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## **FOREWORD**

This assessment is written in accordance with Construction Industry Research and Information Association (CIRIA) guidance;

CIRIA C681, Unexploded Ordnance (UXO) a guide for the construction industry

UXO is defined as explosive ordnance that has been primed, fused, armed, or otherwise prepared for use and used in an armed conflict or during training. It may have been fired, dropped, launched or projected and should have exploded but failed to do so. It also includes unexploded ordnance that may have been dumped, buried or otherwise discarded.

The guidance recommends a risk management process that is divided into the following four distinct stages;

- Preliminary risk assessment;
- Detailed risk assessment;
- Risk mitigation;
- Implementation.

The process adopts a tiered approach that enables the end user to exit the risk management process once an acceptable level of risk has been identified (e.g. is the aim to clear the site of UXO or just to ensure works can be progressed safely). This is intended to ensure that the potential risk from UXO is addressed in an efficient and cost effective way. There are two types of risk assessment defined by the CIRIA guidance, as follows;

**Preliminary risk assessment** - The purpose of a preliminary risk assessment is to enable the non-UXO specialist to place a site in context with the potential risk from UXO and to identify whether more detailed assessment is required. The assessment is based on data obtained from a desktop review of historical information regarding site location, previous site development, wartime bombing records etc. If a potential UXO risk is identified at the preliminary risk assessment, it is important that a UXO specialist is commissioned by the client. This should take place during the initial stages of the project planning and ideally before the start of any detailed design. This early involvement may also enable the project team to identify appropriate techniques to reduce potential risks through considered design, without the need for UXO specific mitigation methods.

**Detailed risk assessment** - The purpose of a detailed risk assessment is to enable an estimate to be made of the likelihood of creating a UXO hazard on a site, giving due consideration to the development type and construction methods to be employed.



## **1 INTRODUCTION**

### **1.1 About this document**

This document is a UXO Preliminary Risk Assessment (PRA) which has been produced to support DIO ASP during the disposal of the Ministry of Defence Police (MDP) Wethersfield site; it has been prepared by ordnance specialists within the Defence Infrastructure Organisation (DIO).

This report has been prepared on the basis of the available information obtainable during the study period. Every reasonable effort has been made to obtain all relevant information, however if additional data becomes available in the future then this assessment may need to be reviewed.

This assessment is also required to inform the project Principal Designer (PD) in accordance with CIRIA C681 UXO - A guide for the construction industry; the PD is responsible for ensuring that the potential risk from UXO is considered and if necessary mitigated within the context of the construction project and the future use of the site.

### **1.2 Tasking**

The DIO Environmental and Ordnance Liability Management (EOLM) team were tasked by [REDACTED] on the 15<sup>th</sup> March 2017 to provide a UXO PRA to support the disposal of the Wethersfield site.

### **1.3 Objectives**

- Identify actual and potential sources of UXO contamination;
- Assess the potential risk of harm from ordnance contamination;
- Identifying if further UXO risk mitigation is required to facilitate the disposal.

## **2 THE SITE**

### **2.1 Location**

The Wethersfield site is located approximately 10 km north of Braintree in Essex and is centred on Grid Ref TL 724334, access is via an unclassified road on the B1053 between Wethersfield and Finchingfield.

### **2.2 Description**

Originally established as a satellite airfield, this unit opened as a Royal Air Force (RAF) airfield in early 1944. During World War II (WWII) it was initially used by the United States Army Air Force (USAAF) before being passed back to the RAF in 1945. It then closed in 1946 but as a result of the Cold War was reopened in 1951 and was then used by the United States Air Force (USAF) until it was again passed back to the RAF in 1990. The RAF then retained the unit until its transfer to the MDP in 1991.

Currently the site is predominantly used by the MDP and Essex Fire and Rescue Service for training, with No. 614 Volunteer Gliding Squadron RAF and a small number of commercial companies also using the site facilities.



## 2.3 Surrounding Area

The surrounding land is in the main used for agriculture.

## 2.4 Previous Reports

- Land Quality Assessment Phase 1 - MWH UK Ltd July 2005;
- Land Condition File - OHES June 2012;
- Historical Background Brief - 33 Engr Regt (EOD) March 2017.

## 3 UXO RESEARCH

### 3.1 Bombing Records and Abandoned Bomb Register

Although the airfield was attacked during WWII the Abandoned Bomb Register does not record any abandoned bombs within the current site boundaries.

*Note. An Abandoned Bomb is defined as;*

*An Unexploded Bomb that was abandoned during WWII rather than being dealt with at the time by bomb disposal teams due to its benign position, difficulty of access, or a lack of resources.*

### 3.2 Defensive Ordnance - Pipemines

A review of the pipemine records has been undertaken and there are none recorded within the current site boundaries.

### 3.3 Defensive Ordnance - Airfield Pipemines

A review of the airfield pipemine records has been undertaken and there are none recorded at this location.

### 3.4 Defensive Ordnance - Minefields

A review of the minefield records has been undertaken and there are none recorded at this location.

### 3.5 Defensive Ordnance - Anti Aircraft Artillery

Although the Land Quality Assessment refers to an anti-aircraft machine gun emplacement near to building 1070, no other references have been found to anti-aircraft artillery being positioned on this unit, although its deployment during WWII cannot be discounted.

### 3.6 Ground Ranges

The following ground ranges have been identified within the notified area;

- A current 25m barrack range located at approximate Grid Ref TL 728330;
- A former aircraft firing in butts previously located at approximate Grid Ref TL 734338;
- A possible former machine gun training ground located at approximate Grid Ref TL 719337;



- A possible grenade training area located at approximate Grid Ref TL 719337.

The 25m barracks range is still actively used by the MDP.

The aircraft firing in butts have been demolished, most probably during the upgrade of the unit in the 1950's to support the USAF use of the site.

The earth bund that anecdotal information suggests was a machine gun training ground is still evident; it should be noted that if this was a small arms range then its use was ad-hoc as there are no indications of any range walls, bullet catchers, firing points etc. The same source of anecdotal information also suggests that this area may have been used for hand grenade training, there is no physical evidence to support this suggestion but see para 3.13 Previous EOC tasks - the entries for December 1990 and April 1991.

The small arms ammunition used on these types of ranges would have been restricted to ball natures, but there remains a possibility that live or spent rounds may have been discarded or buried at these locations.

### 3.7 Training Areas

Currently there appears to be two formal training areas on this unit; the area around the Fire Arms Training Centre and the dry training area located within the service families accommodation area.

It is also evident that Park Wood has been used for low level military related training; DIO EOLM was informed that the most recent likely users are the local army cadet unit. Park Wood was also previously used as a training area during the USAF occupation; see para 3.13 Previous EOC tasks - the entries for December 1990 and April 1991.

Anecdotal information suggests that most areas of this unit are available for ad-hoc training, specifically the former explosive storage area and the airfield.

### 3.8 Chemical Weapons and Chemical Weapon Agents

Anecdotal information presented in the Land Condition File suggests that Chemical Weapons may have been stored in building 2034 within the Explosive Storage Area from 1944 onwards. This building was actually constructed during the post WWII era most probably during the 1960's; the building was added to the Department of the Air Force Master Storm Drainage Plan in January 1969.

There is currently no documentary evidence that Chemical Weapons were stored, buried, burnt or disposed of at this unit during or after WWII.

### 3.9 Nuclear Weapons

Anecdotal information presented in the Land Quality Assessment and the Land Condition File suggests that nuclear weapons were stored on this unit.

Although some of the USAF aircraft types previously stationed at this unit were capable of carrying nuclear weapons, the Explosive Storage Area lacks the physical security required to store these types of weapons and the Land Quality Assessment contains a letter from Dstl that states;



*It has also been suggested that nuclear weapons were stored in the bomb dump to the north of the site. However, there is no documentary evidence to support either of these possible uses of radioactive material at the site.*

The Land Quality Assessment also states that RAF Victor aircraft, which were also capable of carrying nuclear weapons, were stationed at Wethersfield during the Cold War; no other information sources have been found that imply or confirm that Victor aircraft were stationed at Wethersfield, it is therefore highly likely that the term 'Victor Alert' was mistakenly interpreted as Victor aircraft rather than the USAF quick reaction alert operation too which it actually refers.

### **3.10 Explosive Ordnance Disposal**

There is a warning sign 'Explosive Ordnance Disposal Area' at approximate Grid Ref TL 719339 - near to building 256; a previous RAF EOD reconnaissance report dated 13 December 1990 reports that this was a USAF EOD demolition range and that it was cleared before the unit was handed back to the RAF in 1990.

Anecdotal information contained in the Land Quality Assessment suggest that a former duck pond at approximate Grid Ref TL 716330 was infilled with 0.5 inch small arms ammunition; a previous Army EOD reconnaissance report dated 3 October 2006 reports that this area was excavated and no ordnance was recovered; see para 3.13 Previous EOC tasks - the entry for October 2006.

### **3.11 Explosive Storage**

There is an Explosive Storage Area in the north of the site, this contains a variety of storage buildings and hard standings. The area is currently used by the Essex Fire and Rescue Service and other commercial companies and has also previously been used by a civilian fireworks company to store their products. One building (281) was displaying explosive hazard division warning placards during the site visit.

There are other former and current explosive storage buildings outside of the Explosive Storage Area, two of which (26 and 172) were displaying explosive hazard division warning placards during the site visit.

*Note: Explosive hazard division warning placards should only be displayed on buildings that actually contain explosives.*

*Note: JSP 482 contains the regulations relating to explosive Quantity Distances and Licensing Criteria i.e. the Potential Explosion Site (building 281) and the Exposed Site (the commercial companies in buildings 275/276 and the Essex Fire and Rescue Service buildings and training facilities).*

Given that this Explosive Storage Area has been in use virtually uninterrupted since 1944 there is a possibility that a wide variety of live, expended or inert explosive ordnance may have been discarded or buried within the area.



### 3.12 Ordnance Use

The research indicates that current and historical ordnance usage at this unit has been varied;

- Aircraft firing in butts;
- A barrack range;
- An EOD demolition area;
- A possible former machine gun training ground;
- A possible grenade training area;
- Two current dry training areas;
- The military use of Park Wood;
- Dry training within the Explosive Storage Area and on the airfield.

### 3.13 Previous EOC Tasks

December 1990 - RAF EOD completed a reconnaissance of Park Wood which reported the discovery of large quantities of fired small arms ammunition, fired grenade fuzes, grenade fly off levers, expended smoke grenades and booby trap simulators.

April 1991 - following the reconnaissance above RAF EOD completed a clearance of Park Wood that recovered; 1 x Live smoke grenade, 144 x rounds of Live blank small arms ammunition, 31 x Expended smoke grenades, 71 x Expended trip flares and 15kg of fired small arms ammunition.

May 1996 - RAF EOD completed a reconnaissance of an old car park at Grid Ref TL 710325 and a road at Grid Ref TL 711325, concluding that there was no physical evidence of utilisation or storage of explosive and therefore no justification for an EOC task.

October 2006 - Army EOD completed a reconnaissance of four areas, including the excavation of the backfilled duck pond - see para 3.10; no ordnance was recovered.

## 4 UXO HAZARD STATEMENT

Ordnance contamination may present a hazard if present, the magnitude of the hazard is related to;

- Quantity and type of explosive filling;
- The type of ammunition;
- Whether it is likely to burn or explode;
- Whether it is likely to produce fragmentation;
- Whether there is an immediate/short term toxic hazard.

Whilst ordnance related substances may have toxic properties, the long term toxic effects have not been considered in this report.



#### 4.1 Known UXO Hazards

Known current UXO hazards on this site are limited to small arms ammunition and pyrotechnics.

#### 4.2 Potential UXO Hazards

Given that this unit has been occupied by a variety of military units, civilian organisations and commercial companies since it opened in the early 1940's and there are only limited EOC tasks recorded, it is likely that there will be ordnance contamination on this unit. The types of ordnance will be related to the previous and current use of the unit, so small arms ammunition, pyrotechnics, aircraft ordnance and aircraft related pyro-mechanisms could reasonably be expected to be present on site.

#### 4.3 Potential for Injury

Whilst a fatal injury can never be ruled out, the most likely scenario, although remote, for injury at this site is the functioning of ordnance by unintended impact or deliberate tampering, leading to fragmentation, blast, flame, smoke and hot gas being emitted.

### 5 UXO PRELIMINARY RISK ASSESSMENT

Given the long military, police and commercial use of this unit and the restricted nature of the completed EOC tasks, it is assessed that it is likely that there is some ordnance contamination on this unit.

The main sources/locations of potential ordnance contamination at this unit have been identified as being;

- Small arms ammunition, in and around the various former ranges;
- Small arms ammunition and pyrotechnics, in and around any dry training areas;
- Small arms ammunition and pyrotechnics, in and around the army cadet training area in Park Wood;
- Small arms ammunition, pyrotechnics, aircraft ordnance and aircraft related pyro-mechanisms in and around the Explosive Storage Area.

There is currently no evidence to suggest that any Abandoned Bombs, Pipemines or Landmines remain on site.

There is currently no evidence that Chemical Weapons have been stored, buried, burnt or disposed of at this unit.

There is currently no evidence that Nuclear Weapons have been stored at this unit.

Taking into consideration the research results and the assessment above, DIO EOLM considers the risk of injury to those undertaking intrusive ground works at this location to be **LOW**, with the exception of works within the Explosive Storage Area where it is considered



to be **MEDIUM**, the risk to other site users during ground works is considered to be **VERY LOW**.

## **6**      **RECOMMENDATIONS**

It is likely that there is some ordnance contamination on this unit, based on the information currently available DIO EOLM therefore recommends the following actions to facilitate the disposal and redevelopment of the Wethersfield site;

- That an Explosive Ordnance Clearance should be completed within the boundaries of the former Explosive Storage Area.
- That an Explosive Ordnance Clearance should be completed within the boundaries of the former aircraft firing in butts.
- That all buildings/structures used for ordnance related training should be visually searched and certified free from explosives.
- That all areas used for ordnance related training should be visually searched and any live, expended or inert ordnance found disposed of in accordance with the current regulations.
- That all former and current explosive storage buildings and structures should be visually searched and certified free from explosives.
- That whilst MoD personnel continue to use, store or disposal of explosive ordnance at this location, that they should fully comply with all the applicable MoD policy and regulations.
- That during the disposal and redevelopment the contractors should follow the construction industry guidelines:

*CIRIA C681 Unexploded Ordnance (UXO) A guide for the Construction Industry.*





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## Defence Infrastructure Organisation

### UXO – Preliminary Risk Assessment

Ministry of Defence Police Wethersfield

July 2017

Report Number - [REDACTED]

*Report Written by:*

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

*Authorised for release:*

[REDACTED]

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