

UXO Verification Assessment – The Observatory, Woolwich

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UXO VERIFICATION ASSESSMENT

EXECUTIVE SUMMARY

Zetica Ltd was commissioned on behalf of the Defence Infrastructure Organisation (DIO) by Sweco UK Ltd to assist in managing the potential Unexploded Ordnance (UXO) hazard at The Observatory (Married Quarters) in Woolwich (the 'Site').

A third-party Phase I UXO Preliminary Risk Assessment (PRA) identified a potentially significant history of military use and World War Two (WWII) bombing on the Site.

This provides a possible source of shallow-buried Small Arms Ammunition (SAA) and Land Service Ammunition (LSA), and deep-buried Unexploded Bombs (UXB).

UXO Verification Assessment

To further understand the potential UXO hazard at the Site, a UXO Verification Assessment (VA) was recommended, comprising the following:

- Additional Site-specific research to provide a greater understanding of the UXO hazard level.
- A non-intrusive geophysical survey to map potential UXO targets.

Findings

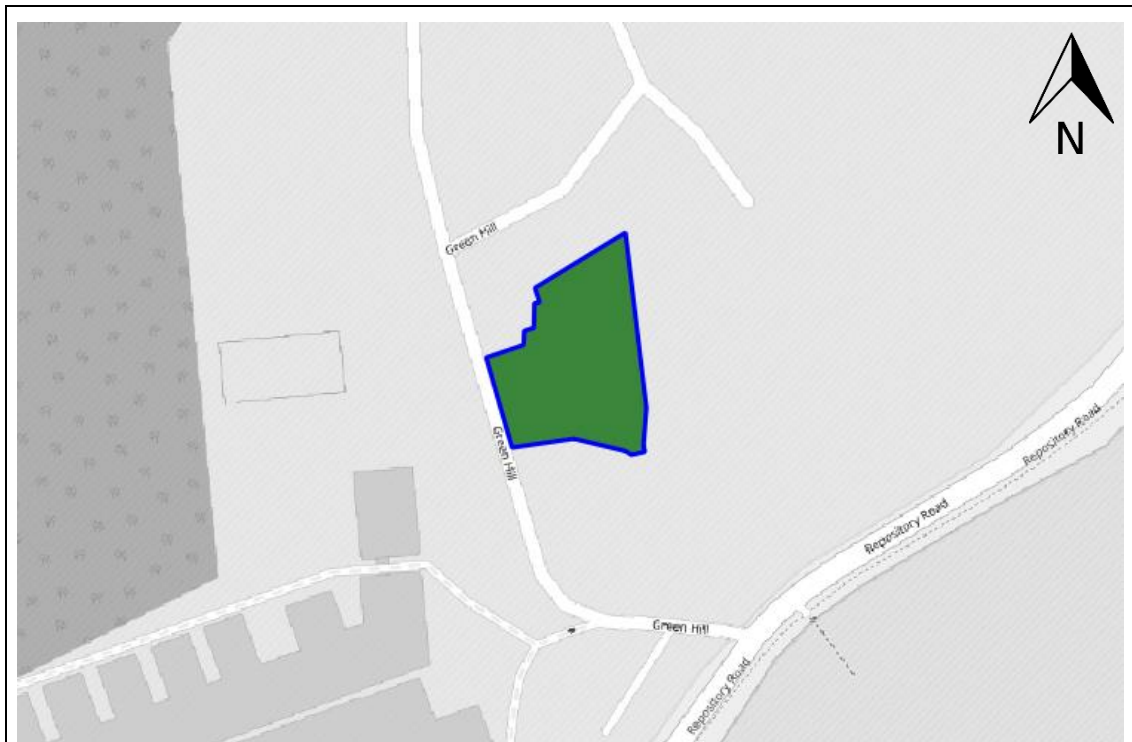
Records indicate that land encompassing the Site has been used for military training since the late-18th century. Since 1838 an observatory has been located on the Site and primarily used for educational and residential purposes.

No evidence of significant military training or bombing on the Site has been identified.

The survey identified 130No. metallic anomalies which, whilst likely related to scrap metal, cannot be completely discounted as UXO.







It is anticipated that the UXO hazard level can be reduced to low across the Site, as shown on the Figure below, reproduced as Figure 8 in the main report.

UXO hazard zone plan of the Site



Source: OpenStreetMap

Not to Scale

Legend	Very Low		Low		Moderate	
	High		Very High		Site boundary	

Recommendations – Current Site Users

No action is required for current Site users, other than to maintain vigilance so that in the event of a suspect find, appropriate action is taken.

Recommendations – Construction Works

Prior to construction works, a sample investigation of potential UXO targets identified by the survey is recommended. This will likely confirm the low UXO hazard level anticipated on the Site.

In the unlikely event UXO is found, a re-assessment of the hazard level will be required.

As with any former military Site, the potential to encounter UXO cannot be totally discounted. Workers engaged in excavations (including trial pits, archaeological trenching and shallow stripping) across the Site should be provided with a formal UXO awareness briefing.

No additional measures are required for borehole or piling works.

Recommendations – Future Site Users

No further action is required for future Site users, including those using the Site for the following activities:

- Agricultural/allotments.
- Commercial.
- Residential.
- Public open space.

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P10494-22-CLS-01-A (Potential UXO Target List)

ABBREVIATIONS

ATR	Army Training Regiment
DEOP	Defence Estates Optimisation Portfolio
DIO	Defence Infrastructure Organisation
DRA	Detailed Risk Assessment
EOC	Explosive Ordnance Clearance
HE	High Explosive
LSA	Land Service Ammunition
MFEM	Multi-Frequency Electromagnetic
OSNGR	Ordnance Survey National Grid Reference
OB	Oil Bomb
PM	Parachute Mine
PRA	Preliminary Risk Assessment
RA	Royal Artillery
SAA	Small Arms Ammunition
SETA	Strategic Environmental and Technical Advisory
TDEM	Time Domain Electromagnet
UXAA	Unexploded Anti-Aircraft
UXB	Unexploded Bomb
UXO	Unexploded Ordnance
VA	Verification Assessment
WWI	World War One
WWII	World War Two

UXO VERIFICATION ASSESSMENT

1 INTRODUCTION

1.1 Project Background

Zetica Ltd was commissioned on behalf of the Defence Infrastructure Organisation (DIO) by Sweco UK Ltd to assist in managing the potential Unexploded Ordnance (UXO) hazard at The Observatory (Married Quarters) in Woolwich (the 'Site').

A third-party Phase I UXO Preliminary Risk Assessment (PRA) identified a potentially significant history of military use and World War Two (WWII) bombing on the Site.

To confirm the findings of the Phase I desk-based assessment, a Phase II Verification Assessment (VA) was undertaken.

The purpose of this report, written in accordance with DIO's 'C22: Unexploded Ordnance Verification Assessment Task Directive', is to detail the findings of the verification works and refine the UXO hazard estimation of the UXO-PRA if possible. It has considered how the risk has changed and identified if further work or risk mitigation is required.

1.2 Site Location and Description

The Site comprises an approximately 0.3ha area located at Woolwich Common in the Royal Borough of Greenwich. The Ordnance Survey National Grid Reference (OSNGR) of the centre of the Site is TQ 427780.

The Site comprises The Observatory, woodland and open ground. It is bounded to the north and east by woodland, to the west by Green Hill and to the south by open ground.

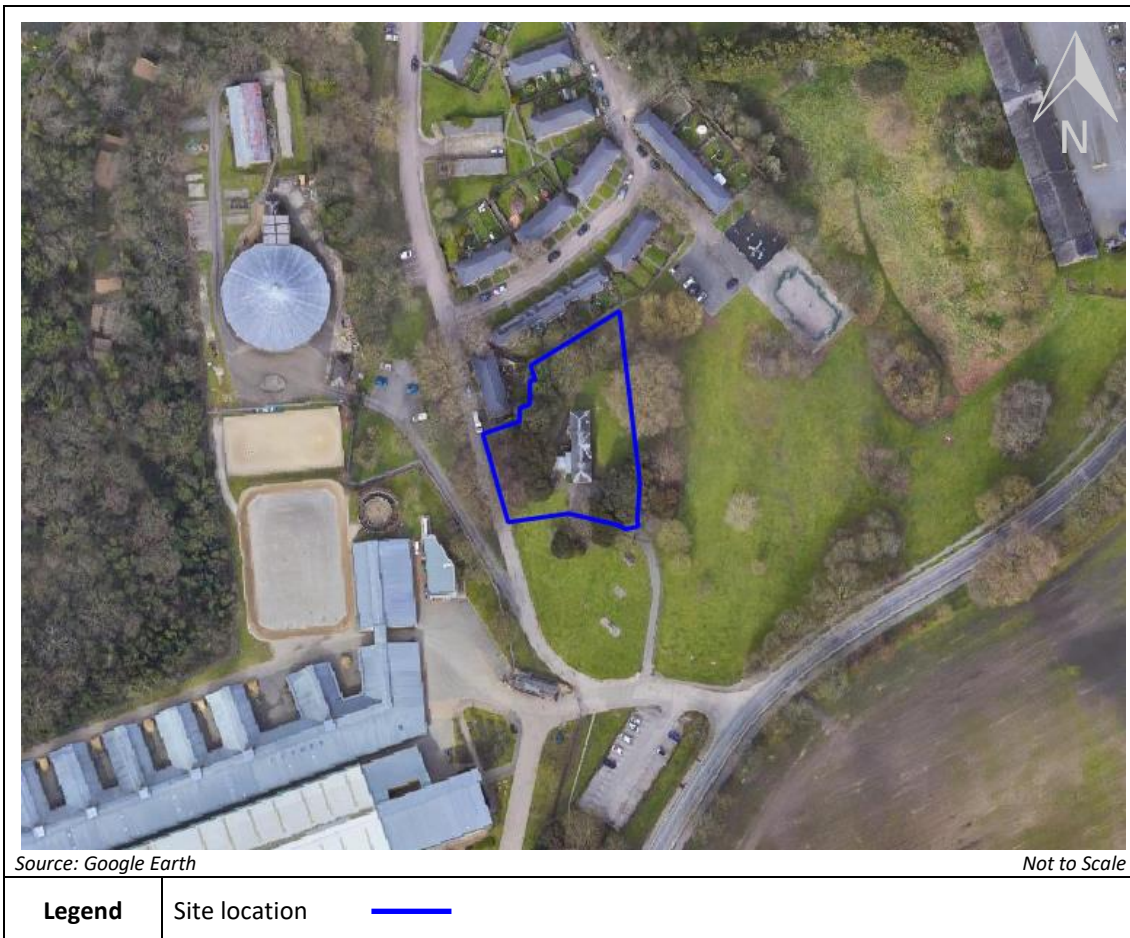
Figure 1 is a Site location map and Plate 1 is a recent aerial photograph of the Site.

Source: © Crown Copyright 2022. Reproduced by permission of Ordnance Survey

Not to Scale

Legend	Site boundary
	—

Plate 1 Recent aerial photograph of the Site



1.3 Scheme Description

It is understood that The Observatory (Married Quarters) will be disposed of by DIO. No information has been provided concerning potential development plans.

1.4 UXO Hazard Background

1.4.1 Review of Third-Party Risk Assessment

The third party UXO-PRA was written for an approximately 53ha area, encompassing the Site. The study area was centred on TQ 429781 and included the Rotunda, the Royal Artillery (RA) barracks, the Barrack Field, The Royal Military Repository and the Repository Woods.

The UXO PRA identified a history of military training and significant WWII bombing. It assigned a medium UXO risk to land encompassing the Site due to the potential to encounter shallow-buried Small Arms Ammunition (SAA) and Land Service Ammunition (LSA), and Unexploded Bombs (UXB) at depth.

2 DESK-BASED REVIEW OF THE UXO HAZARD

Zetica has undertaken additional research to assess the potential UXO hazard on the Site.

2.1 Military Training

For further information on firing ranges and military training areas, and the potential UXO hazards associated with them, follow the links below:

- [Artillery Ranges](#)
- [Military Training Areas](#)
- [Small Arms Ranges](#)

Military training has been undertaken in the vicinity of the Site since the 18th century. Further details are provided below.

2.1.1 Site Background

In the 18th century, Woolwich Common and land encompassing the Site was used by the Royal Artillery (RA) for ad-hoc accommodation and training (see Section 2.1.2).

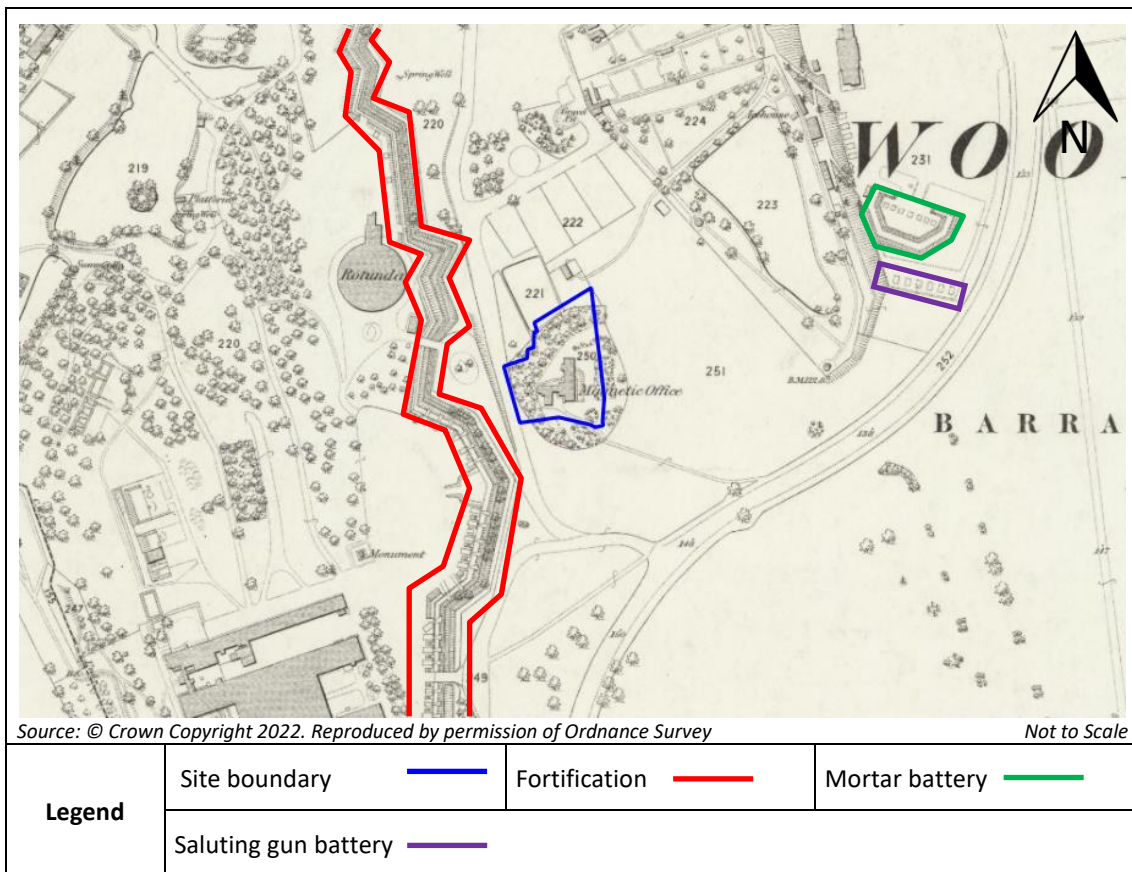
By the 1780s the Royal Artillery (RA) Barracks had been established approximately 0.3km northeast of the Site to accommodate the growing Royal Regiment of Artillery. By 1802 the Royal Military Repository building was constructed approximately 0.1km southwest of the Site.

In 1819 the Rotunda building was established approximately 50m northwest of the Site. From the 1830s, residential and storage buildings were constructed at The Gun Park, on the western side of Repository Road, within approximately 0.3km northeast of the Site.

In 1838 an observatory was built on the Site. Records indicate that this was used by RA officers as a scientific educational club.

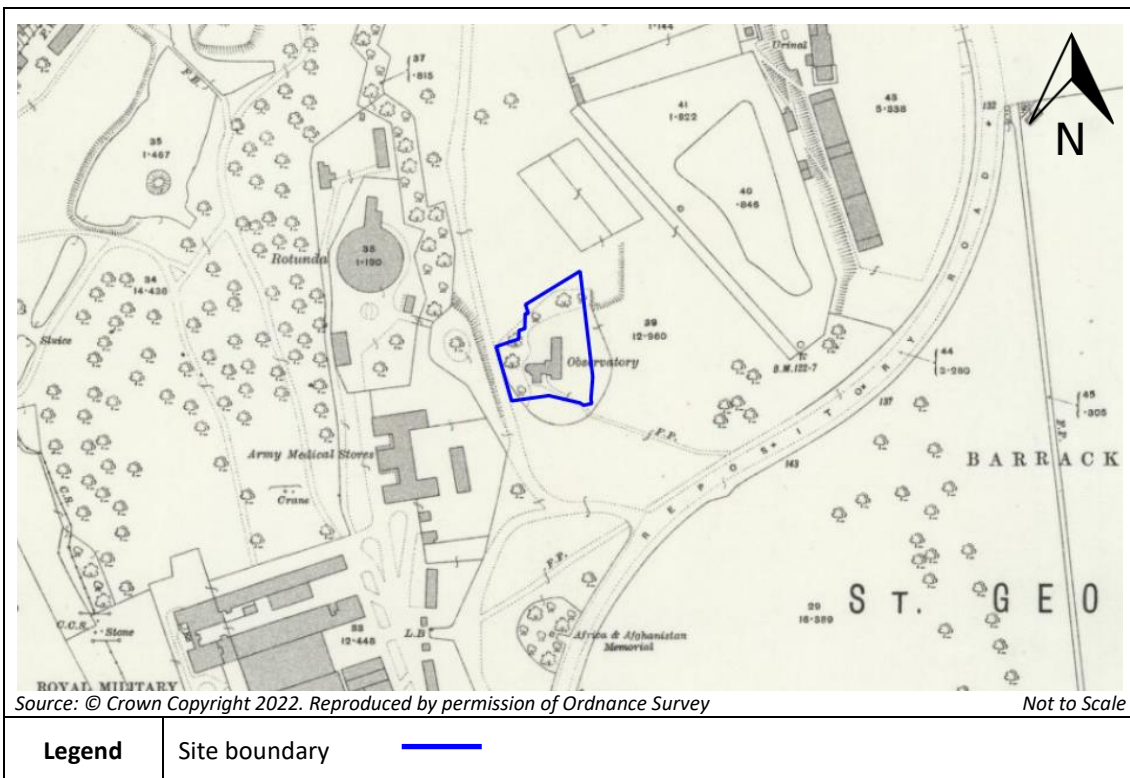
A review of historical maps indicates that the building was known as the 'Magnetic Office' until at least the late-19th century. The building was expanded in 1852.

The Magnetic Office is shown in Figure 2, a historical map dating from 1869. A linear practice fortification has been identified adjacent to the western boundary of the Site, and a mortar and saluting gun battery have been identified within approximately 0.1km east of the Site.

Figure 2 Historical map, 1869

By the early 20th century, historical maps indicate that the building on the Site had been redesignated as an 'Observatory'. An Army Medical Stores building had also been constructed approximately 0.1km west-southwest of the Site.

These developments can be seen in Figure 3, a historical ordnance survey map dating from 1916.

Figure 3 Historical map, 1916

In 1926 a large part of the observatory building was demolished. The remaining parts were redeveloped as married quarters.

By WWII, rows of residential buildings had been constructed to the north of the Site. These can be seen in Plate 2, an aerial photograph dated the 27th September 1940. Records indicate that these were married quarters for RA officers.

This also shows that open ground to the east of the Site had been developed as allotment gardens.

Plate 2 Aerial photograph, 27th September 1940

Records indicate that the building on the Site has since been used as a Royal Military police station.

Potential sources of UXO hazard are discussed in the Sections below.

2.1.2 Royal Military Repository & Repository Grounds

The Royal Military Repository and the associated Repository Grounds, within approximately 0.1km west of the Site, were developed from the mid-18th century to train RA gun crews. Training primarily focused on familiarising gun crews with the movement of heavy ordnance across different terrains.

Major landscaping was undertaken across the repository woods to provide ranges and challenging terrain for gun crews to practice manoeuvring artillery across.

In 1818, construction began on a linear practice fortification, adjacent to the western boundary of the Site (see Figure 2). The fortifications were used by RA units practicing with a wide range of cannons.

In addition to their use for military exercises, records indicate that the grounds were open to the public for recreational use.

Military exercises began to decline from the late-1850s after the establishment of the School of Gunnery at Shoeburyness in Essex.

Records indicate that during WWI, training in the Repository Ground may have comprised the digging of practice trenches. There is no evidence of training with modern artillery.

Records indicate that during WWII, military camps, storage facilities, practice trenches and rifle range were established within the woods approximately 0.1km west of the Site.

Post-WWII the repository grounds continue to be used for physical training. A small arms range is still located approximately 0.1km west of the Site.

2.1.2 Barrack Field

Barrack Field, located adjacent to the southeast of the Site, was used by the RA for training by the late 18th century. Training typically comprised live-fire exercises with cannon and troop manoeuvres.

By the 20th century, major training exercises on the Barrack Field and Woolwich Common had largely ceased. During WWI a large mobilisation camp was established on Barrack Field, located within approximately 0.1km east-southeast of the Site.

In WWII parts of the field were used as allotment gardens. A barrage balloon anchor was established approximately 0.2km south of the Site.

By the late-20th century, the field and common were primarily used for sporting events and public recreation.

2.1.3 The Gun Park

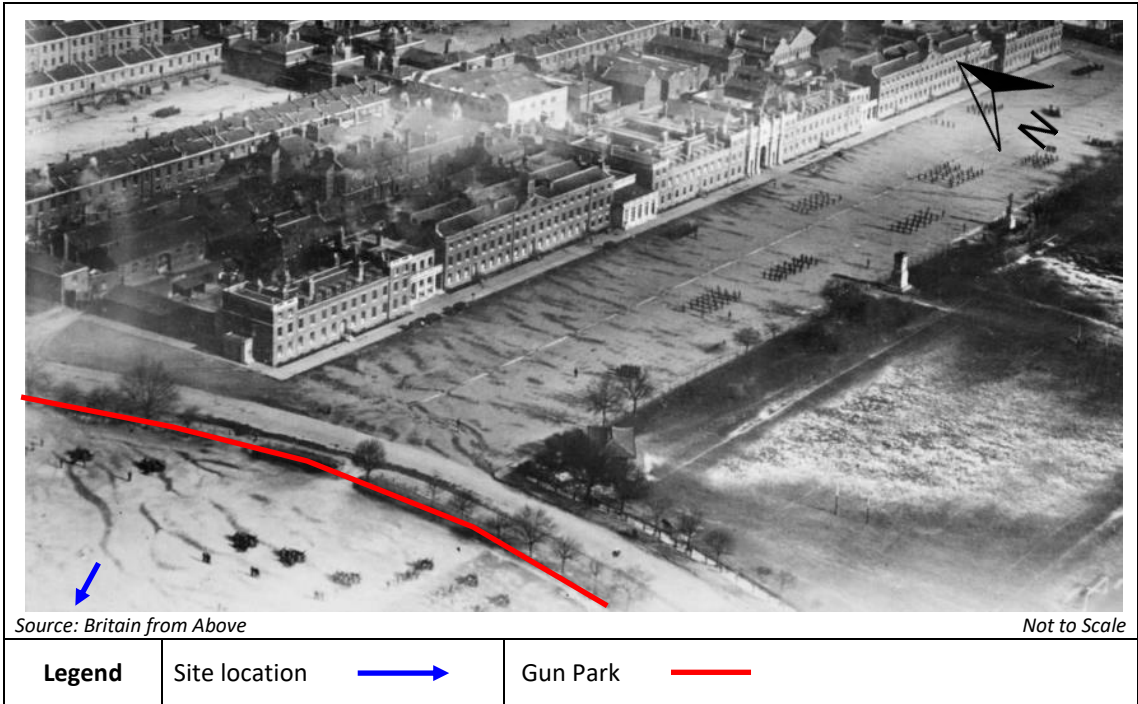
By 1803, a mortar battery had been established at The Gun Park (TQ 429781), approximately 0.1km east of the Site. This comprised 7No. mortar positions which could fire southwards, away from the Site, at targets located on Woolwich Common (see Figure 2).

By the mid-19th century, a saluting battery comprising 7No. cannons had also been established at The Gun Park (see Figure 2).

A drill ground was developed at the Gun Park for field-battery exercises. This continued in use into the early 20th century, as shown in Plate 3, an oblique aerial photograph dating from 1929.

This shows artillery units positioned in close proximity to the eastern boundary of the Site.

Plate 3 Oblique aerial photograph of the Woolwich drill ground, 1929

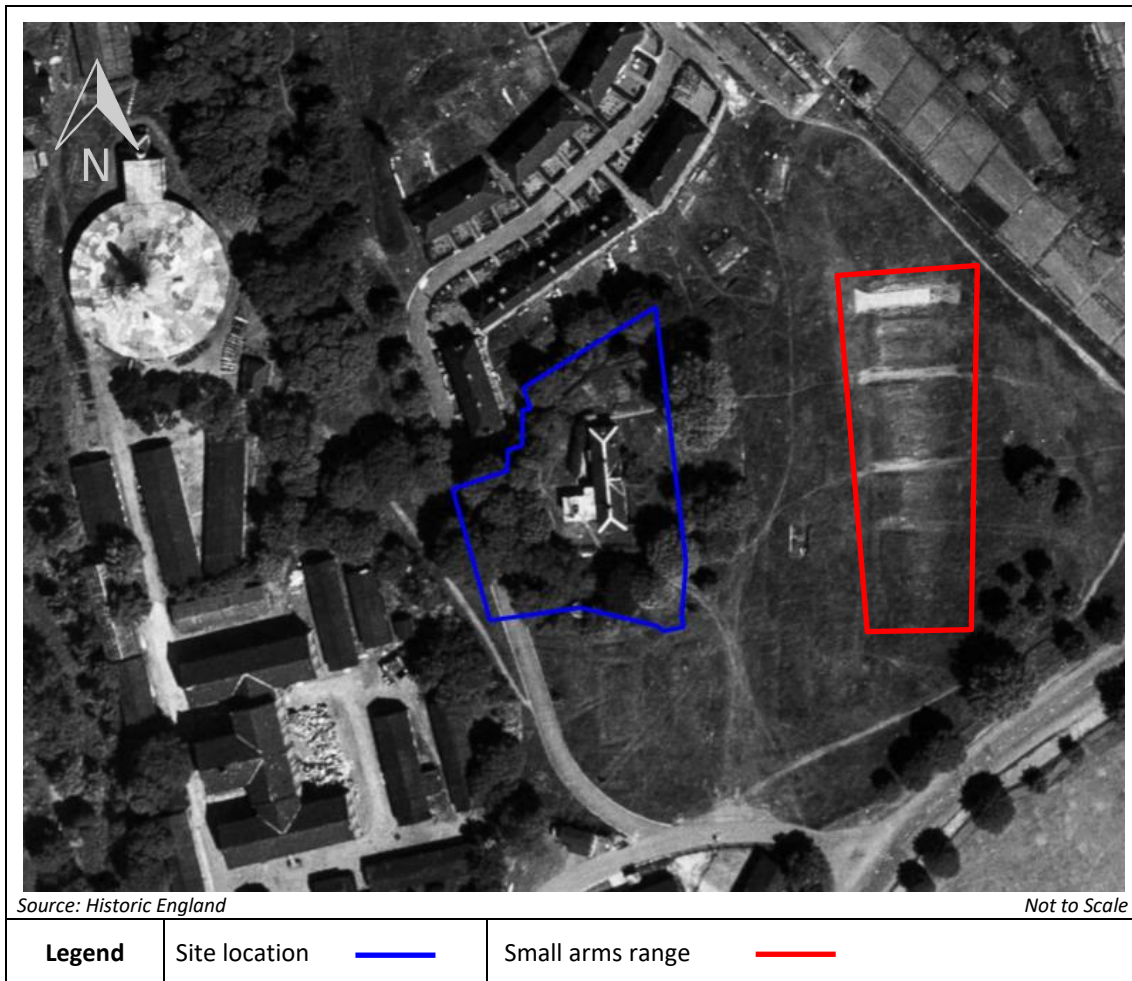


By the 1970s, historical aerial photography indicates that the Gun Park had been developed as a car park.

2.2.4 Temporary Small Arms Range

Historic aerial photography indicates that a possible temporary small arms range was established in close proximity to the eastern boundary of the Site. This is visible in photographs dating from at least 1940.

Plate 4, an aerial photograph dated the 28th May 1947, shows the possible range oriented north to south, with fire directed away from the Site.

Plate 4 Aerial photograph of a temporary rifle range, 28th May 1947

UXO Hazard Estimation

Live fire training undertaken in the vicinity of the Site primarily involved gunpowder, cannon and shot, and is not considered to provide a source of UXO hazard.

The potential for Small Arms Ammunition (SAA) to have been scattered or dropped on the Site by soldiers training on the temporary small arms range to the east of the Site cannot be totally discounted.

Given the establishment of the observatory building and its later use as married accommodation, it is considered unlikely that training involving live ordnance would have been undertaken on the Site.

2.2 Munitions Storage and Disposal

For further information on munitions depots and disposal areas, and the potential UXO hazards associated with them, follow the links below:

- [Munitions Depots](#)
- [Munitions Disposal Areas](#)

Other than those mentioned above, no records of a munitions depot or disposal area in the vicinity of the Site have been found.

Given that the Observatory Married Quarters on the Site were used as a Royal Military police station there may have been a small arms locker and associated SAA storage.

Assuming good housekeeping, this is not considered to provide a source of UXO hazard on the Site.

2.3 WWII Bombing

For further information on WWII bombing in the UK, and the potential UXO hazard associated with it, see Appendix 2.2. Alternatively, use the following link.

- [WWII Bombing](#)

2.3.1 Bombing Incidents

No records of High Explosive (HE) bombs falling on the Site have been found.

Records indicate that the nearest HE bomb fell on Woodhill, approximately 0.2km north of the Site, on the 17th October 1940.

Plate 5 is an aerial photograph of the Site, dated the 25th October 1946. No evidence of bomb damage or cratering has been identified on the Site.

Plate 5 Aerial photograph, 25th October 1946



Source: Historic England

Not to Scale

Legend
Site boundary



Potential UXO Hazard

No records of bombing on the Site have been found and no evidence of bomb damage has been identified on the Site on historical aerial photography.

German UXB are considered unlikely to provide a source of UXO hazard to the Site.

3 NON-INTRUSIVE SURVEY

As part of the verification works, Zetica undertook a non-intrusive geophysical survey of the Site.

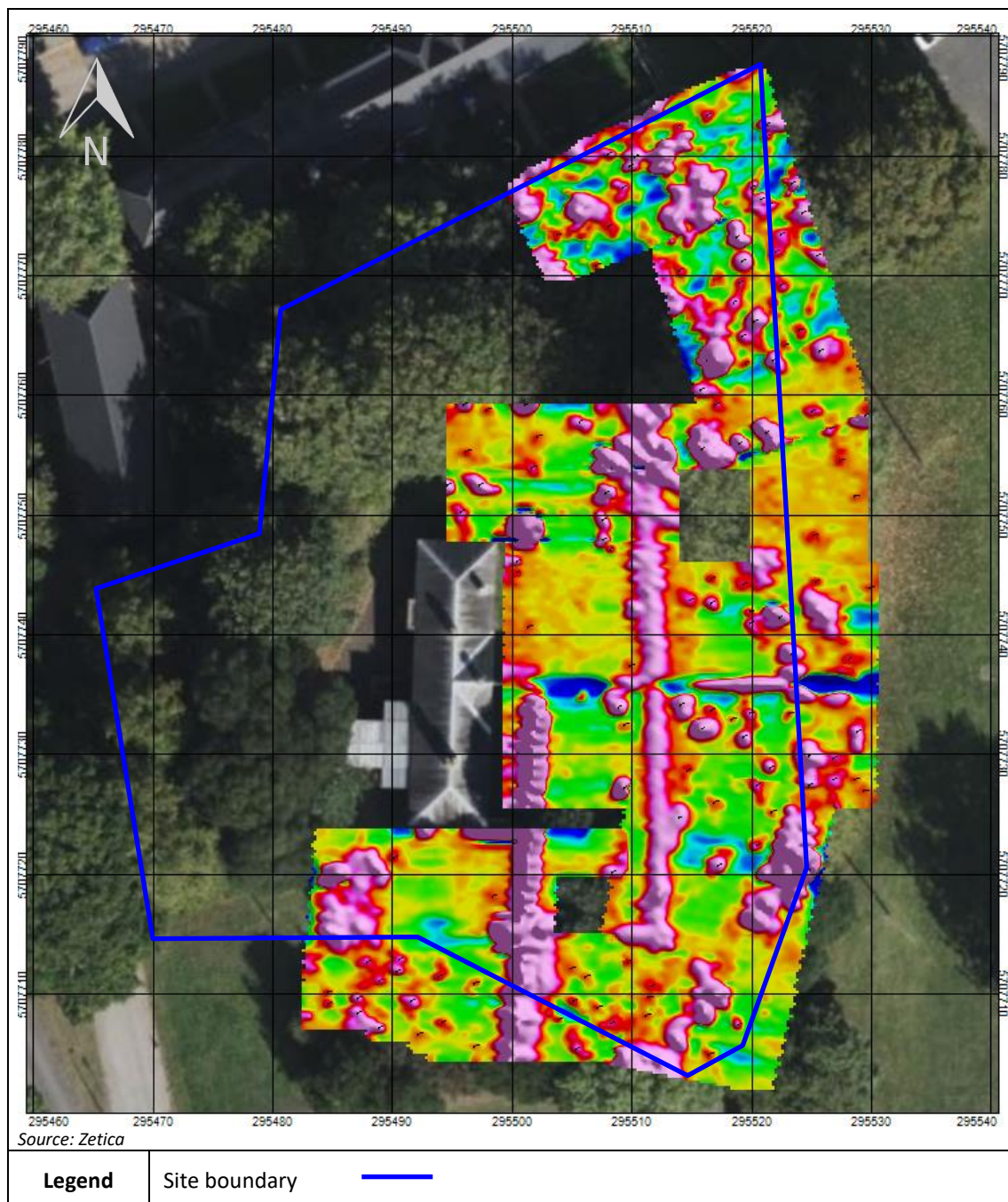
The data acquisition was undertaken on the 22nd September 2022.

3.1 Survey Extents

Part of the Site was accessible for surveying, comprising an area of open grass with trees and a tarmac car park. Densely vegetated and steep slopes restricted survey access on the western part of the Site.

Figure 4 is a map of the secondary decay voltage data plot showing survey coverage at the Site.

Figure 4 Map showing survey coverage on the Site



3.2 Methodology

3.2.1 Introduction

To detect ferrous and non-ferrous ordnance including close combat munitions, a non-intrusive Time Domain Electromagnet (TDEM) survey was undertaken. In addition to potential UXO, TDEM surveys can detect some utility services, reinforced concrete, and archaeological features.

The TDEM data were collected using an EM61-MKII instrument operated in a 1m x 0.5m coincident transmitter-receiver coil configuration. Data were acquired along 0.5 m spaced survey lines. A sample spacing of 0.2m was used, activated by rotation of the instrument's wheel.

The EM61 array creates a transient electric field in the shallow ground underneath the coil. This will create secondary "eddy currents" in any metallic object enclosed in the ground. As the primary field is shut down, the eddy currents collapse, giving rise to a secondary electromagnetic field which is measured by the recording coil.

This decay of the secondary field is measured at 4No. points in time (time gates or channels), respectively 216, 366, 660 and 1,266 microseconds after the end of the primary field.

In general, an earlier time gate will record a stronger response from a metallic object. It may also pick up ground heterogeneities and other weakly polarizable bodies that are not the targets of the survey (such as clays, some minerals, Made Ground), resulting in a lower signal-to-noise ratio.

For this reason, the 2nd or 3rd time gate was chosen for primary plotting and target picking.

Further details of this technique can be found on Zetica's website: <http://www.zetica.com/methods>

3.2.2 Data Processing

A large-window median high pass filter was applied to remove the effect of long wavelength geological variations and background noise.

The processed data were registered to an aerial image plan and subsequently displayed as a colour-coded map.

The results were used to identify features that could potentially be UXO-related.

The threshold above which a feature was considered significant was determined from an analysis of the background signal level on the Site.

The 2nd gate was used for the primary plotting and target picking as it had the highest signal-to-noise ratio based on our assessment. Following the first pass on the 2nd gate, the picks were also manually assessed against gates 1, 3 and 4.

3.2.3 Limitations

TDEM data can be detrimentally affected by surface metal objects, such as power lines, vehicles, fences, reinforced concrete, walls, and above-ground utility services.

The detectability depth for potential features depends on target size and site-specific signal to noise ratios. Large diameter features will be detectable at greater burial depths than small diameter features in the same environment.

Detected items have the potential to mask further items buried beneath them. If greater certainty is required a re-survey may be required to verify the removal of detected objects.

The results of geophysical techniques are not infallible. Whilst all reasonable efforts are made, the detection of all targets cannot be guaranteed.

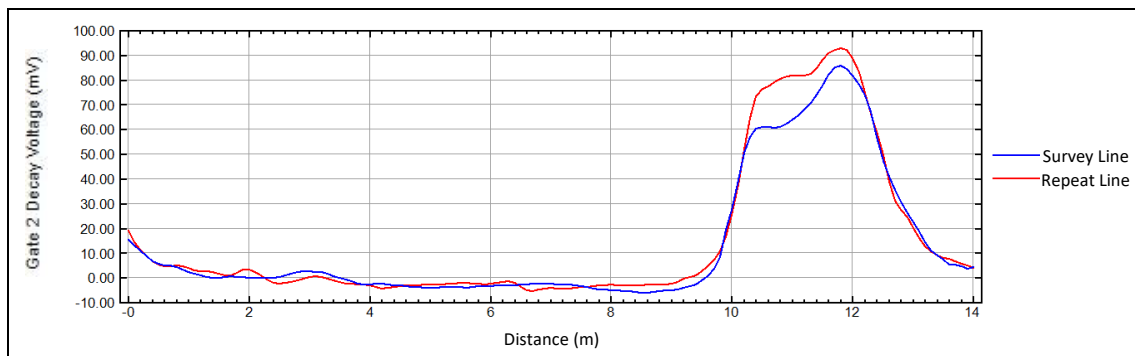
3.3 Survey Results

3.3.1 Data Quality

The data quality across the Site was good. Data repeatability was monitored throughout the project to ensure equipment sensitivity and position remained within the required tolerances.

Figure 5 shows an example of repeat profiles, which demonstrate good repeatability in terms of both positioning and amplitude of the anomalies.

Figure 5 Repeatability assessment



3.3.2 Interpretation

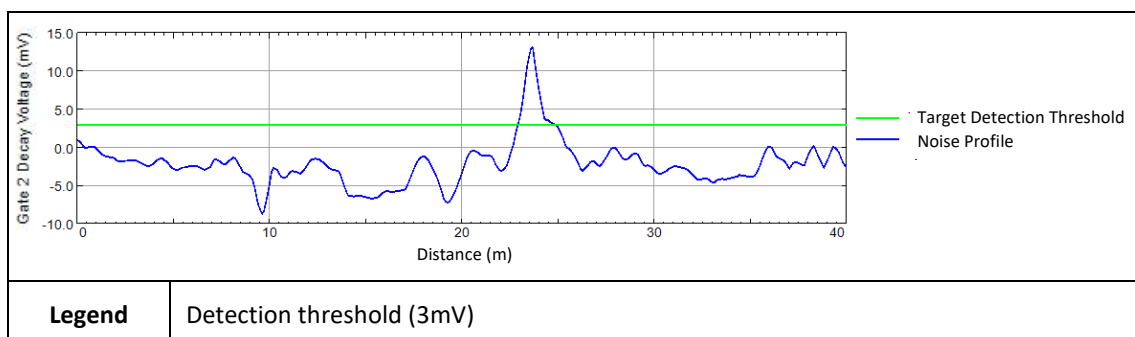
For target selection, a minimum threshold of detection had to be determined. This was calculated from analysis of the geophysical noise levels in the data with a value being chosen that was high enough to avoid false positive targets, and low enough to maximise the detection depth of the survey. Geophysical noise includes all measured signals that were not the target of the survey.

A detection threshold of 3mV was chosen, as shown in Figure 6.

All targets were manually assessed to remove those attributed to known structures, potential utility services and other interference.

The noise threshold refers to the 2nd time gate, as it was the one used in the plots and primary interpretation for the reasons outlined in Sections 3.2.1 of this report.

Figure 6 Target detection threshold (TDEM)



3.3.3 UXO Detection Assurance and Verification

A selection of seed targets was used to monitor the data quality during the survey. A 60mm mortar and 5No. 55 mm by 10 mm bullet casings were placed on the ground. These seed targets were surveyed before the main data collection.

The estimated horizontal accuracy for the TDEM survey is ± 0.2 m.

The limits of detection were assessed by modelling the response for a range of UXO items, as shown in Figure 7.

The modelling included items at different orientations relative to the TDEM sensor and offset 0.25 m (half the survey line spacing) from the centre of the sensor. The Figure shows the minimum modelled response amplitude as a function of burial depth, representing the worst-case response curve for detection.

The response of the seed targets at the same offset of 0.25m is also shown.

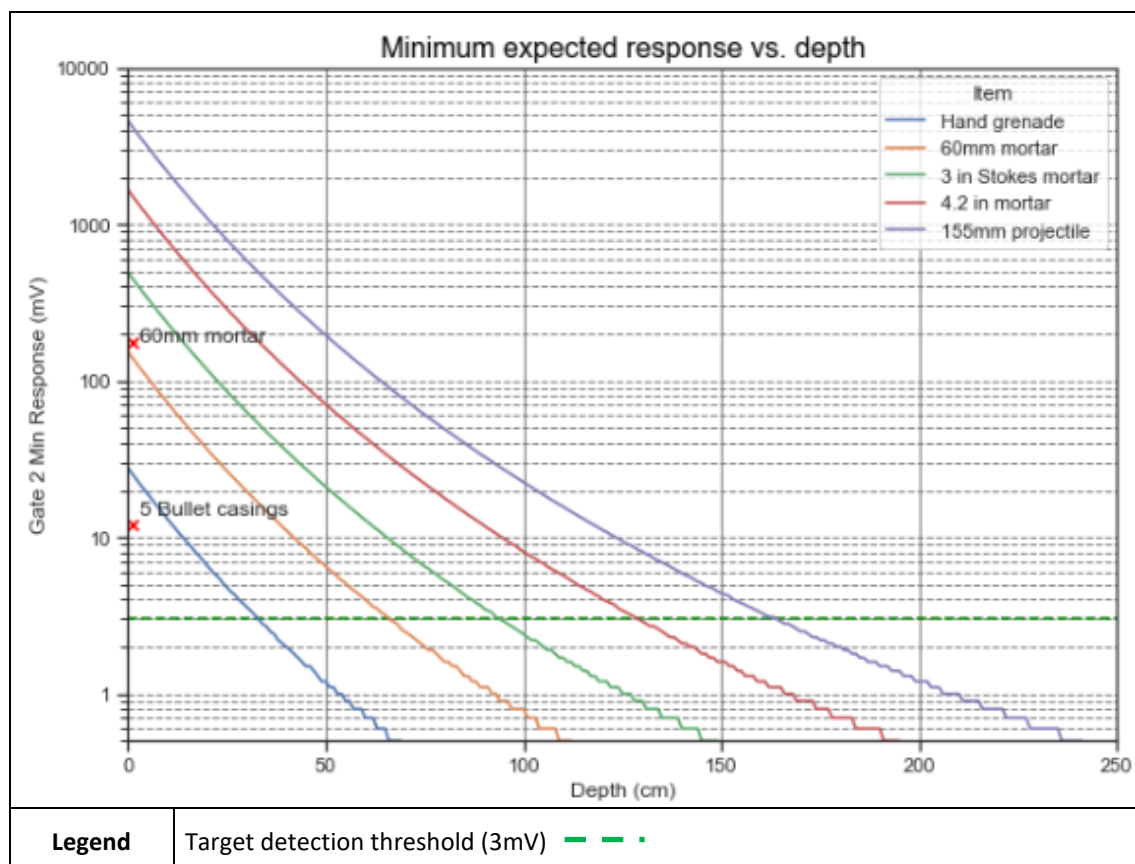
The values on the y axis refer to the 2nd time gate as it was used in the plot and the primary interpretation.

Based on the minimum modelled response for the items shown, a target detection threshold of 3 mV represents the following achieved minimum depths of detection:

- Hand grenade: 30 cm;
- 60 mm mortar: 65 cm;
- 3" Stokes mortar: 90 cm;
- 4.2" mortar: 130 cm;
- 155 mm projectile: 165 cm.

It should be noted that smaller objects may also be detected if they are clustered together and/or very close to the surface. This is usually the case for bullet heads and cartridges for instance.

Figure 7 Modelled UXO detectability depths



The depths of investigation are highly dependent on the target size and the burial setting. The depth of detectability of smaller diameter targets would be smaller than the depth of detectability of larger targets.

The presence of above ground structures (e.g. fences) in some areas had the effect of distorting the amplitude response in TDEM data. Affected areas may mask in-ground features.

3.4 Data Presentation

The survey results are shown on the accompanying summary interpretation plan and as plots of the geophysical data:

- P10494-21-DWG01-A (Summary Interpretation Plan)
- P10494-21-DWG02-A (Map of Secondary Decay Voltage)

The data are presented as colour-shaded grids, with the colours indicating the amplitude of the measured physical properties. Cool colours (blues, greens) represent relatively low values whilst warm colours (reds, magenta) correspond to relatively high values.

3.5 Survey Findings

The sections below summarise the interpreted findings of the non-intrusive electromagnetic survey.

A potential UXO target is defined as a buried ferrous object causing an anomaly which cannot be distinguished from that of UXO. As there is no evidence to the contrary, the potential for some of these to be UXO cannot be discounted until intrusively investigated.

3.5.1 Isolated Metallic Anomalies

The surveys identified 130No. metallic anomalies that could not be discounted as UXO. Whilst it is likely that most of the targets will be scrap metal, given the history of military use in the area, the potential for some of the anomalies being UXO cannot be discounted.

The targets are shown as black crosses on the summary interpretation plans and are listed in the accompanying spreadsheet P10494-22-XLS-01-A (Potential UXO Target List).

3.5.2 Buried Utility Services

4No. linear features were identified across the Site, which have been interpreted as buried utility services (exact type unknown).

These linear features are marked as pink lines on the summary interpretation plans.

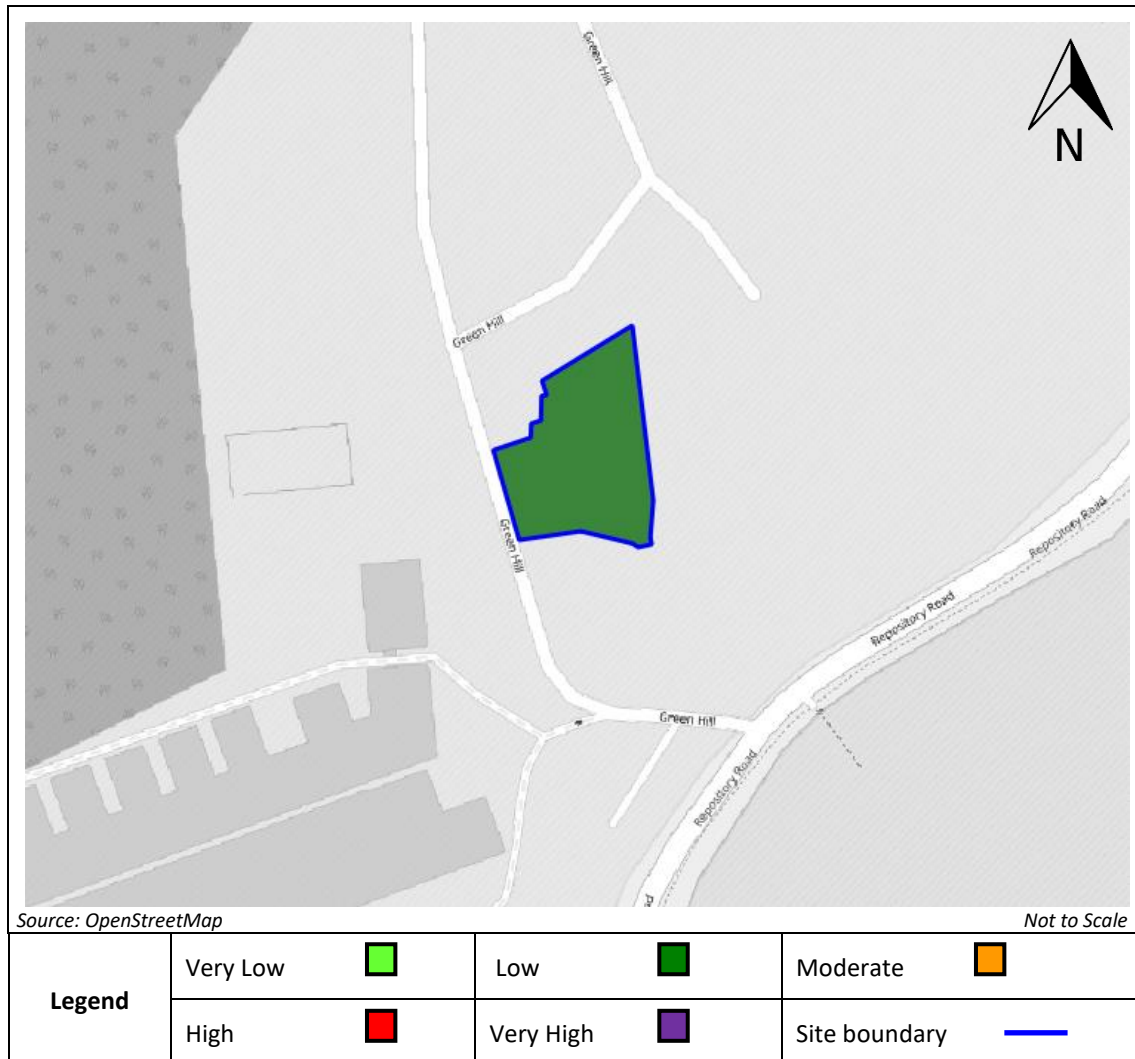
4 HAZARD ESTIMATION

4.1 UXO Hazard Estimation

No records of significant military training on the Site have been found and no evidence of WWII bombing on the Site has been identified.

Given this, it is anticipated that the UXO hazard level can be reduced to low across the Site as shown on Figure 8, a revised hazard zone plan of the Site.

Figure 8 Revised hazard zone plan of the Site



5 UXO RISK EVALUATION

5.1 Qualitative Risk Assessment

Zetica has provided a revised qualitative risk assessment for the Site based on the findings of the UXO verification assessment.

As demonstrated by the verification assessment, there is a potential for encountering the following hazards:

- Small Arms Ammunition (SAA)
- Land Service Ammunition (LSA)

The following receptors are considered:

- Current site users.
- Construction workers engaged in the following activities:
 - Preliminary works such as archaeology, boreholes or trial pitting.
 - Soil-stripping, bulk movement, screening or transportation off Site.
 - Deep excavations, piling or other major ground works.
- Future Site users, including those using the Site for the following activities:
 - Agricultural/allotments.
 - Commercial.
 - Residential.
 - Public open space.
- Property (buildings).

Only plausible sources, pathways and receptors have been considered based on the findings of the UXO-PRA.

Table 2 focuses on the health and safety risks posed by identified hazards.

The classification of the consequences for a source-pathway-receptor linkage occurring, for the probability of this occurring, and the associated risk are given in Appendix 1.

Table 1 Qualitative risk assessment conceptual site model

Area	Potential Contaminant	Potential Receptor	Potential Pathway	Associated Hazard	Potential Consequence	Likelihood of Hazard-Receptor Linkage	Potential Significance	Action Required
Open space	Small Arms Ammunition	Humans (current/future Site users and construction workers)	Direct exposure: Picking up bullets and accidentally discharging	Health risk	Medium	Unlikely: it is possible that future site users (such as local residents/members of the public) could pick up SAA and tamper with them, resulting in an accidental discharge. The probability of this occurring is considered very unlikely, given that most ammunition will be blank. Whilst there is a minor potential for construction workers to encounter SAA during demolition/construction works, the potential for this to provide a kinetic hazard is considered very unlikely.	Low	No action needed while site remains in present use and remains undisturbed. The verification assessment has indicated that only minor additional mitigation measures will be required prior to any potential intrusive works planned as part of a construction phase of works.
	Land Service Ammunition	Humans (current/future Site users and construction workers)	Direct exposure: Disturbing munitions and accidentally discharging	Health risk	Medium	Unlikely: the possibility that informally disposed munitions will be encountered by receptors and then detonated in such a way as to cause injury or damage is very unlikely but cannot be discounted.	Low	No immediate action needed while site remains in present use and remains undisturbed. The verification assessment has indicated that it is unlikely for LSA to be encountered on the Site. A sample target investigation of possible UXO items prior to disposal of the Site is anticipated to confirm the low UXO hazard.

6 RECOMMENDATIONS

6.1 Current Site Users

No action is required for current Site users, other than to maintain vigilance so that in the event of a suspect find, appropriate action is taken.

6.2 Construction Works

Consideration is given to the following activities:

- Preliminary works such as archaeology, boreholes or trial pitting.
- Soil stripping, bulk movement, screening or transportation off site.
- Deep excavations, piling or other major groundworks.

Prior to construction works, a sample investigation of potential UXO targets identified by the survey is recommended. This should be undertaken by an Explosive Ordnance Clearance (EOC) team. It is recommended that approximately half the targets are investigated. This will likely confirm the low UXO hazard level anticipated on the Site.

In the unlikely event UXO is found, a re-assessment of the hazard level will be required.

As with any former military Site, the potential to encounter UXO cannot be totally discounted. Workers engaged in excavations (including trial pits, archaeological trenching and shallow stripping) across the Site should be provided with a formal UXO awareness briefing.

No additional measures are required for borehole or piling works.

6.3 Future Site Users

No further action is required for future Site users, including those using the Site for the following activities:

- Agricultural/allotments.
- Commercial.
- Residential.
- Public open space.

APPENDICES

Appendix 1 Qualitative Risk Assessment Indicators

Table Classification of consequences for source-pathway-receptor linkage

Classification	Definition
Severe	Acute risks to human health. Catastrophic damage to buildings or property (e.g. explosion causing building collapse).
Medium	Chronic risks to human health. Significant damage to buildings, structures and services (e.g. damage rendering a building unsafe to occupy, such as foundation damage).
Mild	Non-permanent health effects to human health (exposure unlikely to lead to 'significant' harm). Minor damage to buildings, structures and services (e.g. damage rendering a building unsafe to occupy, such as foundation damage).
Minor/Negligible	No measurable effects on human health including non-permanent health effects to human health that are easily prevented by appropriate use of PPE etc. Easily repairable effects of damage to buildings, structures, services or the environment (e.g. discoloration of concrete, loss of plants in a landscaping scheme).

Table Classification of probability

Classification	Definition	Probability
High Likelihood	There is a pollutant linkage and an event is High Likelihood to occur in the short term, and is almost inevitable over the long term OR there is evidence at the receptor of harm or pollution.	>95% Likelihood of Consequence Occurring
Likely	There is a pollutant linkage and it is probable that an event will occur. It is not inevitable, but possible in the short term and likely over the long term.	50 – 95% Likelihood of Consequence Occurring
Low Likelihood	There is a pollutant linkage and circumstances are possible under which an event could occur. It is by no means certain that even over a longer period such an event would take place, and less likely in the short term.	5 – 49% Likelihood of Consequence Occurring
Unlikely	There is a pollutant linkage and it is improbable that an event would occur even in the very long term.	<5% likelihood of Consequence Occurring

Table Classification of risk

LIKELIHOOD	Consequence				
		Severe	Medium	Mild	Minor
	High	Very High	High	Moderate	Moderate/Low
	Likely	High	Moderate	Moderate/Low	Low
	Low	Moderate	Moderate/Low	Low	Negligible
	Unlikely	Moderate/Low	Low	Negligible	Negligible

Table Definitions of risk

Risk Level	Definition
Very High	Severe harm to a receptor may already be occurring OR a high likelihood that severe harm will arise to a receptor, unless immediate remedial works/mitigation measures are undertaken. Realisation of that risk is likely to present a substantial liability to the Client.
High	Harm is likely to arise to a receptor, and is likely to be severe, unless appropriate remedial actions/mitigation measures are undertaken. Remedial works may be required in the short term, but likely to be required over the long term. Realisation of that risk is likely to present a substantial liability to the Client.
Moderate	Possible that harm could arise to a receptor, but low likelihood that such harm would be severe. Harm is likely to be mild. Some remedial works may be required in the long term. Realisation of that risk is unlikely to present a substantial liability to the Client, but further work may be required to determine whether this is the case.
Moderate/Low	Possible that harm could arise to a receptor, but where a combination of likelihood and consequence results in a risk that is above low, but is not of sufficient concern to be classified as mild. It can be driven by cases where there is an acute risk which carries a severe consequence, but where the exposure is unlikely. Such harm would at worst normally be mild. Unlikely to present a substantial liability to the Client. Limited further investigation may be required to clarify the risk and liability. If necessary remediation works likely to limit in extent.
Low	Possible that harm could arise to a receptor. Such harm would at worst normally be mild.
Negligible	Low likelihood that harm could arise to a receptor. Such harm unlikely to be any worse than mild. No liability.
No Potential Risk	There is no potential risk where no pollutant linkage has been established. No liability.

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