' Water Depth (No Find)	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_033	11.41	451078.77	4949521.96	Other	FP	N/A	N/A	N/A	12' Water Depth (No Find)	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_034	10.49	451072.09	4949510.57	RS	NMS	1	0.00	Moved	Small Tire	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_035	110.54	451070.73	4949507.68	RS	NMS	1	0.00	LIP	Degraded Metal	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_035	110.54	451070.73	4949507.68	Other	Geo	5	0.00	LIP	Magnetic rocks	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_036	1309.73	451069.70	4949509.66	Other	Geo	1	0.15	Moved	Magnetic rock	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_036	1309.73	451069.70	4949509.66	RS	NMS	3	0.30	Moved	Spike, 50cm / Tires	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_037	43.28	451067.78	4949510.57	Other	Geo	2	0.00	LIP	Magnetic rocks	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_038	39.18	451064.77	4949511.10	Other	Geo	1	0.00	LIP	Magnetic Concrete (some was moved)	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_039	9.62	451065.62	4949515.68	RS	NMS	1	0.00	LIP	Small Tire	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_040	36.70	451062.74	4949513.16	Other	Geo	1	0.15	LIP	Magnetic Concrete Chunk	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_041	152.49	451057.91	4949514.90	RS	NMS	1	0.20	Moved	Scrap metal, 15" diameter	Pass		11-Dec-21	Mine EOD	09-Dec-21	1
NAV_MAG_042	13.20	451055.58	4949522.92	Other	Geo	1	0.10	LIP	3 x Magnetic Rocks (1 x LIP)	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_043	17.77	451059.64	4949529.35	RS	NMS	1	0.00	Moved	Steel Plate 30cm	Pass		11-Dec-21	Mine EOD	10-Dec-21	1
NAV_MAG_044	2.05	451070.64	4949501.11	RS	NMS	1	0.10	Moved	10cm diameter chunk of steel	Pass	EM61 Coverage Pass	07-Dec-21	Mine EOD	12-Dec-21	1



## Discrete Target Dig Sheet



Date:	December 10, 2021	Area:	Navy Island
Location:	Dartmouth, NS	Status:	Final Vallon Mag Array
<b>Type: MEC</b> SubTypes: UXO, DMM, MC		<b>Type: RS</b> SubTypes: MS-E, MS-F, HT, TD, SAA, PM, NMS	
<b>Type: Other</b> SubTypes: SEED, FP, GEO, FN, NC, BCD		<b>Disposition:</b> BIP, LIP, Moved, N/A	

NAV_MAG_045	13.19	451075.23	4949495.22	RS	NMS	1	0.50	LIP	Metal under rock - inaccessible	N/A			Mine EOD	12-Dec-21	1
NAV_MAG_046	3.48	451077.18	4949492.24	RS	NMS	1	0.10	Moved	Small piece of steel	Pass	EM61 Coverage Pass	07-Dec-21	Mine EOD	12-Dec-21	1
NAV_MAG_047	1.13	451082.67	4949493.02	RS	NMS	1	1.00	Moved	Small piece of metal	Pass	EM61 Coverage Pass	07-Dec-21	Mine EOD	12-Dec-21	1
NAV_MAG_048	0.79	451106.94	4949494.73	RS	NMS	1	0.00	LIP	Metal scale from ship hull (10ft)	N/A			Mine EOD	12-Dec-21	1
NAV_MAG_049	16.40	451109.92	4949491.32	RS	NMS	1	0.00	LIP	Large tire (10ft)	N/A			Mine EOD	12-Dec-21	1
NAV_MAG_050	16.37	451131.41	4949454.20	RS	NMS	1	0.00	LIP	Large anchor stuck in sediment	N/A			Mine EOD	12-Dec-21	1
NAV_MAG_051	3.17	451132.78	4949439.68	RS	NMS	1	0.10	Moved	15cm piece of metal	Pass		11-Dec-21	Mine EOD	12-Dec-21	1
NAV_MAG_052	52.14	451134.46	4949450.76	RS	NMS	1	0.00	LIP	Steel pipe in concrete	N/A			Mine EOD	12-Dec-21	1



### Discrete Target Dig Sheet



Date:	December 10, 2021	Area:	Navy Island
Location:	Dartmouth, NS	Status:	Final DAC
<b>Type: MEC</b> SubTypes: UXO, DMM, MC	<b>Type: RS</b> SubTypes: MS-E, MS-F, HT, TD, SAA, PM, NMS	<b>Type: Other</b> SubTypes: SEED, FP, GEO, FN, NC, BCD	<b>Disposition: BIP, LIP, Moved, N/A</b>

Target ID	Ch3	Easting (m)	Northing (m)	Type	SubType	Quantity	Depth (m)	Disposition	Comments	Team Members	Recovered Date	QC
NAV_DAC_001	N/A	451054.51	4949490.38	RS	NMS	1	0.00	Moved	Wood with Nails	Trey / Mitch	06-Dec-21	
NAV_DAC_002	N/A	451063.37	4949484.74	RS	NMS	1	0.00	Moved	Wood with Nails	Trey / Mitch	06-Dec-21	
NAV_DAC_003	N/A	451058.28	4949483.51	RS	MS-F	1	0.05	Moved	Frag	Trey / Mitch	06-Dec-21	
NAV_DAC_004	N/A	451056.10	4949481.58	RS	MS-F	1	0.10	Moved	Frag	Trey / Mitch	06-Dec-21	
NAV_DAC_005	N/A	451054.77	4949476.61	MEC	UXO	1	0.30	LIP	EOID-001 - Suspect 5" Projectile	Trey / Mitch	06-Dec-21	
NAV_DAC_006	N/A	451068.14	4949467.19	RS	MS-F	1	0.05	Moved	Frag	Trey / Mitch	06-Dec-21	
NAV_DAC_007	N/A	451070.56	4949479.58	RS	NMS	1	0.00	Moved	Steel Bar, 2.5'	Trey / Mitch	06-Dec-21	
NAV_DAC_008	N/A	451073.24	4949476.99	RS	MS-F	1	0.00	Moved	Frag	Trey / Mitch	06-Dec-21	
NAV_DAC_009	N/A	451074.57	4949475.25	Other	GEO	1	0.10	LIP	Magnetic Rock	Trey / Mitch	06-Dec-21	
NAV_DAC_010	N/A	451075.42	4949473.11	RS	NMS	1	0.00	Moved	Scrap Metal	Trey / Mitch	06-Dec-21	
NAV_DAC_011	N/A	451077.47	4949473.20	RS	NMS	1	0.05	Moved	Spike	Trey / Mitch	06-Dec-21	
NAV_DAC_012	N/A	451078.11	4949472.28	RS	MS-F	2	0.10	Moved	Frag	Trey / Mitch	06-Dec-21	
NAV_DAC_012	N/A	451078.11	4949472.28	RS	NMS	2	0.10	Moved	Spikes	Trey / Mitch	06-Dec-21	
NAV_DAC_013	N/A	451079.54	4949469.65	RS	GEO	1	0.00	LIP	Magnetic Rock	Trey / Mitch	06-Dec-21	
NAV_DAC_014	N/A	451080.07	4949468.81	RS	NMS	1	0.00	Moved	Scrap Metal	Trey / Mitch	06-Dec-21	
NAV_DAC_015	N/A	451081.30	4949466.82	Other	GEO	1	0.10	LIP	Magnetic Rock	Trey / Mitch	06-Dec-21	
NAV_DAC_016	N/A	451086.67	4949466.09	RS	NMS	1	0.10	Moved	Scrap Metal	Trey / Mitch	06-Dec-21	
NAV_DAC_017	N/A	451083.18	4949458.30	RS	NMS	1	0.05	Moved	Scrap Metal	Trey / Mitch	06-Dec-21	
NAV_DAC_018	N/A	451075.92	4949449.36	RS	NMS	1	0.05	Moved	Hatchet	Trey / Mitch	06-Dec-21	
NAV_DAC_019	N/A	451077.14	4949448.62	RS	NMS	3	0.05	Moved	Scrap / Nails	Trey / Mitch	06-Dec-21	
NAV_DAC_020	N/A	451077.89	4949446.42	RS	NMS	2	0.05	Moved	Nails	Trey / Mitch	06-Dec-21	
NAV_DAC_021	N/A	451081.71	4949440.48	RS	NMS	4	0.10	Moved	Nails	Trey / Mitch	06-Dec-21	
NAV_DAC_022	N/A	451080.72	4949438.61	RS	NMS	6	0.10	LIP	Nails	Trey / Mitch	06-Dec-21	
NAV_DAC_023	N/A	451081.71	4949438.58	RS	NMS	2	0.15	Moved	Nails	Trey / Mitch	06-Dec-21	
NAV_DAC_024	N/A	451094.20	4949442.66	RS	MS-F	1	0.10	Moved	Frag	Trey / Mitch	06-Dec-21	
NAV_DAC_025	N/A	451095.37	4949455.26	RS	NMS	1	0.00	Moved	Chain	Trey / Mitch	06-Dec-21	
NAV_DAC_026	N/A	451095.16	4949457.28	RS	MS-E	1	0.00	Moved	Base Plate (Possible 6Pdr)	Trey / Mitch	06-Dec-21	
NAV_DAC_027	N/A	451096.64	4949454.28	Other	GEO	1	0.10	LIP	Magnetic Rock	Trey / Mitch	06-Dec-21	
NAV_DAC_028	N/A	451100.58	4949448.85	RS	NMS	1	0.00	Moved	Spike	Trey / Mitch	06-Dec-21	
NAV_DAC_029	N/A	451108.77	4949439.60	RS	NMS	1	0.10	Moved	Spike	Trey / Mitch	06-Dec-21	
NAV_DAC_030	N/A	451107.76	4949428.67	RS	NMS	1	0.05	Moved	Spike	Trey / Mitch	06-Dec-21	
NAV_DAC_031	N/A	451098.69	4949423.79	RS	NMS	1	0.10	Moved	Spike	Trey / Mitch	06-Dec-21	
NAV_DAC_032	N/A	451097.83	4949423.27	RS	NMS	2	0.05	Moved	Tent Pegs	Trey / Mitch	06-Dec-21	
NAV_DAC_033	N/A	451096.41	4949423.99	RS	NMS	2	0.10	Moved	Tent Pegs	Trey / Mitch	06-Dec-21	
NAV_DAC_034	N/A	451094.34	4949422.36	RS	NMS	5	0.10	Moved	Nails	Trey / Mitch	06-Dec-21	
NAV_DAC_035	N/A	451096.96	4949422.70	RS	NMS	1	0.05	Moved	Pop Can	Trey / Mitch	06-Dec-21	
NAV_DAC_036	N/A	451099.37	4949421.26	RS	NMS	1	0.05	Moved	Tent Peg	Trey / Mitch	06-Dec-21	

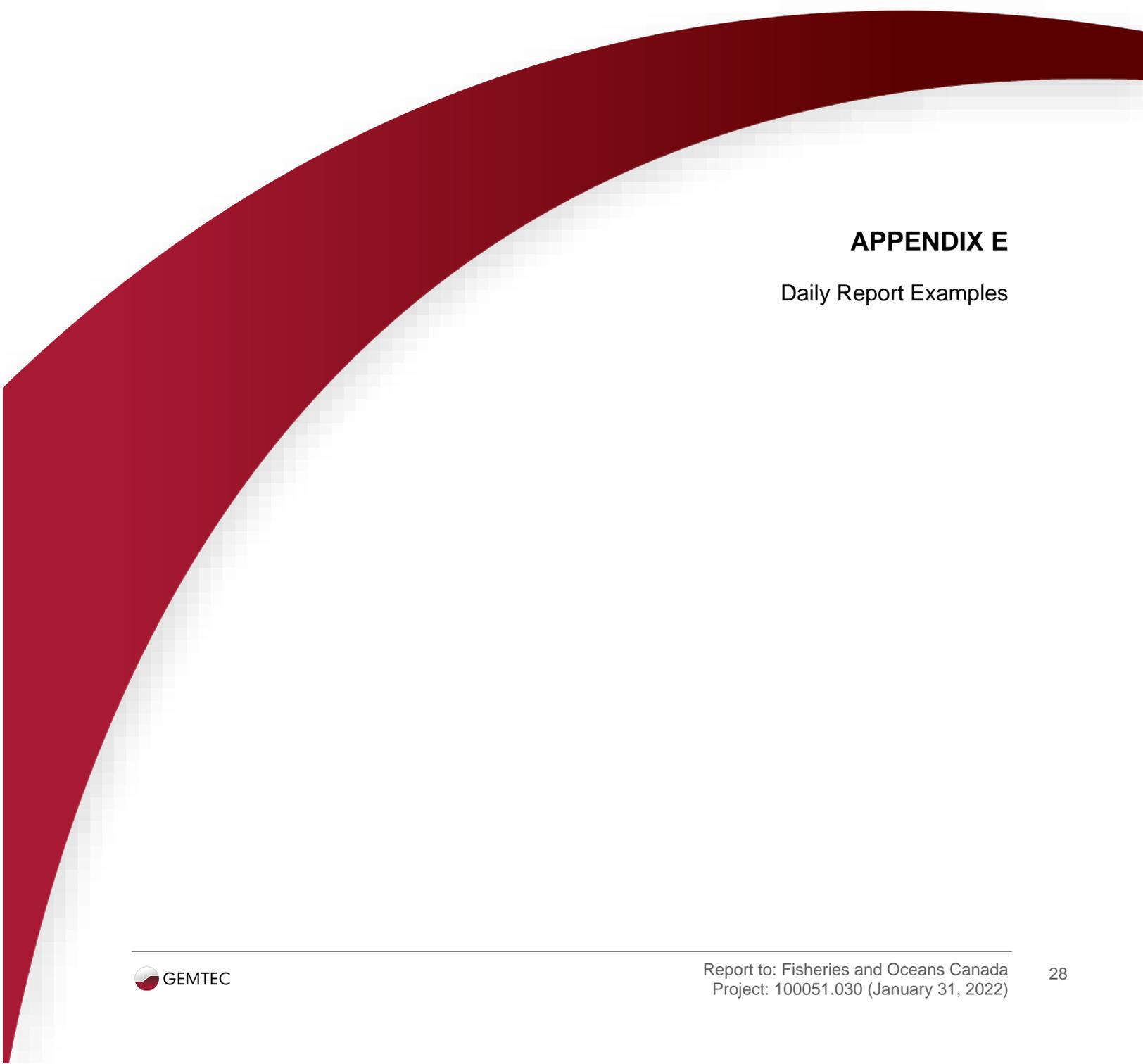


## Discrete Target Dig Sheet



Date:	December 10, 2021	Area:	Navy Island
Location:	Dartmouth, NS	Status:	Final DAC
<b>Type: MEC</b>	<b>Type: RS</b>	<b>Type: Other</b>	<b>Disposition: BIP, LIP, Moved, N/A</b>
SubTypes: UXO, DMM, MC	SubTypes: MS-E, MS-F, HT, TD, SAA, PM, NMS	SubTypes: SEED, FP, GEO, FN, NC, BCD	

NAV_DAC_037	N/A	451105.92	4949421.99	RS	NMS	2	0.10	Moved	File	Trey / Mitch	06-Dec-21	
NAV_DAC_038	N/A	451108.68	4949423.54	RS	NMS	2	0.15	Moved	Nail	Trey / Mitch	06-Dec-21	
NAV_DAC_039	N/A	451116.86	4949428.36	Other	GEO	1	0.10	LIP	Magnetic Rock	Trey / Mitch	06-Dec-21	
NAV_DAC_040	N/A	451119.26	4949423.67	RS	NMS	5	0.00	LIP	Fire Pit	Trey / Mitch	06-Dec-21	
NAV_DAC_041	N/A	451116.05	4949421.34	RS	NMS	1	0.10	LIP	Metal Strapping	Trey / Mitch	06-Dec-21	
NAV_DAC_046	N/A	451100.27	4949421.35	RS	NMS	1	0.05	Moved	Spike	Trey / Mitch	08-Dec-21	
NAV_DAC_047	N/A	451100.06	4949426.43	RS	NMS	1	0.05	Moved	Tent Peg	Trey / Mitch	08-Dec-21	
NAV_DAC_048	N/A	451105.96	4949424.89	RS	MS-F	1	0.05	Moved	Frag	Trey / Mitch	08-Dec-21	
NAV_DAC_049	N/A	451108.09	4949425.25	RS	NMS	1	0.00	Moved	Scrap Metal	Trey / Mitch	08-Dec-21	
NAV_DAC_050	N/A	451092.70	4949420.84	RS	NMS	1	0.10	Moved	Spike	Trey / Mitch	08-Dec-21	
NAV_DAC_051	N/A	451096.26	4949443.37	RS	NMS	1	0.05	Moved	Square Spike	Trey / Mitch	08-Dec-21	
NAV_DAC_052	N/A	451088.68	4949422.47	RS	NMS	1	0.05	Moved	Steel Bar 8.0'	Trey / Mitch	08-Dec-21	
NAV_DAC_053	N/A	451089.15	4949439.58	RS	NMS	1	0.05	Moved	Scrap Metal	Trey / Mitch	08-Dec-21	
NAV_DAC_054	N/A	451094.13	4949446.63	RS	NMS	1	0.30	Moved	Scrap	Trey / Mitch	08-Dec-21	
NAV_DAC_055	N/A	451081.19	4949438.58	RS	NMS	1	0.10	Moved	Spike	Trey / Mitch	08-Dec-21	
NAV_DAC_056	N/A	451094.92	4949449.19	RS	NMS	1	0.20	Moved	Spike	Trey / Mitch	08-Dec-21	
NAV_DAC_057	N/A	451069.90	4949455.17	RS	NMS	1	0.05	Moved	Spike	Trey / Mitch	08-Dec-21	
NAV_DAC_058	N/A	451064.62	4949462.95	RS	MS-F	1	0.10	Moved	Frag	Trey / Mitch	08-Dec-21	
NAV_DAC_059	N/A	451064.47	4949464.07	RS	SAA	1	0.10	Moved	Shotgun shell	Trey / Mitch	08-Dec-21	
NAV_DAC_060	N/A	451084.01	4949450.07	RS	NMS	1	0.30	Moved	Scrap metal	Trey / Mitch	08-Dec-21	
NAV_DAC_061	N/A	451060.38	4949470.08	RS	NMS	1	0.20	Moved	Bolt, 2'	Trey / Mitch	08-Dec-21	
NAV_DAC_062	N/A	451072.43	4949467.72	RS	MS-E	1	0.45	Moved	Base Plate (Possible 6Pdr)	Trey / Mitch	08-Dec-21	
NAV_DAC_062	N/A	451072.43	4949467.72	RS	MS-F	55	0.45	Moved	Frag	Trey / Mitch	08-Dec-21	
NAV_DAC_063	N/A	451065.53	4949471.23	RS	NMS	1	0.10	Moved	Bolt	Trey / Mitch	08-Dec-21	



## **APPENDIX E**

### Daily Report Examples



**DAILY OPERATIONS REPORT**

**Summary of Activities**

Activities Performed	General Remarks								
Weather Conditions Morning °C Afternoon °C Comments:	Field Comments								
PL Comments:  Next Working Day Plan									
Topics Discussed <table border="0" style="width: 100%;"> <tr> <td style="width: 25%;">Schedule</td> <td style="width: 25%;">Risks</td> <td style="width: 25%;">Obstacles</td> <td style="width: 25%;">Milestones</td> </tr> <tr> <td colspan="4">Action Items</td> </tr> </table>		Schedule	Risks	Obstacles	Milestones	Action Items			
Schedule	Risks	Obstacles	Milestones						
Action Items									

**Project Progress**

Task	% Complete	Additional Comments



**DAILY OPERATIONS REPORT**

**Quality Control**

**QC Checks Performed?**

- Yes     No  
 Geophysical     Equipment     Veg Removal  
 Surface Clr.     Subsurface Clr.    MS Screening

**Non-Conformance Issues?**

- Yes     No  
 Minor     Major     Critical  
 NCR Report Reference No.

**Additional Details (Non-Conformance Issues, Equipment Verifications Performed, etc.):**

**PM Comments**

**Approval**

**Client Representative:**

**GEMTEC Project Manager:**

**Date:**

**Signature:**



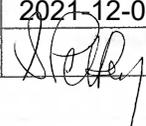

## DAILY OPERATIONS REPORT

# DAILY QUALITY CONTROL REPORT

PROJECT SUMMARY			
Date (YYYY-MM-DD)	2021-12-07	Number of Personnel On Site	8
Project Number	100051.030	Project Name	UXO Survey-Navy Island
Contract Number:	4500015119	Prepared By:	Charles Trombley

QC RELATED OPERATIONS			
UXO RELATED TASKS	COMPLETED	NOTES (location, grid, etc.)	
Avoidance & Escort	<input type="checkbox"/>	Equipment checks completed? <input type="checkbox"/> AM <input type="checkbox"/> PM	
Surface Sweep	<input type="checkbox"/>		
Surface Clearance	<input type="checkbox"/>		
Detector Clearance	<input type="checkbox"/>		
Subsurface Investigation	<input checked="" type="checkbox"/>		
MS Screening & Handling	<input checked="" type="checkbox"/>		
UXO Disposal	<input type="checkbox"/>	Post-Blast Inspections Completed for Each Detonation? <input type="checkbox"/> YES <input type="checkbox"/> NO	
UXO Signage Installation	<input type="checkbox"/>	Adequate Signage for Task? <input type="checkbox"/> YES <input type="checkbox"/> NO Proper Installation? <input type="checkbox"/> YES <input type="checkbox"/> NO	
Other:	<input type="checkbox"/>		
Other:	<input type="checkbox"/>		
Comments/Notes:			
UXO SUPPORT TASKS	COMPLETED	NOTES (location, grid, etc.)	
Vegetation Removal	<input type="checkbox"/>	Vegetation Removal Adequate for Upcoming UXO or Support Tasks? <input type="checkbox"/> YES <input type="checkbox"/> NO	
Geophysical Survey	<input checked="" type="checkbox"/>	Daily Geophysical QC Checks Completed? <input type="checkbox"/> YES <input type="checkbox"/> NO (Confirm with Field Geo)	
GPS Survey/Layout	<input checked="" type="checkbox"/>	Daily GPS Accuracy Test Completed? <input type="checkbox"/> YES <input type="checkbox"/> NO (Confirm with GPS Surveyor)	
Other:	<input type="checkbox"/>	PQM Note: Confirmed QC Check were carried out for Geo Survey and GPS Survey/layout.	
Other:	<input type="checkbox"/>		
Comments/Notes:			
EQUIPMENT CHECKS	IN USE	Equipment Checks	NOTES (detector IDs, test strip location or sample item, etc.)
EM 61 - Mk2 <input checked="" type="checkbox"/> HH <input type="checkbox"/> Carry <input type="checkbox"/> Cart	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> AM <input checked="" type="checkbox"/> PM	163436
Schiebel	<input type="checkbox"/>	<input type="checkbox"/> AM <input type="checkbox"/> PM	
Vallon	<input type="checkbox"/>	<input type="checkbox"/> AM <input type="checkbox"/> PM	
DML2000-XR	<input type="checkbox"/>	<input type="checkbox"/> AM <input type="checkbox"/> PM	
Schonstedt Detectors	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> AM <input checked="" type="checkbox"/> PM	3599581 / 359959
CEIA Detectors	<input type="checkbox"/>	<input type="checkbox"/> AM <input type="checkbox"/> PM	
Other:	<input type="checkbox"/>	<input type="checkbox"/> AM <input type="checkbox"/> PM	

QUALITY CONTROL INSPECTION RESULTS	
<b>SURFACE SWEEP</b>	
Quality Control and Equipment Checks Completed?	<input type="checkbox"/> YES <input type="checkbox"/> NO If NO, state reason: <b>NOT REQUIRED</b>
<b>SURFACE SWEEP DETAILS</b>	<b>QC INSPECTION RESULTS</b>
Area Covered by Sweep:	Failure Criteria:
Current QC State: <input type="checkbox"/> reduced (10%) <input type="checkbox"/> normal (25%) <input type="checkbox"/> tightened (50%)	
Area Verified by QCS: _____ %	
Number of QC Seeds Recovered/Missed:	Inspection Results: <input type="checkbox"/> PASS <input type="checkbox"/> FAIL
Comments:	If FAIL, NCR reference:

SURFACE CLEARANCE	
Quality Control and Equipment Checks Completed?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO If NO, state reason: <b>NOT REQUIRED</b>
<b>SURFACE CLEARANCE DETAILS</b>	<b>QC INSPECTION RESULTS</b>
Area Covered by Surface Clearance:	Failure Criteria:
Current QC State: <input type="checkbox"/> reduced (10%) <input type="checkbox"/> normal (25%) <input type="checkbox"/> tightened (50%)	
Area Verified by QCS: _____ %	
Number of QC Seeds Recovered/Missed:	Inspection Results: <input type="checkbox"/> PASS <input type="checkbox"/> FAIL
Comments:	If <b>FAIL</b> , NCR reference:
DETECTOR CLEARANCE	
Quality Control and Equipment Checks Completed?	<input type="checkbox"/> YES <input checked="" type="checkbox"/> NO If NO, state reason: <b>NOT REQUIRED</b>
<b>DETECTOR CLEARANCE DETAILS</b>	<b>QC INSPECTION RESULTS</b>
Area Covered by Detector Clearance:	Failure Criteria:
Current QC State: <input type="checkbox"/> reduced (10%) <input type="checkbox"/> normal (25%) <input type="checkbox"/> tightened (50%)	
Area Verified by QCS: _____ %	
Number of QC Seeds Recovered/Missed:	Inspection Results: <input type="checkbox"/> PASS <input type="checkbox"/> FAIL
Comments:	If <b>FAIL</b> , NCR reference:
SUBSURFACE INVESTIGATION	
Quality Control and Equipment Checks Completed?	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO If NO, state reason:
<b>SUBSURFACE INVESTIGATION DETAILS</b>	<b>QC INSPECTION RESULTS</b>
Number of Digs Completed: <b>51</b>	Failure Criteria:
Current QC State: <input checked="" type="checkbox"/> reduced (10%) <input type="checkbox"/> normal (25%) <input type="checkbox"/> tightened (50%)	
Number of Digs Verified by QCS: <b>5</b> %	
Number of QC Seeds Recovered/Missed: <b>1</b>	Inspection Results: <input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL
Comments (# of teams, QC state of individual teams, etc.): <b>EM-001, EM-002, EM-089, EM-090, EM-092</b>	If <b>FAIL</b> , NCR reference:
MS SCREENING & HANDLING	
Quality Control Checks Completed?	<input type="checkbox"/> YES <input type="checkbox"/> NO If NO, state reason:
<b>MS SCREENING &amp; HANDLING DETAILS</b>	<b>QC INSPECTION RESULTS</b>
Daily MS Recovered (kg): <b>27.0</b>	Daily MS Screened to Level III: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <b>27.0</b> kg
Daily NMS Recovered (kg): <b>28.0</b>	10% QC Verification Completed on Level III MS: <input type="checkbox"/> YES <input type="checkbox"/> NO <b>2.7</b> kg
QCS Performed Random Daily Field Checks: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	Inspection Results: <input checked="" type="checkbox"/> PASS <input type="checkbox"/> FAIL
Comments (Level II bucket inspections, over shoulder checks, etc.):	If <b>FAIL</b> , NCR reference:
DAILY SUMMARY/RECOMMENDATIONS	
ACKNOWLEDGEMENTS	
Client Representative:	Kyle Jarvis
GEMTEC Project Manager:	Shaun Pelkey
Date:	2021-12-07
Signature:	

## DAILY SAFETY REPORT

PROJECT DETAILS			
Date (YYYY-MM-DD)	2021-12-07	No of Personnel On Site	8
Project Name	UXO Survey-Navy Island	Project Location	Navy Island/Dartmouth NS
Weather (AM)	3°C	Weather (PM)	5°C
New personnel on-site?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Orientation & Briefings Complete?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Visitors on-site?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Orientation & Briefings Complete?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Demolition operations?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Notes:	
If the answer is Yes to any of the questions below a <b>Safety Incident Report</b> should be completed.			
Injury or illness?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Notes:	
Equipment or property damage?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Notes:	
Fire?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Notes:	
Spill?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Notes:	
Near Miss?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Notes:	
Other:	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Notes:	

### DAILY INSPECTIONS

Item	Action	Checked			Action Taken/Notes
		Yes	No	N/A	
Side by Side	Pre drive checklist and vehicle cleaning log complete	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Vehicles	Pre drive checklist and vehicle cleaning log complete	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Communications	Functioning, batteries charged	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
PPE	Staff wearing appropriate PPE for work tasks (e.g., composite toe boots, safety vest, eye protection, mask etc.)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

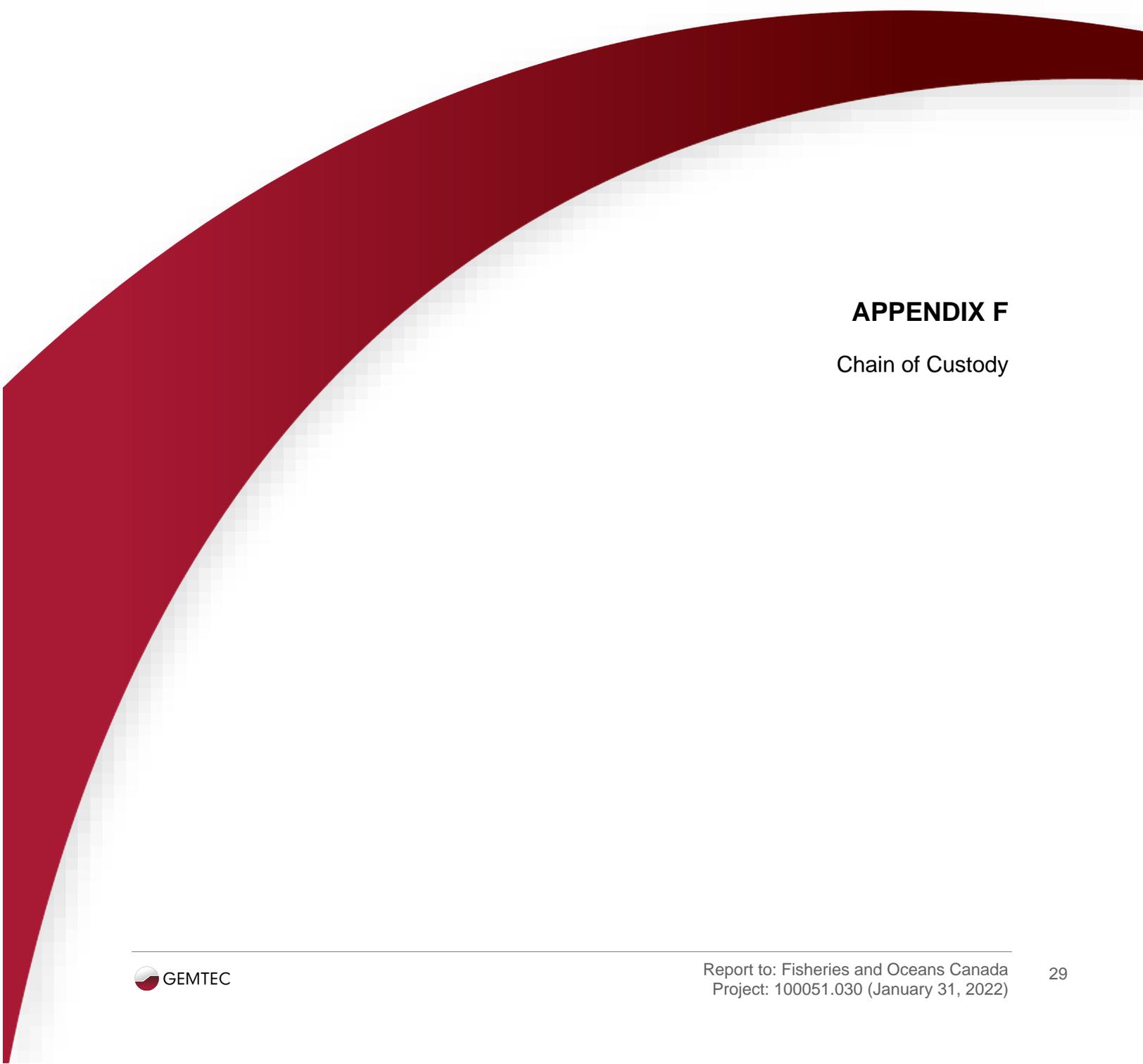
WEEKLY INSPECTIONS (EVERY FRIDAY)					
Item	Action	Checked			Action Taken/Notes
		Yes	No	N/A	
First Aid Kit	Available, adequate supplies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Eye Wash Station	Available, within expiry date	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fire Extinguisher	Charged, expiry date checked	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

OTHER INSPECTIONS (PERIODICALLY)					
Item	Action	Checked			Action Taken/Notes
		Yes	No	N/A	
Safety Data Sheets (SDS)	Available for products on site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
WHMIS	Current for all staff on site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Emergency Response Plan	Posted, up to date	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Fuel Storage	All products stored and secured while not in use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

DAILY SAFETY SUMMARY AND RECOMMENDATIONS
<p>SLIPS, TRIPS, FALLS PPE INCLEMENT WEATHER SAFE WORK PRACTICES</p>

ACKNOWLEDGEMENTS			
PREPARED BY		REVIEWED BY	
Auditor:	Charles Trombley	Acknowledged By:	Susan Trickey
Position:	QC/SO	Position:	PQM
Date:	2021-12-07	Date:	2021-12-07
Signature:	<i>C Trombley</i>	Signature:	<i>S Trickey</i>

Note: Safety Inspections are to be conducted each day and documented on this form.



## **APPENDIX F**

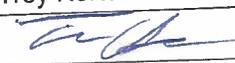
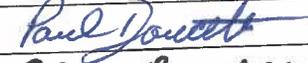
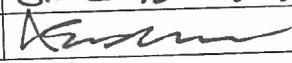
### Chain of Custody

# CHAIN OF CUSTODY FORM

GENERAL OVERVIEW	
PROJECT NAME / CONTRACT NUMBER	UXO Survey-Navy Island / 100051.30
DATE (YYYY-MM-DD)	2021-12-09
TRANSPORT NAME (Name of Transport Agency/Company/Unit)	GEMTEC
APPROX. TOTAL WEIGHT OF MS (kg)	60 kg

MUNITIONS SCRAP INSPECTION			
CONTAINER NUMBER (Tri-Walls)	DESCRIPTION OF CONTENTS	WEIGHT (kg)	SEAL NUMBERS
M548 Container	SCREENED MUNITION SCRAP	65 kg	N/A

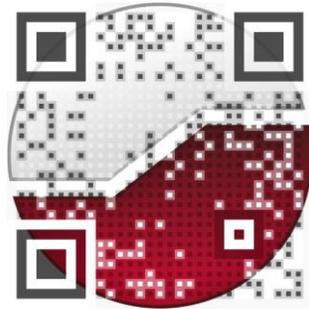
DND 2286/Level III Screening Certificate(s) attached:  Yes  Not Applicable

SCREENING				
LEVEL I	PRINT NAME	Trey Horton	TITLE	Tech
	SIGNATURE		DATE (YYYY-MM-DD)	2021-12-07
LEVEL II	PRINT NAME	Mitch Brewster	TITLE	Tech Supervisor
	SIGNATURE		DATE (YYYY-MM-DD)	2021-12-07
LEVEL III	PRINT NAME	Charles Trombley	TITLE	QC/SO
	SIGNATURE		DATE (YYYY-MM-DD)	2021-12-07
RELEASED BY	PRINT NAME	Paul Doucette	TITLE	Field Supervisor
	SIGNATURE		DATE (YYYY-MM-DD)	2021-12-07
TRANSPORTER	PRINT NAME	Eric Boudreau	TITLE	
	SIGNATURE		DATE (YYYY-MM-DD)	
DND REPRESENTATIVE/ DND AMMO FACILITY	PRINT NAME	Eric Boudreau	TITLE	G72
	SIGNATURE		DATE (YYYY-MM-DD)	10 Dec 2021

## CHAIN OF CUSTODY FORM

GENERAL OVERVIEW				
PROJECT NAME / CONTRACT NUMBER		UXO Survey-Navy Island/ 100051.030		
DATE (YYYY-MM-DD)		2021-12-16		
TRANSPORT NAME (Name of Transport Agency/Company/Unit)		Gemtec		
APPROX. TOTAL WEIGHT OF MS (kg)		20.0		
MUNITIONS SCRAP INSPECTION				
CONTAINER NUMBER (Tri-Walls)	DESCRIPTION OF CONTENTS		WEIGHT (kg)	SEAL NUMBERS
M548 Container	Screened Munition Scrap		25.0	N/A
DND 2286/Level III Screening Certificate(s) attached: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> Not Applicable				
SCREENING				
LEVEL I	PRINT NAME	Trey Horton	TITLE	Tech
	SIGNATURE	<i>[Signature]</i>	DATE (YYYY-MM-DD)	2021-12-14
LEVEL II	PRINT NAME	Paul Doucette	TITLE	Field Supervisor
	SIGNATURE	<i>Paul Doucette</i>	DATE (YYYY-MM-DD)	2021-12-14
LEVEL III	PRINT NAME	Charles Trombley	TITLE	QC/SO
	SIGNATURE	<i>[Signature]</i>	DATE (YYYY-MM-DD)	2021-12-14
RELEASED BY	PRINT NAME	Paul Doucette	TITLE	Field Supervisor
	SIGNATURE	<i>Paul Doucette</i>	DATE (YYYY-MM-DD)	2021-12-16
TRANSPORTER	PRINT NAME		TITLE	
	SIGNATURE		DATE (YYYY-MM-DD)	
DND REPRESENTATIVE/ DND AMMO FACILITY	PRINT NAME	DOUCETTE M-S	TITLE	MATERIAL SYSTEMS OFFICER
	SIGNATURE	<i>[Signature]</i>	DATE (YYYY-MM-DD)	2021.12.16

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environmental  
field services  
materials testing

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surveillance de chantier  
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