Naval Facilities Engineering Systems Command Northwest
Silverdale, Washington

Final
Basewide Site Inspection Addendum Report for Munitions and Explosives of Concern at Naval Base Kitsap Bangor

Military Munitions Response Program Sites

Naval Base Kitsap Bangor
Silverdale, Washington

June 2024

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FINAL
BASEWIDE SITE INSPECTION ADDENDUM REPORT FOR MUNITIONS AND EXPLOSIVES OF CONCERN AT NAVAL BASE KITSAP BANGOR

MILITARY MUNITIONS RESPONSE PROGRAM SITES

NAVAL BASE KITSAP BANGOR
SILVERDALE, WASHINGTON

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY CONTRACT

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Department of the Navy
Naval Facilities Engineering Systems Command Northwest
1101 Tautog Circle, Suite 203
Silverdale, Washington 98315

Submitted by:
Tetra Tech
4433 Corporation Lane, Suite 300
Virginia Beach, Virginia 23462

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PREPARED UNDER THE DIRECTION OF:

Mitch Baron

MITCH BARON
PROJECT MANAGER
TETRA TECH
BOTHELL, WASHINGTON

APPROVED FOR SUBMITTAL BY:

Catherine R Kohler

CATHERINE R KOHLER, P.E.
PROGRAM MANAGER
TETRA TECH
VIRGINIA BEACH, VIRGINIA

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Acronyms and Abbreviations

ºC	Degrees Celsius
ºF	Degrees Fahrenheit
µg/kg	Micrograms per Kilogram
AOC	Area of Concern
AOPC	Area of Potential Concern
APP/SSHP	Accident Prevention Plan/Site Safety and Health Plan
APPL	Agriculture & Priority Pollutants Laboratories, Inc
APS	Applied Professional Services
BA	Biological Assessment
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHE	Chemical Hazard Evaluation
CHF	Contamination Hazard Factor
CLEAN	Comprehensive Long-Term Environmental Action Navy
CSM	Conceptual Site Model
CWM	Chemical Warfare Material
DDESB	Department of Defense Explosives Safety Board
DIP	Destruction-in-Place
DGM	Digital Geophysical Mapping
DNT	Dinitrotoluene
DoD	Department of Defense
DQO	Data Quality Objective
EHE	Explosive Hazard Evaluation
ELAP	Environmental Laboratory Accreditation Program
EM61-HP	EM61-MK2-High Power

EOD	Explosive Ordnance Disposal
ESO	Explosive Safety Officer
ESS	Explosive Safety Submission
EZ	Exclusion Zone
FCR	Field Change Request
FS	Feasibility Study
GPR	Ground Penetrating Radar
GPS	Global Positioning System
GSV	Geophysical System Verification
HE	High Explosive
HERO	Hazards of Electromagnetic Radiation to Ordnance
HHE	Health Hazard Evaluation
HMX	Cyclotetramethylene Tetranitramine
IAS	Initial Assessment Study
IC	Institutional Control
ICMP	Institutional Controls Management Plan
ID	Identification
IDW	Investigation-Derived Waste
INRMP	Integrated Natural Resources Management Plan
ISO	Industry Standard Object
IVS	Instrument Verification Strip
MC	Munitions Constituent
MD	Munitions Debris
MDAS	Material Documented as Safe
MDEH	Material Documented as an Explosive Hazard
MEC	Munitions and Explosives of Concern
MEC HA	MEC Hazard Assessment

MGFD	Munition with Greatest Fragmentation Distance
Mk	Mark
mm	Millimeter
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MRP	Munitions Response Program
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
NAD	Naval Ammunition Depot
NAVFAC	Naval Facilities Engineering Systems Command
NBK	Naval Base Kitsap
NCR	Non-Conformance Report
NEW	Net Explosive Weight
NMRD	Non-Munitions Related Debris
NSWC IHD	Naval Surface Warfare Center Indian Head Division
OB/OD	Open Burning/Open Detonation
OU	Operable Unit
PA	Preliminary Assessment
PM	Project Manager
PSL	Project Screening Level
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCA	Root Cause Analysis
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RF	Receptor Factor
RI	Remedial Investigation

ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
RTK	Real Time Kinematic
RTS	Robotic Total Station
SAA	Small Arms Ammunition
SDG	Sample Delivery Group
SHPO	State Historic Preservation Officer
SI	Site Inspection
SRA	Saturated Response Area
SSL	Soil Screening Level
SUXOS	Senior Unexploded Ordnance Supervisor
SVOC	Semivolatile Organic Compound
SWFPAC	Strategic Weapons Facility Pacific
TEM	Time-Domain Electromagnetic
TNT	2,4,6-Trinitrotoluene
TOI	Target of Interest
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UXO	Unexploded Ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
UXOSO	Unexploded Ordnance Safety Officer
VOC	Volatile Organic Compound

Executive Summary

Tetra Tech performed a basewide Site Inspection (SI) at Naval Base Kitsap (NBK) Bangor for multiple munitions response sites (MRSs) in 2022, under the Military Munitions Response Program (MMRP), located in Silverdale, Washington. Based on the findings of the 2022 SI, Tetra Tech performed additional 2023 SI operations and prepared this SI Addendum on behalf of Naval Facilities Engineering Systems Command (NAVFAC) Northwest under the Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N6247016D9008, Contract Task Order N4425519F4112. Both the 2022 SI and the 2023 SI Addendum activities at NBK Bangor were conducted under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, also known as Superfund).

NBK Bangor occupies approximately 6,130 acres and is located approximately 5 miles northwest of the Silverdale community in Kitsap County, Washington. The installation is situated on the eastern bank of Hood Canal, a long fjord-like body of marine water and arm of Puget Sound. NBK Bangor is a component command of the larger NBK. The current primary missions of NBK are to support the warfighter by providing reliable and timely base operating services for ships, submarines, and shore commands in Bangor, Bremerton, Keyport, Manchester, and Jackson Park/Naval Hospital. NBK provides critical services, programs, and facilities that meet the needs of hosted commands and installation employees supporting and enhancing Fleet, Fighter, and Family readiness. NBK Bangor maintains and supports vessels home ported or moored at the installation and operates administrative and personnel support facilities.

Twenty-one Military Response Program (MRP) sites were included in the original SI scope of work. During the preparation of the Munitions and Explosives of Concern (MEC) Quality Assurance Project Plan (QAPP) for the SI, a desktop study was conducted for all 21 sites, and it was determined that SI field investigations were not warranted at two sites (Unexploded Ordnance [UXO] 9B and UXO 17D).

Between March and November 2022, 15 of the 19 MRP sites were investigated during the 2022 SI. The 15 sites investigated under the 2022 SI included:

- UXO 2 (Site CC)
- UXO 3 (Site D)
- UXO 4 (Site 9)
- UXO 6 (Site 22)
- UXO 7 (Site 23)
- UXO 7B (Operable Unit [OU] 1 Site A)
- UXO 9 (Site OO)

- UXO 11 (Site 14)
- UXO 11B (Site 8)
- UXO 12 (Site HH)
- UXO 13 (Site 4)
- UXO 14 (Site JJ)
- UXO 17 (Site 2)
- UXO 17B (Site 1)
- UXO 17C (Site BB)

The four remaining sites were included in the planning documents and had biological and cultural surveys completed but were deferred for field work. The four deferred sites, which were investigated during a second phase of SI field work conducted from May 2023 through February 2024, included:

- UXO 8 (Site NN)
- UXO 10 (Site 12)
- UXO 15 (Site KK)
- UXO 16 (Site LL)

In addition to the four deferred sites, the following SI field work was also conducted in 2023/2024:

- UXO 2 (Site CC): Based on the 2022 SI recommendation and results, a step-out investigation was conducted.

- UXO 3 (Site D): Based on the 2022 SI recommendation and results, a step-out investigation was conducted; after the step-out was completed, it was determined that additional step-outs were warranted surrounding the site.

- UXO 4 (Site 9): MDAS that was identified during the 2022 SI field work was left onsite after being inventoried and demilitarized. During the 2023 SI field work, the remaining MDAS was reinspected, removed from the site, and destroyed/recycled by a certified facility.

- UXO 6 (Site 22): Based on the SI recommendation, the MEC/MPPEH identified during the 2022 SI field work was removed during the 2023 SI field work. Based on the results of the 2023 SI field work, an additional step-out was conducted.

- UXO 7B (OU 1 Site A): MDAS that was identified during the 2022 SI field work was left onsite after being inventoried and demilitarized. During the 2023 SI field

work, the remaining MDAS was reinspected, removed from the site, and destroyed/recycled by a certified facility.

- UXO 9 (Site OO): No additional field work was conducted in 2023 at UXO 9, which was also addressed in the 2022 SI. Further internal Navy discussions were warranted regarding the recommendation for UXO 9; therefore, UXO 9 is included in this SI Addendum to present the final recommendation.
- UXO 11B (Site 8): MDAS that was identified during the 2022 SI field work was left onsite after being inventoried and demilitarized. During the 2023 SI field work, the remaining MDAS was reinspected, removed from the site, and destroyed/recycled by a certified facility. Additionally, based on the recommendation from the SI Report and a decision by the project team, MDAS located within the subsurface depression onsite was removed.
- UXO 17 (Site 2): MDAS that was identified during the 2022 SI field work was left onsite after being inventoried and demilitarized. During the 2023 SI field work, the remaining MDAS was reinspected, removed from the site, and destroyed/recycled by a certified facility.

The objective of the SI field work was to further assess and verify the absence or presence of material potentially presenting an explosive hazard (MPPEH), and to support the decision-making process for future recommendations at the following MRSs:

- UXO 2 (Site CC)
- UXO 3 (Site D)
- UXO 6 (Site 22)
- UXO 8 (Site NN)
- UXO 9 (Site OO)
- UXO 10 (Site 12)
- UXO 11B (Site 8)
- UXO 15 (Site KK)
- UXO 16 (Site LL)

These SI activities were completed to meet the following objectives:

- Refine the conceptual site model and revise the MRS boundaries, as required.
- Gather sufficient data to assess the presence of MEC/MPPEH at the surface at sites with no previously observed MEC/MPPEH; or assess the presence of

additional MEC/MPPEH at the surface at sites where there was previously observed surface MEC/MPPEH.

- Gather data for known or suspected disposal areas and assess whether MEC/MPPEH may be present in subsurface soil.
- Gather data as determined by the MEC QAPP (e.g., number of transects, or 100 percent coverage constituting complete surface clearance removal action) from analog UXO detector-aided surface surveys and digital geophysical survey mapping, to assist in the decision-making process regarding potential future actions/investigations at each MRS.
- Manage MEC/MPPEH, including detonations, and collect and analyze soil samples to determine whether MC significantly impacted subsurface soil associated with the demolition pits.

The MEC and MC investigation activities were conducted in accordance with the project specific planning documents including the MEC QAPP, MC QAPP, and the Accident Prevention Plan/Site Safety and Health Plan. The sequence of 2023 field work began with vegetation management, followed by UXO detector-aided surface surveys to determine the presence or absence of MEC or MPPEH at each of the MRSs on the ground surface, and to identify any items present,. A geophysical survey (EM61-MK2-High Power [EM61-HP]) was then conducted where subsurface disposal was suspected. MEC/MPPEH management was completed at the end of the SI field work, using donor explosives to destroy MEC in demolition pits (and to demilitarize material documented as safe [MDAS]); 12,000 pounds of MDAS was certified and transported to a certified recycler. In addition, at the end of SI field work, post demolition MC samples were also collected at the established detonation areas at UXO 7 pits to determine potential impacts of the donor explosives to the adjacent subsurface soil.

UXO detector-aided surface surveys were conducted at seven sites (UXO 2, UXO 3, UXO 6, UXO 8, UXO 10, UXO 15, and UXO 16). Geophysical surveys were conducted using a combination of transects and full coverage grid surveys, depending on site-specific data needs. The EM61-HP surveys were conducted at five sites (UXO 3, UXO 8, UXO 10, UXO 15, and UXO 16) to identify the locations of discrete geophysical targets of interest. Metallic anomaly targets of interest identified from the geophysical surveys were not resolved via intrusive investigation. Although sources of the anomalies are unknown, geophysical survey results provide added weight-of-evidence for site recommendations.

MEC were detonated using donor explosives at three demolition pits constructed at UXO 7.

The objectives of the SI were achieved through the data quality and quantity collected. The SI data collected was used to support the following recommendations, for either a remedial investigation or no further action, for each of the following MRSs included in this SI Addendum:

Remedial Investigation:

- UXO 3 (Site D)
- UXO 9 (Site OO) (Area outside of Explosive Ordnance Disposal [EOD] Range Fan)
- UXO 16 (Site LL)

No Further Action:

- UXO 2 (Site CC)
- UXO 8 (Site NN)
- UXO 10 (Site 12)
- UXO 11B (Site 8)
- UXO 15 (Site KK)

Further Evaluation Deferred

- UXO 6 (Site 22)
- UXO 9 (Site OO) (Area inside of EOD Range Fan)

In addition to UXO 6 and UXO 9, which are located either partially or fully within an active operational range fan, two additional sites, UXO 7 (Site 23) and UXO 7B (Operational Unit 1 Site A), are fully encompassed by the operational range fan. Both UXO 7 and UXO 7B were included in the SI Report (Tetra Tech, 2023a) where further investigation under an RI was recommended. Because UXO 6, 7, 7B and 9 are located either partially or fully within an active operational range fan and the possibility exists for the sites to be re-contaminated from range operations, the recommendation for further investigation will be deferred until the operational range is closed by the installation's Commanding Officer. Once the operational range is closed, these sites will be re-evaluated for further investigation under the Navy's Environmental Restoration Program. UXO 7 and UXO 7B are included in this SI Addendum Report to present these updated recommendations and are only documented in Section 7.10 (see the SI Report [Tetra Tech, 2023a] for additional information about the sites).

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1.0 Introduction

This basewide Site Inspection (SI) Addendum Report documents activities conducted at Naval Base Kitsap (NBK) Bangor, located in Silverdale, Washington (Figure 1-1), for multiple munitions response sites (MRSs) under the Military Munitions Response Program (MMRP). Tetra Tech prepared this report on behalf of the Naval Facilities Engineering Systems Command (NAVFAC) Northwest under Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract Number N6247016D9008, Contract Task Order N4425519F4112. These sites are being addressed under the Navy's Military Response Program (MRP) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

Twenty-one MRSs were addressed in the SI scope of work. A desktop study conducted for all sites during the preparation of the Munitions and Explosives of Concern (MEC) Quality Assurance Project Plan (QAPP) determined that two sites (Unexploded Ordnance [UXO] 9B and UXO 17D) did not warrant SI field investigation. The 2022 SI results and site-specific recommendations of the desktop study are included in the 2023 SI Report. This SI Report Addendum provides the results of the 2023 SI.

During 2022 SI activities between March and November 2022, investigation of 15 of 19 MRP were completed (Tetra Tech, 2023a). The 15 sites investigated under the 2022 SI include:

- UXO 2 (Site CC)
- UXO 3 (Site D)
- UXO 4 (Site 9)
- UXO 6 (Site 22)
- UXO 7 (Site 23)
- UXO 7B (Operable Unit [OU] 1 Site A)
- UXO 9 (Site OO)
- UXO 11 (Site 14)
- UXO 11B (Site 8)
- UXO 12 (Site HH)
- UXO 13 (Site 4)
- UXO 14 (Site JJ)
- UXO 17 (Site 2)
- UXO 17B (Site 1)
- UXO 17C (Site BB)

The four remaining sites were included in the planning documents and had biological and cultural surveys completed but were deferred for field work because additional coordination efforts were required. These sites, which were investigated during a second phase of SI field work conducted from May 2023 through February 2024, include:

- UXO 8 (Site NN)
- UXO 10 (Site 12)

- UXO 15 (Site KK)
- UXO 16 (Site LL)

The following SI field work was also conducted in 2023/2024:

- UXO 2 (Site CC): Based on the 2022 SI recommendation and results, a step-out investigation was conducted.
- UXO 3 (Site D): Based on the 2022 SI recommendation and results, a step-out investigation was conducted; after the step-out was completed, it was determined that additional step-outs were warranted surrounding the site.
- UXO 4 (Site 9): Material Documented as Safe (MDAS) identified during the 2022 SI field work was left onsite after being inventoried and demilitarized. During the 2023 SI field work, the remaining MDAS was reinspected, removed from the site, and destroyed/recycled by a certified facility.
- UXO 6 (Site 22): Based on the SI recommendation, MEC/Material Potentially Presenting an Explosive Hazard (MPPEH) identified during the 2022 SI field work was removed during the 2023 SI field work. Based on the results of the 2023 SI field work, an additional step-out was conducted.
- UXO 7B (OU 1 Site A): MDAS that was identified during the 2022 SI field work was left onsite after being inventoried and demilitarized. During the 2023 SI field work, the remaining MDAS was reinspected, removed from the site, and destroyed/recycled by a certified facility.
- UXO 9 (Site OO): No additional field work was conducted in 2023. Further internal Navy discussions were warranted regarding the recommendation for UXO 9; therefore, UXO 9 is included in this SI Addendum to present the final recommendation.
- UXO 11B (Site 8): MDAS identified during the 2022 SI field work was left onsite after being inventoried and demilitarized. During the 2023 SI field work, the remaining MDAS was reinspected, removed from the site, and destroyed/recycled by a certified facility. Additionally, based on the recommendation from the SI Report and a decision by the project team, MDAS located within the subsurface depression onsite was removed.
- UXO 17 (Site 2): MDAS identified during the 2022 SI field work was left onsite after being inventoried and demilitarized. During the 2023 SI field work, the remaining MDAS was reinspected, removed from the site, and destroyed/recycled by a certified facility.

As part of the SI, a Habitat and Endangered Species Survey (i.e., biological survey) and a Historical and Cultural Resources Survey (i.e., cultural resources pedestrian survey) were conducted between August and September 2020. These two survey reports, as well as two follow-on biological documents, a No Effect Determination and a Biological Assessment (BA), identified field constraints and provided recommendations for best management practices during field work. The biological and cultural resources pedestrian surveys and BA are included in the SI report (Tetra Tech, 2023a).

Table 1-1 presents a crosswalk of MRSs and historical UXO site names.

1.1 Objective and Scope of Site Inspection

The objective of the SI was to assess and verify the absence or presence of MPPEH and to support the decision-making process for future recommendations at each MRS. The 2022 SI investigation results for 17 MRSs are included in the Final SI Report (Tetra Tech, 2023a) and the follow-on 2023 investigations at nine of the MRSs are presented in this SI Addendum. The MEC and munitions constituent (MC) investigation activities were conducted in accordance with the project specific MEC QAPP (Tetra Tech, 2021a); the Sampling and Analysis Plan (Field Sampling Plan and QAPP), simply referred to as the MC QAPP (Tetra Tech, 2021b); and with the Explosives Safety Submission (ESS) (Tetra Tech, 2020a). Table 1-2 presents a summary of the field work performed.

These SI activities were completed to meet the following objectives:

- Refine the conceptual site model (CSM) and revise the MRS boundaries, as required.
- Gather sufficient data to assess the presence of surface MEC/MPPEH at the sites with no previously observed MEC/MPPEH, or assess for the presence of additional surface MEC/MPPEH at sites where there was previously observed surface MEC/MPPEH.
- Gather data of known or suspected disposal areas and assess whether MEC/MPPEH may be present in the subsurface soil.
- Gather data as determined by the project delivery team (e.g., number of transects, or 100 percent coverage constituting complete surface clearance removal action) using analog UXO detector-aided surface surveys and digital geophysical mapping (DGM) (EM61-MK2-High Power [EM61-HP]) to assist with the decision-making process regarding potential future actions/investigations at each MRS.

- Manage MEC/MPPEH (including detonations) and collect and analyze soil samples to determine whether MC significantly impacted subsurface soil associated with the demolition pits.

1.2 Regulatory Framework and Project Stakeholder

This SI Addendum for the multiple MRP sites at NBK Bangor follows the CERCLA process and addresses the MEC/MPPEH at these sites. Based on the findings in this SI Addendum, remedial investigation (RI) or no further action recommendation will be presented.

The stakeholders for this project include the Navy and the Washington State Department of Ecology. Because of the cultural concerns at NBK Bangor, the project required compliance with Section 106 of the National Historic Preservation Act. Navy archaeologist consulted with the State Historic Preservation Officer (SHPO), the Skokomish Tribe, the Jamestown S'Klallam Tribe, the Port Gamble S'Klallam Tribe, the Lower Elwha Klallam Tribe, and the Suquamish Tribe, in compliance with Section 106.

The United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service are federal Stakeholders with regard to natural resources. Pursuant to Section 7 of the Endangered Species Act of 1973, as amended, the Navy completed an analysis of potential impacts to Endangered Species Act-listed species within the investigation areas at NBK Bangor. An effect determination was documented (Tetra Tech, 2021c) and approved by USFWS in September 2021. A separate technical memorandum documented the project activities having no effect on other federally listed species or their designated or proposed crucial habits and would not adversely affect essential fish habitat for federally managed fisheries (Tetra Tech, 2021d).

1.3 Report Organization

The SI for NBK Bangor is organized in the following sections:

- Section – 2.0 - General background and physical setting
- Section – 3.0 - SI field work
- Section – 4.0 - Data Quality Assessment
- Section – 5.0 - History and SI results for each site
- Section – 6.0 - Updated CSM and screening level hazard evaluation
- Section – 7.0 - Conclusions and recommendations
- Section – 8.0 - References used in preparation of this document

2.0 Background and Physical Setting

The facility background, physical setting, and previous investigation information is detailed in the SI Report (Tetra Tech, 2023a).

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3.0 Site Inspection Field Work

This section describes field work at the multiple MRSs. All SI activities were completed in accordance with the MEC QAPP (Tetra Tech, 2021a) and MC QAPP (Tetra Tech, 2021b). Field team members reviewed the approved planning documents before starting project activities. The field forms generated from the SI field work are included in Appendix A.

3.1 Site Preparation

This section discusses the general methodologies used during the field work preparation tasks at NBK Bangor.

3.1.1 Mobilization and Demobilization

Field work included vegetation management, followed by UXO detector-aided surface surveys, and if warranted, geophysical surveys. At the end of the field work, the field team detonated recovered MEC, and then collected post-detonation samples from the demolition pits to determine impacts of the donor explosives.

Due to the sequence of field work (i.e., vegetation management, followed by UXO detector-aided surface surveys, and then geophysical surveys) and duration of the work, various mobilizations and demobilizations occurred in order to complete the SI Addendum field work. Field work began on May 7, 2023 with rolling mobilization. The UXO team and cultural monitoring team were onsite during four mobilizations spanning four weeks, from May 7, 2023 through June 11, 2023. The geophysics team mobilized and demobilized to the site as needed for their portion of field work. Other subcontractors were land surveyor, utility locator, and Navy approved escort into secure areas. All necessary site-specific trainings were conducted as new personnel were brought onsite. A break in field work occurred from December 8, 2023 through January 1, 2024. Site restoration (i.e., removing stakes, marking tape, flags, and geophysics quality control (QC) blind seeds at certain sites) was completed and demobilization preparation (i.e., securing the area, cleaning tools and equipment, shipping equipment offsite, etc.) occurred as field tasks were completed. Field work and demobilization was completed on March 6, 2024.

Throughout the duration of the field work, draft daily summary reports were prepared and documented the personnel on site, work accomplished, issues/problems and resolution, important calls/meetings, and planned activities for the next workday, as well as associated photos.

3.1.2 Utility Clearance

Utility clearance was conducted where intrusive QC blind seeding and demo operations were planned. Prior to utility clearances, 811 was called. Utility clearances were completed at UXO 7 and UXO 8.

3.1.3 Site Surveying

A Washington Professional Land Surveyor placed survey control points onsite, which were established using a combination of global positioning system (GPS) coordinates with ties to the Washington State Reference Network and Navy monuments. The control points were used for checking and establishing GPS positional accuracy by the UXO and geophysical teams. Surveying was conducted at UXO 3, UXO 6, UXO 8, UXO 10, UXO 15, and UXO 16. The site survey reports are provided in Appendix C.

3.1.4 Site Accessibility and Exclusion Zones

Exclusion zones (EZs) were established in accordance with the Department of Defense (DoD) Explosives Safety Board (DDESB) approved ESS. Access to the EZ was limited to personnel essential to the operation being conducted; however, under specific conditions, and on a case-by-case basis, authorized visitors were granted access to the EZ when operations were conducted.

Upon establishment of the EZ, the area was controlled by wooden barricades (i.e., saw horses) bright orange in color so that the EZ area was easily identifiable. The EZ distance was determined based on the munition with greatest fragmentation distance (MGFD). Barricades were moved when necessary, depending on the requirements of the field work in progress.

3.1.5 Governing Regulations/Guidance

The MEC investigation was performed in accordance the MEC QAPP (Tetra Tech, 2021a) and with the DDESB-approved ESS (Tetra Tech, 2020a), including ESS Amendment 2 (Tetra Tech, 2023b), as well as with local, state, and federal regulations and applicable DoD requirements. The MC investigation was conducted as described in the MC QAPP (Tetra Tech, 2021b) in accordance with local, state, and federal regulations.

3.1.6 UXO Escort Operations

UXO qualified personnel escorted all onsite visitors (see Appendix A-1 for visitor log) and non-UXO-qualified team members as part of UXO and anomaly avoidance measures. The UXO escort used a hand-held metal detector to check for and avoid

possible ordnance or ordnance-related material before Tetra Tech or the land surveying subcontractor placed temporary control points, during vegetation management, and before the field team collected post-detonation samples. The UXO escort was responsible for clearly marking areas containing visible ordnance or MEC, and for reporting the location to the UXO team leader. When MPPEH was discovered by the UXO escort on the ground surface, the item was managed in accordance with the DDESB-approved ESS.

3.1.7 Biological Surveys and Monitoring

For detailed background information outlining the biological surveys and monitoring and the results of the survey at each MRS, see the SI Report (Tetra Tech, 2023a).

Based on the results of the biological surveys, ecological field constraints were identified at certain sites (UXO 2, 6, 9, and 11B). Based on marbled murrelet nesting season restrictions, field work conducted between April 1 through September 23 started two hours after sunrise and ceased two hours before sunset. No formal restrictions are in place regarding salmon, but field work was conducted within the window of July 16 through February 15 to avoid spawning concerns in the wetland areas at UXO 9.

3.1.8 Cultural Resources Surveys and Monitoring

For detailed background information outlining the cultural resource surveys and monitoring, see the SI Report (Tetra Tech, 2023a).

Any discoveries of cultural and/or historical items during the 2023 SI field work were documented and the Navy archaeologist was notified. The cultural SI findings are considered sensitive information and are documented in a separate report, with all cultural monitoring logs for field work included as an attachment to that report (Tetra Tech, 2021e, 2023c).

3.2 Site Inspection Methodology for MEC

This section describes the SI methodology used for the MEC portion of this investigation. The MEC SI activities were conducted in accordance with the MEC QAPP (Tetra Tech, 2021a). The daily MEC activity logs, daily safety logs, and safety sign-in sheets are included in Appendix A-2, A-3, and A-4, respectively.

3.2.1 Vegetation Reduction

Vegetation reduction to 6 inches above ground surface was performed before analog surface surveys and geophysical surveys (EM61-HP) where conditions restricted safe

access to the site and where the vegetation height and thickness would compromise data quality.

Vegetation reduction was also conducted along access routes to the survey areas when a site was located relatively far from an access road. Access pathways to a site were reviewed by UXO field personnel and UXO management to determine the safest and most convenient route permissible for vegetation reduction. Within the survey area, an approximate 5-foot buffer area around the SI perimeter was cleared to allow data collection to the SI perimeter and to provide physical space for field personnel to maneuver equipment at the SI boundary.

Vegetation was cleared or trimmed using a combination of hand tools and mechanical methods. Shielded equipment or MEC avoidance procedures were implemented by Tetra Tech UXO escort personnel. Vegetation was cleared to approximately 6 inches of the ground surface to minimize the chances of an accidental ground strike with hand tools or mechanized equipment. Trees and other vegetation with diameters of 3 inches or less were cut, as needed, to facilitate access to and within the site. Tree branches, limbs, vines and other vegetation above the ground surface were removed to heights of approximately 7 feet to facilitate safe passage of personnel and equipment through the survey areas, and to facilitate line of sight when using robotic total station (RTS) positioning systems during data collection. During the 2022 SI field work, a Field Change Request (FCR) was issued to modify how vegetation management would be conducted (see SI Report [Tetra Tech, 2023a] for additional details). Tetra Tech was given permission to remove any sized trees (including trees larger than 3 inches diameter at breast height), as needed, to clear the path for the chipping equipment, if essential to the work effort. In addition, chipped material was allowed to be spread on the forest floor, but not stock piled. Any material that was too large to fit into the chipper was allowed to be scattered onto the forest floor (not stock piled), as needed.

3.2.2 Quality Control Seeding

A blind seeding program was implemented at the MRSs with analog instrument-assisted surface surveys and at those with full coverage DGM surveys. The blind seeding program included surface seeds placed in advance of analog surface surveys by the UXO team and subsurface seeds placed within planned full coverage DGM survey areas.

3.2.2.1 UXO Surface Seeds

The UXO surveys detected surface seeds that consisted of small Schedule 80 industry standard objects (ISOs), which were placed on the surface by the UXO Quality Control Specialist (UXOQCS). Surface seeds were placed at a rate that facilitated 1 to 6 seeds

encountered per operator per daily lot of work. The daily UXO QC reports from the SI field work are included in Appendix A-5.

3.2.2.2 DGM Subsurface Seeds

QC subsurface blind seeds were only used for full coverage geophysical surveys at UXO 8. At this site, full coverage geophysics (EM61-HP) was conducted, and subsurface seeds were emplaced at varying depths and orientations within the subsurface so that each DGM field team would encounter at least one blind seed per day of data collection. UXO personnel assisted with seed placement and implemented anomaly avoidance measures to avoid placement of a QC seed too close to another metallic object in the ground. The maximum burial depth for small ISOs was 6 inches in a horizontal orientation, and 12 inches in a vertical orientation. All medium-sized ISOs used as seeds were emplaced in a horizontal orientation at variable depths, but not exceeding 18 inches below ground surface. The maximum achievable seed depth was governed in the field by digging conditions.

The seeds were clearly identified as inert and affixed with identification (ID) labels. Subsurface seed IDs were discernably different from surface seed IDs to avoid confusion between the two data sets. The seed locations were recorded using a handheld GPS instrument, and the coordinates were recorded in the blind seed register. The seed register was firewalled from UXO and DGM production personnel at the time of field work. After the geophysics field work was completed and the third-party quality assurance (QA) approval of the geophysics data was provided, the geophysics team removed the QC subsurface blind seeds during the site restoration efforts. The final version of the geophysics master database is included as an appendix to the DGM Survey Report (see Appendix D) includes the QC blind seed details.

3.2.3 UXO Detector-Aided Surface Survey

The UXO team conducted detector-aided surface surveys at each MRS to identify, map, and photograph MPPEH/MEC found at the surface so that it could then be removed. For sites where no geophysical surveys were conducted, the UXO team removed all MEC/MPPEH from the ground surface and non-munitions related debris (NMRD) remained in place. For those sites where geophysical surveys were conducted, the UXO team removed NMRD on the surface that would interfere with the ground-based DGM surveys (i.e., any piece of metal 2 inches or greater in any dimension) to the extent practical. Metallic NMRD too heavy to move without assistance of mechanized equipment or that was partially buried remained in place, as did existing infrastructure such as fencing and railroad tracks.

The UXO team established a fiducial positioning system for the detector-aided surveys by creating a labeled system of survey stakes. The UXO team established 5-foot survey lanes in selected accessible portions of the site. A Schonstedt GA-52Cx or Subsurface Instruments ML-3S magnetic locator, and a Vallon VMH 3 all-metals detector were used to locate surface metal and debris. The disposition of recovered MPPEH was handled in accordance with the approved ESS.

When a suspect MEC/MPPEH item was encountered, its location was recorded using a GPS instrument. Each MEC/MPPEH item was marked with flagging tape and assigned a unique number. Available information about the item was recorded, including location, identification, item number, and whether the item was suspect MEC/MPPEH. A digital photograph was taken of each MEC/MPPEH item. After dual inspection, a determination about the item was made by the Senior Unexploded Ordnance Supervisor (SUXOS) and UXOQCS/ Unexploded Ordnance Safety Officer (UXOSO) and, subsequently, the Tetra Tech project manager and Navy RPM were notified of all MEC finds. If the MEC/MPPEH was determined safe to move, after consulting with the NBK Explosive Safety Officer (ESO), the Navy RPM, and/or SUXOS, its transport to a facility magazine for temporary storage was coordinated until the item could be detonated at the end of the field work (see Section 3.2.6). Had MEC/MPPEH been determined to be unsafe to move, the NBK Explosive Ordnance Disposal (EOD) team would have been contacted to assume custody of the item and address its final disposition, through either destruction-in-place (DIP) or by moving the item to another area (UXO 7) for detonation. MDAS items were secured by Tetra Tech in a locked container at the laydown area until transfer and final disposition by a certified recycler (see Section 3.2.6).

3.2.4 Geophysical System Verification

A geophysical system verification (GSV) process, consisting of the Instrument Verification Strip (IVS) and blind seeding program, was implemented for the DGM systems during the SI. The IVS was established under the 2022 SI field work and left in place for the 2023/2024 SI field work. A post-seeded survey of the IVS was conducted before the geophysical surveys and after the EM61-HP assembly at each mobilization, and the results of this process were documented in the IVS Technical Memorandum (see Appendix D). For additional information on the IVS establishment and the blind seeding, see the SI Report (Tetra Tech, 2023a).

3.2.5 DGM Surveys

The following subsections describe the DGM survey conducted during the SI field investigation and associated data processing and QC. Separate DGM Reports were

prepared to document the DGM surveys in detail (Appendix D). Daily DGM reports are included as attachments to the DGM Survey Reports.

Because no intrusive investigation of DGM targets of interest (TOIs) was included as part of the SI, there is no information available on the vertical extent of the discrete anomaly sources or the nature of these sources. Based on the surface clearance findings, at locations where MEC/MPPEH was encountered on the ground surface, MEC/MPPEH may also be present within the subsurface, either as discrete objects or co-mingled with other debris. Without intrusive investigation of TOI locations, the nature of the anomaly sources remains unknown.

3.2.5.1 EM61-HP Field Surveys

The purpose of the DGM survey was to assess the presence of metal in the subsurface, which may potentially be MEC/MPPEH, and determine the potential lateral extent (i.e., footprint) of suspected disposal areas within the SI investigation boundaries; these surveys were completed to support the overall SI objective of assessing the absence or presence of MEC/MPPEH. The DGM surveys also support the decision-making process for next steps at each site. The EM61-HP surveys were conducted via transects or were conducted over the entire site. Transect collection included a single pass with the geophysics sensor along each transect, marked out using flagging. Deviations from the planned transect alignment occurred in order to navigate around trees or other obstructions. See Appendix D for detailed information regarding the EM61-HP surveys, including mapping to the DGM Survey Report.

EM61-HP surveys, via transects and/or full coverage, were conducted at five MRSs: UXO 3, UXO 8 (limited full coverage), UXO 10, UXO 15, and UXO 16.

3.2.5.2 DGM Data Processing and QC

Data processing was conducted in accordance with the MEC QAPP (Tetra Tech, 2021a) and is further detailed in the DGM Survey Report (Appendix D), which includes the electronic Master Project Database as an appendix. The task was to process DGM data, select targets from DGM data, and update the project GIS and Access database. DGM data were processed, and target picking was performed. In some cases, the density of subsurface anomalous response was so high that the selection of individual TOIs was not possible. These areas, identified as saturated response areas (SRAs), were bounded by polygons in the processed DGM results. Refer to the DGM Survey Report (Appendix D) for DGM mapping.

The QC Geophysicist was responsible for completing the final QC of the DGM data prior to delivery to the Navy. Various QC checks were performed in the field (i.e., through the field QC program) and by the data processors (e.g., check of sample separation and

survey coverage) during data analysis. Completed data processing standard operating procedure checklists are provided in the DGM Survey Report. The QC Geophysicist performed necessary checks of blind seed performance with each data package submitted by the data processors. Weekly QC DGM reports were prepared and submitted to the Navy and the third-party QA, Naval Surface Warfare Center Indian Head Division (NSWC IHD), which are included in the DGM Survey Report in Appendix D.

3.2.6 MEC/MPPEH and MDAS Management

MEC/MPPEH was managed in accordance with the DDESB-approved ESS. When MPPEH was identified by the field team, a temporary work stoppage was called, and the SUXOS and UXOQC/UXOSO independently inspected the item to identify it or to verify the associated hazards. Upon dual inspection, the SUXOS and UXOQCS/UXOSO determined whether the item was MEC or MDAS. If the item was MDAS and determined free of explosive material, it was stored in drums at the laydown yard until the end of the project when the MDAS drums were transferred to the qualified recycler. If the item was MEC that was safe to move (which was documented in writing prior to movement), the Tetra Tech project manager (PM) was notified. The Tetra Tech PM provided the notification with necessary information (i.e., item type, description, location, etc.) to the Navy RPM. The Navy RPM then contacted the NBK ESO, and direction was provided on a case-by-case basis.

MEC determined by the SUXOS and UXOSO to be safe to move were relocated to a collection point within the MRS where they were either guarded overnight or sandbagged in place (after direction from the Navy was given) until they were transferred to the facility's temporary explosives storage magazine for later detonation at the end of the project. The magazine manager was contacted about any items that required relocation to the magazine, and a date/time to transport the item(s) to the magazine was coordinated.

At the end of the SI field work, all MEC located in the temporary storage magazine were detonated using donor explosives prior to being transferred to a qualified recycler. Detonations were conducted as outlined in the MEC QAPP (Tetra Tech, 2021a) with the Navy RPM coordinating all notifications of detonations with the NBK Public Affairs Officer. Donor charges were delivered on call to the detonation area at UXO 7. Four shots, using three demolition pits, were conducted as per the ESS. During detonation, the EZ was established, and access was limited to essential personnel only. Photos showing the management of MEC, and detonations, are included in Appendix A.

The MDAS process was conducted under chain of custody. The DD form 1348-1A, which verifies the MDAS status, was signed upon Tetra Tech transfer of items and is

included in Appendix E. As per the certificate of destruction, 12,000 pounds of material were destroyed.

3.3 Site Inspection Methodology for Munitions Constituents

This section describes the SI methodology completed for the MC portion of this investigation. The MC investigation activities were conducted in accordance with the MC QAPP (Tetra Tech, 2021b).

3.3.1 Post-Detonation Sample Collection

A total of four detonation pits were dug; however, only three detonation pits were utilized during demolition operations. One post-detonation subsurface soil sample was collected and submitted for explosives analysis from the three detonation locations at UXO 7. Detonations of all MEC encountered during the span of the SI field work were performed in three separate demolition pits, followed by MC sampling to determine impacts of the donor explosives. UXO Technicians conducted a post detonation inspection and confirmed all the energetic materials were consumed. Post-detonation soil samples were collected from each of the three demolition pits (3 samples total) and sent to the analytical laboratories for explosives analysis. Each sample was collected as a composite sample with one aliquot collected from the middle of the demolition pit and the remaining four aliquots from each side wall. A summary of post-detonation samples collected is included in Table 3-1.

3.3.2 Quality Control Sample Collection

Soil QC samples (matrix spike/matrix spike duplicate) were collected at a frequency of 1 per 20 total combined samples for this investigation for laboratory QC purposes. Field duplicates were collected at a rate of 1 per 10 samples across all sampled sites. A summary of QC samples collected is included in Table 3-1.

3.3.3 Decontamination Procedures

All soil samples were collected using dedicated bowls and spoons; therefore, no decontamination procedures were necessary and investigation-derived waste (IDW) wash water was not generated.

3.3.4 Laboratory Analysis

All post-detonation soil samples were analyzed for explosives (SW-846 8330B). The analysis for explosives was completed by Eurofins TestAmerica Denver, while Agriculture & Priority Pollutants Laboratories, Inc (APPL) completed the analysis for

nitrocellulose (United States Environmental Protection Agency [USEPA] 353.2 modified). Eurofins TestAmerica Denver and APPL are current DoD Environmental Laboratory Accreditation Program (ELAP)-approved laboratories.

3.3.5 Project Screening Levels

The post-detonation sampling results were compared to human health and ecological screening criteria. The human health project screening level (PSL) chosen for each parameter is the lowest of these values, as available: State of Washington Method A soil cleanup levels for unrestricted land use; Method B soil cleanup levels for unrestricted land use; soil cleanup level protective of groundwater vadose at 13 degrees Celsius (°C); USEPA regional screening level (RSL) for residential soil, industrial soil; and risk-based soil screening levels (SSL) for protection of groundwater (USEPA, 2023). USEPA risk-based SSLs for protection of groundwater (USEPA, 2023) correspond to a dilution attenuation factor of 1; carcinogenic values represent an incremental cancer risk of 1×10-6, and noncarcinogenic values correspond to a hazard quotient of 1. No screening values were available for 3,5 dinitroaniline at the time of the 2020 MC QAPP preparation; however, when the results were evaluated in 2022, a screening value was available and was used to evaluate the MC sample results. For all explosives analytes, the selected PSL (lowest of the values) was the USEPA SSLs for protection of groundwater.

The ecological screening values were selected from the following sources listed in order of preference: WAC – Washington State Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (Table 749-3); Draft Ecological SL – Draft Ecological SSL (SERDP, 2012); Draft Ecological SSL (1) – Draft Ecological SSL (Checkai et al., 2012); LANL – Los Alamos National Laboratory (LANL, Intellus New Mexico, 2022); and Region 4 – USEPA Region 4 SSL (USEPA, 2018).

The PSLs used to screen the post detonation sampling results are included in the Section 5 post-detonation soil results table (Table 5-3). The most recent updated PSLs included in the 2020 MC QAPP were reviewed and updated (November 2023 criteria values) to evaluate the MC sample results.

3.3.6 Field Sample Documentation and Shipping

Documentation of field observations were recorded in a field logbook (see Appendix A-6). Sample log sheets for the post-detonation samples recorded the sample ID number, sample time and date, location, and analytical matrix and are included in Appendix A-7. The chain-of-custodies are included in Appendix A-8.

Samples were packed into coolers with ice for transport to the analytical laboratory under chain-of-custody. The samples were taken to the local FedEx drop off location and shipped for next day delivery at Eurofins TestAmerica Denver, located in Arvada, Colorado for explosives analysis and to APPL located in Clovis, California for nitrocellulose analysis.

3.4 Management of IDW

No decontamination procedures were necessary (see Section 3.3.3) and IDW wash water was not generated.

3.5 Deviations from the Planning Documents

FCRs were completed either prior to the start of or during the 2023 field work, resulting in updates or revisions to the planning documents:

Accident Prevention Plan/Site Safety and Health Plan (APP/SSHP):

- FCR-05 (Navy Approved 05/23/2023): Implemented personnel changes and change in the occupational medical consultant facility.
- FCR-06 (Navy Approved 06/22/2023): Addressed additional requirements for the UXOSO based on the number of personnel onsite.
- APP/SSHP Rev 1 (Navy Approved 08/3/2023): Updated the APP/SSHP to incorporate prior FCRs and to include tree felling and climbing.

MEC QAPP:

- FCR-07 (Navy Approved 07/06/2023): Addressed a correction to the investigation areas at site UXO 15 and UXO 16 based on data provided by land surveyors for accessible inspection areas.
- FCR-08 (Navy Approved 08/03/2023): Reflected updates to the planned geophysical surveys at the four deferred sites: UXO 8, UXO 10, UXO 15, and UXO 16.

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4.0 Data Quality Assessment

This section assesses the success of the project in meeting data quality objectives (DQOs) and summarizes the quality of resultant analytical data. The project objective (see Section 1.1) was met, and the results met the quality requirements.

The field work activities for the SI Addendum were planned and executed to collect as much information as possible to meet the DQOs. Field decisions incorporated dynamic flexibility to optimize the field work. All field work was performed with continuous monitoring by project QC and QA staff to verify collected data met the measurement performance criteria (MPC) and associated measurement quality objectives (MQO). The onsite UXOQCS monitored the vegetation clearance and UXO detector-aided surface surveys with no resulting MQO failures. On and offsite QC personnel monitored the DGM surveys and prepared nonconformance reports (NCR) where applicable. The resulting NCRs and root cause analyses were approved by the Navy QA geophysicists and did not result in any loss of data. Details of the DGM QC and conformance to MPCs is details in the DGM Survey Report in Appendix D. Tetra Tech operated in close contact with the Navy by providing daily field summary reports and weekly calls; therefore, the field work schedule was modified where necessary, and the initial field work execution plans were revised to increase productivity. Deviations and/or updates from the MEC QAPP were authorized by the Navy through this coordination and are explained in Section 3.5.

4.1 Data Quality Objectives Review

DQOs for the SI field work were presented in the MEC QAPP (Tetra Tech, 2021a) and MC QAPP (Tetra Tech, 2021b). All field work activities were conducted by qualified personnel, and the data collected fulfilled the procedure, coverage, and accuracy requirements of the MEC and MC QAPPs and associated FCRs.

4.1.1 Information Inputs to Assess SI

All field work was completed in accordance with the procedures described in the MEC and MC QAPPs. The data used as input to meet the stated SI objective (Section 1.1) are:

- Previous collected historical data.
- SI QC/QA data.
- UXO detector-aided surface survey results.
- Geophysical survey results (EM61-HP).

Appendix D contains results from the DGM surveys. As indicated earlier, the field forms associated with the MEC intrusive investigation are in Appendix A. The results of the DGM surveys and intrusive MEC investigation are further evaluated in respective Sections 5 and 7, with the MEC baseline risk assessment (included as Appendix F) summarized in Section 6.

All MC investigation field forms related to the MC sampling effort are included in Appendix A. Post-detonation soil samples were analyzed by USEPA-approved laboratories with all results were verified (Appendix G); results are further described in Sections 5 and 7.

4.1.2 Defined Boundaries of the Study

Spatial and temporal boundaries were established for the MRSs at NBK Bangor:

- Spatial boundaries were based on the development of the CSM for each site and were biased to areas where MEC/MPPEH were most likely to be encountered to determine their absence or presence per the SI objective. The lateral boundaries of the investigations of each site were within the boundaries of the MRS sites identified on Figure 2-1, and at select sites, step-out investigations were conducted where additional SI information was needed. Geophysical surveys were also conducted at the ground surface at select sites, where the potential for subsurface disposal existed based on the CSM. Results indicated that subsurface anomalies are present; however, the identification of the geophysical anomalies was limited by the maximum detection depth of the instrumentation. Intrusive subsurface resolution of anomalies as MEC/MPPEH or NMRD was not conducted; therefore, the vertical depth of potential MEC/MPPEH at a given site is unknown.

- Temporal boundaries were established as required or as necessary by base activities (which restricted site access at times), weather, and ecological resources restrictions. These latter restrictions were identified by the habitat/threatened and endangered field survey results, which resulted in updated vegetation stands and wetlands mapping; the updated wetlands mapping was used in the field to avoid disturbing valued wetlands. A cultural field survey resulted in updated cultural resources, and cultural resource areas of concern were removed from the SI investigation footprints. Similarly, additional cultural resources identified in the field by a Tetra Tech cultural monitor were removed from SI investigation footprints. Note that sensitive cultural resource areas are not shown on the SI report mapping because of sensitivity of the information.

4.1.3 Specified Performance Checks/Verifications or Acceptance Criteria

The following are the specified performance checks/verifications or acceptance criteria, as outlined in the MEC QAPP (Tetra Tech, 2021a):

UXO detector-aided surveys - Verified correct assembly, initial and ongoing instrument function tests, ongoing instrument settings checks, verified analog survey repeatability and coverage, and verified surface MEC removal.

DGM surveys (EM61-HP) - Verified correct assembly, initial and ongoing instrument function tests, initial dynamic positioning accuracy, ongoing detection survey positioning precision (IVS), in-line measurement spacing, transect and full coverage, line and fiducial positioning, sensor separation, battery voltage, valid position data (real time kinematic [RTK] GPS), valid position data (post-processed GPS), and dynamic DGM survey performance. See Appendix D for details.

All field work was completed fully in accordance with the DQOs in the MC and MEC QAPP.

During field work, FCRs and non-conformance reports (NCRs) documented non-conformance to the specific performance checks/verifications or acceptance criteria during the DGM surveys. One FCR to the MEC QAPP was generated specific to geophysical surveys, FCR-08, as described in Section 3.5 and provided in Appendix B of this SI Report. Three NCRs were prepared and, in all cases, documented nonconformances have been addressed with a root cause analysis (RCA), and an appropriate corrective action has been implemented, as necessary. The NCRs are further described in the DGM Survey Report in Appendix D.

4.2 Analytical Data Quality

The analytical laboratory data reports are included in Appendix G-1. In general, the quality of the analytical data was acceptable, and none of the analytical results were rejected during data validation (see Appendix G-2 for data validation reports).

Eurofins TestAmerica Denver submitted the soil chemical data under Sample Delivery Group (SDG) number 280-188555-1 for explosives analyses. APPL submitted the soil chemical data under SDG number 24C0028 for nitrocellulose analysis. The SDG packages are included in Appendix G-1.

For SDG 280-188555-1, associated with Eurofins Test America Denver, one closing continuing calibration verification had a percent difference outside the QC limits for the select semivolatile organic compounds (SVOC) (2,4-dinitrophenol, diphenylamine and

N-nitrosodiphenylamine) analyses. Matrix spike/matrix spike duplicate percent recoveries were outside the QC limits for picric acid. Detected results below the limit of quantitation but above the detection limit were qualified as estimated. Field duplicate imprecision was noted for sample pair X7-TP-C02-2430/FD-03062401.

The explosives compounds 2,4-diamino-6-nitrotoluene and 2,6-diamino-4-nitrotoluene were reported by the laboratory but were not included in the list of analytes required in the project QAPP and were not included in the final project database. All results were non-detect. The rationale for exclusion is that these two analytes were originally included in the analytical laboratory scope of work; however, there are no screening criteria for these two analytes nor were either of the two project laboratories certified for the analysis. In order to be consistent with data submitted in January 2023, the aforementioned analytes were not included in the final data set of this SDG after validation.

For SDG 24C0028, associated with APPL analysis of nitrocellulose, matrix spike/matrix spike duplicate percent recoveries were outside the QC limits.

4.3 Completeness and Usability

This section describes the evaluation of the completeness of each stage of the field work conducted during the SI and usability of the data.

4.3.1 UXO Detector-aided Surface Surveys

UXO detector-aided surface surveys were to be conducted within certain areas at seven MRSs to verify the presence or absence of MPPEH/MEC. The data quality and quantity of the UXO detector-aided surface surveys are sufficient to support the overall project objectives of the SI. Worksheets 12 and 22 of the MEC QAPP presents the project MPCs and MQOs respectively. Daily, the onsite UXOQCS inspected and documented the satisfactory MPC during vegetation management and surface surveys within all accessible areas of each site with a MQO failure. The actual areal coverage of the UXO detector-aided surface surveys varied based on site conditions (e.g., unsafe terrain, obstructions, etc.). The following summary includes a breakdown of the planned versus the actual acreage included in the UXO detector-aided surface surveys:

Completeness of UXO Detector-aided Surface Surveys

Site Name	Planned UXO detector-aided surface surveys (acres)	Actual UXO detector-aided surface surveys (acres)	Completeness (percent)
UXO 2 (Site CC)	1.1[1]	1.1	100
UXO 3 (Site D)	5.16[1]	15.25[2]	296
UXO 6 (Site 22)	1.65[3]	2.15[2]	130
UXO 8 (Site NN)	3.7	3.7	100
UXO 10 (Site 12)	2.3	2.3	100
UXO 15 (Site KK)	6.8	6.99	103
UXO 16 (Site LL)	10	7.31[4]	73

[1] The SI Report recommended an additional step-out be conducted based on the 2022 SI results; the planned detector-aided surface UXO detector-aided surface surveys includes the original investigation area and the step-out.
[2] Based on the 2023 SI results, additional step-outs were warranted and conducted.
[3] Field work at UXO 6 included the removal of MEC and MDAS from the slope. During the 2022 field work, metal debris, drums, ammunition cans, and MPPEH were found; however, MPPEH was not removed. The MPPEH items were removed under the 2023 SI field effort.
[4] Inaccessible areas were present in UXO 16, which prevented the field team from conducting UXO detector-aided surface surveys over the entire site.

4.3.2 Geophysical Surveys

Geophysical surveys were conducted at five sites. Survey data were collected via transects, full coverage, or through a combination of both. The DGM Survey Report in Appendix D documents the survey results and associated QC. Tables 4 and 5 of the report present the MPC and MQO results. All MPCs were met for all accessible DGM survey areas and the MQOs were passing within acceptance criteria. The NCR/RCA process was followed for QC variances associated with the dynamic surveys and processing, and corrective actions were developed to ensure the usability of the data was not adversely impacted. The geophysics verification and validation confirm the data quality and quantity are sufficient to support the overall project objectives of the SI.

The actual areal coverage of the geophysical surveys varied based on site conditions (e.g., unsafe terrain, obstructions, etc.). The following summary includes a breakdown of the planned versus the actual geophysical survey coverage:

Completeness of Geophysical Surveys

Site Name	Planned Geophysical Survey Coverage	Actual Geophysical Survey Coverage[1]	Completeness (percent)
	EM61-HP (acres)	EM61-HP (acres)	
UXO 3 (Site D)	T (3.78)	T (3.8)	(100)
UXO 8 (Site NN)	T & FC (0.7)	T (0.212) & FC (0.494) = 0.706 Total	(101)
UXO 10 (Site 12)	T (1.1)	T (1.07)	(97)
UXO 15 (Site KK)	T (0.8)	T (0.95)	(119)
UXO 16 (Site LL)	T (1.1)	T (0.84)[1]	(76)

T: Transect
FC: Full Coverage
Notes: [1] Northwest section of site was unable to be collected due to steep slopes and obstructions.

4.3.3 MC Sampling

Post-detonation samples were collected from the demolition pits. A total of three post-detonation samples were collected (one from each demolition pit), which resulted in sampling conducted at 100-percent completeness.

5.0 Site History and Summary of Site Inspection Results

This section summarizes the site-specific history, field investigation, and results of the SI field work at each MRP site investigated including the vegetation management, UXO detector-aided surface surveys, geophysical surveys (EM61-HP), and post-detonation soil sampling results (where conducted).

Field work tasks were documented in daily report submittals. The photographs of MEC/MDAS and other significant features (i.e., NMRD, shipping containers, debris, disposal areas, etc.) and vegetation management are included in Appendix A-9.

5.1 UXO 2 (Site CC)

This section provides the site history and results of the 2022 and 2023 SI field work for the UXO 2 MRS.

5.1.1 Site History

UXO 2 was a disposal area within Keyport Annex in the southeastern portion of NBK Bangor (Figure 5-1) and the CSM indicated potential presence of surface MPPEH/MEC. The overall site comprises approximately 19 acres along a railroad line which operated from 1946 to present (Figure 5-1).

In February 2015, EOD responded to the site because MPPEH was observed on the ground surface along the railroad tracks during routine vegetation management. Four discrete areas were observed with metallic debris; and three of these areas contained various MPPEH including ammunition cans, ordnance storage containers, 40-millimeter (mm) cartridge casings, .50-caliber cartridge casings, and a potential smoke pot. The EOD response team reportedly did not specifically identify explosives or explosive residue within the inspected MPPEH; however, the MPPEH were not designated as MDAS, and the area was not completely investigated and delineated. Based on the presence of MPPEH and the potential presence of MC contamination, the area was classified by the Navy as a MMRP Area of Concern (AOC) requiring further investigation (Battelle, 2017).

The 2017 PA (Battelle) recommended removal of the surface MPPEH/MEC, followed by confirmatory MC soil sampling. A previously planned detector-aided survey was not completed because of the presence of very dense vegetation and other obstacles.

During the SI planning phase, and during a site visit in September 2019, an ammo box was identified on the ground surface within the investigation area.

The primary AOC investigated during the SI was along approximately 3.5 linear acres and approximately 80 feet wide, with an approximately 1,900 linear feet of railroad track. The width of the AOC was approximately 30 feet from the center of the active rail line on one side, and approximately 50 feet to the swale on the other side. Vegetation observed at the site during the September 2019 site visit included young alder, cedar,and Douglas-fir, which create a dense tree canopy along both sides of the railroad line. Uneven terrain was obscured by dense understory, and deadfall with the ground cover consists primarily of ferns, mullein, and scattered Scotch broom. A ditch along the eastern side of the MRS may be considered a wetland for at least a portion of the length that was visited. The western side of the rail bed was bordered by a steep slope extending down from the rail line.

5.1.2 2022 and 2023 Field Investigation

UXO 2 was identified as a site with ecological field constraints (see Section 3.1.7). UXO 2 was investigated as part of the 2022 SI, and field activities included vegetation management and UXO detector-aided surface surveys. Additionally, a step-out investigation was conducted to the east and west in the southern portion of the site. Based on MDAS findings in the 2022 SI another step-out investigation was recommended to the south of the site. The 2023 SI field activities included vegetation management and UXO detector-aided surface surveys of the step-out investigation area, as well as the removal of an MDAS pile left onsite during the 2022 field work. Field work was conducted on the following dates:

2022:

- Vegetation management: June 19 to July 16, 2022.
- Detector-aided surface surveys: July 30 to August 7, 2022.
- Third-party QA: August 7, 2022.
- Step-out vegetation management: September 24-25, 2022.
- Step-out UXO sweeps: October 8-9, 2022.
- Step-out third-party QA: October 8-9, 2022.
- Site restoration: October 8-9, 2022.

2023:

- Step-out vegetation management: October 7-14, 2023.
- Step-out UXO detector-aided surface surveys: October 21, 2023.
- Step-out third-party QA: October 21, 2023.
- Site restoration: October 21, 2023.

5.1.3 MEC/MDAS Results

The list of 2022 and 2023 MEC/MDAS findings at UXO 2 is included in Table 5-1 and presented on Figure 5-1. Photos of the 2023 UXO 2 MDAS are included in Appendix A-9.

2022 SI Results

The UXO detector-aided surface surveys identified a total of 660 items identified as MDAS. The findings included 582 Mark (Mk) 2/3 40-mm cartridge cases and 78 unknown model 20-mm cartridge cases. A dump site formerly located in the southern portion of UXO 2 contained visible ammo cans and other shipping containers. Additionally, four empty shipping containers were identified across three locations in the southern portion of UXO 2. The items in the dump site and four additional shipping containers were left on site and demilitarized in accordance with Navy guidance (OP 5) (NAVSEA, 2020). For detailed information regarding the 2022 SI results, see the SI Report (Tetra Tech, 2023a).

2023 SI Results

The UXO detector-aided surface survey of the step-out investigation area did not identify MEC, MPPEH, and/or MDAS. The MDAS pile identified within the original investigation area during the 2022 field work and left onsite and was inspected (all visible marks were obliterated and “empty” was stenciled” where necessary), piled, and left onsite; however, the pile was not inventoried. Under the 2023 field work, this pile of items was reinspected, inventoried, and removed from the site. A total of 92 items were identified as MDAS and various other items (i.e., shipping containers, ammo cans, etc.).

5.2 UXO 3 (Site D)

This section provides the site history and results of the 2022 and 2023 SI field work for the UXO 3 MRS.

5.2.1 Site History

UXO 3 is located within the central portion of NBK Bangor (Figure 5-2) and the CSM indicated potential presence of surface and subsurface MPPEH/MEC. The overall site comprises approximately 37 acres (Figure 5-2). The SI Report (Tetra Tech, 2023a) provides a further detailed site history, significant information is provided here. Site D is a former ordnance disposal area and served as the principal area for ordnance burning and detonating (i.e., OB/OD) at NBK Bangor from 1946 until 1963. On-site

locations of waste disposal included a small arms incinerator, a trench, and smaller burn areas or mounds.

An interviewee for the 1989 Situation Report recalled the explosive ordnance team detonating "thousands" of photoflash bombs. A historical features map (see SI Report [Tetra Tech, 2023a]) appears to indicate that Site D extends underneath and to the east of the road near the site, which appears to be constructed after 1957.

A Record of Decision (ROD) for OU 6, Site D, was signed in September 1994.

As part of the soil remedy, soil excavation, remediation by composting, and soil replacement occurred in 1996.

Operational maintenance and monitoring were not required by the OU 6 ROD, and while there are no formal institutional controls (ICs) for OU 6, the site has restrictions in place under wetland regulations, which were determined to provide sufficient protection in the ROD (NAVFAC NW, 1994). Wetlands laws are used to restrict the current wetland area (to remain a wetland). Per the Institutional Controls Management Plan (ICMP), although there are no formal ICs, excavation permits, and construction review are required for work within the Site D boundary (Navy, 2018). The IC boundary (i.e., OU 6 boundary) for Site D is shown on Figure 5-2 and partially covers the UXO 3 boundary.

The primary area of concern investigated during the SI included a heavily wooded area of approximately 20 acres that contained the burn trench, burn mounds, and small arms incinerator. Note that the OU 6 Site D boundary, shown on Figure 5-2, extends farther to the north and west of the UXO 3 site boundary, but only extends as far as the UXO 3 southern site boundary.

5.2.2 2022 and 2023 Field Investigation

UXO 3 was investigated as part of the 2022 SI and field investigation activities included vegetation management and UXO detector-aided surface surveys followed by geophysical surveys (EM61-HP and time-domain electromagnetic [TEM-8g]). The 2022 SI recommended another step-out investigation to the north and west of the site and east of the road. The 2023 SI field activities included vegetation management and UXO detector-aided surface surveys of the step-out investigation area. The step-out investigation resulted in the identification of multiple MEC/MDAS, which warranted additional step-out investigations to the north, east, and west. Geophysics (EM62-HP) was also conducted as part of the step-out investigations. Note, a portion of the 2023 field work extended into January and February 2024; however, this work will be referred

to and documented under the 2023 SI field activities. Field work was conducted on the following dates:

2022:

- Vegetation management: April 5 to July 7, 2022.
- UXO detector-aided surface surveys: May 1 to July 27, 2022.
- Third-party QA: August 10, 2022.
- Geophysics:
  - EM61-HP: July 20 to September 23, 2022 (transects).
  - TEM-8g: August 23, 2022 (full coverage).
  - Follow-on/data gap recollection: October 17 and October 28,2022 (TEM-8g).
  - Third-party QA: November 8, 2022 (EM61-HP/TEM-8g).
- Site restoration: September 26-28, 2022 (UXO) and November 16, 2022 (geophysics).
- MC sampling: November 1-3, 2022.

2023/2024:

- Step-out vegetation management: June 27, 2023 to February 1, 2024.
- Step-out UXO detector-aided surface surveys: August 28, 2023 to February 8, 2024.
- Third-party QA: August 28, 2023 to November 1, 2023
- Step-out geophysics (EM61-HP): October 31, 2023 to March 22, 2024.
- Step-out site restoration: November 2, 2023 and February 9, 2024 (UXO) and November 20, 2023 and March 23, 2024 (geophysics).

5.2.3 MEC/MDAS Results

The list of MEC/MDAS findings at UXO 3 is included in Table 5-1 and presented on Figure 5-2. Photos of the 2023 UXO 3 MEC and MDAS are included in Appendix A-9.

2022 SI Results

The UXO detector-aided surface surveys identified a total of 416 items (14 MEC and 402 MDAS). The MEC findings included 13 AN-M46 Photoflash Bombs/AN-M46 Photoflash Bomb Booster Cups and one Mk 19 Base Detonating Fuze. The MDAS findings included one pile of 8 pounds of suspect MDAS, one unknown projectile munitions debris (MD), and 400 100-pound photoflash bomb MD. For detailed information regarding the 2022 SI results, see the SI Report (Tetra Tech, 2023a).

2023 SI Results

The UXO detector-aided surface surveys identified a total of 196 items (6 MEC and 190 MDAS). The MEC findings included four AN-M46 Photoflash Bomb Boosters and two Mk 19 Series BD Fuzes. The MDAS findings included 179 AN-M46 Photoflash Bomb MD, seven Unknown Projectile MD, three Ammunition Containers, and one SCAR Practice 2.25-inch Rocket, MD.

5.2.4 Geophysical Survey Results

Details of the geophysical surveys are included in Appendix D and the survey acreages are summarized in Table 5-2.

2022 SI Results

Geophysical surveys conducted at UXO 3 included EM61-HP transects and TEM-8g full coverage surveys. The TEM-8g experienced equipment issues so the EM61-HP was used to collect the remaining surface area. In summary, UXO 3 EM61-HP and TEM-8g data exhibit the presence of widespread metallic debris across most of the site, consistent with historical disposal activities.

2023 SI Results

Geophysical surveys were conducted at four UXO 3 step-outs and included EM61-HP transects. The four UXO 3 step-outs were referred to as UXO 3 SE, UXO 3 SW, UXO 3 NW, and UXO 3 N.

Step-out Site UXO 03 SE data exhibit the presence of widespread metallic debris across the majority of the site. The eastern border of the DGM data includes an SRA, the footprint of which appears to extend from the large, central SRA in the original Site UXO 3 DGM data. This may indicate additional burn trenches or an extension of the original burn trench location across the adjacent road. A large quantity of MEC and MDAS identified during the surface clearance corresponds to areas of DGM targets throughout the step-out. The inaccessible areas identified prior to the SI were confirmed to be unsuitable for the EM61-HP system in wheel mode due to steep slopes, ravines, and mounds.

Step-out Site UXO 03 SW data exhibit the presence of metallic debris across the site, with a heavier concentration of DGM targets and SRAs in the southern half of the step-out. This corresponds to a higher number of recovered MEC and MDAS locations in the southern half of the step-out. The southeastern border of the DGM data includes an SRA, the footprint of which appears to extend from a small SRA in the original Site UXO 3 DGM data. The inaccessible areas identified prior to the SI were confirmed to be

unsuitable for the EM61- HP system in wheel mode due to mounds, and water saturated areas.

Step-out Site UXO 03 NW data exhibit the presence of metallic debris across the site, with MDAS recovered throughout the step-out. Localized dense discrete geophysical target counts were observed, notably along the southwestern and northeastern step-out boundary. Two SRAs were delineated from the DGM data; one of which appears to extend from the large, central SRA in the original Site UXO 3 DGM data. The inaccessible areas identified prior to the SI were confirmed to be unsuitable for the EM61-HP system in wheel mode due to mounds, and water saturated areas.

Step-out Site UXO 03 N data exhibit the presence of widespread metallic debris across the majority of the site. The southern half of the step-out exhibits a higher concentration of recovered MEC and MDAS, which corresponds to areas of higher target densities and SRAs.

5.2.5 MC Results

Under the 2022 SI, biased MC sampling was conducted at UXO 3 at locations where MC were potentially released. Three of seven composite samples and one corresponding duplicate had exceedances of the human health Project Screening Levels (PSLs), or exceedances of both the human health and ecological PSLs. The remaining samples had concentrations either below the PSLs or were nondetect. For detailed information regarding the 2022 SI results, see the SI Report (Tetra Tech, 2023a).

MC sampling was not conducted during the 2023 field effort.

5.3 UXO 6 (Site 22)

This section provides the site history and results of the 2022 and 2023 SI field work for the UXO 6 MRS.

5.3.1 Site History

UXO 6 is located within the Lower Base in the northern portion of NBK Bangor (Figure 5-3) and the CSM indicated potential presence of surface MPPEH/MEC. The overall site comprises approximately 1 acre and was used from 1965 to 1973 as an area for the disposal of old paint cans and drums, ammunition and boxes, and other metal debris (Battelle, 2017).

Based on an RI/FS conducted for OU 1 Site A, a former dumping site (i.e., Debris Area 2/Site 22) associated with UXO 6 was identified at the top of the hillside (Hart Crowser,

1991). The Site 22 area was used along with the main burn area (OU 1 Site A) for munitions disposal. Soil samples were collected in October 1988 and MC were identified in the upper region of this area. In the lower region, closer to the hillside, MC concentrations in soil declined to background values; therefore, it appeared as though the areal extent of soil contamination was limited to the upper half of the area. The primary soil contaminants of concern driving human health risks were lead and 2,4,6-Trinitrotoluene (TNT) (Hart Crowser, 1991).

Per the ICMP (Navy, 2018), both ICs and engineering controls are in place for the Debris Area 2 under OU 1 Site A, which overlaps the northeastern portion of the UXO 6 investigation boundary. As stated above, the contaminants of potential concern for OU 1 Site A Debris Area 2 include TNT (an explosive) and lead. Land use is restricted to recreational use including hiking, bird watching, hunting, nature watching, or any other short-term, non-intrusive activity on the land. Excavation permits, consistent with NBK Bangor instructions, are required to be reviewed and approved by the Navy, as are construction project reviews. Vegetation (only) removal is allowed, but all disturbed or excavated soils at or from the site need to be properly categorized and disposed, and workers are required to wear personal protection equipmentduring any such disturbance or excavations. In 1995, an extensive stand of blackberries was planted along the upper portion of the steep ravine containing Debris Area 2 to restrict access to the ravine. A warning sign was also installed as an additional means of preventing access to the area from the top of the ravine (Navy, 2018). The engineering controls include access control, maintenance of signage, and maintenance of thorny vegetation (blackberries) on the hillside.

During the PA, an area of metallic debris and MPPEH (including ammunition boxes, ordnance storage containers, and cartridge casings [generally 40-mm]), was observed in a locally steep hillside area between Site A and UXO 9 (Battelle, 2017). The PA recommended performing a removal action for MPPEH in the steep hillside area, followed by confirmatory geophysical surveying and MC soil sampling.

The primary area of concern investigated during the SI included the entire 1-acre site, which is comprised of a heavily wooded area. Vegetation observed on the steep hillside during the site visit in September 2019 included mature western hemlock and Douglas-fir that created a dense tree canopy with a light understory. Paint cans and metal strapping were also observed in the northeastern portion of the site in September 2019, although the steep slope prevented verification of these observation. Historical documents were reviewed in preparation of the SI and UXO 6 was identified on historical aerial photographs.

5.3.2 2022 and 2023 Field Investigation

UXO 6 (Site 22) was identified as a site with ecological field constraints (see Section 3.1.7). UXO 6 was investigated as part of the 2022 SI and field activities included vegetation management and UXO detector-aided surface surveys. The SI report recommended an additional phase of SI field work to remove the MEC/MPPEH that was identified down the slope that was left in place. The 2023 SI field activities included vegetation management and UXO detector-aided surface surveys and an additional step-out investigation. Field work was conducted on the following dates:

2022 SI Results

- Vegetation management: October 4-10, 2022 (anchor point tie down area and top of hill only).
- UXO detector-aided surface surveys: October 10-11, 2022 (anchor point tie down area and top of hill only) and October 24 to November 4, 2022 (sloped hillside).
- Third-party QA: October 12, 2022 (anchor point tie down area and top of hill only); due to site conditions (sloped hillside) third-party QA was performed alongside UXO detector-aided surface surveys.
- Step-out vegetation management: November 4, 2022.
- Step-out UXO detector-aided surface surveys: November 7-9, 2022.
- Step-out third-party QA: Due to site conditions (sloped hillside) third-party QA was performed alongside UXO detector-aided surface surveys.
- Site restoration: November 7, 2022.

2023 SI Results

- Vegetation management: September 13 to October 14, 2023.
- UXO detector-aided surface surveys: October 9-17, 2023.
- Third-party QA: October 17, 2023 (from top of hill)
- Step-out vegetation management: October 19-23, 2023.
- Step-out UXO detector-aided surface surveys: October 24, 2023.
- Step-out third-party QA: October 24, 2023
- Site restoration: October 24, 2023.

Field work at UXO 6 required the use of a subcontractor (Gravitec) that trained Tetra Tech UXO personnel and NSWC IHD personnel to scale down the steep slope using rope access techniques for fall protection.

5.3.3 MEC/MDAS Results

The list of MEC/MDAS findings at UXO 6 is included in Table 5-1 and presented on Figure 5-3. Photos of the 2023 UXO 6 MEC and MDAS are included in Appendix A-9.

2022 SI Results

The UXO detector-aided surface surveys identified a total of 16 items with 6 MEC and 10 MDAS items. MEC findings included five unfired Mk 22 percussion primers fitted into empty Mk 2 cartridge cases and one unfired Mk 2 Mod 1 primer from an unknown item. The 10 MDAS items were determined to be various unknown pieces of MD. All 16 items were found in the rope access tie down area located at the top of the slope in the northern boundary of UXO 6. Detector-aided surface surveys were conducted down the slope at UXO 6 via ropes. A cascading swath of MEC/MDAS, metal debris, drums, and ammo cans were observed scattered down the slope along the northern portion of the site. The Navy, in consensus with Tetra Tech and NSWC IHD, decided to keep these items remained in place down the slope, considering the items were inaccessible and there were safety concerns regarding bringing them up the hillside. A 'safe to move' determination was not made by concurrence of SUXOS and UXOQCS/UXOSO. For detailed information regarding the 2022 SI results, see the SI Report (Tetra Tech, 2023a).

2023 SI Results

The previously identified MEC/MPPEH visible on the slope surface was removed in 2023. The UXO detector-aided surface surveys identified a total of 124 items (73 MEC and 51 MDAS). The MEC findings included one unknown fuze adapter, 55 Mk 22 percussion primers, and 17 unknown percussion primers. The MDAS findings included various unknown munitions debris (MD). All recovered items were removed from the slope investigation area with the exception of one MEC item (casing with percussion primer) which was recovered from the site access route adjacent to the site (and within the boundary of site UXO 7B). Based on this find, a step out investigation was conducted, but no additional munitions were found.

5.4 UXO 8 (Site NN)

This section provides the site history and results of the 2023 SI field work for the UXO 8 MRS.

5.4.1 Site History

UXO 8 is located within Lower Base in the northwestern portion of NBK Bangor (Figure 5-4) and the CSM indicated potential for surface and subsurface MPPEH/MEC. The overall site comprises approximately 9 acres and was operational between 1951 and 1973 as a disposal area. Historical EOD response actions to retrieve MPPEH were reported for this area, and ammunition cans, SAA, and M115 artillery simulators were found (Battelle, 2017).

The 2017 PA (Battelle) recommended completing an additional document/records search to better define the site location and MPPEH discovery history. A search of historical documents and aerial photographs was conducted during the SI planning phase, and although UXO 8 was located in the historical aerial photographs, no important site features were noted.

5.4.2 2023 Field Investigation

UXO 8 (Site NN) was not investigated under the 2022 SI but was deferred until the 2023 SI (see Section 1.0). The 2023 SI field activities included vegetation management, UXO detector-aided surface surveys, and geophysical surveys. Field work was conducted on the following dates:

- Vegetation management: June 12-19, 2023.
- UXO detector-aided surface surveys: July 11 – 24, 2023.
- Third-party QA: July 12-25, 2023
- Geophysical surveys:
  - EM61-HP transects: August 7-8, 2023.
  - EM61-HP full coverage: September 13-14, 2023.
  - Third-party QA: October 18, 2023
- Site restoration: September 21, 2023 (geophysics) and November 1, 2023 (UXO)

5.4.3 MEC/MDAS Results

No MEC, MPPEH, and/or MDAS were identified during the UXO detector-aided surface survey.

5.4.4 Geophysical Survey Results

Geophysical surveys were conducted at UXO 8 and included EM61-HP transects and full coverage surveys. The surveys acreages are summarized in Table 5-2. Details of the geophysical surveys are included in Appendix D.

The SRAs at UXO 8 are coincident with fence lines, a culvert, and parking lots visible at the surface. In the full coverage data, one delineated SRA was not associated with any observed surface features but is suspected to be associated with underground utilities based on review of construction drawings. No MEC or MPPEH was identified during surface sweep operations.

5.5 UXO 9 (Site OO)

This section provides the site history and results of the 2022 SI field work for the UXO 9 MRS. While no additional field work was conducted at UXO 9 in 2023, internal Navy discussion regarding the final recommendation for UXO 9 was pending during the finalization of the SI report; therefore, that recommendation is included in this SI Addendum report.

5.5.1 Site History

UXO 9, comprising approximately 7 acres, is located within Lower Base in the northern portion of NBK Bangor (Figure 5-5) and the CSM indicated potential presence of surface MPPEH/MEC. The marshy area, restored in 2012, is approximately 12 acres and is habitat for a variety of wildlife species. A former lake was created in the 1950s when a main road was constructed along the installation waterfront at the Hood Canal, restricting the stream and creating the former lake. A historical EOD response action to retrieve MPPEH was reported for this area. Items found included a signal flare in its original container (L312), and a smoke grenade which was found in the marshy area during its reconstruction. According to Battelle (2017), old ammunition was observed "popping off" during a controlled burn; however, this statement has since been re-evaluated and was determined unlikely to pertain to this site. Site 7, a disposal site for Old Paint Cans and Drums, was documented in the PA Report as being associated with the site. The site was located near the southern end of the site, and the old paint shop was demolished during the mid-1970s. The contents of the shop, including one-gallon paint cans to 55-gallon drums that were either empty or partially filled with liquid and/or hardened materials, were transported and discarded over the side of an embankment near the south end of the site. The cans and drums were subsequently removed from the site in 1981 to an unknown destination, with no visible evidence of disposal remaining (URS Consultants, 1991).

Per the ICMP (Navy, 2018), both ICs and engineering controls are associated with groundwater and leach basin liner for Site A Burn Area (OU 1). OU 1 groundwater ICs cover a portion (eastern side) of the UXO 9 boundary, but the leach basin is outside the UXO 9 boundary. The OU 1 Site A contaminants of potential concern are explosives (Hexahydro-1,3,5-trinitro-1,3,5-triazine [RDX], TNT, and Dinitrotoluene [DNT]) and lead.

ICs include prohibition of groundwater use (in shallow and perched aquifers). Also required are excavation permits, construction project review, and review for changes in land use or activity. The ICs and engineering controls are a result of activities conducted at OU 1 Site A, but overlap a portion of the UXO 9 site boundary.

The 2017 PA (Battelle) recommended performing a detailed surface inspection of accessible portions of the site to identify potential MPPEH at the surface.

The primary area of concern investigated during the SI included approximately 7 acres of the large wetland area. A large, vegetated wetland was observed during the site visit in September 2019; a small beaver pond was also identified. No tree canopy exists in this area.

5.5.2 2022 Field Investigation

UXO 9 (Site OO) was identified as a site with ecological field constraints (see Section 3.1.7). The SI field investigation activities included only UXO detector-aided surface surveys. Vegetation management was only conducted in the non-wetlands portion of the site to cut an access path from a recreational trail that is located outside the investigation site boundary (and south of UXO 9) to the southern portion of the UXO 9 site; vegetation management was not conducted in any wetland areas. In accordance with the MEC QAPP (Tetra Tech, 2021a), geophysical surveys were not conducted, because only surface disposal occurred onsite (rather than subsurface disposal). Field work was conducted on the following dates:

- Vegetation management: August 15-16, 2022 (access path only).
- UXO detector-aided surface surveys: March 10-15, 2022 and August 15 to September 19, 2022.
- Third-party QA: August 15 to September 19, 2022 (due to site conditions QC/QA were performed simultaneously).
- Site restoration: September 20, 2022.

The UXO detector-aided surface surveys were initially started in March 2022; however, site conditions were exceedingly wet so only a 0.5-acre area of the site was accessible at that time. Because of these conditions, GPS coordinates were recorded for the areas where UXO detector-aided surface surveys were completed, with the plan to return to UXO 9 when the site conditions were dry to complete the UXO detector-aided surface surveys. UXO detector-aided surface surveys resumed mid-August when the site was more dry and less water was present in the wetland. The UXO detector-aided surface survey team used chest waders as there was intermittent standing, or hidden areas of

water, that were above hip level. Because of these conditions, the UXOQCS/UXOSO provided direct oversight of operations and QC/QA as the detector-aided surface surveys were occurring, ensuring both quality surface survey performance and safety. All swept areas successfully passed QC/QA. An approximate 0.93-acre area was inaccessible because of a sloped hillside.

5.5.3 MEC/MDAS Results

The UXO detector-aided surface survey, which covered all accessible portions of the site, identified only one MEC, a M18 smoke hand grenade (ID #0901), that was located in the northeastern corner of the investigation area. The MEC finding at UXO 9 is included in Table 5-1, and presented on Figure 5-5. A photo of the UXO 9 MEC is included in Appendix A-9. No MDAS was identified. For detailed information regarding the 2022 SI results, see the SI Report (Tetra Tech, 2023a).

5.6 UXO 10 (Site 12)

This section provides the site history and results of the 2023 SI field work for the UXO 10 MRS.

5.6.1 Site History

UXO 10 is located within Lower Base in the northwestern portion of NBK Bangor (Figure 5-6) and the CSM indicated potential presence of surface and subsurface MPPEH/MEC. The overall site comprises approximately 7 acres and was operational from 1950 to 1970. UXO 10 (Site 12) was used for the disposal of ordnance dunnage, scrap metal, and potentially for the disposal of ammonium picrate (Battelle, 2017).

Between approximately 1970 and 1973, the site served as a disposal area for wood, metals, rubber, and other wastes. A large portion of the approximately 5-acre ravine was filled with solid wastes and partially covered with unconsolidated soil. Although use of the site for waste disposal was curtailed in 1973, smaller quantities of wastes, including drums labelled as containing antifreeze, Freon, and Otto fuel, were disposed at the site since that time (Hart Crowser, 1989).

The 2017 PA (Battelle) recommended a detailed surface inspection to identify additional potential MPPEH at the surface based on the identification of munitions that have been recovered there (3-inch projectiles, Mark 22 fuzes, Mk1 and Mk2 40-mm projectiles, and ammonium picrate). During the SI planning phase, the former disposal area was identified on historical aerial photographs.

5.6.2 2023 Field Investigation

UXO 10 (Site 12) was not investigated under the 2022 SI but was deferred until the 2023 SI Addendum (see Section 1.0). The 2023 SI field activities included vegetation management, UXO detector-aided surface surveys, and geophysical surveys. Field work was conducted on the following dates:

- Vegetation management: June 14 to August 8, 2023.
- UXO detector-aided surface surveys: July 20 to August 14, 2023.
- Third-Party QA: July 21 to August 15, 2023.
- Geophysical surveys (EM61-HP transects): August 10-31, 2023.
- Third-Party QA: October 13, 2023.
- Site restoration: September 21, 2023 (geophysics) and November 1, 2023 (UXO)

5.6.3 MEC/MDAS Results

The UXO detector-aided surface surveys identified 12 MDAS items. The MDAS findings included one 40-mm 4-round clip, one 3-inch cartridge case, eight partial shipping containers, one ammo can shipping container, and one 40-mm cartridge case. While conducting the UXO detector-aided surface surveys, the UXO team removed NMRD consisting largely of banding straps from the site surface. The list of 2023 MDAS findings at UXO 10 is included in Table 5-1 and presented on Figure 5-6. Photos of the 2023 UXO 10 MDAS are included in Appendix A-9.

5.6.4 Geophysical Survey Results

Geophysical surveys were conducted at UXO 10 and included EM61-HP transects. The surveys acreages are summarized in Table 5-2. Details of the geophysical surveys are included in Appendix D.

Data from UXO 10 indicate the presence of widespread metallic debris across the majority of the site, limiting the ability to select discrete targets. Whether the saturated DGM responses are associated with metallic surface debris smaller than the surface removal requirement, with subsurface anomalies, or both is unknown. During the surface surveys, the UXO team removed 5-10 cubic yards of NMRD consisting of dunnage related metal materials from the surface; additional NMRD is likely to be present in the subsurface. Twelve MDAS objects were identified throughout the site during surface clearance, three of which were discovered in the vicinity of the former disposal area.

5.7 UXO 11B (Site 8)

This section provides the site history and results of the 2022 and 2023 SI field work for the UXO 11B MRS.

5.7.1 Site History

UXO 11B is located within Lower Base in the southeastern portion of NBK Bangor (Figure 5-7) and the CSM indicated potential presence of surface and subsurface MPPEH/MEC. The overall site comprises approximately 2 acres, and was operational between 1946 and 1973. Site 8 was used for the disposal of inert ordnance-related items, including ammunition cans and tanks, with the latter described as propellent tanks (Battelle, 2017). The 2017 PA (Battelle) recommended conducting a detailed surface inspection to identify the extent of MPPEH at the surface, based on the observation of a single ammunition box.

During the SI planning phase, the former disposal area was identified based on historical aerial photographs. The primary area of concern investigation during the SI included an area of approximately 2 acres. Vegetation observed during the site visit in September 2019 included a dense tree canopy with understory.

5.7.2 2022 and 2023 Field Investigation

UXO 11B (Site 8) was identified as a site with ecological field constraints (see Section 3.1.7). The SI field investigation activities included vegetation management and UXO detector-aided surface surveys followed by geophysical surveys (EM61-HP). Field work was conducted on the following dates:

<u>2022 SI Results</u>

- Vegetation management: May 18-25, 2022.
- UXO detector-aided surface surveys: May 24-31, 2022.
- Third-party QA: May 31, 2022.
- Geophysics:
  - EM61-HP: August 15 to October 4, 2022 (transects).
  - Follow-on/data gap recollection: August 26 and 29, 2022 and October 4, 2022.
  - Third-party QA: October 21, 2022 (EM61-HP).
- Site restoration: November 1, 2022 (UXO) and November 14, 2022 (geophysics).

2023 SI Results

- Vegetation management: November 27, 2023.
- UXO shipping container removal: October 31 and November 28-30, 2023.
- Site restoration: December 6, 2023

5.7.3 MEC/MDAS Results

The list of MDAS findings at UXO11B is included in Table 5-1 and presented on Figure 5-7. Photos of the 2023 UXO 11B MDAS are included in Appendix A-9.

2022 SI Results

The UXO detector-aided surface survey identified only one MDAS item, and no MEC. The MDAS item was a Mk 2 cartridge case located in the central/west-central portion of the investigation area, and was secured in a drum at the laydown yard. In addition to the identified MDAS item, a pile of ammo cans (also located in the central/west-central portion), and a pile of shipping containers (located near the southern boundary of the site) were identified. The ammo cans were discovered in a ground surface depression previously described in 2022 as an underground pit that led to a subsurface structure. During the 2022 investigation, the UXO team retrieved as many exposed wooden ammo cans, that could be reached from the surface, as possible without entering the structure. The removed ammo cans were empty and there were no MEC/MPPEH concerns; however, the depression extended underneath a large tree and was unsafe to enter, so the remaining items that were visible from the surface (that may or may not include ammo cans) were not removed and were left in place. The MDAS item identified was located near the ammo can pile. The accessible ammo cans were demilitarized (i.e., all markings covered with spray paint and then the word “empty” stenciled on the can) and then left in place as NMRD. Similarly, shipping containers were demilitarized and left in place as NMRD.

2023 SI Results

During the 2023 investigation, the field team returned to site and removed the demilitarized ammo cans and shipping containers previously left in place as NMRD. Additionally, a recommended removal action for UXO 11B addressed the observed suspect MPPEH remaining in a subsurface feature (depression) adjacent to a culturally historic building foundation. The depression being approximately 5 foot by 5 foot by 5 foot in depth and located at the base of a tree with shipping containers observed within the depression. During the 2022 SI field work, the ammo cans and shipping containers were left in place as entry would have required confined space entry. Due to field work continuing in 2023, the field team retrieved the items with reach rods and magnets,

removing all items from the depression without confined space entry. Seven suspect MPPEH items were removed, inspected, and determined to be MDAS. The inspection was completed with no additional items observed or identified for removal. Analog indicators detected subsurface anomalies, which continued below the visible surface within the depression. The detection is likely attributed to deteriorated metallic particles corroded from the removed ammo cans. The MDAS findings at UXO 11B are included in Table 5-1 and presented on Figure 5-7.

5.7.4 Geophysical Survey Results

An EM61-HP transect geophysical survey was conducted at UXO 11B. Details of the geophysical surveys are included in Appendix F of the 2022 SI Report (Tetra Tech, 2023a). In summary, UXO 11B EM61-HP data depict SRAs coincident with non-munitions related surface obstructions (i.e., burn barrels and cultural features).

5.8 UXO 15 (Site KK)

This section provides the site history and results of the 2023 SI field work for the UXO 15 MRS.

5.8.1 Site History

UXO 15 was a disposal area, located within Lower Base in the northwestern portion of NBK Bangor (Figure 5-8) and the CSM indicated potential presence of surface MPPEH/MEC. Site KK was operational between 1951 and 1977, and was identified as a disposal area and on historical drawings as a dunnage yard. Historical EOD response actions to retrieve MPPEH were reported at a building in the same vicinity (Battelle, 2017).

The 2017 PA (Battelle) recommended performing a detailed SI to identify potential MPPEH at the surface because the following items were found at the site: Mk 22 dummy fuzes, 3-inch projectiles, Mk1 40-mm dummy projectiles, Mk2 40-mm projectiles, and other 40-mm projectiles.

5.8.2 2023 Field Investigation

UXO 15 (Site KK) was not investigated under the 2022 SI but deferred until the 2023 SI (see Section 1.0). The 2023 SI field activities included vegetation management, UXO detector-aided surface surveys, and geophysical surveys. Field work was conducted on the following dates:

- Vegetation Management: May 16 to July 17, 2023.

- UXO detector-aided surface surveys: June 12 to July 20, 2023.
- Third-party QA: June 13 to July 20, 2023.
- Geophysical Surveys (EM61-HP Transects): July 24 to September 12, 2023.
- Third-party QA: October 13, 2023.
- Site Restoration: September 21, 2023 (Geophysics) and November 1, 2023 (UXO)

5.8.3 MEC/MDAS Results

The UXO detector-aided surface surveys identified a total of one MDAS item. The MDAS finding included one 3-inch cartridge case. The list of 2023 MDAS findings at UXO 15 is included in Table 5-1 and presented on Figure 5-8. Photos of the 2023 UXO 15 MDAS are included in Appendix A-9.

5.8.4 Geophysical Survey Results

Geophysical surveys were conducted at UXO 15 and included EM61-HP transects. The surveys acreages are summarized in Table 5-2. Details of the geophysical surveys are included in Appendix D.

SRAs at UXO 15 are coincident with fence lines, roadways, and parking areas visible at the surface. The aboveground power lines paralleling the adjacent road coincide with an SRA due to noise impacting the data from the power lines. One MDAS (3-inch cartridge case) object was identified during surface clearance in the southeastern portion of the site. The MDAS item location falls within a delineated SRA in the DGM data.

5.9 UXO 16 (Site LL)

This section provides the site history and results of the 2023 SI field work for the UXO 16 MRS.

5.9.1 Site History

UXO 16 is located within Lower Base in the northwest portion of NBK Bangor (Figure 5-9) and the CSM indicated potential presence of surface and subsurface MPPEH/MEC. The overall MRS comprises approximately 10 acres and was formerly known as the Former Dunnage Yard Soil Mound (Figure 5-9). The burn site was operational between 1951 and 1977 and was identified in historical drawings as a burn pit. Site LL may have been used for ordnance-related disposal (Battelle, 2017).

The 2017 PA (Battelle) recommended that an additional document/records research effort be conducted to better define the site location and site history/use, and also that a detailed SI be performed to identify the site. Munitions recovered at the site include 3-inch projectiles, Mk1 40-mm dummy projectiles, Mk2 40-mm projectiles, and other 40-mm projectiles.

A former burn site in this area was identified using historical maps and aerial photographs. Current imagery of the site shows a security fence bordered with roads on both sides through the eastern side of the MRS. The imagery indicates that the construction of the security fence and adjacent roads occurred in 2013. In preparation for security fence construction, a munitions response action consisting of excavation and screening of soils and debris for the presence of MEC and MPPEH was conducted at the Former Dunnage Yard Soil Mound, which was later renamed to UXO16 (Site LL) (Tetra Tech, 2013 and 2014). Soil (approximately 3,700 cubic yards) within the identified dunnage yard burn site mound and located within the construction path of the fence, was excavated and screened to remove potential MEC. Over 1,000 pounds of MPPEH was recovered, all of which was determined to be MDAS, with no resulting MEC or material documented as an explosive hazard (MDEH) observed. Drill and dummy rounds were noted amongst the MDAS finds. According to the Final After Action Report prepared for the 2013 soil screening process, the likelihood of encountering MEC/MPPEH within the investigation area or within the adjacent area was low. Based on inspection of the munitions items recovered and scrap removed from the site, the site was apparently used for refuse disposal, and diligence was used in the disposal of inert, non-explosive items (Tetra Tech, 2014).

5.9.2 2023 Field Investigation

UXO 16 (Site LL) was not investigated under the 2022 SI but was deferred until the 2023 SI (see Section 1.0). The 2023 SI field activities included vegetation management, UXO detector-aided surface surveys, and geophysical surveys. Field work was conducted on the following dates:

- Vegetation management: June 23 to August 11, 2023.
- UXO detector-aided surface surveys: July 5 to August 21, 2023.
- Third-party QA: July 6 to August 22, 2023.
- Geophysical surveys (EM61-HP Transects): August 9 to September 11, 2023.
- Third-party QA: October 13, 2023.
- Site restoration: September 21, 2023 (geophysics) and November 1, 2023 (UXO)

5.9.3 MEC/MDAS Results

The UXO detector-aided surface surveys identified one MEC item (Figure 5-9): a 20-mm projectile that was recovered within tire tracks on the ground surface of a limited use access road. The list of 2023 MEC findings at UXO 16 is included in Table 5-1 and presented on Figure 5-9. Photos of the 2023 UXO 16 MEC are included in Appendix A-9.

5.9.4 Geophysical Survey Results

Geophysical surveys were conducted via EM61-HP at UXO 16 using transects. The surveys acreages are summarized in Table 5-2. Details of the geophysical surveys are included in Appendix D.

SRAs at UXO 16 partially overlap the suspected former burn site area but continue further north and west of the former burn site area. SRAs not associated with the suspected burn site coincide with fence lines and roadways visible at the surface. The inaccessible (ravines and mounds) and steeply sloped areas identified prior to the SI were confirmed to be unsuitable for the EM61-HP system in wheel mode. One MEC item, a 20-mm projectile, was identified during surface clearance immediately adjacent to road on the eastern edge of the site.

5.10 NMRD Removal

During the 2022 SI field work at UXO 4, 7B, 11B, and 17, munition and shipping container piles were identified within the investigation areas. The munition and shipping container piles were inspected, all visible marks obliterated, and “empty” stenciled on the item. These items were left onsite as NMRD. During the 2023 SI Addendum field work, these piles were reinspected, inventoried, and removed from the respective sites. All items found were identified as munitions/shipping containers, and included 58 containers at UXO 4, 92 containers at UXO 7B, 31 containers at UXO 11B, and 10 containers at UXO 17. The items, certified and managed as MDAS as described in Section 3.2.6.

5.11 Post-Detonation MC Sampling Results

Three post-detonation samples were collected from three demolition pit locations in UXO 7 after the MEC/MPPEH demolition operations on March 5, 2024 to determine impacts of the donor explosives on the surrounding soil. The post-detonation samples were collected from the subsurface, which was anticipated to be the most contaminated soil interval if any. Post-detonation sample log sheets are provided in Appendix A-7.

The soil analytical results (explosives) are compared to PSLs in Table 5-3, and PSL exceedances are shown on Figure 5-9.

The human health PSL was exceeded in one of the three composite samples for cyclotetramethylene tetranitramine (HMX). Two of the three composite samples exceeded the human health PSL for RDX. One of the three composite samples exceeded the ecological PSL for RDX. The maximum concentrations detected for HMX and RDX were 12,000 microgram per kilogram (µg/kg) and 250,000 µg/kg, respectively, with both concentrations detected at FD-03062401, which is the field duplicate sample of X7-TP-C02-2430. One composite sample had detections of 2,4,6-Trinitrotoluene but did not exceed any PSL. All other parameters were nondetect (see Table 5-3). The PSL exceedances are associated with the donor explosives used to conduct the detonations and are unlikely to present a significant exposure/risk to receptors considering that the contamination is subsurface and that ICs for OU 1 Site A (UXO 7B) restrict groundwater use.

6.0 Updated Conceptual Site Models and Screening Level Hazard Evaluation

The CSM is a "picture" of site conditions that illustrates contaminants, contaminant release mechanisms, migration pathways, affected environmental media, receptors potentially exposed to contaminated environmental media, and the mechanism by which the receptors could be exposed (i.e., receptor exposure pathways or routes). The CSMs for MEC and MC exposure at the nine MRSs at NBK Bangor are summarized in this section and were developed based on historical qualitative information and results of the 2022 and 2023 SI. The CSM for potential exposure to MEC and MC from contaminant release is presented on Figure 6-1, and the updated CSM information for the nine MRSs is included in Table 6-1.

The need for remedial action at an MRS is evaluated through conducting a qualitative hazard assessment. The purpose of a screening level hazard assessment is to evaluate the potential current and future risk of injury caused by the explosive hazards (i.e., MEC) at an MRS in the absence of any actions to control or mitigate interaction between a receptor and the explosive hazard. In addition, the assessment evaluates the magnitude of the potential hazard at the site and the primary causes of those potential hazards. The results of the hazard assessment aid in the development, evaluation, and selection of appropriate response alternatives.

6.1 Updated Conceptual Site Model

The following subsections describe the updated site-specific CSMs.

6.1.1 UXO 2 (Site CC)

Prior to the SI, the CSM identified the UXO 2 MRS as having the potential for surface MPPEH/MEC because it was designated as an operational rail line with surface disposal evident. Based on the SI field work, the area of concern was identified to be the southern portion of UXO 2 along both sides of the rail line; and up to less than approximately 100 feet laterally away from the rail line based on the SI step-out investigation. Although MEC was not identified during the SI field work, large amounts of MDAS (Mk 2/3 40-mm cartridge cases, 20-mm cartridge cases, ammo cans and shipping containers) were found, which were similar to the historical munitions-related findings (40-mm and .50 caliber casings, ammunition containers labelled explosive D, RDX, smokeless powder, and TNT, as well as a potential smoke pot). The step-out investigation was conducted to the south to determine the extent of MEC/MPPEH, and no additional munitions items were identified. Additionally, the MDAS left onsite from

the 2022 SI field work was removed under the 2023 SI field work. No additional munitions items were present on the ground surface under the pile of MDAS. These SI findings support the CSM that UXO 2 is a surface disposal area with surface concerns.

The updated CSM identifies an incomplete exposure pathway for human receptors to munitions items on the ground surface because the extent of MDAS at the surface of the site was removed during the SI field work. The historical research and CSM of a surface disposal area do not indicate subsurface concerns for munitions items, therefore, a geophysical survey to assess presence of subsurface metallic anomalies was not performed.

6.1.2 UXO 3 (Site D)

Prior to the SI, the CSM identified the UXO 3 MRS as having the potential for surface/subsurface MPPEH because it was designated as an OB/OD area with a former small arms incinerator, trench, and smaller burn areas that were historically present. Based on the 2022 and 2023/2024 SI field work, the entire site was found to have munitions items on the surface, and subsurface metallic anomalies. On the surface, MEC (AN-M46 photoflash bombs/booster cups and Mk 19 series base detonating fuzes) and MDAS (AN-M46 100 lb photoflash bomb MDs, unknown projectiles MD, a SCAR Practice 2.25-inch Rocket, and ammunition cans) were identified and support the CSM based on the historical accounts that photoflash bombs were reportedly detonated at UXO 3. In the subsurface, geophysical survey results indicate the presence of widespread metallic anomalies across most of the site, including the step-outs, consistent with historical disposal activities. These SI findings support the CSM that UXO 3 was an OB/OD and disposal area with surface and subsurface concerns. Consistent with the 2022 geophysical results, with the geophysical surveys in the step-outs, the extent has not been determined in any direction beyond the SI investigation and step out boundaries; considering the site history and MEC/MDAS encountered, MPPEH is likely present beyond the current UXO 3 SI investigation and step-out boundaries. MPPEH may be present in the subsurface considering site history, geophysical survey results, and marshy site conditions leading to possible erosion/redeposition between surface and subsurface MPPEH. During the SI, one MEC item was discovered (during geophysical surveying) due to erosion following removal of munitions items found on the surface.

The updated CSM identifies a complete exposure pathway for human receptors to MPPEH on the ground surface, as MEC was identified at UXO 3 during the SI; also, subsurface MPPEH is of potential concern within and beyond the SI investigation boundary. The site is located within Lower Base, so current and potential future receptors include installation personnel, site workers (including utility maintenance in

subsurface utilities/culverts and road maintenance), site visitors, and installation traffic . The most likely scenario for a receptor to encounter subsurface MPPEH would be through soil-disturbing activities such as construction activities or utilities/culvert work. Munitions items (if present as expected) may be transported by erosion/redeposition, land disturbance such as construction activities, or by direct contact (i.e., someone picking it up). Also, per the informal ICs covering most of UXO 3, permits are needed for excavation, and construction review is required by the Navy (see Section 5.2.1). Based on current site conditions (soft wetlands soils), MPPEH is likely present in the subsurface, and if present, can be uplifted to the surface.

The updated CSM identifies a complete exposure pathway for human and ecological receptors to MC in soil. The results of the MC sampling effort indicated that MC contamination is present at discrete locations of breached MEC, and at key site features (i.e., incinerator and mounded area) (see SI Report for additional details regarding the results [Tetra Tech, 2023]); MC could likely be present at other breached MEC locations in the surface, beyond the current SI site boundary, and/or subsurface, throughout and beyond the current SI site boundary. Current and future receptors include current and future industrial workers, future construction workers, and terrestrial ecological receptors. MC (if present) exposure pathways include incident ingestion and dermal contact of soil from the 0 to 2 feet bgs for industrial and construction workers. Exposure to potential contaminants in groundwater is also possible for construction workers during excavation activities through direct contact (i.e., incidental ingestion, dermal contact). Terrestrial ecological receptor exposure pathways include incidental ingestion of and direct contact with soil and ingestion of plants/animals. The primary MC of concern are explosives based on the types of MPPEH observed at the site.

6.1.3 UXO 6 (Site 22)

Prior to the SI, the CSM identified the UXO 6 MRS as having the potential for surface MPPEH/MEC, as it was designated as a surface disposal area for paint cans, drums, ammunition and boxes, and other metal debris. Based on the SI field work, an area of concern was identified along the northern portion of the site boundary. A step-out investigation was conducted to the north of the site and the extent of the area of concern was determined. Seven MEC (Mk 22 percussion primer and Mk 2 Mod 1 primer) and 10 MDAS (unknown [various] MD) were identified at the top of the hill. As well, 72 MEC (Mk 22/unknown percussion primer and an unknown fuze adapter) and 51 MDAS items (unknown [various] MD) were removed from the hillside. Items found during the SI were similar to the historical munitions-related findings (metallic debris, MPPEH including ammunition cans, 40-mm cartridge casings, and various other unopened ordnance storage containers). These SI findings support the CSM of a disposal area with surface concerns.

A portion of the site is located at the top of a steep hill and is accessible to current and potential future receptors such as installation personnel, site workers, site visitors. A surface survey was conducted at the top of the hill that identified and led to the removal of surface MEC and eliminated any exposure to surface MEC. The other portion of the site is the steep hillside, where MEC and MDAS were identified and removed from the surface. While surface MPPEH is no longer present on the surface of the hillside, it is possible that MPPEH may be present in the subsurface of the hillside and could surface due to erosion.

The updated CSM identifies no (remaining) surface source of MPPEH and an incomplete exposure pathway for human receptors to MPPEH buried in soil for the portion of the site at the top of the hill, and a possible source of subsurface MPPEH exposure for the steep (vertical to near vertical) hillside portion of the site. The ICs for Debris Area 2 under the OU 1 ROD, which encompass the northwestern portion of UXO 6, include restricting land use to outdoor recreational use, and requiring excavation permits for any intrusive activities at the site.

6.1.4 UXO 8 (Site NN)

Prior to the SI, the CSM identified the UXO 8 MRS as having the potential for surface/subsurface MPPEH/MEC, as it was designated as a surface and subsurface disposal area. Historically, EOD had responded to retrieve MPPEH reported for this area including ammunition cans, SAA, and M115 artillery simulators. MEC and MDAS were not identified on the surface at the site during the SI. In the subsurface, geophysical survey results indicate SRAs coincident with fence lines, a culvert, and parking lots visible at the surface. In the full coverage data, one delineated SRA was not associated with any observed surface features, but is suspected to associated with underground utilities based on review of construction drawings. An aerial photograph analysis indicated site conditions have changed at UXO 8; land disturbing activities occurred at UXO 8 between 1973 and 1977. UXO 8 was a disposal area with surface and subsurface concerns; however, due to the aerial photograph analysis and the development of the area, the SI findings showed no evidence of an explosive hazard.

The updated CSM identifies absence of a MPPEH source and an incomplete exposure pathway for human receptors to MPPEH on the surface because no surface items were identified for removal from the UXO 8 ground surface during the SI. Additionally, the geophysics surveys identified subsurface SRAs that were associated with facility infrastructure.

6.1.5 UXO 9 (Site OO)

Prior to the SI, the CSM identified the UXO 9 MRS as having the potential presence of surface MPPEH/MEC. Based on the SI field work, only a single MEC (an M18 smoke hand grenade) was located on the surface in the northeastern portion of the site; this MEC is similar to the historical munitions-related findings (signal flare in its original container [L312], and a smoke grenade).

The updated CSM identifies absence of a remaining MPPEH source and an incomplete exposure pathway remaining for human receptors to MPPEH in soil because the surface items were removed from the UXO 9 ground surface. Receptors include installation personnel, United States Army Corps of Engineers (USACE) ecological management personnel (seeding/tree planting), site workers, and site visitors. Although receptors can access UXO 9, most of the site is wetlands, so accessing the site would likely be infrequent and would occur for a prescribed reason. The most likely scenario for a receptor to encounter subsurface MPPEH, if present, would be through soil-disturbing activities such as USACE planting activities. Munitions items, if present, may be transported by erosion/redeposition, land disturbance activities, or by direct contact (persons picking up an item). However, only surface disposal is a concern at UXO 9. Therefore, subsurface contact is unexpected unless a surface munitions item settled within the marsh; if this has occurred and a MPPEH is present in the subsurface, based on the site conditions (wetlands and tidal influences), it could be uplifted to the surface.

6.1.6 UXO 10 (Site 12)

Prior to the SI, the CSM identified the UXO 10 MRS as having the potential for surface/subsurface MPPEH/MEC, as it was designated as both a surface and subsurface disposal area. Historically, munitions-related items (3-inch projectiles, Mark 22 fuzes, Mk1 and Mk2 40-mm projectiles, and ammonium picrate) have been identified on the surface. Based on the SI field work, MDAS (40-mm four-round clip, 3-inch cartridge case, partial shipping container, ammo can shipping container, and 40-mm cartridge case) was identified on the surface at the site. In the subsurface, geophysical survey results indicate the presence of widespread metallic debris across the majority of the site, limiting the ability to select discrete targets. Whether the saturated DGM responses are associated with metallic surface debris smaller than the surface removal requirement, subsurface anomalies, or both, is unknown. During the surface surveys, the UXO team removed five to ten cubic yards of NMRD consisting of dunnage related metal materials from the surface of the site, additional NMRD is likely to be present in the subsurface. Three MDAS items were identified in the vicinity of the former disposal area. There is an indication of high response areas in the DGM data within the current site boundary. An aerial photograph analysis indicated the site was used as a disposal

area around 1957; however, the disposal area is not shown on the next available aerial photo from 1973. These SI findings support the CSM that UXO 10 was a disposal area with surface and subsurface concerns.

The updated CSM identifies the absence of a surface MPPEH source and an incomplete exposure pathway for human receptors to MPPEH on the surface because the surface items were removed. The geophysical surveys identified widespread metallic debris across the site which could suggest the potential presence of subsurface MPPEH as a potential concern, however no MPPEH and only twelve MDAS items from five locations were recovered during the SI.

6.1.7 UXO 11B (Site 8)

Prior to the SI, the CSM identified the UXO 11B MRS as having the potential for surface/subsurface MPPEH/MEC as it was designated as a disposal area for inert ordnance-related items including ammunition cans and propellent tanks. An area of concern was identified on historical aerial photos as a former disposal area, which was located during SI field work in the central portion of the site. Additionally, piles of ammo cans and shipping containers were identified on the surface in the south-central and southern portions of the site, respectively, and these items were demilitarized and recharacterized as NMRD (see Section 5.10). An MDAS item (Mk 2 cartridge case) was removed from the surface near the ammo cans. The recovered ammo cans and identified shipping containers were similar to the historical munitions-related findings (ammunition box). During the 2022 investigation, inaccessible items were observed remaining in the ground surface depression (previously identified as an alcove) at the site. These items could not be removed from the UXO 11B site, which is also a listed cultural site, during the 2022 SI because removal and inspection could not be done safely. During the 2023 SI investigation, the investigation team returned to the depression and removed all surface items including the shipping containers. In the subsurface, geophysical survey results indicate the presence of SRAs coincident with known surface obstructions (excessive metal debris piles not removed during UXO surface clearance, or cultural sites), and do not indicate a disposal site. The surface depression was not surveyed; however, analog indicators detected subsurface anomalies, which continued below the visible surface of the depression as likely attributed to corroded metallic particles from the removed munitions containers. These SI findings support the CSM of a surface disposal area with a potential subsurface disposal concern present in the subsurface depression.

Based on the SI activities and complete UXO surface clearance, additional surface MDAS items or MPPEH (none were encountered during the SI) are not a concern. The

absence of MEC and only a single MDAS observance during the SI suggests that neither surface or subsurface MEC would be anticipated.

The updated CSM identifies absence of a MPPEH source and an incomplete exposure pathway for human receptors.

6.1.8 UXO 15 (Site KK)

Prior to the SI, the CSM identified the UXO 15 MRS as having the potential for surface/subsurface MPPEH/MEC as it was designated as a surface and subsurface disposal area and dunnage yard. Historically, munitions-related items (Mk 22 dummy fuzes, 3-inch projectiles, Mk1 40-mm dummy projectiles, Mk2 40-mm projectiles, and other 40-mm projectiles) have been identified on the surface. An MDAS item (3-inch cartridge case) was removed during the SI field work. In the subsurface, geophysical survey results indicate SRAs are coincident with facility infrastructure, which impacts the DGM data to include additional noise that may increase the number of false positives in the target list based on the established target picking threshold. One MDAS object was identified within a delineated SRA in the DGM data during surface clearance in the southeastern portion of the site. An aerial photograph analysis indicated site conditions changed at UXO 15, and land disturbing activities occurring. These SI findings support the CSM that UXO 15 was a disposal area with surface and subsurface concerns; however, due to extensive reworking of the site, no surface and subsurface concerns remain at UXO 15.

The updated CSM identifies the absence of a MPPEH source and an incomplete exposure pathway for human receptors to surface MPPEH as items were removed. Subsurface MPPEH is not a potential concern within the SI investigation boundary based on the geophysical surveys.

6.1.9 UXO 16 (Site LL)

Prior to the SI, the CSM identified the UXO 16 MRS as having the potential for surface/subsurface MPPEH/MEC, as it was designated as a surface and subsurface disposal area. Historically, munitions-related items (3-inch projectiles, Mk1 40-mm dummy projectiles, Mk2 40-mm projectiles, and other 40-mm projectiles) have been identified on the surface. One MEC (20-mm projectile) was removed from the surface. In the subsurface, geophysical survey results indicate several SRAs that partially overlap the suspected former burn site area but continue further north and west of the former burn site area. SRAs not associated with the suspected burn site coincide with facility infrastructure. The inaccessible (ravines and mounds) and steeply sloped areas identified prior to the SI were confirmed to be unsuitable for the EM61-HP system in wheel mode. The DGM data indicate a high response area within delineated SRAs that

extends to the current site boundary. An aerial photograph analysis indicated the site was used as a disposal area around 1957; however, the disposal area is not shown on the next available aerial photo from 1973. During construction activities in 2013, a munitions response action was conducted at the disposal area burn site consisting of excavating and screening the soil to remove MPPEH in support of other construction activities. MPPEH was removed; however, no MEC was identified. These SI findings support the CSM that UXO 16 was a disposal area with surface and subsurface concerns.

The updated CSM identifies a complete exposure pathway for human receptors to MPPEH on the ground surface, if present. Also, subsurface MPPEH is of potential concern within the SI investigation boundary based on the geophysical surveys. Receptors include installation personnel, site workers (including utility maintenance and road maintenance personnel), and site visitors. The most likely exposure scenario is a receptor encountering subsurface MPPEH (if present) during soil-disturbing activities such as construction or infrastructure maintenance. Munitions items (if present) may be transported by erosion/redeposition, land disturbance such as construction activities, or via direct contact.

6.2 Screening Level Hazard Assessments

This section presents the screening level hazard assessments conducted for the NBK Bangor MRSs using historical data and data collected during the SI. The methodologies applied during these screening level hazard assessments correspond to the known or suspected MEC releases at the MRSs. Only those MRSs (UXO 3, UXO 6, UXO 9, and UXO 16) with confirmed MEC releases were subject to a preliminary MEC Hazard Assessment (MEC HA); this assessment can be updated if or when additional data is collected during future investigations. The MRSs where a MEC release has not been confirmed, and the SI results indicate that a MEC release was unlikely, underwent a qualitative hazard evaluation. For several of the MRSs where no MEC was encountered but the extensive MDAS presence suggests a MEC release is possible, additional investigation data are needed to appropriately evaluate the explosive hazards potentially present.

6.2.1 MEC Hazard Assessments

The MEC HA method focuses on hazards to human receptors and does not directly address environmental or ecological concerns that might be associated with MEC. The process for conducting the MEC HA is described in the MEC HA interim guidance document (USEPA, 2008) and uses input from historical documentation, field observations made during this SI and previous studies, and results of the intrusive

investigations conducted during this SI and previous investigations. The MEC HA results are qualitative references only, and do not represent quantitative measures of explosive hazard at any of the NBK Bangor MRSs. The qualitative hazard assessment technique used for the MRSs without a confirmed MEC release follows the same MEC HA method, which assesses the acute explosive hazards associated with remaining MEC at an MRS by analyzing site-specific conditions and human issues that affect the likelihood that a MEC accident will occur.

The MEC HAs presented in this report were conducted to establish a preliminary assessment of the explosive hazard for the MRSs where MEC has been encountered. The MEC HA results are considered preliminary because they will likely change when the nature and extent of MEC impacts are characterized during future investigations, where recommended. Appendix F-1 of this report provides the MEC HA results for the applicable MRSs, which are also briefly summarized in the following sections.

6.2.1.1 Overview of the MEC HA Primary Input Factors

Under the MEC HA method, the potential hazards posed by MEC are characterized qualitatively by evaluating three primary factors. These primary factors are related to the three critical elements of a potentially complete MEC exposure pathway:

- Severity – the potential consequences to a human receptor should MEC detonate.
- Accessibility – the likelihood that a human receptor will be able to encounter MEC.
- Sensitivity – the likelihood that MEC will detonate if a human receptor interacts with it.

To complete the preliminary MEC hAs for the applicable MRSs (UXO 3, UXO 6, UXO 9, and UXO 16), the various input factors were reviewed, and suitable categories were selected based on historical documentation and field observations made during the SI and previous studies. These input factors included such details as energetic material type, site accessibility, potential receptor contact hours, and MEC classification/size. Each category for each of the MEC HA input factors has an assigned score that relates to the relative contributions of the different input factors to the overall MEC hazard.

6.2.1.2 Overview of the MEC HA Output Factors

Once the categories and scores for input factors were determined for the applicable MRSs, the related scores for each category were totaled to calculate an overall MEC HA score. Scores for the categories are in multiples of five, with a total maximum

possible score for all factors of 1,000 and a minimum possible score of 125. These MEC HA scores are qualitative references only and should not be interpreted as quantitative measures of explosive hazard. The MEC HA method describes associated hazard levels for these scores, which range from 1 (highest) to 4 (lowest). Qualitative Hazard Evaluations

The MRSs without a confirmed MEC release, or where the presence of MPPEH suggest a release is possible, were subject to a qualitative hazard evaluation to assess the potential explosive hazards at the MRS. The purpose of these hazard evaluations is to qualitatively determine whether a potential hazard is present and the primary causes of that potential hazard. The hazard evaluations presented are based on the historical research and data generated during the SI.

The approach for evaluating the magnitude of the potential explosive hazard involves evaluating site-specific CSM data to relate accessibility, munitions sensitivity, and the severity of an explosive event, if it were to occur. The evaluation includes the following qualitative considerations:

- The likelihood of a receptor to encounter MEC based on the amount potentially present and the accessibility of the site.
- The likelihood MEC will detonate based on the sensitivity of the MEC potentially present, and the energy imparted by the MEC on the receptor.
- The severity of the explosive incident based on the properties of the MEC potentially present.

6.2.2 Screening Level Hazard Assessment Results

The following sections present the screening level hazard assessment results for the four MRSs where MEC was documented; information is also provided explaining why MEC hAs were not conducted for each of the remaining MRSs.

6.2.2.1 UXO 2 (Site CC)

The presence of hundreds of MDAS items suggests the possibility that MEC may be present within the SI investigation boundary; however, no MEC was encountered during the SI, so a MEC HA was not prepared.

6.2.2.2 UXO 3 (Site D)

The explosive hazard at UXO 3 was characterized using the MEC HA method described in Section 6.2.2. Table 6-2 summarizes the results of the preliminary MEC HAs for the current land uses; future use is presumed the same as current use, since an informal IC

boundary covers most of the site, and considering the site is a wetlands and should remain so. Based on the MEC HA characterization, UXO 3 has a total MEC HA score of 750, which corresponds to a hazard level of 2.

6.2.2.3 UXO 6 (Site 22)

The explosive hazard at UXO 6 was characterized using the MEC HA method described in Section 6.2.2. Table 6-2 summarizes the results of the preliminary MEC hAs for the current land uses for the MRS; future use is presumed the same as current use considering approximately 80 percent of the site is nearly inaccessible due to steep slopes. Based on the MEC HA characterization, UXO 6 has a total MEC HA score of 560, which corresponds to a hazard level of 3.

6.2.2.4 UXO 8 (Site NN)

No explosive hazard was identified during the SI. Munitions-related findings (ammunition can finds, small arms and M115 artillery simulators) were identified historically at the site; however, no MEC was encountered during the SI, so a MEC HA was not prepared.

6.2.2.5 UXO 9 (Site OO)

The explosive hazard at UXO 9 was characterized using the MEC HA method described in Section 6.2.2. Table 6-2 summarizes the results of the preliminary MEC hAs for the current land uses for the MRS; future use is presumed the same as current use. Since approximately 90 percent of the site is cover by a wetland area, current and future use of the land is limited. Based on the MEC HA characterization, UXO 9 has a total MEC HA score of 515, which corresponds to a hazard level of 4.

6.2.2.6 UXO 10 (Site 12)

The presence of MDAS items during the SI, and the presence of previously encountered MPPEH, suggests that MEC may be present; however, no MEC was recovered during the SI, so a MEC HA was not prepared.

6.2.2.7 UXO 11B (Site 8)

The presence of MDAS items suggests the possibility that MEC may be present within the SI investigation boundary; however, no MEC was encountered during the SI, or historically, so a MEC HA was not prepared.

6.2.2.8 UXO 15 (Site KK)

The presence of MDAS items during the SI, and the presence of previously encountered MPPEH, suggests that MEC may be present in the MRS; however, no MEC was encountered during the SI, so a MEC HA was not prepared.

6.2.2.9 UXO 16 (Site LL)

The explosive hazard at UXO 16 was characterized using the MEC HA method described in Section 6.2.2. Table 6-2 summarizes the results of the preliminary MEC hAs for the current land uses for the MRS; future use is presumed the same as current use. Since the site is within a highly secured area, current and future use of the land is limited. Based on the MEC HA characterization, UXO 16 has a total MEC HA score of 605, which corresponds to a hazard level of 3.

7.0 Conclusions and Recommendations

The objective of this SI was to assess and verify the absence or presence of MPPEH and provide the next step forward recommendations at each of the 17 individual sites fully studied for the SI. The SI objective was met. The remaining four sites, which were removed from the SI munitions related portion of the field work scope (biological surveys and cultural surveys portion of the SI field work were conducted), were investigated during a second phase of field work beginning in spring 2023. Additional field work at four sites where the SI was performed in 2022, and a pending recommendation is included for one site investigated in 2022. A summary of the SI results, data gaps identified, and recommendations are included in Table 7-1.

7.1 UXO 2 (Site CC)

The SI results confirmed the CSM of a disposal site at UXO 2 with surface munitions related concerns.

MDAS was encountered both before the SI (40-mm and .50 caliber casings; ammunition containers labelled explosive D, RDX, smokeless powder, and TNT; and a potential smoke pot) and during the 2022 SI (660 MDAS items, including 582 Mark (Mk) 2/3 40-mm cartridge cases and 78 unknown model 20-mm cartridge cases; and shipping containers). MDAS encountered during the SI was located in the southern portion of UXO 2, and based on the step-out investigation, the extent of MDAS was identified and no further MEC and/or MDAS was identified to the south of the site. MDAS left onsite from the 2022 SI field work was reinspected and removed from the site in 2023. The 2023 MDAS consisted of additional shipping containers and ammo cans of which were removed.

No further action is recommended for UXO 2.

7.2 UXO 3 (Site D)

The SI results confirmed the CSM of an OB/OD site at UXO 3 with surface and subsurface munitions related concerns. Historically, munitions-related items (.30-caliber and 20-mm munitions related materials) have been identified at the site, and historical accounts report thousands of photoflash bombs were detonated at UXO 3. During the 2022 SI, 14 MEC and 402 MDAS items were encountered over the surface of the entire site, with most of the items found being AN-M46 photoflash bombs.

During the 2023 SI, an additional 6 MEC and 190 MDAS items were recovered from the step out investigations. Although surface items were removed from the UXO 3 ground

surface during the SI, the extent has not been determined in any direction beyond the SI investigation boundary; considering the site history and multitude of MEC/MDAS encountered, MEC/MPPEH is likely present beyond the current UXO 3 SI investigation and step-out boundaries.

Also, MEC/MPPEH is likely present in the subsurface, considering the site's history, the geophysical survey results, and marshy onsite conditions that can favor possible erosion and redeposition, causing MEC to occur in the surface and in the subsurface. In fact, during the SI, one MPPEH item resurfaced during geophysical surveying (and after the UXO survey) of the SI investigation area.

The qualitative, preliminary MEC HA resulted in a score of 750 (Level 2), which is consistent with the weight of evidence evaluation of UXO 3 as an explosive hazard.

Additionally, based on the MC sampling results (see Section 5.2.5), exceedances of the PSLs for select explosives were detected at some of the MC sampling locations (i.e., incinerator area and areas where there were breached MEC and/or MDAS items). It is uncertain if human health and ecological overall risks from point source MC contamination is acceptable or not.

An RI is recommended for UXO 3 to determine the nature and extent of explosive hazard.

7.3 UXO 6 (Site 22)

The SI results confirmed the CSM of a disposal area at UXO 6 with surface munitions related concerns. Historically, munitions-related items (metallic debris, MPPEH including ammunition cans, 40-mm cartridge casings, and various other unopened ordnance storage containers) have been identified at the site. During the 2022 SI, a total of six MEC (five unfired Mk 22 percussion primers fitted into empty Mk 2 cartridge cases and one unfired Mk 2 Mod 1 primer from an unknown item) and 10 MDAS items (various unknown pieces of MD) were identified at the top of the hill within the UXO 6 investigation boundary. Additionally, a swath of metal debris, drums, ammo cans, MDAS (various), and MEC (including unfired percussion primers for various caliber artillery cartridge cases) were identified scattered down the steep hillside. During the 2023 SI, the items on the hillside were identified as 73 MEC (one unknown fuze adapter, 55 Mk 22 percussion primers, and 17 unknown percussion primers) and 51 various unknown MDAS items were recovered from the site.

The qualitative, preliminary MEC HA resulted in a score of 560 (Level 3), which likely overestimates explosive hazard considering the weight of evidence. Specifically, during the SI, a UXO surface survey was conducted that identified and led to the removal of

surface MEC that eliminated any exposure to surface MEC. The other portion of the site is the steep hillside, where MEC, MDAS, and MD were identified and removed, but the hillside is largely inaccessible to all receptors, except possibly for personnel in training; warning signage was installed during the SI as a deterrence to accessing the hillside. Regardless of determined removed and remaining explosive hazard, there is potential for recontamination from the active EOD range. The presence of subsurface MEC/MPPEH is unknown.

Since UXO 6 is fully located within an active operational range fan, further investigation at this site is deferred until the operational range is closed by the installation's Commanding Officer. Once the operational range is closed, the site will be re-evaluated for further investigation under the Navy's Environmental Restoration Program.

7.4 UXO 8 (Site NN)

Prior to the SI for UXO 8, the CSM identified the MRS as having the potential for surface/subsurface MPPEH/MEC as it was designated surface and subsurface disposal area. The SI results, however, showed no evidence of an explosive hazard.

During the SI, UXO detector-aided UXO surface survey was conducted of all accessible areas within the SI investigation boundary. No munitions related findings (MEC or MDAS) were identified on the ground surface.

In the subsurface, geophysical survey results did not indicate SRAs or other features consistent with a disposal site. The SRAs were associated with fence lines, a culvert, and parking lots visible at the surface. Historically, EOD had responded to retrieve MPPEH reported for this area including ammunition cans, SAA, and M115 Artillery simulators. MEC/MPPEH presence in the subsurface is not evident. Moreover, aerial photograph analysis conducted indicates that UXO 8 has been redeveloped extensively throughout the years, which resulted in land disturbing activities. If MEC/MPPEH was present in the subsurface, it would have likely been encountered during construction activities.

No further action is recommended for UXO 8.

7.5 UXO 9 (Site OO)

The SI results do not support the UXO 9 CSM related to munitions concerns associated with reported use as a potential burn or disposal site. Prior to the SI, UXO 9 was initially identified as having the potential for surface MEC to be present. During the SI, only a single MEC (an M18 smoke hand grenade) was located on the surface in the northeastern portion of the site, which is similar to the historical munitions-related

findings (signal flare in its original container [L312] and a smoke grenade found during construction). Additionally, the SI finding was located in the northern portion of UXO 9; it is suspected that the item was disposed of into the wetlands or the former lake. The northern portion of UXO 9 is located outside of the active operational range fan (see Figure 5-5). An RI is recommended for this portion of UXO 9 area, which is outside of the active operational range fan, to determine the nature and extent of the explosive hazard.

The qualitative, preliminary MEC HA resulted in a score of 515 (Level 4), which likely overestimates the explosive hazard, considering that the UXO surface survey was completed for the entirety of UXO 9 accessible area during the SI.

As shown in Figure 5-5, the southern portion of UXO 9 lies within an active operational range fan. Although surface explosive hazards were removed during the SI, activities at the operational range present potential for surface recontamination. The presence of subsurface MEC/MPPEH is unknown. Further investigation within the southern portion of UXO 9 (within the active operational range fan) is deferred until the operational range is closed by the installation's Commanding Officer. Once the operational range is closed, the site will be re-evaluated for further investigation under the Navy's Environmental Restoration Program.

7.6 UXO 10 (Site 12)

Prior to the SI for UXO 10, the CSM identified the MRS as having the potential for surface/subsurface MPPEH/MEC, as it was a dunnage yard and designated a surface and subsurface disposal area. The SI results, however, showed no evidence of an explosive hazard.

During the SI, UXO detector-aided UXO surface survey was conducted of all accessible areas within the SI investigation boundary. No MEC were identified during fieldwork; however, 12 MDAS items were recovered from on the surface. The MDAS findings included one 3-inch cartridge case, one 40-mm cartridge case, one 40-mm 4-round clip, one ammo can shipping container, and eight partial shipping containers.

Historically, munitions-related items (3-inch projectiles, Mark 22 fuzes, Mk1 and Mk2 40-mm projectiles, and ammonium picrate) have been identified on the surface. Aerial photograph analysis conducted during the SI planning phase identified a former disposal area.

The geophysical surveys identified widespread metallic debris across the site which could suggest the potential presence of subsurface MEC as a potential concern,

however no MEC and only 12 MDAS items from five locations were recovered during the SI.

No further action is recommended for UXO 10.

7.7 UXO 11B (Site 8)

Prior to the SI for UXO 11B, the CSM concern was related to surface and subsurface disposal of inert ordnance-related items, including ammunition cans and propellent tanks, suggesting a possible explosive hazard could also be present from unknown MEC. The 2022 SI results confirmed surface disposal of ammo cans and shipping containers; however, no evidence of any explosive hazard was observed. Limited subsurface concerns remained for possible MEC/MPPEH which were noted associated with the surface depression previously described as a "visible alcove area leading to a subsurface structure."

Historically, an ammunition box was observed on the surface during the PA. During the 2022 SI, one MDAS item (Mk 2 cartridge case) was identified on the surface near a pile of ammo cans. Additionally, 31 shipping containers were found near the southern boundary of the investigation area. During the 2023 SI Addendum field work, the shipping containers were reinspected, inventoried, and removed from the site, and the visible items were removed from the surface depression. Items in the depression consisted of seven MDAS munitions shipping containers. No visible items remained on the surface of the depression after the items were extracted; however, analog indicators detected subsurface anomalies, which continued below the surface within the depression. The detection is likely attributed to deteriorated metallic particles corroded from the removed munitions containers.

The absence of MEC (or a multitude of MDAS on the ground surface) do not suggest a subsurface concern for MEC for the site. Furthermore, subsurface geophysical survey results indicate the presence of SRAs coincident with known surface obstructions (excessive metal debris piles not removed during UXO surface clearance, or former cultural sites), and do not indicate a disposal site based on currently available data.

No further action is recommended for UXO 11B.

7.8 UXO 15 (Site KK)

Prior to the SI for UXO 15, the CSM identified the MRS as having the potential for surface/subsurface MPPEH/MEC, as it was designated surface and subsurface disposal area and dunnage yard. However, no evidence of an explosive hazard was detected during the SI. During the SI, UXO detector-aided UXO surface survey was

conducted of all accessible areas within the SI investigation boundary. No MEC and only one MDAS item was identified on the surface during fieldwork.

In the subsurface, geophysical survey results did not indicate SRAs or other features consistent with a disposal site. SRAs are coincident with facility infrastructure.

Historically, munitions-related items (Mk 22 dummy fuzes, 3-inch projectiles, Mk1 40-mm dummy projectiles, Mk2 40-mm projectiles, and other 40-mm projectiles) have been identified on the surface. Moreover, aerial photograph analysis conducted indicated site conditions changed at UXO 15 over time when land disturbing activities occurred. If MEC/MPPEH was present in the subsurface, it would have likely been encountered during those construction activities.

No further action is recommended for UXO 15.

7.9 UXO 16 (Site LL)

Prior to the SI for UXO 16, the CSM identified the MRS as having the potential for surface/subsurface MPPEH/MEC, as it was designated surface and subsurface disposal area. The SI did result in evidence of an explosive hazard.

During the SI, a UXO detector-aided surface survey was conducted of all accessible areas within the SI investigation boundary. No MDAS was identified however one MEC item, a 20-mm projectile (without casing), was recovered on the surface during fieldwork.

Historically, munitions-related items (3-inch projectiles, Mk1 40-mm dummy projectiles, Mk2 40-mm projectiles, and other 40-mm projectiles) have been identified on the surface. An analysis of historical aerial photographs indicated that the site was used as a disposal area around 1957. During soil disturbing activities in 2013, MPPEH was present in the subsurface, it would have likely been encountered during construction. Due to the location of the MEC find at the eastern edge of the site, it is likely to have been transported during construction activities.

The geophysical survey results identified several SRAs in the subsurface that partially overlap the suspected former burn site area but continue further north and west of the former burn site area. The delineated SRAs indicate a high response area in the DGM data that extends to the current site boundary.

An RI is recommended for UXO 16 to determine the nature and extent of the explosive hazard.

7.10 Update to SI Report Recommendations

In addition to UXO 6 and UXO 9, located either partially or fully within the active operational range fan, two additional sites, UXO 7 (Site 23) and UXO 7B (OU 1 Site A), are fully encompassed by the operational range fan. Both UXO 7 and UXO 7B were included in the SI Report (Tetra Tech, 2023) and each were recommended for an RI; however, based on recent direction from the Navy, further investigation at UXO 7 and UXO 7B is deferred until the operational range is closed by the installation's Commanding Officer. Once the operational range is closed, these two sites will be re-evaluated for further investigation under the Navy's Environmental Restoration Program.

7.11 UXO 7 (Site 23)

Upon completion of SI investigations beginning in 2022 and extending into 2024, the recovered MEC items were detonated in onsite demolition pits using donor explosives. Four demolition pits were used in 2022 and three pits were required for the 2024 finds. All of the pits were located within the UXO 7 MRS, which itself is located within the NBK Bangor facility operational range. Each of the seven demolition pits were excavated to approximately two feet wide by four feet long and extended two to four feet in depth. Post-detonation soil samples were collected from each pit upon completion of demolition operations, see Section 5.11 for results which includes exceedances of human health and ecological PSLs. The PSL exceedances were determined to be attributable to use of demolition donor explosives.

As described in Section 7.10, due to the location of UXO 7 within the operational range fan, further investigation at UXO7 will be deferred until the operational range is closed. Upon completion of any future investigation, the MRS, including the seven demolition pits and those potentially used in future investigations, will be evaluated for remediation.

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8.0 References

B&V (B&V Waste Science and Technology Corp). 1990. *Draft Final RI/FS Work Plan, U.S. Navy CLEAN Program Operable Unit 6 (Sites D and C-East),* Naval Submarine Base Bangor, Bangor, Washington. December.

Battelle, 2017. *Military Munitions Response Program Preliminary Assessment Report,* Naval Base Kitsap Bangor, Bangor, Washington. February 24.

Checkai, R. T., R. G. Kuperman, M. Simini, C. T. Phillips, 2012. Derivation of Draft Ecological Soil Screening Levels for TNT and RDX Utilizing Terrestrial Plant and Soil Invertebrate Toxicity Benchmarks. Edgewood Chemical Biological Center. U.S. Army Research, Development and Engineering Command. ECBC-TR-963. November.

Department of Defense (DoD). 2007. *Munitions Response Site Prioritization Protocol (MRSPP) Primer*. July.

Hart Crowser, 1989. *Current Situation Report on Site C, Side D, Site E, Site F, Site 5, Site 6, Site 11, Site 12, Site 24 and Site 25, Naval Base Kitsap Bangor, Bangor, Washington.* April 18.

Hart Crowser, 1991. *Final Remedial Investigation/Feasibility Study Report, Site A, Naval Submarine Base, Bangor, Washington*. Prepared for United States Navy. August.

Los Alamos National Laboratory (LANL), Intellus New Mexico, 2019. EcoRisk Database, Release 4.1. LANL (Los Alamos National Laboratory) files. Accessed November 2019. https://www.intellusnm.com

National Fisheries Research Center, 1988. *Natural Resources Management Plan for the Naval Submarine Base Bangor, Bremerton Washington*. April.

NAVFAC Northwest, 1994. *Record of Decision for Operable Unit 6 (OU 6), Naval Base Kitsap Bangor, Bangor Washington.* July 18.

Tetra Tech, 2014. Former Dunnage Yard Soil Mound Screening Boundary Survey Report P-977 Waterfront Security Enclave, Naval Base Kitsap, Bangor Silverdale, Washington. Draft. December.

NAVSEA, 2020. Ammunition and Explosives Safety Ashore. OP-5, Volume 1, Revision Seven, Change 15. March.

Navy (Department of Navy). 2005. *Second Five-Year Review of Record of Decision*. Naval Base Kitsap at Bangor, Silverdale, Washington. April.

Navy, 2018. *Institutional Controls Management Plan Naval Base Kitsap, Bangor, Bangor Washington.* October 19.

SES-TECH, 2008. *Final Partial Remedial Action Completion Report for Soils at Various Operable Units Naval Base Kitsap Bangor, Bangor Washington.* April 22.

SERDP (Strategic Environmental Research and Development Program), 2012. *Development of Toxicity Benchmarks and Bioaccumulation Data for N-Based Organic Explosives for Terrestrial Plants and Soil Invertebrates*. ER-1416. November.

Tetra Tech, 2014. Final After-Action Report, Former Dunnage Yard Former Dunnage Yard Soil Screening MCON P-977 Waterfront Security Enclave SWFPAC, Naval Base Kitsap, Bangor Silverdale, Washington. April.

Tetra Tech, 2020a. Final Explosives Safety Submission Munitions and Explosives of Concern Site Inspection Naval Base Kitsap Bangor Silverdale, Washington. December.

Tetra Tech, 2020b. Draft Summary Report, Habitat/Endangered Species Survey for Munitions and Explosives of Concern Site Inspection at Naval Base Kitsap Bangor, Basewide Multiple MRP Sites. October (draft accepted as final).

Tetra Tech, 2021a. *Final Revision 0 Munitions Response Quality Assurance Project Plan for Munitions and Explosives of Concern Site Inspection at Multiple MRP Sites. Naval Base Kitsap Bangor Silverdale, Washington*. June.

Tetra Tech, 2021b. *Final Revision 0 Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) for Munitions Constituents Site Inspection at Multiple MRP Sites. Naval Base Kitsap Bangor Silverdale, Washington*. June.

Tetra Tech, 2021c. *Final Biological Assessment Munitions Response for Munitions and Explosives of Concern Site Inspection at Naval Base Kitsap Bangor, Washington. Silverdale, WA*. Prepared by Tetra Tech, Inc. on behalf of the Navy. March 2021.

Tetra Tech, 2021d. *Final Endangered Species Act and Essential Fish Habitat No Effect Determination Munitions Response for Munitions and Explosives of Concern Site Inspection at Naval Base Kitsap Bangor, Silverdale, Washington.* Prepared by Tetra Tech, Inc. on behalf of the Navy. February 2021.

Tetra Tech, 2021d. *Final Biological Assessment Munitions Response for Munitions and Explosives of Concern Site Inspection at Naval Base Kitsap Bangor, Washington. Silverdale, WA*. Prepared by Tetra Tech, Inc. on behalf of the Navy. March 2021.

Tetra Tech, 2021e. *Historical and Cultural Resources Survey Report for Munitions and Explosives of Concern Site Inspection Project at Naval Base Kitsap Bangor Basewide Munitions Response Sites. Naval Base Kitsap Bangor Silverdale, Washington*. March.

Tetra Tech, 2023a. *Final Site Inspection Report for Munitions and Explosives of Concern at Naval Base Kitsap Bangor Munitions MRP Sites. Naval Base Kitsap Bangor Silverdale, Washington.* October.

Tetra Tech, 2023b. *Final Amendment 2 Explosives Safety Submission Munitions and Explosives of Concern Site Inspection Naval Base Kitsap Bangor Silverdale, Washington*. July.

Tetra Tech, 2023c. *Historical and Cultural Resources Monitoring Report for Munitions and Explosives of Concern Site Inspection Project at Naval Base Kitsap Bangor Basewide Munitions Response Sites. Naval Base Kitsap Bangor Silverdale, Washingto*n. Month (pending).

USEPA (U.S. Environmental Protection Agency), 2008. *Interim Munitions and Explosives of Concern Hazard Assessment Methodology*. October.

USEPA, 2018. *Region 4 Ecological Risk Assessment Supplemental Guidance. Scientific Support Section, Superfund Division*. March.

USEPA, 2023. *Regional Screening Levels for Chemical Contaminants at Superfund Sites, prepared by Oak Ridge National Laboratory* Regional Screening Levels (RSLs) - Generic Tables | US EPA. November.

URS Consultants, 1991. *Operable Unit 7 (OU 7) Project Work Plan, Naval Submarine Base, Bangor, Washington. Prepared for Engineering Field Activity Northwest, Naval Facilities Engineering Command.* October 14.

URS Consultants, 1993. *Final Remedial Investigation/Feasibility Study for Operable Unit 6. Naval Submarine Base Bangor, Washington.* December 10.

Washington Administrative Code, 2019. WAC 173-340-900. Table 749-3 (Certified January 28, 2022).

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TABLES

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Table 1-1: Crosswalk Table

Munitions Response Site	Alternative Site Names
UXO 000002 (Site CC)	Site CC
UXO 000003 (Site D)	OB/OD Site D OU 6 Former Ordnance Burning Ground Munitions Burn Area
UXO 000006 (Site 22)	Debris Area 2 Site 22 Paint Cans/Drums #2 Debris Area 2 at Site A Debris Area 2 Site
UXO 000008 (Site NN)	Site NN Construction Site
UXO 000009 (Site OO)	Site OO
UXO 000010 (Site 12)	Site 12
UXO 000011B (Site 8)	Ammunition Can/Tank Disposal Site Site 8 Ammo Cans/Tanks
UXO 000015 (Site KK)	Site KK Dunnage Yard
UXO 000016 (Site LL)	Burn Site Site LL Burn Pit Site LL Burn Area Site

OB/OD: Open Burning/Open Detonation
OU: Operable Unit
UXO: Unexploded Ordnance

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Table 1-2: Summary of SI Activities by Site

Site Name[1]	Location	Site Size (acres)	Investigation Description	Vegetation Clearance	Detector-aided Surface Sweep	Geophysical Survey (EM61-MK2 HP)		2023 Step-out Investigation	Investigation Rationale
						Transects	Full Coverage		
UXO 2 (Site CC)	Keyport Annex	19	Step-out Investigation	✓	✓	---	---	---	Based on the 2022 SI recommendation, a step-out investigation was conducted at UXO 2.
UXO 3 (Site D)	Lower Base	37	Step-out Investigation	✓	✓	✓	---	✓	Based on the 2022 SI recommendation, a step-out investigation was conducted at UXO 3. Based on the results of the 2023 SI field work, additional step-outs were conducted.
UXO 4 (Site 9)	Upper Base/ Lower Base	6	2022 MDAS Removal	---	---	---	---	---	MDAS that was identified during the 2022 SI field work was left onsite after being inventoried and demilitarized. During the 2023 SI field work, the remaining MDAS was reinspected, removed from the site, and destroyed/recycled by a certified facility.
UXO 6 (Site 22)	North Lower Base	1	MEC/MDAS Removal from Slope	✓	✓	---	---	✓	Based on the SI recommendation, the MEC/MPPEH identified during the 2022 SI field work would be removed during the 2023 SI field work. Based on the results of the 2023 SI field work, an additional step-out was conducted.
UXO 8 (Site NN)	Waterfront Restricted Area	9	SI Investigation	✓	✓	✓	✓	---	Site was deferred from the 2022 field work; SI field work conducted in 2023
UXO 10 (Site 12)	Waterfront Restricted Area	7	SI Investigation	✓	✓	✓	---	---	Site was deferred from the 2022 field work; SI field work conducted in 2023
UXO 11B (Site 8)	Lower Base	2	2022 MDAS Removal and Interim Removal Action	---	✓	---	---	---	MDAS that was identified during the 2022 SI field work was left onsite after being inventoried and demilitarized. During the 2023 SI field work, the remaining MDAS was reinspected, removed from the site, and destroyed/recycled by a certified facility. Based on the recommendation from the SI Report and a decision by the project team, MDAS located within the subsurface depression onsite was removed.
UXO 15 (Site KK)	Waterfront Restricted Area	12	SI Investigation	✓	✓	✓	---	---	Site was deferred from the 2022 field work; SI field work conducted in 2023
UXO 16 (Site LL)	Waterfront Restricted Area	10	SI Investigation	✓	✓	✓	---	---	Site was deferred from the 2022 field work; SI field work conducted in 2023
UXO 17 (Site 2)	Upper Base	9.3	2022 MDAS Removal	---	---	---	---	---	MDAS that was identified during the 2022 SI field work was left onsite after being inventoried and demilitarized. During the 2023 SI field work, the remaining MDAS was reinspected, removed from the site, and destroyed/recycled by a certified facility.

✓: Task completed
---: Task not conducted

[1] UXO 9 (Site OO), is included in this SI addendum to present the final SI recommendation. While no additional field work was conducted at UXO 9 during the 2023 field work, internal Navy discussion regarding the final recommendation was pending during the finalization of the SI report; therefore, the final recommendation is included in this SI addendum report.

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Table 3-1: MC Sampling Overview and Rationale

Site	MC Sampling Rationale	Sample ID	Date Collected	Medium	Analysis	Actual Number of Composite Samples Collected
Detonation Holes at UXO 7	Collected 1 composite sample from bottom of each of three detonation holes at UXO 7. (1)	X7-TP-C01-3642	03/06/2024	Subsurface Soil	Explosives	3
		X7-TP-C02-2430	03/06/2024	Subsurface Soil	Explosives	
		X7-TP-C03-2436	03/06/2024	Subsurface Soil	Explosives	

(1) As per the MC QAPP, each surface soil composite sample consisted of 5 aliquots. Surface soil sample collection depth was surface soil from 0 to 6 inches. Surface soil samples were collected using UXO avoidance.

MC: Munitions Constituents
QAPP: Quality Assurance Project Plan
UXO: Unexploded Ordnance

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Table 5-1: Summary of MEC and MDAS Results

Site	Date	MEC Management Dates	Item ID	Findings		Item Description	Transport/ Disposition	Filler / NEW	Date of Final Disposition
				# MDAS	# MEC				
UXO 2 (Site CC)									
UXO 2	7/31/2022	NA	UXO02-01 (658)	658	--	Case, Cartridge, 40mm, MK 2/3 (580) / Case, Cartridge, 20mm, Unknown model (78)	Placed in MDAS drum at laydown yard	NA	NA
UXO 2	8/6/2022	NA	UXO02-02	1	--	Case, Cartridge, 40mm, MK 2/3	Placed in MDAS drum at laydown yard	NA	NA
UXO 2	8/6/2022	NA	UXO02-03	1		Case, Cartridge, 40mm, MK 2/3	Placed in MDAS drum at laydown yard	NA	NA
UXO 2	10/21/2023	NA	UXO02-04	92	--	MDAS from Phase 1 surface survey (Various shipping containers and ammo cans)	Placed in MDAS drum at laydown yard	NA	NA
UXO 3 (Site D)									
UXO 3	4/11/2022	NA	UXO03-01	1	--	MD, AN-M46, 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/11/2022	NA	UXO03-02	1	--	MD, AN-M46, 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/11/2022	NA	UXO03-03	1	--	MD, AN-M46, 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/11/2022	NA	UXO03-04	1	--	MD, AN-M46, 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/12/2022	NA	UXO03-05	1	--	MD, AN-M46, 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/12/2022	NA	UXO03-06	1	--	MD, AN-M46, 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/12/2022	NA	UXO03-07	1	--	MD, AN-M46, 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/12/2022	NA	UXO03-08	1	--	MD, AN-M46, 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/12/2022	NA	UXO03-09	1	--	MD, AN-M46, 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/12/2022	NA	UXO03-10	1	--	MD, AN-M46, 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/12/2022	NA	UXO03-11	1	--	MD, AN-M46, 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/13/2022	NA	UXO03-12	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/12/2022	NA	UXO03-11	1	--	MD, AN-M46, 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/13/2022	NA	UXO03-12	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/14/2022	NA	UXO03-13	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/18/2022	NA	UXO03-14	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/18/2022	NA	UXO03-15	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/20/2022	NA	UXO03-16	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/20/2022	NA	UXO03-17	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/20/2022	NA	UXO03-18	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/21/2022	NA	UXO03-19	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/21/2022	NA	UXO03-20	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/26/2022	NA	UXO03-21	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/26/2022	NA	UXO03-22	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/26/2022	NA	UXO03-23	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/26/2022	NA	UXO03-24	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/26/2022	NA	UXO03-25	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/27/2022	NA	UXO03-26	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	4/27/2022	NA	UXO03-27	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/1/2022	NA	UXO03-28	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/1/2022	NA	UXO03-29	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/1/2022	NA	UXO03-30	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/1/2022	NA	UXO03-31	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/1/2022	NA	UXO03-32	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/1/2022	NA	UXO03-33	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/2/2022	NA	UXO03-34	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA

Table 5-1: Summary of MEC and MDAS Results

Site	Date	MEC Management Dates	Item ID	Findings		Item Description	Transport/ Disposition	Filler / NEW	Date of Final Disposition
				# MDAS	# MEC				
UXO 3	5/2/2022	NA	UXO03-35	1	--	MD, AN-M46 100lb Photoflash Bomb	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/8/2022	NA	UXO03-36	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/8/2022	NA	UXO03-37	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/8/2022	NA	UXO03-38	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/9/2022	NA	UXO03-39	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/9/2022	NA	UXO03-40	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/9/2022	NA	UXO03-41	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/9/2022	NA	UXO03-42	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/9/2022	NA	UXO03-43	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/9/2022	NA	UXO03-44	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/9/2022	NA	UXO03-45	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/9/2022	NA	UXO03-46	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/9/2022	NA	UXO03-47	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/9/2022	NA	UXO03-48	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/9/2022	NA	UXO03-49	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/9/2022	NA	UXO03-50	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/9/2022	NA	UXO03-51	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/9/2022	NA	UXO03-52	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-53	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-54	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-55	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-56	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-57	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-58	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-59	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-60	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-61	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-62	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-63	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-64	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-65	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-66	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-67	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-68	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-69	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-70	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-71	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/10/2022	NA	UXO03-72	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/15/2022	NA	UXO03-73	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/15/2022	NA	UXO03-74	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/15/2022	NA	UXO03-75	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/15/2022	NA	UXO03-76	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA

Table 5-1: Summary of MEC and MDAS Results

Site	Date	MEC Management Dates	Item ID	Findings		Item Description	Transport/ Disposition	Filler / NEW	Date of Final Disposition
				# MDAS	# MEC				
UXO 3	5/15/2022	NA	UXO03-77	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/15/2022	NA	UXO03-78	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/15/2022	NA	UXO03-79	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/15/2022	NA	UXO03-80	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/15/2022	5/16/2022	0301	--	1	Bomb, Photoflash, AN-M46	DIP by EOD	DIP by EOD	5/16/2022
UXO 3	5/16/2022	NA	UXO03-81	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/16/2022	NA	UXO03-82	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/16/2022	NA	UXO03-83	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/16/2022	NA	UXO03-84	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/16/2022	NA	UXO03-85	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/16/2022	NA	UXO03-86	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/17/2022	NA	UXO03-87	1	--	8lbs suspect MDAS	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/17/2022	NA	UXO03-88	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/17/2022	NA	UXO03-89	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/17/2022	NA	UXO03-90	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/17/2022	NA	UXO03-91	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/17/2022	NA	UXO03-92	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/17/2022	NA	UXO03-93	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/17/2022	NA	UXO03-94	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/17/2022	NA	UXO03-95	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/17/2022	NA	UXO03-96	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/17/2022	NA	UXO03-97	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/17/2022	NA	UXO03-98	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/17/2022	NA	UXO03-99	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/17/2022	5/18/2022	0302	--	1	Booster cup, Bomb, Photoflash, AN-M46	Tt transport to Keyport Annex magazine for storage until detonation	9 gm black powder / 0.01	11/2/2022
UXO 3	5/18/2022	NA	UXO03-100	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/18/2022	NA	UXO03-101	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/18/2022	5/19/2022	0303	--	1	Booster cup, Bomb, Photoflash, AN-M46	Tt transport to Keyport Annex magazine for storage until detonation	9 gm black powder / 0.01	11/2/2022
UXO 3	5/18/2022	5/19/2022	0304	--	1	Booster cup, Bomb, Photoflash, AN-M46	Tt transport to Keyport Annex magazine for storage until detonation	9 gm black powder / 0.01	11/2/2022
UXO 3	5/31/2022	NA	UXO03-102	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/31/2022	NA	UXO03-103	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/31/2022	NA	UXO03-104	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/31/2022	NA	UXO03-105	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/31/2022	NA	UXO03-106	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	5/31/2022	NA	UXO03-107	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-108	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-109	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-110	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-111	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-112	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA

Table 5-1: Summary of MEC and MDAS Results

Site	Date	MEC Management Dates	Item ID	Findings		Item Description	Transport/ Disposition	Filler / NEW	Date of Final Disposition
				# MDAS	# MEC				
UXO 3	6/1/2022	NA	UXO03-113	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-114	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-115	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-116	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-117	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-118	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-119	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-120	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-121	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-122	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-123	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-124	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-125	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-126	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-127	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-128	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-129	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-130	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-131	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-132	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-133	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-134	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-135	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-136	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-137	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-138	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-139	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-140	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-141	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-142	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-143	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-144	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-145	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-146	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-147	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-148	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-149	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-150	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-151	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-152	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-153	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-154	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA

Table 5-1: Summary of MEC and MDAS Results

Site	Date	MEC Management Dates	Item ID	Findings		Item Description	Transport/ Disposition	Filler / NEW	Date of Final Disposition
				# MDAS	# MEC				
UXO 3	6/1/2022	NA	UXO03-155	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-156	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	NA	UXO03-157	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/1/2022	6/2/2022	0305	--	1	Booster, Bomb, Photoflash, AN-M46	DIP by EOD	DIP by EOD	6/2/2022
UXO 3	6/1/2022	6/2/2022	0306	--	1	Bomb, Photoflash, AN-M46	DIP by EOD	DIP by EOD	6/2/2022
UXO 3	6/1/2022	6/2/2022	0307	--	1	Booster, Bomb, Photoflash, AN-M46	DIP by EOD	DIP by EOD	6/2/2022
UXO 3	6/2/2022	NA	UXO03-158	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/2/2022	NA	UXO03-159	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/2/2022	NA	UXO03-160	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/2/2022	NA	UXO03-161	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/2/2022	NA	UXO03-162	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/6/2022	6/7/2022	0308	--	1	Fuze, Base Detonating, Mk 19	Tt transport to Keyport Annex magazine for storage until detonation	6 gm black powder / 0.01	11/2/2022
UXO 3	6/13/2022	6/14/2022	0309	--	1	Booster, Bomb, Photoflash, AN-M46	Tt transport to Keyport Annex magazine for storage until detonation	9 gm black powder / 0.01	11/2/2022
UXO 3	6/13/2022	NA	UXO03-163	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/13/2022	NA	UXO03-164	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/13/2022	NA	UXO03-165	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/21/2022	NA	UXO03-166	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/21/2022	NA	UXO03-167	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/21/2022	NA	UXO03-168	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/21/2022	NA	UXO03-169	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/21/2022	NA	UXO03-170	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/22/2022	NA	UXO03-171	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/22/2022	NA	UXO03-172	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/22/2022	NA	UXO03-173	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/22/2022	NA	UXO03-174	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/22/2022	NA	UXO03-175	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/22/2022	NA	UXO03-176	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/22/2022	NA	UXO03-177	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/22/2022	NA	UXO03-178	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/27/2022	6/28/2022	0310	--	1	Booster, Bomb, Photoflash, AN-M46	Tt transport to Keyport Annex magazine for storage until detonation	9 gm black powder / 0.01	11/2/2022
UXO 3	6/27/2022	NA	UXO03-179	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/27/2022	NA	UXO03-180	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/27/2022	NA	UXO03-181	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/27/2022	NA	UXO03-182	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/27/2022	NA	UXO03-183	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/27/2022	NA	UXO03-184	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/27/2022	NA	UXO03-185	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/27/2022	NA	UXO03-186	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/27/2022	NA	UXO03-187	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/27/2022	NA	UXO03-188	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA

Table 5-1: Summary of MEC and MDAS Results

Site	Date	MEC Management Dates	Item ID	Findings		Item Description	Transport/ Disposition	Filler / NEW	Date of Final Disposition
				# MDAS	# MEC				
UXO 3	6/27/2022	NA	UXO03-189	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/27/2022	NA	UXO03-190	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/27/2022	NA	UXO03-191	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/27/2022	NA	UXO03-192	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/28/2022	6/29/2022	0311	--	1	Booster, Bomb, Photoflash, AN-M46	Tt transport to Keyport Annex magazine for storage until detonation	9 gm black powder / 0.01	11/2/2022
UXO 3	6/28/2022	NA	UXO03-193	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/28/2022	NA	UXO03-194	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/28/2022	NA	UXO03-195	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	6/28/2022	NA	UXO03-196	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/7/2022	NA	UXO03-197	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/7/2022	NA	UXO03-198	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/7/2022	NA	UXO03-199	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/7/2022	NA	UXO03-200	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/7/2022	NA	UXO03-201	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/7/2022	NA	UXO03-202	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/11/2022	NA	UXO03-203	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-204	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-205	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-206	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-207	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-208	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-209	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-210	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-211	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-212	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-213	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-214	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-215	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-216	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-217	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-218	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-219	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-220	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-221	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-222	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-223	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-224	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-225	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-226	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-227	1	--	MD, Projectile, Unknown	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-228	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA

Table 5-1: Summary of MEC and MDAS Results

Site	Date	MEC Management Dates	Item ID	Findings		Item Description	Transport/ Disposition	Filler / NEW	Date of Final Disposition
				# MDAS	# MEC				
UXO 3	7/12/2022	NA	UXO03-229	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-230	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-231	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-232	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-233	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-234	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-235	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-236	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-237	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-238	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-239	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-240	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-241	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/12/2022	NA	UXO03-242	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-243	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-244	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-245	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-246	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-247	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-248	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-249	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-250	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-251	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-252	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-253	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-254	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-255	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-256	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-257	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-258	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-259	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-260	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-261	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-262	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-263	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-264	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-265	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-266	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-267	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-268	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-269	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-270	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA

Table 5-1: Summary of MEC and MDAS Results

Site	Date	MEC Management Dates	Item ID	Findings		Item Description	Transport/ Disposition	Filler / NEW	Date of Final Disposition
				# MDAS	# MEC				
UXO 3	7/13/2022	NA	UXO03-271	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-272	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-273	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-274	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-275	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-276	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-277	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-278	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-279	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-280	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-281	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-282	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-283	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-284	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-285	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-286	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-287	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-288	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-289	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-290	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-291	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-292	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-293	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-294	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-295	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-296	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-297	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-298	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-299	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-300	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-301	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-302	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-303	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-304	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-305	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-306	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-307	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-308	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-309	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-310	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-311	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-312	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA

Table 5-1: Summary of MEC and MDAS Results

Site	Date	MEC Management Dates	Item ID	Findings		Item Description	Transport/ Disposition	Filler / NEW	Date of Final Disposition
				# MDAS	# MEC				
UXO 3	7/13/2022	NA	UXO03-313	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-314	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-315	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-316	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-317	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-318	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-319	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-320	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-321	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-322	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-323	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-324	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/13/2022	NA	UXO03-325	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/14/2022	NA	UXO03-326	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/14/2022	NA	UXO03-327	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/19/2022	NA	UXO03-328	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/19/2022	NA	UXO03-329	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/19/2022	NA	UXO03-330	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/19/2022	NA	UXO03-331	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/19/2022	NA	UXO03-332	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/19/2022	NA	UXO03-333	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/19/2022	NA	UXO03-334	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/19/2022	NA	UXO03-335	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/19/2022	NA	UXO03-336	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/19/2022	NA	UXO03-337	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/19/2022	NA	UXO03-338	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/19/2022	NA	UXO03-339	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/19/2022	NA	UXO03-340	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/19/2022	7/20/2022	0312	--	1	Booster, Bomb, Photoflash, AN-46	Tt transport to Keyport Annex magazine for storage until detonation	9gm black powder / 0.01	11/2/2022
UXO 3	7/25/2022	7/26/2022	0313	--	1	Booster, Bomb, Photoflash, AN-M46	Tt transport to Keyport Annex magazine for storage until detonation	9gm black powder / 0.01	11/2/2022
UXO 3	7/25/2022	NA	UXO03-341	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-342	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-343	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-344	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-345	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-346	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-347	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-348	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-349	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-350	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-351	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA

Table 5-1: Summary of MEC and MDAS Results

Site	Date	MEC Management Dates	Item ID	Findings		Item Description	Transport/ Disposition	Filler / NEW	Date of Final Disposition
				# MDAS	# MEC				
UXO 3	7/25/2022	NA	UXO03-352	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-353	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-354	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-355	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-356	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-357	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-358	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-359	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-360	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-361	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-362	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-363	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-364	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-365	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-366	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-367	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-368	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-369	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-370	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-371	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-372	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-373	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-374	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-375	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-376	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-377	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-378	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-379	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-380	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-381	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-382	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-383	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-384	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-385	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-386	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-387	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/25/2022	NA	UXO03-388	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/26/2022	NA	UXO03-389	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/26/2022	NA	UXO03-390	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/26/2022	NA	UXO03-391	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/26/2022	NA	UXO03-392	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/26/2022	NA	UXO03-393	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA

Table 5-1: Summary of MEC and MDAS Results

Site	Date	MEC Management Dates	Item ID	Findings		Item Description	Transport/ Disposition	Filler / NEW	Date of Final Disposition
				# MDAS	# MEC				
UXO 3	7/26/2022	NA	UXO03-394	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/26/2022	NA	UXO03-395	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/26/2022	NA	UXO03-396	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/26/2022	NA	UXO03-397	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/26/2022	NA	UXO03-398	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/26/2022	NA	UXO03-399	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/26/2022	NA	UXO03-400	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/27/2022	NA	UXO03-401	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	7/27/2022	NA	UXO03-402	1	--	MD, Bomb, Photoflash, AN-M46	Placed in MDAS drum at laydown yard	NA	NA
UXO 3	8/17/2022	8/17/2022	0314	--	1	Bomb, Photoflash, AN-M46	EOD DIP (Eroded to Surface)	NA	11/2/2022
UXO 3	8/29/2023	8/30/2023	0315	--	1	Fuze, BD, Mk 19 series	Secured in place overnight; transported to CE magazine	lead azide, tetryl, black powder / 0.01	*Pending*
UXO 3	8/30/2023	8/31/2023	0316	--	1	Fuze, BD, Mk 19 series	Secured in place overnight; transported to CE magazine	lead azide, tetryl, black powder / 0.01	*Pending*
UXO 3	8/30/2023	--	UXO03-403 – UXO03-404 / UXO03-407 – UXO03-432	28	--	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	8/30/2023	--	UXO03-405 – UXO03-406	2	--	MD, Projectile, Unknown	NA	NA	NA
UXO 3	8/31/2023	--	UXO03-433 – UOX03-449	17	--	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	9/5/2023	--	UXO03-450 – UXO03-454	5	--	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	9/5/2023	--	UXO03-455	1	--	MD, Projectile, unknown nomenclature	NA	NA	NA
UXO 3	9/25/2023	--	UXO03-456	1	--	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	9/27/2023	--	UXO03-457 – UXO03-465	9	--	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	9/27/2023	--	UXO03-466	1	--	MD, Projectile, Unknown	NA	NA	NA
UXO 3	10/18/2023	--	UXO03-467 – UXO03-470	4	--	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	10/19/2023	--	UXO03-471 – UXO03-474	4	--	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	10/23/2023	--	UXO03-475 – UXO03-476	2	--	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	10/23/2023	--	UXO03-477	1	--	MD, Projectile, Unknown	NA	NA	NA
UXO 3	10/24/2023	--	UXO03-478 – UXO03-482	5	--	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	10/26/2023	--	UXO03-483	1	--	Can, Ammunition	NA	NA	NA
UXO 3	10/30/2023	--	UXO03-484 – UXO03-486	3	--	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	1/8/2024	--	UXO03-487	1	--	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	1/9/2024	--	UXO03-488	1	--	MD, Bomb, Photoflash, AN-M46	NA	NA	NA

Table 5-1: Summary of MEC and MDAS Results

Site	Date	MEC Management Dates	Item ID	Findings		Item Description	Transport/ Disposition	Filler / NEW	Date of Final Disposition
				# MDAS	# MEC				
UXO 3	1/10/2024	--	UXO03-489-UXO03-495	7	--	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	1/10/2024	--	UXO03-496-UXO03-497	2	--	Container, Shipping, Ammunition	NA	NA	NA
UXO 3	1/11/2024	--	UXO03-498-UXO03-504	7	--	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	1/30/2024	--	UXO03E-505 - UXO03E-529	25	0	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	1/30/2024	--	UXO03E-530	1	0	MD, Projectile, Unknown	NA	NA	NA
UXO 3	1/30/2024	1/30/2024	0317-E	--	1	Booster, Bomb, Photoflash, AN-M46	Tt transport to Keyport Annex magazine for storage until detonation	Black powder / .01	*Pending*
UXO 3	1/30/2024	1/30/2024	0318-E	--	1	Booster, Bomb, Photoflash, AN-M46	Tt transport to Keyport Annex magazine for storage until detonation	Black powder / .01	*Pending*
UXO 3	1/31/2024	1/31/2024	0319-E	--	1	Booster, Bomb, Photoflash, AN-M46	Tt transport to Keyport Annex magazine for storage until detonation	Black powder / .01	*Pending*
UXO 3	1/31/2024	--	UXO03E-531 - UXO03E-541	11	0	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	1/31/2024	--	UXO03E-542	1	0	MD, Projectile, Unknown	NA	NA	NA
UXO 3	2/5/2024	--	UXO03E-543 - UXO03E-559	17	0	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	2/6/2024	--	UXO03E-560 - UXO03E-582	23	0	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	2/7/2024	2/7/2024	0320-E	--	1	Booster, Bomb, Photoflash, AN-M46	Tt transport to Keyport Annex magazine for storage until detonation	Black powder / .01	*Pending*
UXO 3	2/7/2024	--	UXO03E-583 - UXO03E-589	7	0	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 3	2/7/2024	--	UXO03E-590	1	0	MD, Rocket, 2.25 in, Practice, SCAR	NA	NA	NA
UXO 3	2/8/2024	--	UXO03E-591 - UXO03E-592	2	0	MD, Bomb, Photoflash, AN-M46	NA	NA	NA
UXO 4 (Site 9)									
UXO 4	6/12/2022 & 10/31/2023[1]	--	UXO04-54	58	--	Container, munitions	NA	NA	NA
UXO 6 (Site 22)									
UXO 6	10/10/2022	10/11/2022	0601	--	1	Primer, Percussion, Mk 22	Tt transport to Keyport Annex magazine for storage until detonation	64gm black powder / 0.06	11/2/2022
UXO 6	10/10/2022	10/11/2022	0602	--	1	Primer, Percussion, Mk 22	Tt transport to Keyport Annex magazine for storage until detonation	64gm black powder / 0.06	11/2/2022
UXO 6	10/10/2022	10/11/2022	0603	--	1	Primer, Percussion, Mk 22	Tt transport to Keyport Annex magazine for storage until detonation	64gm black powder / 0.06	11/2/2022
UXO 6	10/10/2022	10/11/2022	0604	--	1	Primer, Percussion, Mk 22	Tt transport to Keyport Annex magazine for storage until detonation	64gm black powder / 0.06	11/2/2022
UXO 6	10/10/2022	10/11/2022	0605	--	1	Primer, Percussion, Mk 22	Tt transport to Keyport Annex magazine for storage until detonation	64gm black powder / 0.06	11/2/2022
UXO 6	10/10/2022	10/11/2022	0606	--	1	Primer, Mk 2 Mod 1	Tt transport to Keyport Annex magazine for storage until detonation	< .25lbs black powder / 0.11	11/2/2022
UXO 6	10/10/2022	NA	UXO06-01	10	--	MD, Unknown (various)	Placed in MDAS drum at laydown yard	NA	NA

Table 5-1: Summary of MEC and MDAS Results

Site	Date	MEC Management Dates	Item ID	Findings		Item Description	Transport/ Disposition	Filler / NEW	Date of Final Disposition
				# MDAS	# MEC				
UXO 6	10/10/2023	10/17/2023	0607 – 0635	--	29	Primer, Percussion, Mk 22	Tt transport to Keyport Annex magazine for storage until detonation	black powder / 0.06	*Pending*
UXO 6	10/10/2023	NA	UXO06-02	51	--	MD, Various	Placed in MDAS drum at laydown yard	NA	NA
UXO 6	10/11/2023	10/17/2023	0636 - 0637	--	2	Primer, Percussion, Mk 22	Tt transport to Keyport Annex magazine for storage until detonation	black powder / 0.06	*Pending*
UXO 6	10/11/2023	10/17/2023	0638 - 0639	--	2	Primer, Percussion, Unknown	Tt transport to Keyport Annex magazine for storage until detonation	black powder / 0.06	*Pending*
UXO 6	10/11/2023	10/17/2023	0640 - 0655	--	16	Primer, Percussion, Mk 22	Tt transport to Keyport Annex magazine for storage until detonation	black powder / 0.06	*Pending*
UXO 6	10/11/2023	10/17/2023	0656 - 0660	--	5	Primer, Percussion, Unknown	Tt transport to Keyport Annex magazine for storage until detonation	black powder / 0.06	*Pending*
UXO 6	10/16/2023	10/17/2023	0661 – 0662, 0666 – 0668, 0674 - 0678	--	10	Primer, Percussion, Unknown	Tt transport to Keyport Annex magazine for storage until detonation	black powder / 0.06	*Pending*
UXO 6	10/16/2023	10/17/2023	0663 – 0665, 0669 - 0673	--	8	Primer, Percussion, Mk 22	Tt transport to Keyport Annex magazine for storage until detonation	black powder / 0.06	*Pending*
UXO 6	10/16/2023	10/17/2023	0679	--	1	Adapter, Fuze, Unknown	Tt transport to Keyport Annex magazine for storage until detonation	Unknown / 0.1	*Pending*
UXO 7B (OU 1 Site A)									
UXO 7B	3/6/2024	--	UXO07B-44	92	0	Various shipping container constituents	NA	NA	NA
UXO 10 (Site 12)									
UXO 10	7/25/2023	--	UXO10-01	1	--	4-round clip, 40mm	NA	NA	NA
UXO 10	7/25/2023	--	UXO10-02	1	--	Case, Cartridge, 3-in	NA	NA	NA
UXO 10	7/25/2023	--	UXO10-03	8	--	Container, Shipping, Partial	NA	NA	NA
UXO 10	7/31/2023	--	UXO10-04	1	--	Container, Shipping, Ammo Can	NA	NA	NA
UXO 10	8/14/2023	--	UXO10-05	1	--	Case, Cartridge, 40mm	NA	NA	NA
UXO 11B (Site 8)									
UXO 11B	5/26/2022	--	UXO11B-01	1	--	Case, Cartridge, Mk 2	NA	NA	NA
UXO 11B	5/26/2022 & 10/31/2023[1]	--	UXO11B-02	31	--	Container, munitions	NA	NA	NA
UXO 11B	11/29/2023	--	UXO11B-03	7	--	Container, munitions	NA	NA	NA
UXO 15 (Site KK)									
UXO 15	6/22/2023	--	UXO15-01	1	--	Case, Cartridge, 3-in	NA	NA	NA
UXO 16 (Site LL)									
UXO 16	7/5/2023	7/6/2023	1601	--	1	Projectile, 20mm	Tt transport to Keyport Annex magazine for storage until detonation	Tetryl or Pentolite / 0.01	*Pending*

Table 5-1: Summary of MEC and MDAS Results

Site	Date	MEC Management Dates	Item ID	Findings		Item Description	Transport/ Disposition	Filler / NEW	Date of Final Disposition
				# MDAS	# MEC				
UXO 17 (Site 2)									
UXO 17	9/27/2022 & 10/31/2023[1]	--	UXO17-15	10	--	Container, munitions	NA	NA	NA

[1] Item identified, inspected, and inventoried during the 2022 SI field work, but left onsite in a pile. During the 2023 SI field work, the items were reinspected and removed from the site.

Grey shaded cells indicate the item found was MEC.

DIP: Detonation in Place
EOD: Explosives Ordnance Disposal
gm: grams
HE: High Explosive
lb: pound
in: inch
MD: Munitions Debris
MDAS: Material Documented as Safe
MEC: Materials and explosives of Concern
mm: millimeters
NA: Not Available
NEW: Net Explosive Weight
NSWC IHD: Naval Surface Warfare Center Indian Head Division
TNT: Trinitrotoluene
Tt: Tetra Tech
UXO: Unexploded Ordnance

Table 5-2: Summary of Geophysics Results

Site Name	Location	Site Size (acres)	Results for Type of Geophysical Survey Coverage			
			EM61-MK2 HP			
			Transects (acres)	Full Coverage (acres)	Number of Targets	Number/ Acres of SRAs
UXO 3 (Step-outs) (Site D)	Lower Base	37	3.8	---	4152	13 / 0.71
UXO 8 (Site NN)	Lower Base	9	0.212	0.494	124	5 / 0.67
UXO 10 (Site 12)	Lower Base	7	1.07	---	N/A[1]	N/A[1]
UXO 15 (Site KK)	Lower Base	12	0.95	---	656	8 / 1.97
UXO 16 (Site LL)	Lower Base	10	0.84	---	907	8 / 1.19

[1] No discrete targeting or delineation of SRAs performed based on project team concurrence, as documented in weekly Digital Geophysical Mapping Quality Control Report (QCR) #30.

EM61-HP EM61-MK2-High Power
SRA Saturated Response Area
UXO Unexploded Ordnance

Table 5-3: Post-Detonation Sample Results

SAMPLE ID SAMPLE DATE SAMPLE DEPTH (INCHES) DUP OF	CAS No.	Human Health PSL[1]	Ecological PSL[2]	X7-TP-C01-3642 03/06/2024 36-42		X7-TP-C02-2430 03/06/2024 24-30		FD-03062401 03/06/2024 24-30 X7-TP-C02-2430		X7-TP-C03-2436 03/06/2024 24-36	
EXPLOSIVES (UG/KG)											
NITROGUANIDINE	556-88-7	480	NC	24	U	25	U	23	U	24	U
1,3,5-TRINITROBENZENE	99-35-4	2,100	300	39	U	37	U	40	U	39	U
1,3-DINITROBENZENE	99-65-0	1.8	34	39	U	37	U	40	U	39	U
2,4,6-TRINITROTOLUENE (TNT)	118-96-7	57	7,500	69	U	64	U	**40**	**J**	68	U
2,4-DINITROTOLUENE	121-14-2	0.32	6,000	39	U	37	U	40	U	39	U
2,6-DINITROTOLUENE	606-20-2	0.067	4,000	39	U	37	U	40	U	39	U
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	1.5	14,000	69	U	64	U	70	U	68	U
2-NITROTOLUENE	88-72-2	0.3	190	98	U	92	U	100	U	97	U
3,5-DINITROANILINE	618-87-1	4.1	NC	20	U	18	U	20	U	19	U
3-NITROTOLUENE	99-08-1	1.6	130	150	U	140	U	150	U	150	U
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	1.5	12,000	69	U	64	U	70	U	68	U
4-NITROTOLUENE	99-99-0	4	140	98	U	92	U	100	U	97	U
HMX	2691-41-0	1,300	16,000	69	U	1600	J	12000	J	68	U
NITROBENZENE	98-95-3	0.092	4,800	200	U	180	U	200	U	190	U
NITROGLYCERIN	55-63-0	0.85	13,000	690	U	640	U	700	U	680	U
PETN (PENTAERYTHRITOL)	78-11-5	260	2,200	980	U	920	U	1000	U	970	U
PICRIC ACID (2,4,6-TRINITROPHENOL)	88-89-1	190	NC	79	U	73	U	80	U	77	UJ
RDX	121-82-4	0.37	2,300	71	J	*36000*	*J*	*250000*	*J*	97	U
TETRYL	479-45-8	370	18	98	U	92	U	100	U	97	U
2,4-DINITROPHENOL	51-28-5	44	61	1100	UJ	1200	UJ	1100	UJ	1200	UJ
DIPHENYLAMINE	122-39-4	2,300	1,010	190	U	190	U	190	U	200	U
N-NITROSODIPHENYLAMINE	86-30-6	67	545	77	U	77	U	74	U	80	U
NITROCELLULOSE (MG/KG)											
NITROCELLULOSE	9004-70-0	13,000	NC	9.4	UX	9.4	UX	9.1	UX	9.6	UX

All results are in ug/kg except for Nitrocellulose, which is in mg/kg.

Bolded results indicate a detection.

Black shading indicates an exceedances of the Human Health PSL.

Italicized and black shading indicates an exceedances of the Human Health and Ecological PSL.

[1] USEPA Regional Screening Levels risk-based soil screening levels for protection of groundwater.

[2] Ecological screening value selected from the following sources listed in order of preference: Washington State Ecological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals (Table 749-3), Draft Ecological Soil Screening Levels (SERDP, 2012), Draft Ecological Soil Screening Levels (Checkai et al., 2012), Los Alamos National Laboratory (2022), and Region 4 - USEPA Region 4 Soil Screening Levels (March 2018).

NC: No Criteria

U: Non-detect

J: Result is an estimated quantity

X: The presence or absence of the analyte cannot be substantiated by laboratory provided data

Table 6-1: Updated CSM for MRP Sites

MRS	Site Boundary (total acres)	Investigation Boundary (acres)[1]	Former Land Use and Site History	Current/Future Land Use	Historical Munitions-Related Findings	SI MEC Findings (Surface Results)	SI Geophysics/ Subsurface Anomalies Evaluation	MDAS/ Munitions Scrap/ Fragments (Surface Results)	Associated MC
UXO 2 (Site CC)	19	5.64 (4.54 in 2022 and 1.1 in 2023)	• Rail line operational as early as 1946 • Identified as surface disposal area	• Accessible to installation personnel, site workers, and visitors (limited) • Active rail line 1946 to present (operation by Keyport Annex installation personnel) Future land use same as current land use	• EOD responded to MPPEH observed at the surface (February 2015) • MPPEH observed include 40mm and .50 caliber casings, ammunition containers labelled explosive D, RDX, smokeless powder, and TNT, as well as potential smoke pot • EOD team did not identify explosives or explosive residue within items inspected	• None Identified	• NA (Geophysics not conducted - Only surface concerns were identified for UXO 2 CSM)	• MDAS: MK 2/3 40 mm Cartridge Case (582), Unknown model 20mm Cartridge Case (78) • Various ammo cans and shipping containers (92) • Disposal site identified	• NA (MC Sampling Not Warranted)
UXO 3 (Site D)	37	35.25 (20 in 2022 and 15.25 in 2023)	• Identified as a surface/subsurface ordnance disposal area and primary area OB/OD activity between 1946 and 1965 • Former small arms incinerator, trench, and smaller burn areas present • Explosive D sludge disposal occurred between 1944 and 1957 • Other items disposed of may have included smokeless powder, black powder, rocket propellant, white phosphorous shells, compound B (TNT and RDX), Amatol (ammonia nitrate and trinitrotoluene), ordnance wastes containing TNT and RDX, propulsion missile grains and reportedly 600 obsolete rocket motors • Per interviewee knowledge, thousands of photoflash bombs were recalled to be detonated in trenches with ammonium nitrate blocks.	• Accessible to installation personnel, site workers, site visitors (limited), installation traffic from road intersecting site Future land use same as current land use	• During PA a masonry block structure was observed that appears to have been the small arms ammunition incinerator • Adjacent to this structure was an accumulation of .30-caliber and 20mm munitions-related materials, soil staining and minimal vegetation	• MEC: AN-M46 Photoflash Bomb/AN-M46 Photoflash Bomb Booster Cup (17), Mk 19 series base detonating MD (2), Mk Base Detonating Fuze (1)	• 2022: Geophysics was conducted at the site during the SI. UXO 3 EM61-HP and TEM-8g data exhibit the presence of widespread metallic debris across the majority of the site, consistent with historic disposal activities. • 2023: Geophysics was conducted at site step outs during the SI. UXO 3 EM61-HP data exhibit the presence of widespread metallic debris across the majority of each of the step-out sites, consistent with historic disposal activities	• MDAS: AN-M46 100 lb. Photoflash Bomb MD (579), 8 lbs. suspect MDAS (1), Unknown Projectile MD (8), Ammunition Can/Shipping Containers (3), SCAR Practice 2.25 in Rocket MD (1)	7 samples collected - 4 samples: TNT HH (4) and ecological (1) - 3 samples: 2,4-DNT HH (3) and ecological (1) - 1 sample: 2, 6-DNT HH - 3 samples: 2-amino-2,6-DNT HH - 3 samples: 3,5-DNT HH - 2 samples: 4-amino-2,6-DNT HH - 1 sample: N-nitrosodiphenylamine HH and ecological
UXO 6 (Site 22)	1	2.15 (1.65 in 2022 and 0.5 in 2023)	• Surface disposal area 1965 to 1973 (over bank) • Paint cans, drums, ammunition and boxes and other metal debris.	• Accessible to installation personnel, site workers, site visitors (limited) • Steep hillside portion of site largely inaccessible to all receptors Future land use same as current land use. As wetlands site, would not be developed.	• During PA metallic debris and MPPEH observed including ammunition cans, 40mm cartridge casings, and various other unopened ordnance storage containers	• MEC: Mk 22 Percussion Primer (60), Mk 2 Mod 1 Primer (1), Unknown Percussion Primer (17), Unknown Fuze Adapter (1)	• NA (Geophysics not conducted - Only surface concerns were identified for UXO 6 CSM)	• MDAS: Unknown (various) MD (61)	• NA (MC Sampling Not Warranted)
UXO 8 (Site NN)	9	3.7 (2023)	• Operational 1951 to 1973 • Surface/subsurface disposal area	• Accessible to installation personnel, site workers, site visitors (limited) • Recent construction of buildings and parking lot completed onsite Future land use same as current land use	• Documented EOD response to ammunition can finds, small arms and M115 Artillery Simulators	• None Identified	• 2023: Geophysics was conducted at the site during the SI. UXO 8 EM61-HP data depicts SRAs coincident with facility infrastructure visible at the surface. In the full coverage data, there is one SRA delineated that is not associated with any observed surface features however is suspected to be associated with facility infrastructure based on review of construction drawings.	• None Identified	• NA (MC Sampling Not Warranted)

Table 6-1: Updated CSM for MRP Sites

MRS	Site Boundary (total acres)	Investigation Boundary (acres)[1]	Former Land Use and Site History	Current/Future Land Use	Historical Munitions-Related Findings	SI MEC Findings (Surface Results)	SI Geophysics/ Subsurface Anomalies Evaluation	MDAS/ Munitions Scrap/ Fragments (Surface Results)	Associated MC
UXO 9 (Site OO)	7	6.07 (2022)	• Manmade lake created in the 1950s when a road was constructed along the installation waterfront of Hood Canal. Restored to marsh in 2012 with bridge installation. • Site 7 (disposal site for old paint cans and drums) was also documented as being associated with the lake with cleanup conducted in 1981	• Accessible to installation personnel, site workers, site visitors (limited), installation traffic on adjacent roads, marines training, ecological management by USACE (e.g., seeding, tree planting), recreational walking trail Future land use same as current land use plus potential harvesting by tribes. As wetlands site, would not be developed.	• Documented Navy EOD response to a signal flare in its original container (L312) and a smoke grenade in the marsh area during its construction	• MEC: M18 Smoke Hand Grenade (1)	• NA (Geophysics not conducted - Only surface concerns were investigated at UXO 9 due to presence of wetlands)	• Drums identified	• NA (MC Sampling Not Warranted)
UXO 10 (Site 12)	7	2.3 (2023)	• Operational 1950 to 1970 • Surface/subsurface disposal of ordnance dunnage, scrap metal, and potentially ammonium picrate	• Accessible to installation personnel, site workers, site visitors (limited) Future land use same as currently land use	• MEC/MPPEH identified at the site include ammonium picrate, MK22 fuzes, 3” projectiles, MK1 and MK2 40mm projectiles.	• None Identified	• 2023: Geophysics was conducted at the site during the SI. UXO 10 EM61-HP data exhibit the presence of widespread metallic debris across the majority of the site, limiting the ability to select discrete targets. It is not known whether the saturated DGM responses are associated with metallic surface debris smaller than the surface removal requirement, subsurface anomalies or both. Twelve MDAS objects were identified throughout the site during surface clearance, three of which were discovered in the vicinity of the former disposal area. There is an Indication of high response areas in the DGM data extending within the current site boundary.	• MDAS: 40-mm 4-round clip (1), 3-inch Cartridge Case (1), Partial Shipping Container (8), Ammo Can Shipping Container (1), and 40-mm Cartridge Case (1)	• NA (MC Sampling Not Warranted)
UXO 11B (Site 8)	2	2 (2022)	• Operational 1946 to 1973 • Surface/subsurface disposal area for inert ordnance-related items including ammunition cans and tanks	• Accessible to installation personnel, site workers, site visitors (limited due to wooded area with no reason to visit) Future land use same as current land use	• Ammunition box was observed at the surface during PA.	• None Identified	• 2022: Geophysics was conducted during the SI. UXO 11B EM61-HP data depict SRAs coincident with non-munitions related surface obstructions (i.e., burn barrels and cultural features).	• MDAS: Mk 2 Cartridge Case (1) and Munition Container (38) • Ammo cans and shipping containers identified	• NA (MC Sampling Not Warranted)
UXO 15 (Site KK)	12	6.99 (2023)	• Operational 1951 to 1977 • Site identified as surface/subsurface disposal area and dunnage yard	• East side of site accessible to installation personnel, site workers, site visitors (limited) • Central portion used as storage area and parking area for site workers Future land use same as current land use	• MEC/MPPEH found at site include MK22 dummy fuzes, 3” projectiles, MK1 40mm dummy projectiles, MK2 40mm projectiles, and various other 40mm projectiles • EOD response actions to retrieve MPPEH were reported at nearby building	• None Identified	• 2023: Geophysics was conducted at the site during the SI. UXO 15 EM61-HP data depicts SRAs coincident with facility infrastructure. One MDAS object was identified during surface clearance in the southeastern portion of the site. The MDAS item location falls within a delineated SRA in the DGM data. Facility infrastructure on the site impacts DGM data include additional noise, which may increase the number of false positives in the target list based on the established target picking threshold.	• MDAS: 3-inch Cartridge Case (1)	• NA (MC Sampling Not Warranted)

Table 6-1: Updated CSM for MRP Sites

MRS	Site Boundary (total acres)	Investigation Boundary (acres)[1]	Former Land Use and Site History	Current/Future Land Use	Historical Munitions-Related Findings	SI MEC Findings (Surface Results)	SI Geophysics/ Subsurface Anomalies Evaluation	MDAS/ Munitions Scrap/ Fragments (Surface Results)	Associated MC
UXO 16 (Site LL)	10	7.31 (2023)	• Operational 1951 to 1977 • OB area and possible ordnance-related surface/subsurface disposal	• Accessible to installation personnel, site workers, site visitors (limited) Future land use same as current land use	• MEC/MPPEH found at the site includes: MK22 dummy fuzes, 3" projectiles, MK1 40mm dummy projectiles, MK2 40mm projectiles, and various other 40mm projectiles	• MEC: 20-mm Projectile (1)	• 2023: Geophysics was conducted at the site during the SI. UXO 16 EM61-HP data depicts several SRAs that partially overlap the suspected former burn site area but continue further north and west of the former burn site area. SRAs not associated with the suspected burn site coincide with facility infrastructure visible at the surface. The inaccessible areas identified prior to the SI were confirmed to be unsuitable for the EM61-HP system in wheel mode due to steep slopes, ravines and mounds. One MEC item was identified during surface clearance immediately adjacent to road on the eastern edge of the site.	• None Identified	• NA (MC Sampling Not Warranted)

[1] Investigation boundary is based on the area where the UXO detector-aided surface survey was conducted.

CSM: Conceptual site model
EOD: Explosive ordnance disposal
lbs: pounds
MC: Munitions constituents
MD: Munitions debris
MDAS: Material documented as safe
MEC: Munitions and explosives of concern
mm: millimeter
MPPEH: Material potentially presenting an explosive hazard
MRS: Munitions response site
NA: Not Applicable
NBK: Naval Base Kitsap
OB/OD: Open burn/open detonation
OU: Operable unit
PA: Preliminary Assessment
PETN: Pentaerythritol tetranitrate
QAPP: Quality assurance project plan
RDX: 1,3,5-trinitro-1,3,5-triazine
ROD: Record of decision
RSL: Regional screening level
SI: Site inspection
SRA: Saturated Response Area
SWFPAC: Strategic Weapons Facility Pacific
SUBASE: Submarine base
TNT: Trinitrotoluene
UXO: Unexploded ordnance

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Table 6-2: Summary of Preliminary MEC Hazard Assessment

Site Name	MEC HA Score[1,2]	MEC HA Hazard Level[1,2]	Comments
UXO 2 (Site CC)	---	---	---
UXO 3 (Site D)	750	2	Qualitative MEC HA evaluation is consistent with weight of evidence results from the SI: - MEC was encountered during SI and extent was not determined. - Because near surface anomalies are suspected to potentially be MEC, erosion/uplifting could result in near surface MEC migrating to the ground surface. - Accessibility is somewhat limited by site location. Moreover, a road cuts through the site.
UXO 6 (Site 22)	560	3	Qualitative MEC HA evaluation likely overestimates hazards considering the weight of evidence results from the SI: - Although MEC/MPPEH remains in place down the steep hillside, the area has been delineated and is only accessible via rope access. Moreover, UXO danger signs with point of contact information have been installed at the top of the hillside in the location. - Accessibility is also greatly limited by site location plus additional accessibility limitations associated with EOD training range nearby.
UXO 8 (Site NN)	---	---	---
UXO 9 (Site OO)	515	4	Qualitative MEC HA evaluation likely overestimates hazards considering the weight of evidence results from the SI: - UXO 9 was identified as a surface clearance only and the SI investigation area cleared accessible ground surface of MEC; only one MEC item was encountered during the SI, and so may or may not have been site related considering near the bridge. - Accessibility is somewhat limited by site location.
UXO 10 (Site 12)	---	---	---
UXO 11B (Site 8)	---	---	---
UXO 15 (Site KK)	---	---	---
UXO 16 (Site LL)	605	3	Qualitative MEC HA evaluation is consistent with weight of evidence results from the SI: - MEC was encountered during SI and extent was not determined. - Because near surface anomalies are suspected to potentially be MEC, erosion/uplifting could result in near surface MEC migrating to the ground surface. - Accessibility is somewhat limited by site – the majority of the site is very limited due to the steep slope however portions of the site are accessible and near the adjacent roadway.

[1] The MEC HA results are qualitative references only and do not represent quantitative measures of explosive hazard at any of the NBK Bangor MRSs. Moreover, the MEC HA results are considered preliminary because they will likely change when the nature and extent of MEC impacts are characterized during future investigations, where recommended.

[2] For UXO sites with no results provided, this is because no conclusive MEC has been encountered at the site to date, in the instance that MPPEH (not conclusively MEC), or MDAS, or neither may have been encountered. Although the presence of MDAS suggests that MEC may be present at a given MRS with no MEC, this has not been confirmed through the data collected to date. As such, additional data is needed to evaluate the explosive hazards presented by any potential MEC within the MRS.

MDAS	Material Documented as Safe	MPPEH	Material Presenting an Explosive Hazard
MEC	Munitions and Explosives of Concern	MRS	Munitions Response Site
MEC HA	MEC Hazard Assessment	UXO	Unexploded Ordnance

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Table 7-1: Summary of SI Results and Recommendations

Site		Item Type / Number of Items	Number of Item(s) / Item Description	Geophysical Survey Results	MC Sampling PSL Exceedances	MEC HA Score/ MEC HA Hazard Level	Preliminary Data Gaps Identified	Recommendations
UXO 2	(Site CC)	MDAS (752 Items)	(582) MK 2/3 40mm Cartridge Case (78) Unknown model 20-mm Cartridge Case (92) Various (shipping containers, ammo cans, etc.)	N/A (Geophysics not conducted – Only surface concerns were identified for UXO 2 CSM)	N/A	MEC HA was not prepared. No explosive hazards identified.	None	No Further Action
UXO 3	(Site D)	MDAS (592 Items)	(579) AN-M46 100lb Photoflash Bomb MD (1) 8lbs suspect MDAS (8) Unknown Projectile MD (3) Ammunition Can/Shipping Containers (1) SCAR Practice 2.25 in Rocket MD	2022: UXO 3 EM61-HP and TEM-8g data exhibit the presence of widespread subsurface metallic debris across the majority of the site (unknown if MEC), consistent with historic disposal activities. 2023: Consistent with the 2022 results, the UXO 3 step-out EM61-HP data exhibit the presence of widespread subsurface metallic debris across the majority of the site step-outs (unknown if MEC).	7 samples collected - 4 samples: TNT HH (4) and ecological (1) - 3 samples: 2,4-DNT HH (3) and ecological (1) - 1 sample: 2, 6-DNT HH - 3 samples: 2-amino-2,6-DNT HH - 3 samples: 3,5-DNT HH - 2 samples: 4-amino-2,6-DNT HH - 1 sample: N-nitrosodiphenylamine HH and ecological	750/ Level 2 Qualitative MEC HA evaluation is consistent with weight of evidence results from the SI.	- Surface extent MEC/MPPEH in all directions laterally from the SI investigation area, including east over the nearby road - Subsurface MEC/MPPEH presence and extent is unknown - Determination if SI MC PSL exceedances pose unacceptable risk - Evaluate protectiveness of OU 6 institutional controls currently in place	Remedial Investigation
		MEC (19 Items)	(17) AN-M46 Photoflash Bomb Booster Cup/ AN-M46 Photoflash Bomb (1) Mk 19 Base Detonating Fuze (2) Mk 19 Series Base Detonating Fuze					
UXO 6	(Site 22)	MDAS (61 Items)	(10) Unknown (various) MD (51) Unknown, Various	N/A (Geophysics not conducted – Only surface concerns were identified for UXO 6 CSM)	N/A	560/ Level 3 Qualitative MEC HA evaluation overestimates explosive hazard considering the weight of evidence results from the SI.	An active operational range fan overlies this site. Although surface explosive hazards were removed during the SI, activities at the operational range present potential for surface recontamination. The presence of subsurface MEC/MPPEH is unknown.	This Site is located fully within an active operational range fan and therefore further investigation will be deferred until the operational range is closed by the installation Commanding Officer
		MEC (79 Items)	(60) Mk 22 Percussion Primer (17) Unknown Percussion Primer (1) Mk 2 Mod 1 Primer (1) Unknown Fuze Adaptor					
UXO 8	(Site NN)	N/A	N/A	UXO 8 EM61-HP data depicts SRAs coincident with fence lines, a culvert, and parking lots visible at the surface. In the full coverage data, there is one SRA delineated that is not associated with any observed surface features, however, is suspected to be associated with underground utilities based on review of construction drawings.	N/A	MEC HA was not prepared. No explosive hazards identified.	None	No Further Action
UXO 9	(Site OO)	MEC (1 Item)	(1) M18 Smoke Hand Grenade	N/A (Geophysics not conducted – Only surface concerns were investigated at UXO 9 due to presence of wetlands)	N/A	515/ Level 4 Qualitative MEC HA evaluation overestimates explosive hazard considering the weight of evidence results from the SI	- The SI finding was located near the road/bridge located to the north of UXO 9; it is suspected that the item was disposed of into the wetlands or the former lake from the road/bridge. This northern portion of UXO 9 is located outside of the active operational range fan. - The southern portion of UXO 9 lies within an active operational range fan. Although surface explosive hazards were removed during the SI, activities at the operational range present potential for surface recontamination. The presence of subsurface MEC/MPPEH is unknown.	Remedial Investigation for the UXO 9 area outside of the active operational range fan Further investigation will be deferred for the UXO 9 area inside the active operational range fan until the operational range is closed by the installation Commanding Officer
UXO 10	(Site 12)	MDAS (12 items)	(1) 40-mm 4-round Clip (1) 3-inch Cartridge Case	UXO 10 EM61-HP data exhibit the presence of widespread metallic debris across the majority of the site, limiting the ability to select discrete targets. It is	N/A	MEC HA was not prepared. No explosive hazards identified.	None	No Further Action

Table 7-1: Summary of SI Results and Recommendations

Site		Item Type / Number of Items	Number of Item(s) / Item Description	Geophysical Survey Results	MC Sampling PSL Exceedances	MEC HA Score/ MEC HA Hazard Level	Preliminary Data Gaps Identified	Recommendations
			(8) Partial Shipping Container (1) Ammo Can Shipping Container (1) 40-mm Cartridge Case	not known whether the saturated DGM responses are associated with metallic surface debris smaller than the surface removal requirement, subsurface anomalies or both. Twelve MDAS objects were identified throughout the site during surface clearance, three of which were discovered in the vicinity of the former disposal area.				
UXO 11B	(Site 8)	MDAS (39 Items)	(1) Mk 2 Cartridge Case (38) Munition Containers	UXO 11B EM61-HP data depict SRAs coincident with non-munitions related surface obstructions (i.e., burn barrels and cultural features).	N/A	MEC HA was not prepared. No explosive hazards identified.	None	No Further Action
UXO 15	(Site KK)	MDAS (1 item)	(1) 3-inch Cartridge Case	UXO 15 EM61-HP data depicts SRAs coincident with fence lines, roadways and parking areas visible at the surface. The aboveground power lines paralleling the adjacent road coincide with an SRA due to noise impacting the data from the power lines. One MDAS object was identified during surface clearance in the southeastern portion of the site. The MDAS item location falls within a delineated SRA in the DGM data.	N/A	MEC HA was not prepared. No explosive hazards identified.	None	No Further Action
UXO 16	(Site LL)	MEC (1 item)	(1) 20-mm Projectile	UXO 16 EM61-HP data depicts several SRAs that partially overlap the suspected former burn site area but continue further north and west of the former burn site area. SRAs not associated with the suspected burn site coincide with fence lines and roadways visible at the surface. The inaccessible areas identified prior to the SI were confirmed to be unsuitable for the EM61-HP system in wheel mode due to steep slopes, ravines and mounds. One MEC item was identified during surface clearance immediately adjacent to road on the eastern edge of the site.	N/A	605/ Level 3 Qualitative MEC HA evaluation is consistent with weight of evidence results from the SI.	Subsurface MEC/MPPEH presence and extent is unknown	Remedial Investigation

DGM	Digital geophysical mapping
DNT	Dinitrotoluene
EM61-HP	EM61-MK2-High Power
HH	Human health
MC	Munitions constituents
MD	Munitions Debris
MDAS	Material documented as safe
MEC	Munitions and explosives of concern
MEC HA	MEC Hazard Assessment
MPPEH	Material potentially presenting an explosive hazard
N/A	Not Applicable
OU	Operable Unit
PSL	Project Screening Level
SI	Site Inspection
SRA	Saturated Response Area
TEM	Time-domain electromagnetic
TNT	2,4,6-trinitrotoluene
UXO	Unexploded ordnance

FIGURES

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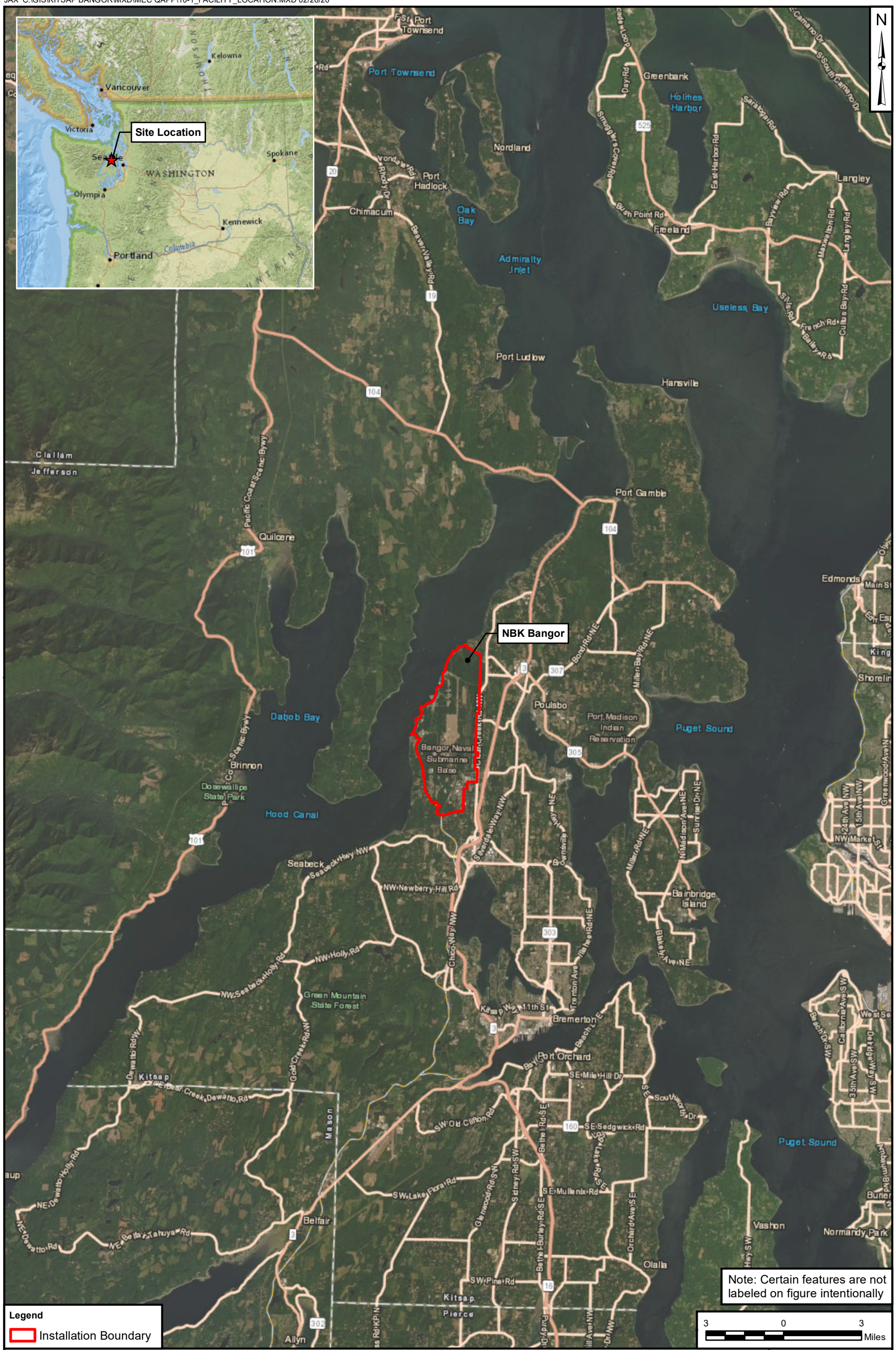

FACILITY LOCATION MAP
KITSAP BANGOR
BANGOR, WASHINGTON

CTO	
-	
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J.MADDEN	02/26/20
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H.NOLF	02/26/20
FIGURE NUMBER	
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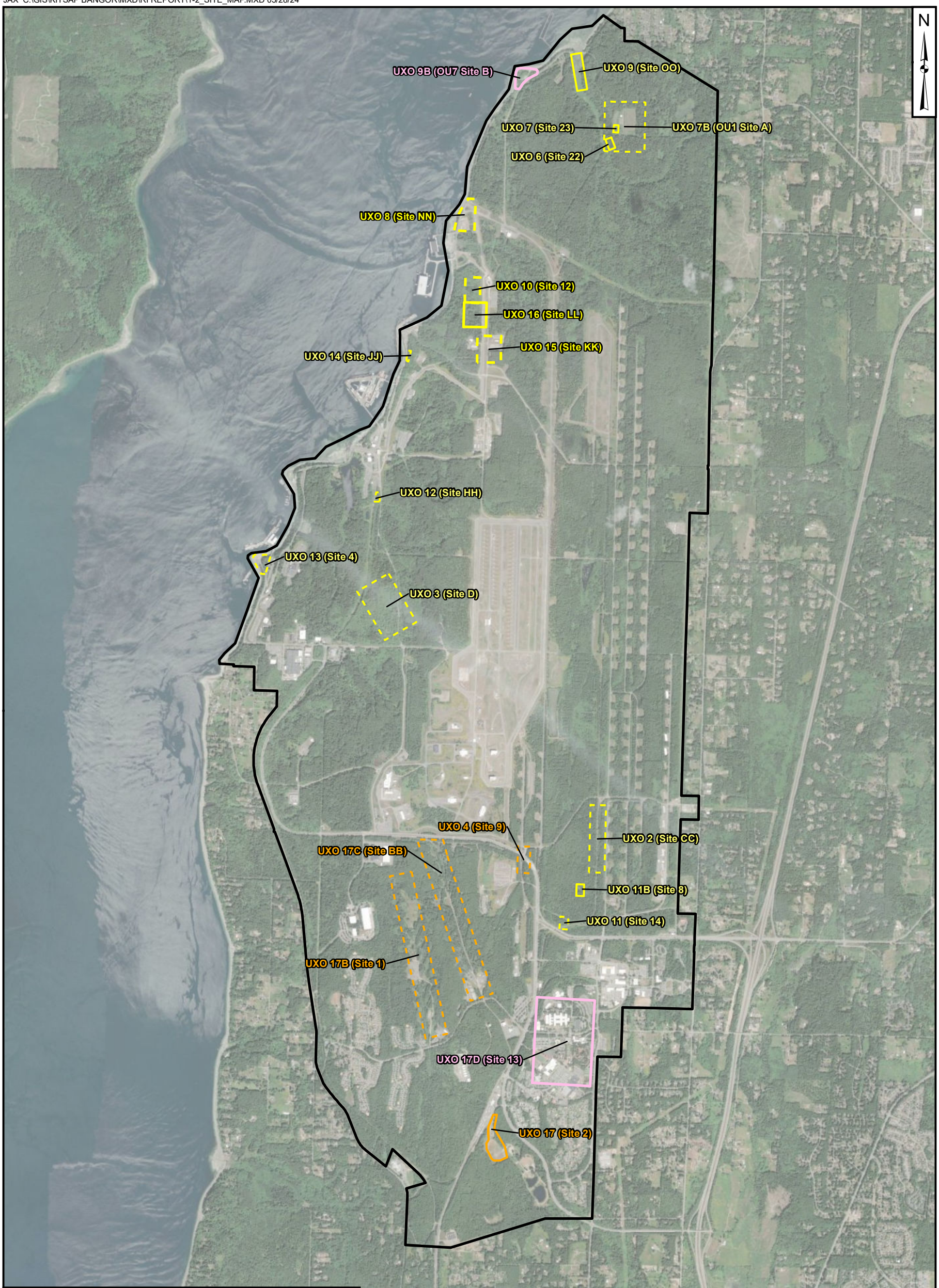

SITE MAP
KITSAP BANGOR
BANGOR, WASHINGTON

Naval Facilities Engineering Systems Command

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M.BARON	05/28/24	2-1

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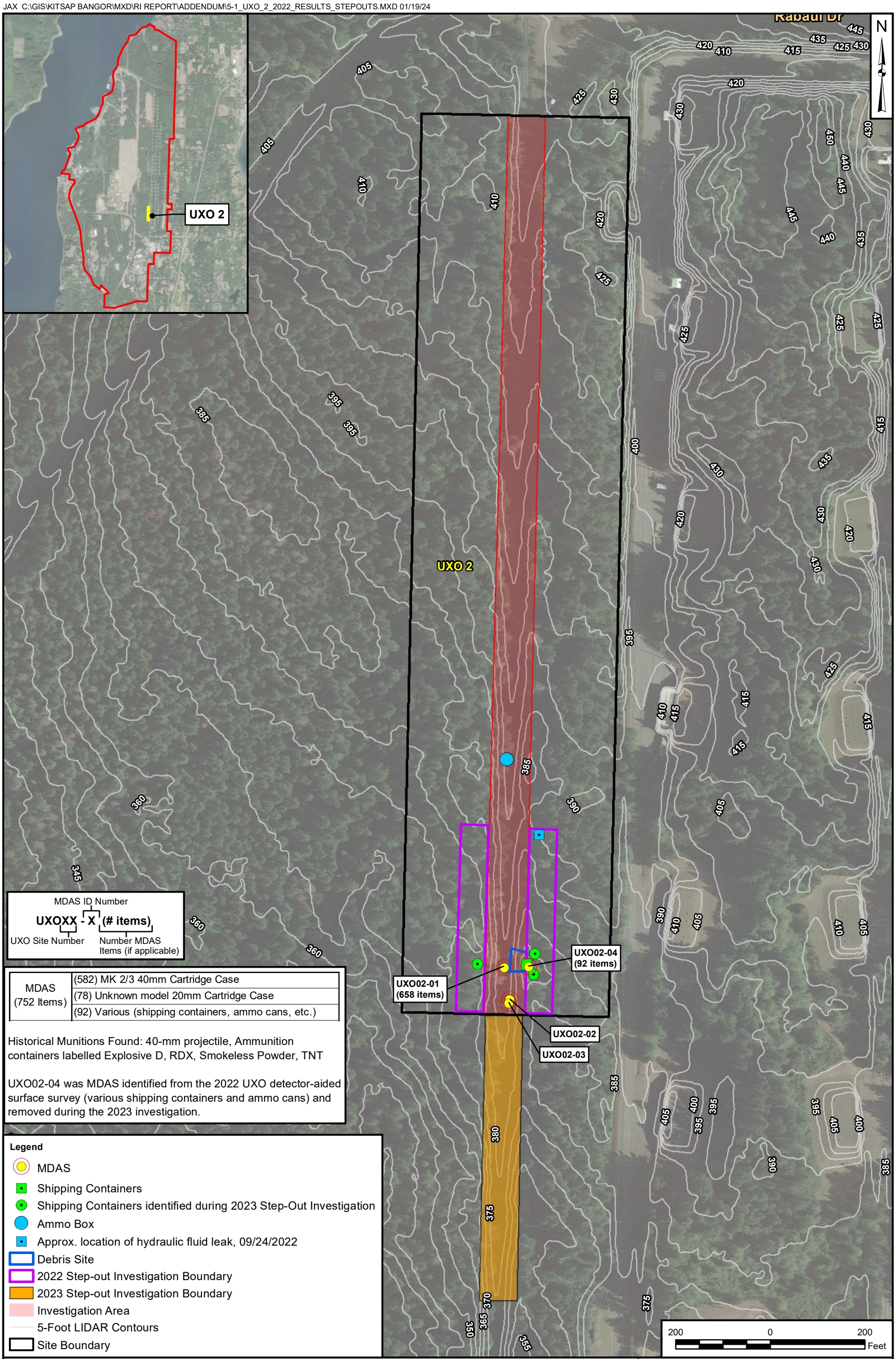

2022 & 2023 SITE INSPECTION AND STEP-OUT INVESTIGATION RESULTS
UXO 2 (SITE CC)
KITSAP BANGOR
BANGOR, WASHINGTON

NAVFAC
Naval Facilities Engineering Systems Command

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J.MADDEN	01/19/24	N4425519F4112
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H.HOOK	01/19/24	5-1

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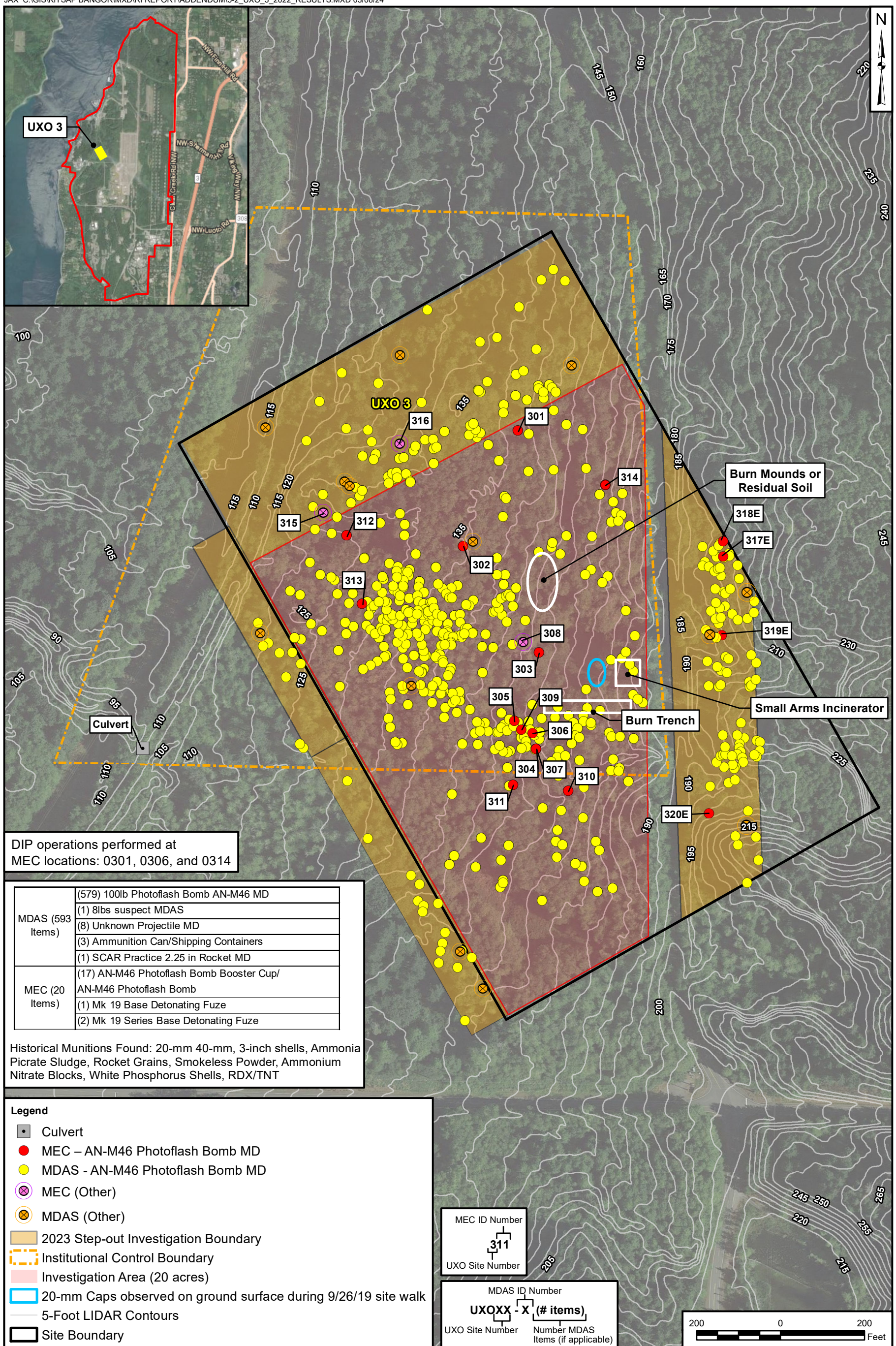

DIP operations performed at
MEC locations: 0301, 0306, and 0314

MDAS (593 Items)	(579) 100lb Photoflash Bomb AN-M46 MD
	(1) 8lbs suspect MDAS
	(8) Unknown Projectile MD
	(3) Ammunition Can/Shipping Containers
	(1) SCAR Practice 2.25 in Rocket MD
MEC (20 Items)	(17) AN-M46 Photoflash Bomb Booster Cup/ AN-M46 Photoflash Bomb
	(1) Mk 19 Base Detonating Fuze
	(2) Mk 19 Series Base Detonating Fuze

Historical Munitions Found: 20-mm 40-mm, 3-inch shells, Ammonia Picrate Sludge, Rocket Grains, Smokeless Powder, Ammonium Nitrate Blocks, White Phosphorus Shells, RDX/TNT

Legend

- Culvert
- MEC – AN-M46 Photoflash Bomb MD
- MDAS - AN-M46 Photoflash Bomb MD
- MEC (Other)
- MDAS (Other)
- 2023 Step-out Investigation Boundary
- Institutional Control Boundary
- Investigation Area (20 acres)
- 20-mm Caps observed on ground surface during 9/26/19 site walk
- 5-Foot LIDAR Contours
- Site Boundary

MEC ID Number
311
UXO Site Number

MDAS ID Number
UXOXX - X (# items)
UXO Site Number — Number MDAS Items (if applicable)

200 0 200 Feet

2022 & 2023 SITE INSPECTION AND STEP-OUT INVESTIGATION RESULTS
UXO 3 (SITE D)
KITSAP BANGOR
BANGOR, WASHINGTON

NAVFAC Naval Facilities Engineering Systems Command

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H.HOOK	03/08/24	5-2

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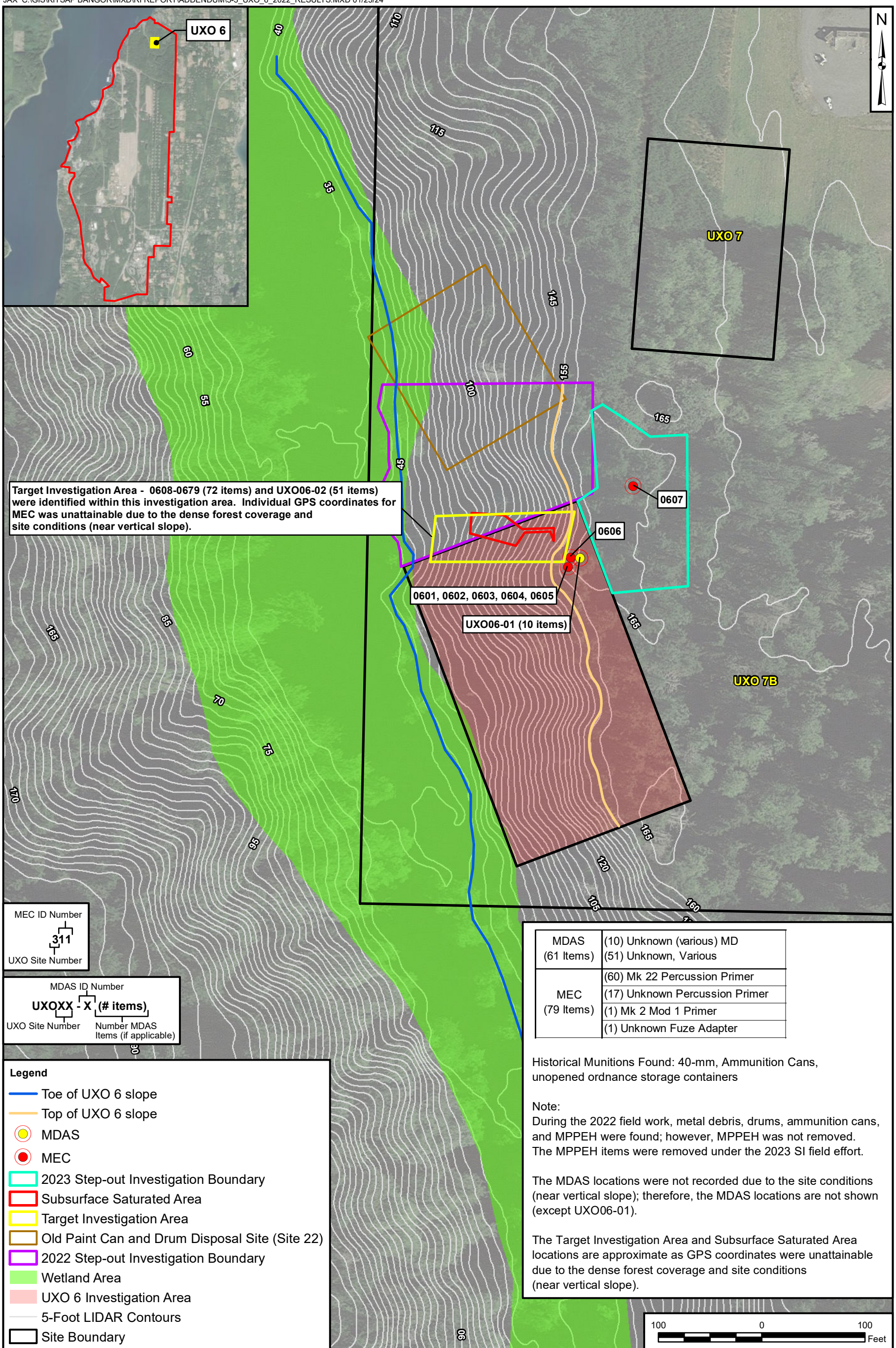

2022 & 2023 SITE INSPECTION AND STEP-OUT INVESTIGATION RESULTS
UXO 6 (SITE 22)
KITSAP BANGOR
BANGOR, WASHINGTON

NAVFAC
Naval Facilities Engineering Systems Command

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H.HOOK	01/25/24	5-3

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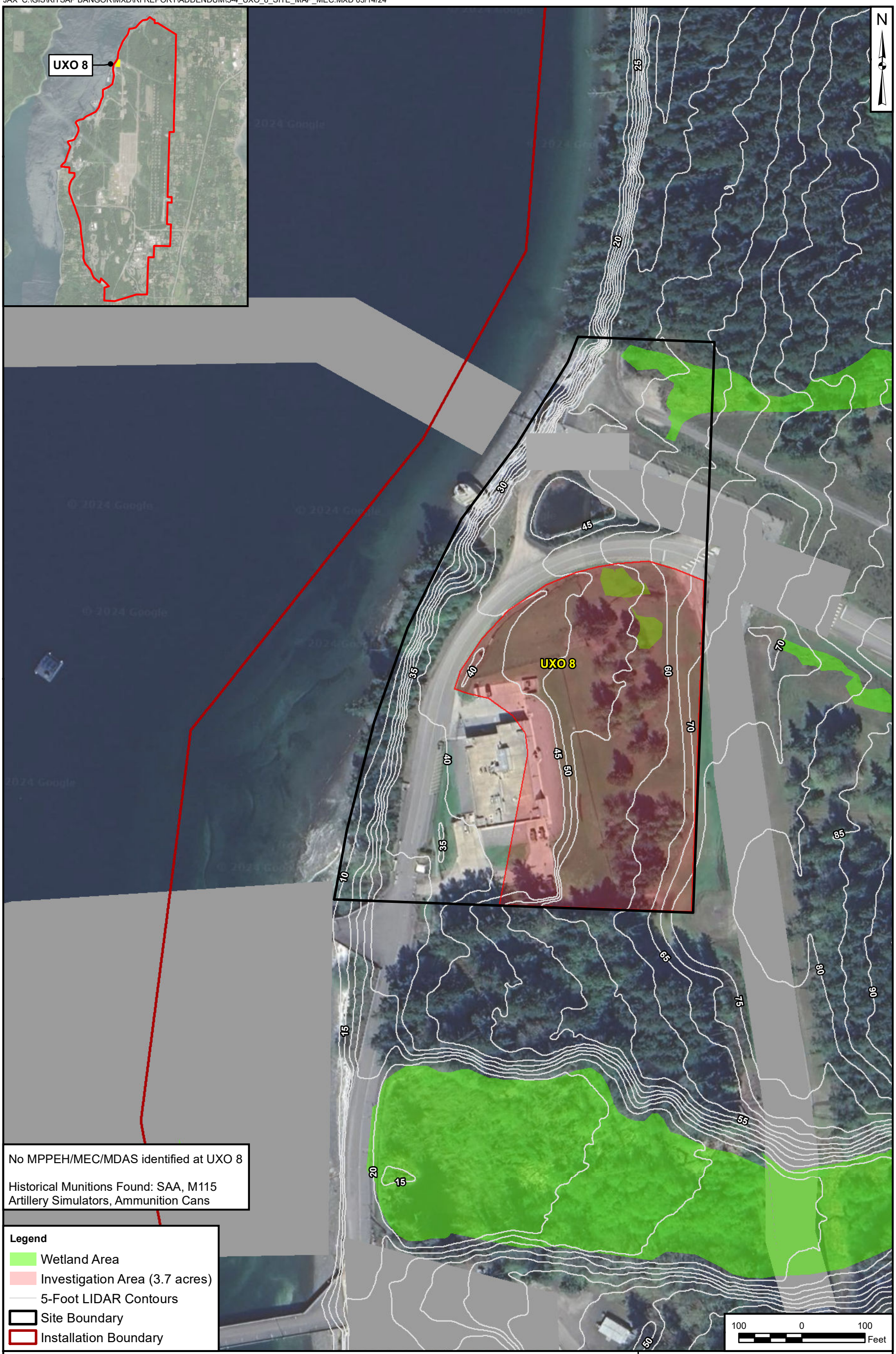

2023 SITE INSPECTION RESULTS
UXO 8 (SITE NN)
KITSAP BANGOR
BANGOR, WASHINGTON

Naval Facilities Engineering Systems Command

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H.HOOK	03/14/24	5-4

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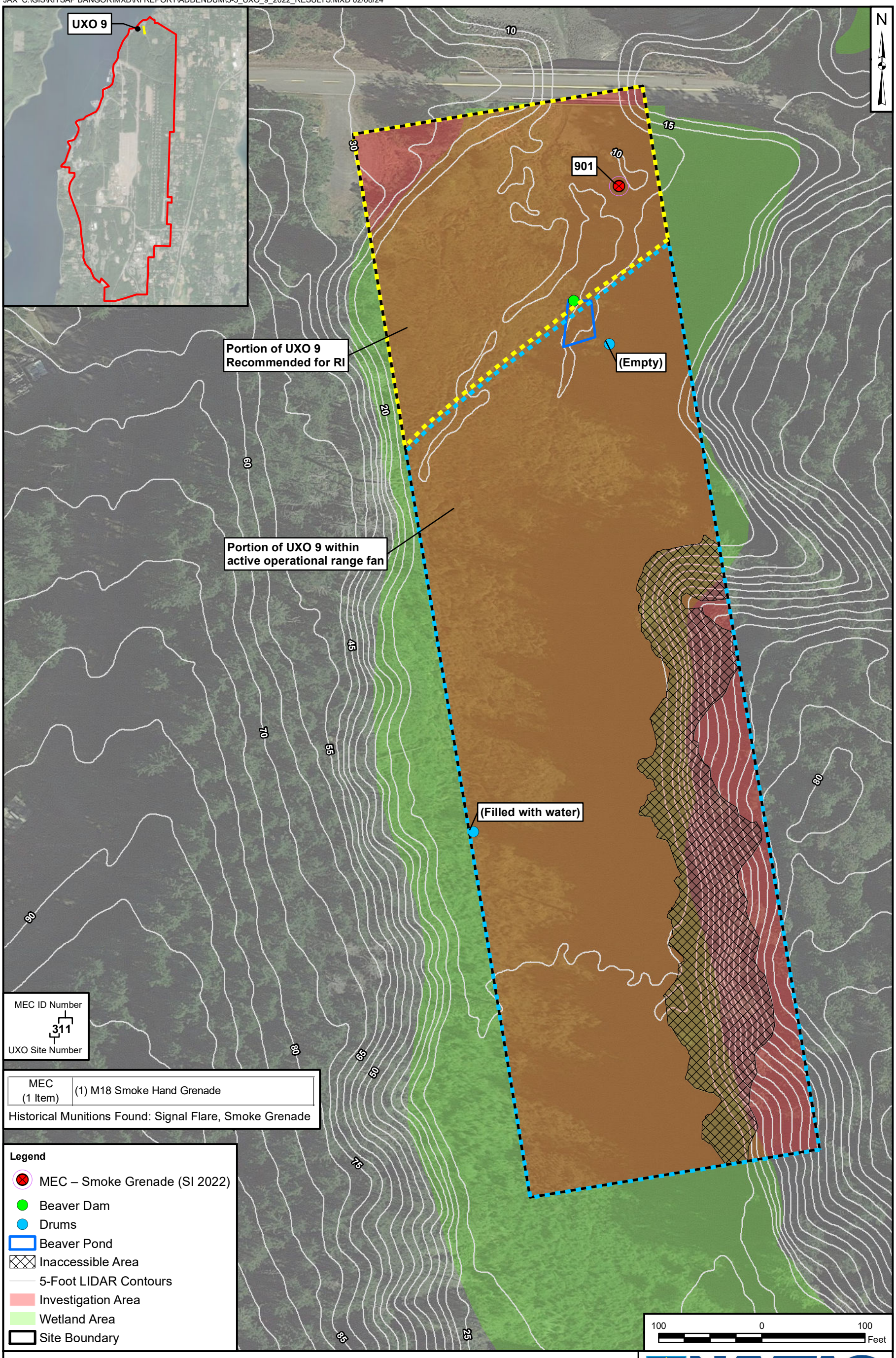

2022 SITE INSPECTION RESULTS
UXO 9 (SITE OO)
KITSAP BANGOR
BANGOR, WASHINGTON

NAVFAC
Naval Facilities Engineering Systems Command

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J.MADDEN	02/08/24	N4425519F4112
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H.HOOK	02/08/24	5-5

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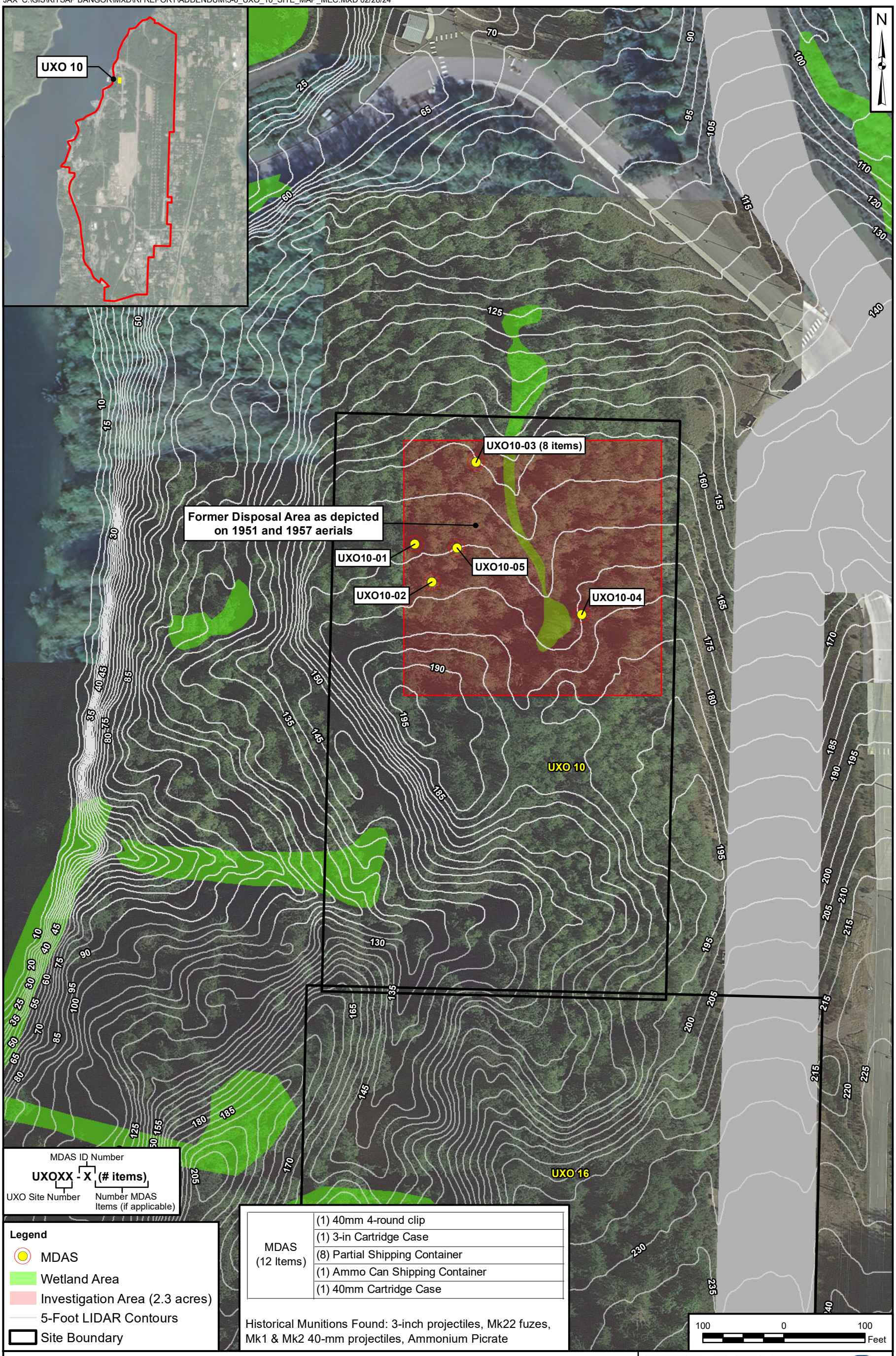

2023 SITE INSPECTION RESULTS
UXO 10 (SITE 12)
KITSAP BANGOR
BANGOR, WASHINGTON

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Naval Facilities Engineering Systems Command

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J.MADDEN	02/28/24	N4425519F4112
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H.HOOK	02/28/24	5-6

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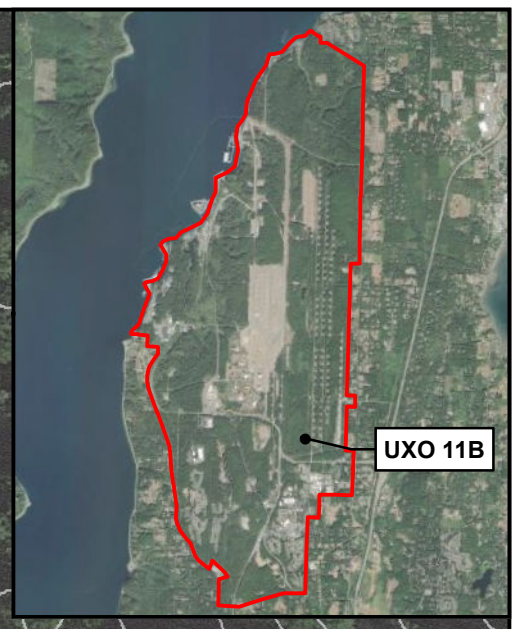

350
340
UXO 11B
UXO11B-01
UXO11B-03
UXO11B-02
335
330
345
325

MDAS ID Number
UXOXX - X (# items)
UXO Site Number
Number MDAS Items (if applicable)

MDAS (39 Items)	(1) Mk 2 Cartridge Case
	(38) Munitions containers

Historical Munitions Found: Ammunition Box

Legend
- MDAS
- Ammo Cans
- Shipping Containers
- 5-Foot LIDAR Contours
- Former Disposal Area as depicted on 1957 aerial
- Investigation Area
- Site Boundary

100 0 100 Feet

2022 & 2023 SITE INVESTIGATION RESULTS
UXO 11B (SITE 8)
KITSAP BANGOR
BANGOR, WASHINGTON

NAVFAC Naval Facilities Engineering Systems Command

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H.HOOK	01/19/24	5-7

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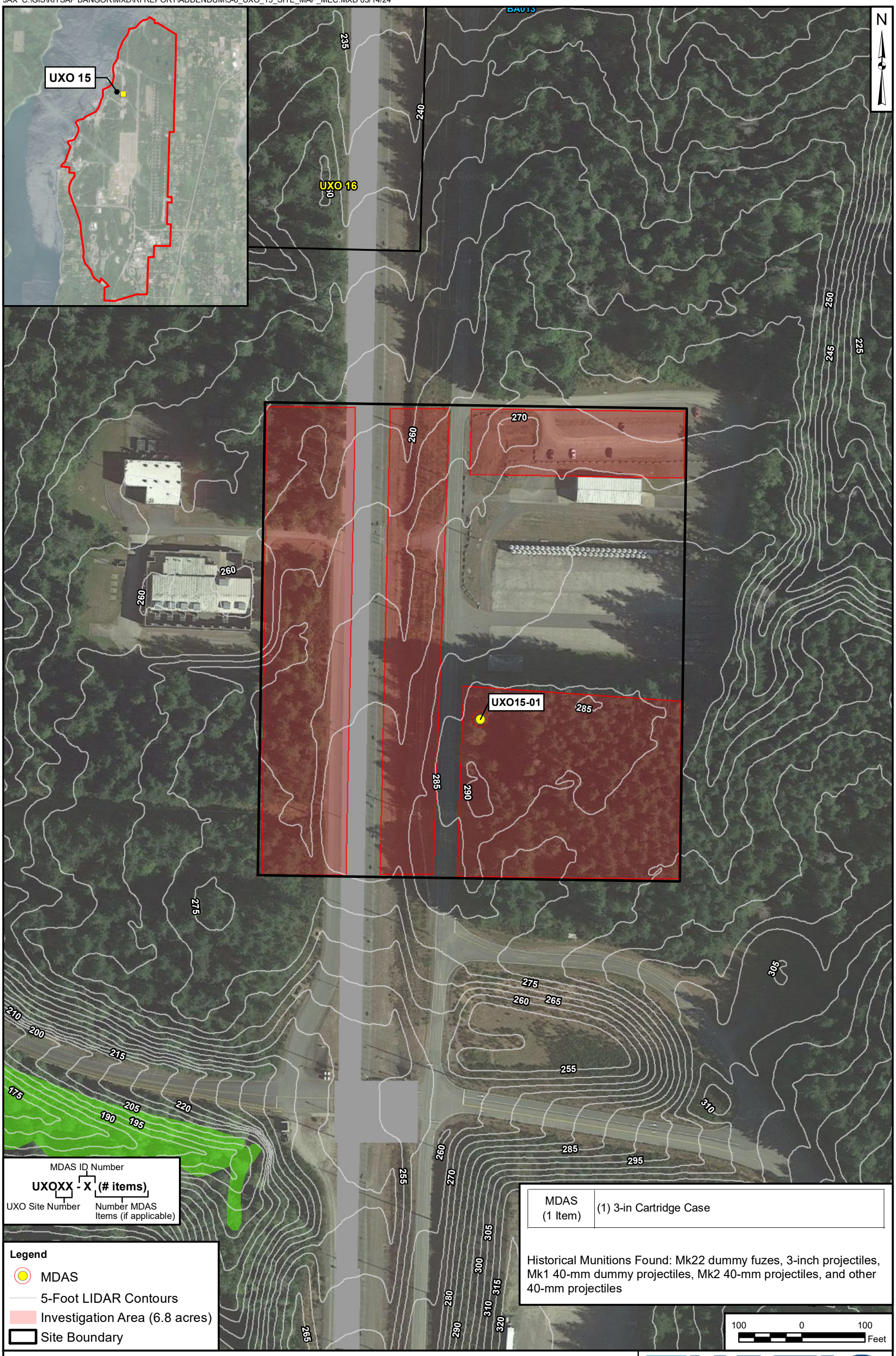

2023 SITE INSPECTION RESULTS
UXO 15 (SITE KK)
KITSAP BANGOR
BANGOR, WASHINGTON

Naval Facilities Engineering Systems Command

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H.HOOK	03/14/24	5-8

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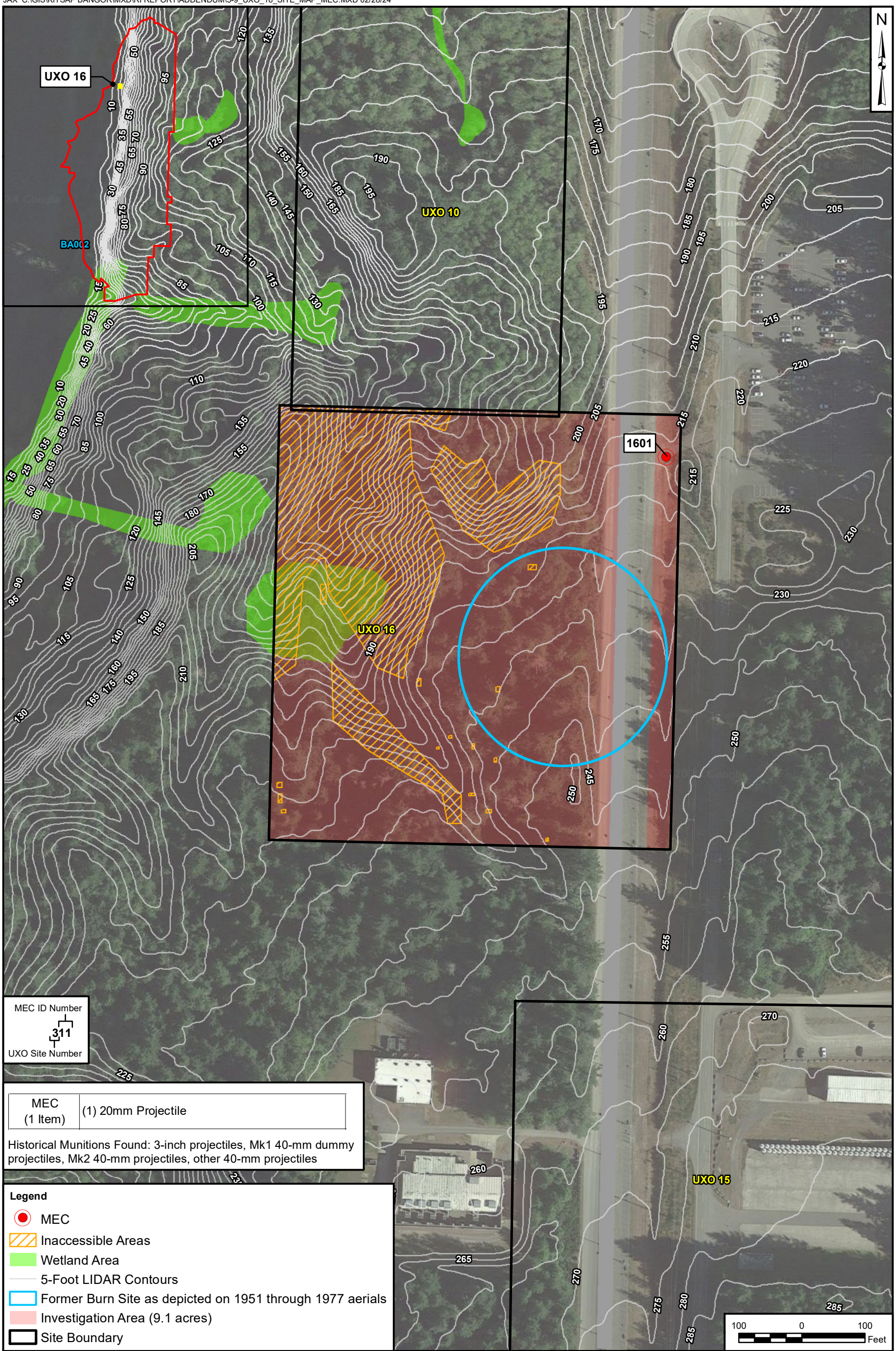

2023 SITE INSPECTION RESULTS
UXO 16 (SITE LL)
KITSAP BANGOR
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Naval Facilities Engineering Systems Command

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H.HOOK	02/28/24	5-9

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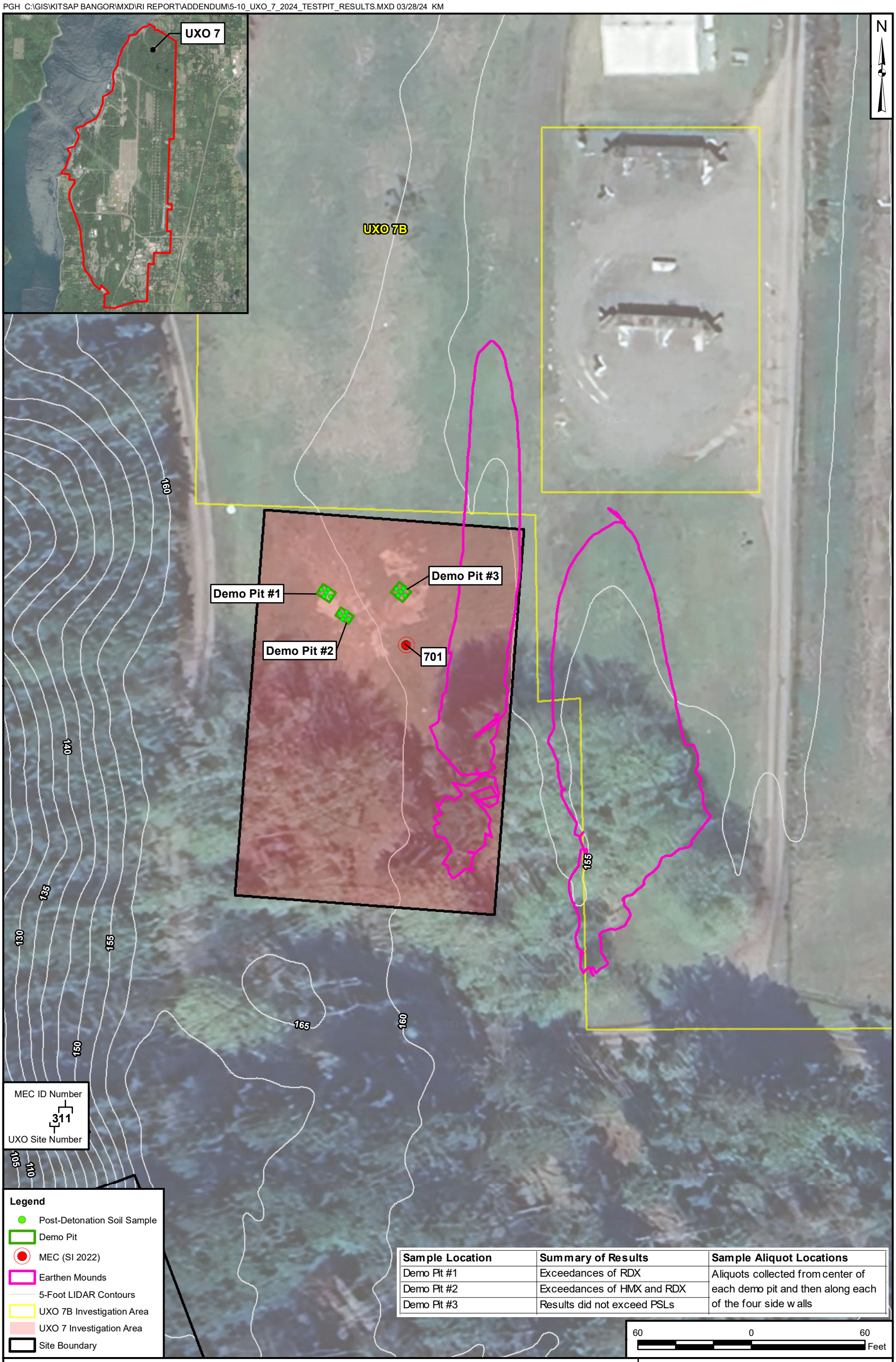

Sample Location	Summary of Results	Sample Aliquot Locations
Demo Pit #1	Exceedances of RDX	Aliquots collected from center of each demo pit and then along each of the four side w alls
Demo Pit #2	Exceedances of HMX and RDX	
Demo Pit #3	Results did not exceed PSLs	

2024 POST-DETONATION SOIL SAMPLING RESULTS
UXO 7 (SITE 23)
KITSAP BANGOR
BANGOR, WASHINGTON

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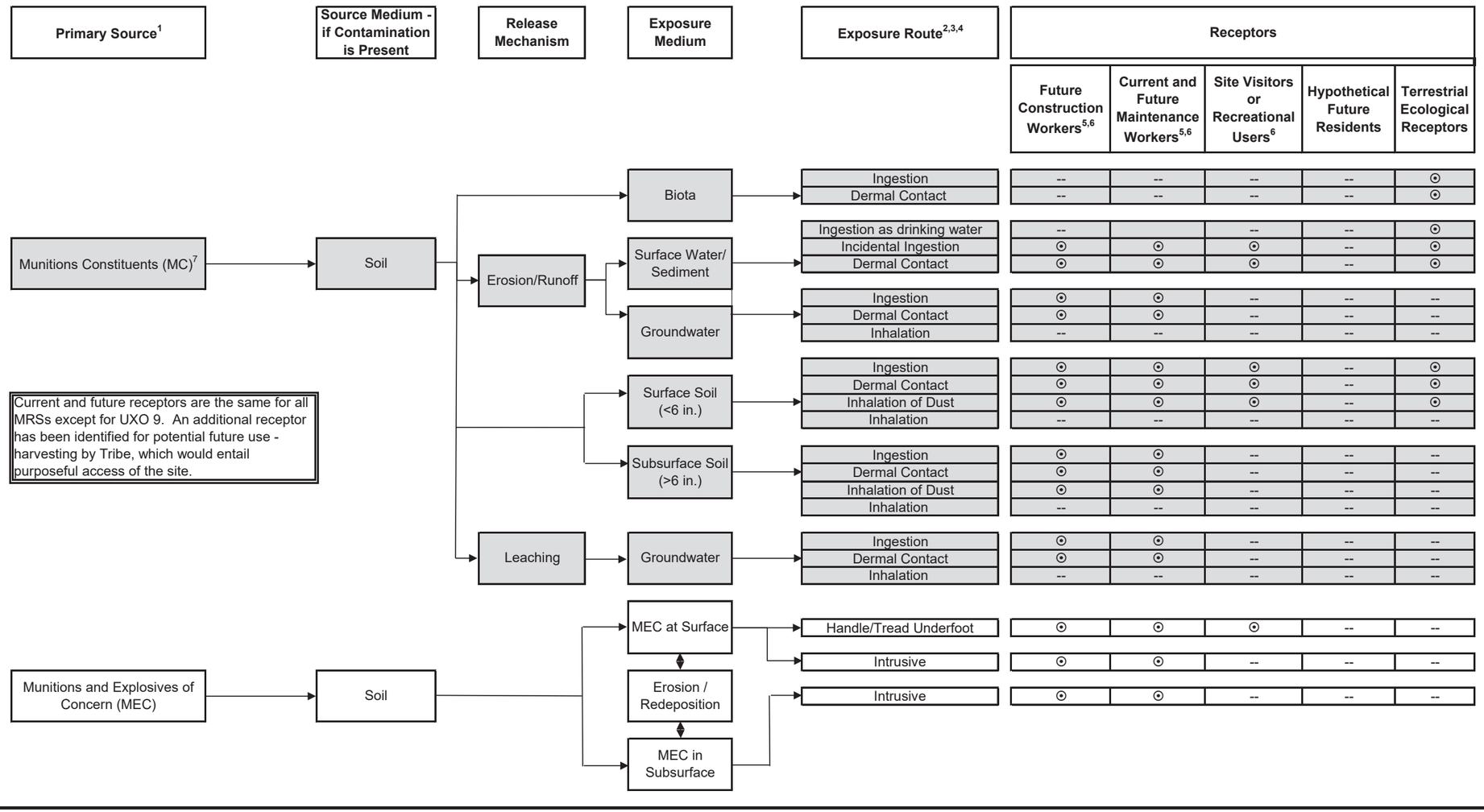
M.BARON	03/28/24	5-10

FIGURE 6-1
CONCEPTUAL SITE MODEL FOR POTENTIAL EXPOSURE TO MUNITIONS CONSTITUENTS AND MUNITIONS AND EXPLOSIVES OF CONCERN FROM MEC/MPPEH RELEASE



LEGEND

⊙ = Potentially complete/complete exposure pathway (pathway is considered completed if MEC was identified and considered potentially complete if MDAS is present as MDAS suggests that MEC may be present)

-- = Incomplete pathway

in. = inches

[1] Sites where source (MEC) was not present or are no longer suspected, as per historical information and/or SI results, include UXO 9, UXO 11, UXO 12, UXO 13, UXO 14, UXO 17B, UXO 17C, and UXO 17D.

[2] Sites where source (MEC) may be present or remain suspect, as per historical information and/or SI results, but existing land use restrictions are effective in limiting exposure routes include UXO 3 (over most of the site), UXO 7, UXO 7B, and UXO 9B.

[3] Sites where source (MEC) may be present or remain suspect, as per historical information and/or SI results, but exposures are limited based on high security areas include UXO 2, UXO 3 (remaining portions), UXO 4 (northern portion), UXO 6, UXO 7, UXO 7B, and UXO 11B.

[4] Sites where source (MEC) may be present or remain suspect, as per historical information and/or SI results, and located on low security areas include UXO 4 (southern portion) and UXO 17.

[5] Subsurface MEC: Sites with underground utilities and/or where construction activities are possible coupled with unknown MEC subsurface concerns include UXO 3, UXO 4, and UXO 17.

[6] Sites with MEC that is known or suspected to remain at the ground surface (e.g., although munitions items were removed during the SI but extent not yet determined and so remains suspect) include UXO 6. Moreover, the future RI may show evidence of MEC at the ground surface in the future during site boundary expansion (e.g., UXO 2, UXO 3, UXO 4, and UXO 17).

[7] MC is only considered a potential pathway if breached MEC was identified during the SI field work, as these areas (UXO 3, UXO7, and UXO 7B) were indicative of potential MC contamination. Of these 3 UXO sites, only UXO 3 had site-related PSL exceedances, although MC samples from SI detonations at end of field work in demolition pits at UXO 7 had PSL exceedances associated with donor explosives used for the detonations and, therefore, should be now included as part of UXO 7.

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APPENDIX A
Field Forms and Photographic Log

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APPENDIX B
Field Change Requests

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APPENDIX C
Survey Report

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APPENDIX D
Digital Geophysical Mapping Survey Report

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APPENDIX E
MDAS Documentation

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APPENDIX F
MEC HA Results

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APPENDIX G
Analytical Data

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