Defence Estates

Additional Sites at Sites D&E, DSDC Bicester

Land Quality Assessment

Phase One: Desk Study
DE Project No.: 13014

Final LQA Report

25 March 2011

Prepared by Entec UK Limited for the Ministry of Defence under commission FTS3/PTSELM/091

DEFENCE ESTATES
Delivering Estate Solutions to Defence Needs

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1	Draft Report	11 February 2011
2	Final Report	25 March 2011

Land Quality Statement for Additional Sites at Sites D&E, DSDC Bicester

Introduction and Terms of Reference

Entec UK Ltd (Entec) was commissioned by Defence Estates (DE) to undertake a Phase One Land Quality Assessment (LQA) of the Ministry of Defence (MOD) of two additional sites (hereafter referred to as Area 1 and Area 2 or 'the site') adjacent to Sites D&E, DSDC Bicester. This commission was carried out under the interim contracting arrangement and the FATS/3 framework between Entec and Defence Estates.

Site Location, Description and History

The site is located approximately 1.5 km south-east of Bicester town centre, Oxfordshire. Area 2 is located to the immediate north and east of the summit of Graven Hill, which is located at National Grid Reference (NGR) 458800 220500, and Area 1 is immediately north and east of Area 2. Area 1 is bounded on the north and east by DSDC Bicester D&E sites.

The site forms a semi circle of land surrounding the wooded summit of Graven Hill and covers a total area of approximately 49.1 ha. The majority of the site is fields used for agricultural grazing. The far south of the site adjacent to the St David's Barracks is used for sports fields. During the site walkover, the hard standing area in the north of Area 1 was being used as an overflow car park for the nearby Bicester Village retail outlet. In the wooded areas there were industrial bird feeders suggesting that these areas are used for rearing game birds.

Historic mapping and aerial photographs indicate that the entire DSDC Bicester site was built on agricultural land and woodland during the period 1941-1943 and was subsequently stocked with tanks, armoured cars, other vehicles and guns in preparation for the invasion of Europe in 1944. A 500 yard rifle range is marked on historic maps from 1898 and 1920 to the west of E2, with the rifle targets and butts marked at the northern boundary of Area 2. A plan of the depot dated June 1943 shows that the vast majority of the existing site infrastructure was in place by that time. A series of three workers camps (Camp Nos. 5, 6 and 7) are marked on the 1943 plan. Camp Nos. 5 and 6 are located on the Area 1 and Area 2 sites (Camp No. 5 in the west and Camp No. 6 in the east) and Camp No. 7 is the location of the present day St David's Barracks.

The 1950s maps and aerial photos show the presence of the Garrison Theatre, with the general field layout and wooded areas very similar to that of the present day. The 1966 and 1970 historical maps show that Camp No. 5 has been demolished and land use has reverted to agricultural fields, and the current overflow car park is marked on the maps. Camp No. 6 appears to still to be operational and a roadway loop has appeared to the east of Area 1. Camp No. 7 has been replaced with St David's Barracks. Aerial photos from 1975 show what appears to be the demolition of the Camp No. 6 area and by the 1980s the maps and aerial photographs show the site in the current layout.

Environmental Setting and Sensitivity

Geology/ Hydrogeology

According to the GeoInsight report, the solid geology consists of the Peterborough, Stewartby and Weymouth members (all mudstones) of the Oxford Clay Formation. Drift deposits are generally absent beneath the site. Beneath the Oxford Clay Formation, the Kellaways Sand and Kellaways Clay members of the Kellaways Formation both outcrop to the north of the Site. According to the Aquifer and Abstraction License Map provided in the EnviroInsight Report, the site is underlain by a Non-Aquifer (Negligibly Permeable), which appears to relate to the Oxford Clay Formation. The site does not fall within a groundwater Source Protection Zones (SPZ) and there are no SPZ marked within 1 km of the site.

Groundwater Sensitivity: Low

Hydrology

The closest surface water feature to the site is the Langford Brook, which is located approximately 600 m north of Area 1. The Langford Brook discharges into the River Ray approximately 3 km south-west of the site. During the site walkover, a number of dry surface water drainage ditches were noted, principally adjacent to the circular road between areas 1 and 2, although another ditch was noted running northwards within agricultural land in the north of Area 1. It is likely that these ditches would ultimately discharge to the Langford Brook. There are no records of surface water abstraction licenses within 1 km of the site.

Surface Water Sensitivity: Moderate/ Low

Ecology

The EnviroInsight Report provides details of three Environmentally Sensitive Areas (ESAs) within the vicinity of the site. These three areas are all part of the same ESA, the Upper Thames Tributaries. The closest of these areas is 450 m south-west of the site boundary. In addition, the site falls within a Nitrate Vulnerable Zone (NVZ).

Ecological Sensitivity: Moderate/ Low

Sources of Information

General mapping sources and public body records were consulted for this study, including topographical, geological and groundwater vulnerability maps of the area, the British Geological Survey (BGS), the local authority, emapsite™ GroundSure reports and aerial photographs from the National Monuments Record. Specialist radiological and explosive ordnance desk studies were commissioned. MOD sources of information include plans, previous reports as well as anecdotal information from site personnel.

Potential Site Contamination

Following the assessment of historical and current activities, there are several potentially contaminative activities which have been identified both on and off site. On site sources relate to the former firing range and Nissen hut camps, as well as areas of demolition and disturbed ground and asbestos within structures. Off site sources include the adjacent St David's Barracks. Most of the above identified sources are generally likely to be limited in their extent, with the possible exception of the former Nissen hut camps.

Environmental Risks

The risks to most human receptors, including current site users/ visitors, construction and maintenance workers, future residential/commercial/industrial users and neighbouring site users have been assessed in the range of **moderate** to **low**, with the **moderate** risks generally associated with future residential users and construction/ maintenance works from source areas including the former firing range and historical Nissen hut camps.

There is a generally **negligible** risk for contaminant migration to groundwater due to the generally negligible permeability strata beneath the site. It is likely that the on-site ditches will ultimately discharge to the Langford Brook, some 600 m north of Area 1. The risks to surface water have therefore been assessed as generally **moderate/low**.

Although a number of ecologically sensitive receptors have been identified in the vicinity of the site, given the limited potential contamination identified on site and the dilution and attenuation of contaminants given the distance of the identified sources to potential receptors, the risk to ecological receptors and vegetation is assessed as generally **negligible** to **low**. Similarly, the risks to agricultural receptors have been assessed as **negligible** to **low**, although a **moderate/low** risk is assessed for unexploded ordnance within the former rifle range.

The potential presence of localised contamination at the site generally gives rise to **low** to **negligible** risks to buildings and buried services.

Overall Land Quality and Suitability for Redevelopment

In general, it is considered that the land quality at the majority of the site is likely to be generally good, with isolated areas of potentially poor land quality associated with the principal areas used for the former firing range, historical Nissen hut camps and infilling along with demolition and disturbed ground. Therefore, the site is considered to be suitable for its present (predominantly agricultural) use given the current site configuration.

Due to the uncertainty regarding the nature of the some of the areas, including the former firing range, historical Nissen hut camps and infilling along with demolition and disturbed ground, these potential land quality issues have carried forward into the risk assessment. In areas associated with these current and former potentially contaminative uses it is likely that land quality will have been impacted and redevelopment proposals, especially those related to a residential with gardens end use, will need to be tailored to the potential contamination present in these areas.

It is considered likely that construction/ redevelopment workers will come into direct contact with areas of potential contamination and all workers should be made aware of potential risks that exist at the site and take suitable measure to avoid or mitigate potential risk. Appropriate personal protective equipment (PPE) should be used and good working practices adhered to during any future investigation or redevelopment work at the site.

Development may involve the removal of the subsurface infrastructure and obstructions. Remediation may be required if following the removal of infrastructure the soils and waters are found to have been impacted by any contamination. Development may also require the removal or alteration of building foundations, building fabric, underground pipework/services and underground voids.

Development of the land is also likely to involve the removal of buildings present on site, some of which are known to contain asbestos within the building fabric. Disposal of all asbestos containing material would need to be carried out by a specialist contractor.

Finally, it should be noted that the high sulphate concentrations present within the Oxford Clay present beneath the site are likely to be detrimental to concrete foundations. Therefore, any new foundations will likely require construction with a Sulphate Resistant Portland Cement.

Contents

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Glossary of Terms

Site Specific

BFI	Bulk Fuel Installation
DE	Defence Estates
DSTL	Defence Science and Technology Laboratory
DSTL RPS	DSTL Radiation Protection Service
MOD	Ministry of Defence
MT	Motor Transport
OSU	Operational Service Unit
OWI	Oil Water Interceptor
POL	Petrol, Oil and Lubricants
RPC	Regional Prime Contractor
UXO	Unexploded Ordnance
WWII	World War 2
QM	Quarter Master

Environmental

ACM	Asbestos Containing Material
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
bgl	below ground level
BGS	British Geological Survey
CLEA	Contaminated Land Exposure Assessment
DEFRA	Department for Food and Rural Affairs
EA	Environment Agency
EPA	Environmental Protection Act 1990
GAC	Generic Assessment Criteria
GQA	General Quality Assessment (Surface Water)
GQRA	Generic Quantitative Risk Assessment
HPA	Health Protection Survey

LQA	Land Quality Assessment
ESA	Environmentally Sensitive Areas
NGR	National Grid Reference
NNR	National Nature Reserves
NRPB	National Radiological Protection Board
NGR	National Grid Reference
OS	Ordnance Survey
PAH	Polycyclic Aromatic Hydrocarbons
Part 2A	Part 2A of the Environmental Protection Act (1990)
PCB	Polychlorinated Biphenyls
PPE	Personal Protective Equipment
QRA	Quantitative Risk Assessment
SAC	Special Area of Conservation
SPA	Special Protection Areas
SPZ	Source Protection Zone (groundwater)
SSSI	Site of Special Scientific Interest
TPH	Total Petroleum Hydrocarbons

1. Introduction

1.1 Terms of Reference

Entec UK Ltd (Entec) was commissioned by Defence Estates (DE) to undertake a Phase One Land Quality Assessment of two additional sites (hereafter referred to as Area 1 and Area 2 or 'the site') adjacent to Sites D&E, DSDC Bicester. This commission was carried out under the interim contracting arrangement and the FATS/3 framework between Entec and Defence Estates.

The purpose of the assessment is to provide information on the site as well as any health and environmental risks that any potential contamination may present to existing site users and in changing the use of the land.

1.1.1 Aims and Methodology

The aim and purpose of the Phase One Land Quality Assessment (LQA) report is to collate and review desk study information on the likely ground and contamination conditions at the site to enable a health and environmental risk assessment to be undertaken. The assessment also addresses the potential for ground contamination to arise from the demolition of buildings and structures presently on the site. The objective of the risk assessment is to identify any potential health or environmental risks and liabilities posed by the site which may affect its valuation or future use and to describe the scale of any identified risks.

The following methodology was adopted:

- A site reconnaissance visit was carried out to record potentially contaminative features and operations on site and to gather any evidence of past contaminative uses;
- During the site reconnaissance, potential pathways and environmental receptors were identified, both on the site and within the immediate surrounding area;
- Historical maps, aerial photographs and site layout plans indicating areas where potentially contaminative activities may have been undertaken were inspected;
- Environmentally pertinent information was gathered regarding the site and the surrounding locality from a variety of sources including the Environment Agency (EA), the Local Authority (LA), British Geological Survey (BGS) and Dstl Radiological Protection Service (DRPS); and
- Present day maps, geological records, and groundwater information were inspected.

The findings of the study are based on the information made available to Entec by the MOD and personnel, together with information obtained from public domain and other sources.

1.1.2 Site Management and Future Use

It is understood from Defence Estates that the site is being considered for disposal to a currently unconfirmed end use. Consequently, this report considers the risks applicable to various potential end uses, including commercial/ industrial, public open space and residential with gardens.

1.2 Site Location

The site is located approximately 1.5 km south-east of Bicester town centre, Oxfordshire. Area 2 is located to the immediate north and east of the summit of Graven Hill, which is located at National Grid Reference (NGR) 458800 220500, and Area 1 is immediately north and east of Area 2. Area 1 is bounded on the north and east by DSDC Bicester D&E sites.

Access to the site is made via a dedicated access road off a roundabout on the A41 to the immediate south of Bicester.

The location of the site is shown in Figure 1.

1.3 Site Description

1.3.1 General

The site forms a semi circle of land surrounding the wooded summit of Graven Hill. The site covers a total area of approximately 49.1 ha (Area 1, 25.5 ha and Area 2, 23.6 ha) with buildings, roads and other hardstanding covering less than 5 % of the site area and the balance as soft landscaping, fields and woodland.

A site layout plan is included as Figure 2.

1.3.2 Site Visit

An Entec representative conducted a site walkover on 29 December 2010. The site was closed for the Christmas break so on site interviews with site staff were not possible. However, hardcopy and electronic data was obtained from site staff and LQA Sponsor during the previous 2010 Entec Phase One and Two LQA of the adjacent D&E sites.

The Entec representative was able to access the vast majority of the site, with the exception of the inside of some of the buildings, which were locked or otherwise inaccessible at the time for health and safety reasons.

Selected photographs taken during the site walkover are presented as Annex A to this report.

General Land Use

The majority of the site is fields used for agricultural grazing. The far south of the site adjacent to the St David's Barracks is used for sports fields. During the site walkover, the hardstanding area in the north of Area 1 was being used as an overflow car park for the nearby Bicester Village retail outlet, the surface of which appeared to be broken in places (see Plate 9 in Annex A). In the wooded areas there were industrial bird feeders suggesting that these areas are used for rearing game birds.

Site Buildings and Activities

With reference to Figure 2, Table 1.1 summarises the buildings/activities within each area of the site.

Table 1.1 Site Buildings and Activities

Building No.	Description and Activities
Area 1	
Garrison Theatre	Two storey brick building with asbestos roof. Currently unused and boarded up.
Small brick building north of Garrison Theatre	Small brick building. Currently unused and boarded up.
Sports field changing rooms	Small temporary building used as changing facilities.
Area 2	
There are no buildings on Area 2.	

Evidence of Former Structures, Fill Material and/or Disturbed Ground

The predominant surface cover at the site is a mixture of soft landscaping and woodland. Although some snow still remained on the ground, evidence of several former structures, fill material and/or disturbed ground was noted during the site walkover, and, with reference to historic maps and plans is summarised in the following table and on Figure 2.

Table 1.2 Site Former Structures, Fill Material and/or Disturbed Ground

Building No.	Description
Area 1	
Eastern part of Area 1	Historical maps and photos show this area as camp between 1943 and 1975. The majority of the camp structures have been removed. However, there is a 10 x 10 m concrete plinth with a brick surround (representing a probable former building) and a overgrown 10 x 20 m concrete plinth, (representing a probable area of hardstanding).
Western part of Area 1	Historical maps and photos show this area as camp between 1943 and 1966. The majority of the camp structures have been removed. However, there are two areas of building rubble just off the circular road and in a wooded area near the very west of Area 1.
Area 2	
Eastern part of Area 2	Historical maps and photos show this area as camp between 1943 and 1975, with no evidence of any remaining structures during the site walkover.
Western part of Area 2	Historical maps and photos show this area as camp between 1943 and 1966, with no evidence of any remaining structures during the site walkover.
Range Target	There earliest available maps (1898) show a 500 yard range across the site with the target at the north of Area 2. The Target area is now scrubland with slightly raised banks.

Waste

There is evidence of ad-hoc waste disposal at the rear of the changing rooms on the sports field in the southern part of Area 1, which appear to consist of building materials including plasterboard, timber and paint containers (see Plate 4 in Annex A). Scrap timber, barbed wire and apparently empty small calibre ammunition containers were noted at the rear of a container on the car park in the north of Area 1 (see Plate 8 in Annex A). Scrap metal and vehicle wheels were also noted in woodland directly to the south of the roadway loop in Area 1.

Water Mains and Waste Water Drainage

Plans of buried water and waste water services were made available to Entec by Kelda Water Services, the Project Aquatrine Contractor for the DSDC Bicester site, during the 2010 Phase Two LQA. The plans show a water main adjacent to the circular road separating Area 1 and Area 2, along with other water mains radiating from the water main adjacent to the road.

Foul sewerage and storm drainage from the vicinity of the Garrison Theatre drains to the north towards DSDC Bicester E Site. Foul sewage and storm drainage are also shown in the agricultural field in the east of Area 2, which may have been related to the former camps situated in this area.

Topography

Area 1 is located on the generally flat surroundings of Graven Hill, with Area 2 located on the lower slopes of Graven Hill. The summit of Graven Hill is at 115 m AOD with most of the site between approximately 75 and 95 m AOD.

1.3.3 Site Boundaries

Land uses surrounding the site are summarised in Tables 1.3 and 1.4 below.

Table 1.3 Area 1 Boundaries and Adjacent Land Uses

Boundary	Adjacent Land Use	Nearby Land Use
North	Military (DSDC Bicester E Site), railway	A41 road, agricultural and residential
East	Military (DSDC Bicester D&E Sites)	Predominantly agricultural with some residential
South	Area 2, DSDC Bicester E Site and woodland	Military (DSDC Bicester D Site)
West	Military (St David's Barracks and DSDC Bicester E Site)	Agricultural

Table 1.4 Area 2 Boundaries and Adjacent Land Uses

Boundary	Adjacent Land Use	Nearby Land Use
North	Area 1, Military (DSDC Bicester E Site), railway	A41 road, agricultural and residential
East	Area 1, Military (DSDC Bicester D Site)	Predominantly agricultural with some residential
South	Woodland	Military (DSDC Bicester D Site)
West	Area 1, Military (St David's Barracks and DSDC Bicester E Site), railway	Agricultural

1.3.4 Tenants, Lodgers and Enclaves

According to mapping provided by DE, the entire site appears to be owned by the Land Command Top Level Budget holder (TLB) of MOD. However, it would appear that from additional June 2010 mapping made available by DE that approximately two-thirds of Areas 1 and 2 are 'Full Agricultural Tenancy' land, which appears to equate to all of the open agricultural land that makes up the majority of the site.

1.4 Site-Sourced Information

Additional environmentally pertinent information relating to the site was requested from the site contact. This information is summarised in the following sections.

1.4.1 COSHH Register and Material Safety Data Sheets

According to site staff, each building at the DSDC Bicester site has an individual hardcopy COSHH Register. It has not been possible to view the COSHH register(s) for the buildings on

site, although it is understood from a conversation with the Site Manager that the COSHH records are generally for minor quantities of substances kept in each building.

1.4.2 Asbestos Surveys

There are very few buildings on site, with the exception of the Garrison Theatre (see Plate 1 in Annex A) and a limited number of small brick buildings in the vicinity of the theatre and the changing rooms in the south of the site (see Plate 4 in Annex A).

From the site walkover, it appears that signage has been placed around the Garrison Theatre warning of asbestos within the building, and access to the building has been prevented.

Conversations with PriDE, (the site Regional Prime Contractor) who hold asbestos surveys and registers for the DSDC Bicester site, revealed that the only buildings within areas 1 and 2 for which asbestos surveys are available are the Garrison Theatre (also referred to as Building 1 Garrison Briefing Facility) and the adjacent portakabin WC (referred to as building SDBB02GHT002). PriDE is not aware of asbestos within the other buildings in areas 1 and 2.

Entec were provided with copies of the above asbestos surveys by PriDE, which are reproduced as Annex H to this report.

In summary:

- Asbestos containing materials (ACMs) were detected in many locations within the Garrison Theatre, as asbestos cement, insulating board, gaskets and liners, fire blanket, pipes, panels, cowls, rope, fascia and cisterns. Most of the asbestos identified was chrysotile (white asbestos), although amosite (brown asbestos) was identified in a sample of a cistern. It was recommended that much of the ACMs identified could be 'marked and managed', although it was recommended that the asbestos insulating board, fire blanket, cement debris, pipe lagging and rope are removed. It was recommended that the 'durasteel panels' in the roof void are to be encapsulated/ enclosed; and

- No asbestos containing materials (ACMs) were detected in the portakabin building.

1.4.3 Ordnance

As part of this Phase One LQA, an updated Explosive Ordnance Threat Assessment (EOTA) was commissioned. The EOTA was undertaken by BACTEC International Ltd (BACTEC), a specialist consultancy. The EOTA concluded as follows:

- DSDC Bicester has been a military depot for over 65 years. No evidence could be found to indicate that the purpose of the depot was ever for the storage of explosive ordnance. Nevertheless, as with all historic military facilities, there is always a residual risk of explosive ordnance contamination;

- During the war years, the facility would have been defended, and weaponry in the form of small arms and land service ammunition (LSA and SAA) would have been stored and available for use. Furthermore, as a result of the military association with the area, it is likely that the land on and around the depot would have been utilised for ground training exercises historically;

- The ‘house-keeping’ of WWII facilities is known to have often been poor with unwanted and unused items of explosive ordnance frequently buried, burnt, lost or otherwise discarded within a facility perimeter. Given the available history of the site, the likelihood of this having occurred within the perimeter of DSDC Bicester itself is not considered high, but cannot be entirely discounted. BACTEC consider that the risk of encountering LSA and SAA in Proposed Additional Areas 1 and 2 [the subject site of this LQA Report] is somewhat higher than the background level due to the areas use for US ‘Bolero’ Army Camps during WWII – it is very unlikely that explosive ordnance would have been stored in large quantities within these camps, but it is likely to have been present and available for use, and potentially therefore buried and/or discarded within these areas;

- It should be noted that several search and clear operations have been undertaken at several locations on the site by 33 Engineer Regiment (EOD) in the post-war period. Although nothing was found, the requirement for and completion of such operations at the cost of the MoD indicates that there was a credible perceived threat/possibility of explosive ordnance contamination being present. It should also be noted that only small sections of DSDC Bicester have been subject to such searches, those searches only providing 12.5% clearance;

- Research indicates that bombing density over the Bicester area was low. Very few references could be found to raids over the region despite there being a number of high profile RAF targets present. ARP records for COD Bicester could not be located (reports of bombing on military land were generally made by military personnel and kept separate from civilian records). It has therefore not been possible to confirm that the facility was not attacked. However, work on the construction of the depot did not commence until after the main period of bombing in this part of the UK;

- The depot employed thousands of people and for the latter part of WWII at least, would have been manned twenty-four hours a day. It is considered very unlikely that evidence of unexploded ordnance would have been overlooked across the site subsequent to construction work beginning in June 1941. Prior to this date, the site comprised open, agricultural land on which it is conceivable that unexploded bombs could have been overlooked had they been dropped. However, given the low bombing density in this part of the county and lack of viable targets within the site area in 1940/early 1941, the likelihood of unexploded bombs having been dropped is considered minimal.

Entec is content with BACTEC’s EOTA for the site. The potential risks to the identified sensitive receptors from ordnance are further discussed in Section 4 and Annex G of this report.

The full EOTA is included as Annex B to this report.

1.4.4 Ionising Radiation Sources and DSTL Radiological Desk Study

As part of the Phase One LQA for the adjacent DSDC Bicester Sites D&E, undertaken in early 2010, a desk study was commissioned through the Dstl Environmental Services Department (Dstl ESD). As part of this study, Dstl ESD conducted a search of records relating to any radiological contamination issues at the whole DSDC Bicester site, which includes the subject sites of this Phase One LQA.

Dstl ESD records show that a very large number of items of standard military equipment containing radioactive material have been stored at the DSDC Bicester site from at least 1994 to the present day; the site being a major distribution centre for the main storage facility at DSDC Donnington. These include various pieces of instrumentation and check sources containing the following radionuclides: tritium (H-3), nickel-63 (Ni-63), thorium-232 (Th-232), strontium-90 (Sr-90) chlorine-36 (Cl-36) and cobalt-57 (Co-57). In addition, an instrumentation dial from a Canberra (jet aircraft) cockpit containing radium-226 (Ra-226) has been stored on site since at least 1999.

The desk study concluded that the likelihood of contamination being present on other parts DSDC Bicester is deemed to be moderate. In particular, if any additional burning grounds, disposal areas or workshops are identified on the site, these should be subject to a radiological survey.

Entec is content with DSTL's radiological desk study for the site. The potential risks to the identified sensitive receptors from radiological artefacts are further discussed in Section 4 and Annex G of this report.

The full Dstl ESD desk study is included as Annex C to this report.

1.5 Site History

1.5.1 Historical Landuse Summary

Historic mapping and aerial photographs indicate that the entire DSDC Bicester site was built on agricultural land and woodland during the period 1941-1943 and was subsequently stocked with tanks, armoured cars, other vehicles and guns in preparation for the invasion of Europe in 1944. A 500 yard rifle range is marked on historic maps from 1898 and 1920 to the west of E2, with the rifle targets and butts marked at the northern boundary of Area 2. A plan of the depot dated June 1943, included in the 1998 Aspinwall Phase One LQA factual report, shows that the vast majority of the existing site infrastructure was in place by that time. The June 1943 plan shows that, at the time, D Site was the site armaments depot, whereas E Site was the small arms sub-depot. A series of three workers camps (Camp Nos. 5, 6 and 7) are marked on the 1943 plan. Camp Nos. 5 and 6 are located on the Area 1 and Area 2 sites (Camp No. 5 in the west and Camp No. 6 in the east) and Camp No. 7 is the location of the present day St David's Barracks. The Aspinwall Phase One LQA factual report indicates that these camps consisted of Nissen huts and were used to accommodate troops and depot workers.

Historic aerial photographs and mapping from 1947 and 1950 show the majority of Areas 1 and 2 is used for the worker camps consisting of a large number of small buildings linked by roadways. The 1950s maps and aerial photos show the presence of the Garrison Theatre, with the general field layout and wooded areas very similar to that of the present day.

The 1966 and 1970 historical maps show that Camp No. 5 has been demolished and land use has reverted to agricultural fields, and the current overflow car park is marked on the maps. Camp No. 6 appears to still to be operational and a roadway loop has appeared to the east of Area 1. Camp No. 7 has been replaced with St David's Barracks.

Aerial photos from 1975 show what appears to be the demolition of the Camp No. 6 area and by the 1980s the maps and aerial photographs show the site in the current layout.

Selected historic aerial photographs are included as Annex D.

1.6 Environmental Setting and Sensitivity

1.6.1 Geology

Geological information on the site is provided within the emapsite™ GroundSure GeoInsight Report obtained as part of the site data acquisition exercise, a copy of which is included in Annex E. The geological information provided in the GeoInsight report is derived from the British Geological Survey (BGS) Digital Geological map of Great Britain and 1:50 000 scale, Sheet 219.

According to the GeoInsight report, the solid geology consists of the Peterborough, Stewartby and Weymouth members (all mudstones) of the Oxford Clay Formation. Drift deposits are generally absent beneath the site. Beneath the Oxford Clay Formation, the Kellaways Sand and Kellaways Clay members of the Kellaways Formation both outcrop to the north of the Site.

Beneath the Oxford Clay and Kellaways Formation is the Cornbrash Formation (predominantly calcareous shelly mudstones and fossiliferous limestones) which outcrops to the north-west and south-east of the site.

No faults are marked within the site boundary. The closest fault to the site is marked within 200 m of the south-eastern boundary of the adjacent DSDC Bicester D Site, with a strike trending north-west to south-east.

The natural ground subsidence section of the GeoInsight Report presents the following assessment of risks by the BGS for potential geological hazards that may be present in the general area of the site:

- Potential for shrink-swell clay ground stability hazards: Moderate (source: BGS);
- Potential for landslide ground stability hazards: Very Low to Moderate (source: BGS);
- Potential for ground dissolution of soluble rocks stability hazards: Very Low (source: BGS);
- Potential for compressible deposits stability hazards: Negligible to Very Low (source: BGS);
- Potential for collapsible deposits stability hazards: No Hazard to Negligible (source: BGS);
- Potential for running sand stability hazards: Negligible (source: BGS);
- Radon: The site is not within a radon Affected Area, as less than 1 % of properties are above the Action Level. No radon protection measures are necessary (sources: Health Protection Agency and Building Research Establishment); and
- Mining: There are no historical mining and/or coal mining areas within 1 km of the site boundary. The maximum hazard rating of subsidence relating to shallow mining within the site is Negligible. There are no non-coal mining cavities, natural

cavities, brine extraction areas, gypsum extraction areas, tin mining areas or clay mining areas within 1 km of the site boundary (sources: GroundSure, Coal Authority, BGS, Peter Brett Associates mining cavities and natural cavities databases, British Gypsum and relevant tin and clay mining records).

Ground Workings

According to the GroundSure GeoInsight Report, included within Annex E of this report, there are no records of any historic surface ground workings within the site boundary.

In addition to the above, the site Estate Development Plan (v1.1, dated 15 August 2008) states in Section 16.38 that: *'High sulphate concentrations in clay which are detrimental to concrete foundations, require construction with a Sulphate Resistant Portland Cement'.*

1.6.2 BGS Borehole Records

The GroundSure GeoInsight report provides details of six exploratory holes within the site boundary. Of these exploratory holes, four appear to be trial pits. Of the remaining two boreholes, both are recorded in the south-eastern part of the site.

As the adjacent DSDC Bicester D&E sites have already been subject to several stages of intrusive site investigation, borehole logs were not ordered from the BGS. The ground conditions encountered during the June 2001 and September 2010 Phase Two LQAs generally concur with the BGS geological mapping, indicating Made Ground in places over Oxford Clay. The thickness of the clay has not been fully established, although the Aspinwalls 2001 Phase Two LQA report states that: *'The Oxford Clay is an estimated 15m minimum thickness below DSDC Bicester and there is no hydraulic continuity with the underlying Great Oolite Aquifer'.*

1.6.3 Groundwater

Hydrogeological information on the site is provided within the emapsite™ GroundSure EnviroInsight Report obtained as part of the site data acquisition exercise, a copy of which is included in Annex E.

According to the Aquifer and Abstraction License Map provided in the EnviroInsight Report, the site is underlain by negligibly permeable strata, which appears to relate to the Oxford Clay Formation.

Beneath the Oxford Clay and Kellaways formations, the Cornbrash Formation (part of the Great Oolite Group) that outcrops to the north-east and south-west of the site, is also classified as a Secondary 'A' Aquifer of Low Leaching Potential.

According to the site Estate Development Plan (EDP) (v1.1, 15 August 2008) groundwater levels, although recorded at 70m Above Ordnance Datum (AOD) are within the aquifer of the Great Oolite Group (approximately 30 m below ground level), comprising limestone and sands. The EDP states that this confined aquifer is under high pressure conditions, which if penetrated by a borehole will produce artesian conditions with a head of approximately 20 m. The September 2010 Entec Phase Two LQA recorded groundwater levels in the monitoring boreholes installed across DSDC Bicester D&E sites at between 63 and 71mAOD, which equates to a minimum of 4 metres below ground level in the lowest areas of the site.

The site does not fall within a groundwater Source Protection Zones (SPZ) and there are no SPZ marked within 1 km of the site.

Groundwater Abstraction Licenses

The EnviroInsight Report provides details of seven groundwater abstraction licenses within the vicinity of the site. The closest is 700 m to the north-east of the site and relates to a general farming and domestic supply from a borehole at Wretchwick Farm, Bicester.

Potable Water Abstraction Licenses

The EnviroInsight Report provides details of three potable water abstraction licenses within the vicinity of the study site, of which none are within 1 km of the site.

Groundwater Sensitivity: Low

1.6.4 Surface Water

The closest surface water feature to the site is the Langford Brook, which is located approximately 600 m north of Area 1. The Langford Brook discharges into the River Ray approximately 3 km south-west of the site.

During the site walkover, a number of dry surface water drainage ditches were noted, principally adjacent to the circular road between areas 1 and 2, although another ditch was noted running northwards within agricultural land in the north of Area 1. It is likely that these ditches would ultimately discharge to the Langford Brook.

The EA record the quality of the Langford Brook in two reaches within approximately 1 km of the site. The first (Stratton Audley - Bicester STW) is rated by the EA as chemical grade 'D' (fair) and biological grade B (good). The second reach (Bicester STW - Ray) is rated as chemical grade 'C' (fairly good) and biological grade B (good).

Surface Water Abstractions

There are no records of surface water abstraction licenses within 1 km of the site.

Discharges

There are records of thirty-three Licensed Discharge Consents within the vicinity of the site, nineteen of which relate to permits that are now revoked. Details of the extant permits are as follows:

- Four relate to the discharge of sewage effluent by the adjacent DSDC Bicester D&E sites to the Langford Brook;
- Three relate to the discharge of sewage effluent by the adjacent DSDC Bicester D&E sites to the River Ray;
- Three relate to storm water or final/treated sewage discharge by Bicester STW to the Langford Brook;
- One relates to discharge of final/treated sewage by Wretchwick Farm to a tributary of the Langford Brook;

- One relates to miscellaneous discharges by Bicester Retail Park to a tributary of the Langford Brook;
- Two relate to discharge of final/treated sewage by Alchester House to a tributary of the Gagle Brook.

During a conversation with a representative of Kelda Water Services, the Aquatrine Contractor for the wider DSDC Bicester site, it was indicated that no discharge consents related to the adjacent DSDC Bicester D&E sites site are still extant.

Flooding

The Surface Water Flood Map provided with the EnviroInsight Report shows that none of the site is within Zone 2 and Zone 3 floodplains.

There are BGS groundwater flooding susceptibility flood areas within the vicinity of the site, and a high groundwater flooding susceptibility is indicated. This means that due to the underlying geology, the area groundwater flooding hazard should be considered in all land use planning decisions. The BGS confidence rating for the groundwater flooding susceptibility areas is moderately high; meaning the groundwater flooding susceptibility areas can be used with confidence.

Surface Water Sensitivity: Moderate/ Low

1.6.5 Ecology

The EnviroInsight Report provides details of three Environmentally Sensitive Areas (ESAs) within the vicinity of the site. These three areas are all part of the same ESA, the Upper Thames Tributaries. The closest of these areas is 450 m south-west of the site boundary.

In addition, the site falls within a Nitrate Vulnerable Zone (NVZ).

Ecological Sensitivity: Moderate/ Low

1.7 Additional Information

1.7.1 IPPC Authorisations

According to the EnviroInsight report, there are records of a single Integrated Pollution Prevention and Control (IPPC) Authorisation within 500 m of the site. This authorisation appears to be related to a poultry farm (Ambrosden Farm) located 300 m south-east of Area 1.

1.7.2 List 2 Dangerous Substance Inventory Sites

According to the EnviroInsight report, there are records of a List 2 Dangerous Substance Inventory Site within 500 m of the site. This relates to the Bicester STW 460 m north-west of the site and the 'authorised substance' is iron.

1.7.3 Environment Agency Recorded Pollution Incidents

According to the EnviroInsight report, there are records of two recorded pollution incidents within 500 m of the site. The first relates to a diesel spill on site on 21 April 2003 at the

adjacent DSDC Bicester Site D (approximately 300 m from Area 1) and was a Category 2 (Significant) incident with regard to the impacts to land and water. The second incident relates to spillage/ discharge of 'other sewage material' on 17 April 2002 at a location 500 m north-east of Area 1. This incident was a Category 3 (Minor) and Category 4 (No Impact) incident with respect to the impacts to water and land respectively.

1.7.4 Waste Sites

According to the EnviroInsight report, there are records of a historic landfill 1 km north of Area 1 at NGR 458800 221900. The operator was Ploughley Rural District Council and the waste types included inert, industrial, commercial and household.

In addition, there are records of four 'other waste sites' within approximately 1.5 km of the site, all of which are metal recycling sites. The closest site is 1 km north of Area 1 and is operated by McGregor Railway Services Ltd for a metal recycling site with an annual throughput of between 25 000 and 75 000 tonnes. The Waste Management License number for this site is 86100.

1.7.5 Petrol and Fuel Sites

According to the EnviroInsight report, there are records of an 'obsolete' petrol station 1.5 km south-east of the site boundary, which is known as Three Corners Garage. From publicly available street-level imagery, Three Corner Garage now appears to be a MOT Test Centre and car/van sales centre with no obvious signs of being a petrol station.

1.7.6 Archaeological Issues

According to the Multi-Agency Geographic Information for the Countryside (MAGIC) website (www.defra.magic.gov.uk, accessed 25 January 2011) there are records of two Scheduled Ancient Monuments (SAMs) within 1 km of the site, details of which are as follows:

- Alchester Roman Site (460 m south-west of the site); and
- Wretchwick Deserted Medieval Settlement (two areas 530 m and 810 m north-east of the site).

In addition, historic mapping shows St David's Barracks to be the site of a battle between Danes and Saxons, and a roman road crossing the site in an approximate south-west to north-east orientation in the far west of Area 1.

1.7.7 Local Authority Environmental Services Department

A response for an information request for Sites D&E at DSDC Bicester was received by Entec from Cherwell District Council Environmental Service Department (ESD) on 19 January 2010. This search includes a 500 m search buffer around Sites D&E, which appears to overlap the entire area of the site.

The response is extensive, amounting to a 52 page report using information gathered from the Landmark Group and the BGS, as well as records held within Cherwell ESD. The response includes detailed information on the site geology (including information on borehole records), hydrogeology and hydrology, naturally occurring arsenic (no naturally occurring arsenic at the

site), historical mapping, infilled sites, landfill sites, licensed waste management facilities, environmentally sensitive data, sites of environmental importance and heritage sites.

The data from Landmark and BGS is noted by Cherwell ESD to be current up to 01/04/07. Therefore, it has been assumed that the majority of information provided is superseded by the emapsite™ reports, which was commissioned by Entec in January 2010. However, information on historical land use, infilled ground, site of environmental importance and pollution incidents from the Cherwell ESD has been included in this section for the sake of completeness.

On the historical land use maps covering the periods 1899-1905 and 1913-1926, an 'MOD firing range' is shown in the centre-north of Area 2. The firing range is not explicitly shown on the earlier or later historical land use maps, although the 1891-1912, 1904-1939 and 1914-1943 maps also appears to show 'Military Land' in the same area, which is assumed to also relate to the firing range. The 1940-1970 and 1970-1996 show the entire site as 'Military Land'.

'Unknown Infilled Ground' is marked on an infilled sites plan (c.1840-1997) included with the Cherwell ESD report in three locations within the site boundary: two locations in the north of Area 1 and one location in the far south of Area 1.

The woodland to the immediate south of Area 2 is shown on the 'Sites of Environmental Importance' map as ancient woodland (County Wildlife site).

No pollution incidents are recorded on site, with the closest pollution incident marked approximately 360 m south-west of Area 1, adjacent to Building D4 at DSDC Bicester D Site. This incident is classed as a 'minor current pollution incidents (2001-)' with no further details provided. There are also records of nineteen historical and one current pollution incidents within the 500 m search buffer, which generally relate to spillages of sewage, oils, fuels and poultry manure, the closest of which is almost immediately off site to the north-east of Building D9 at DSDC Bicester D site.

The full Cherwell ESD response is included as Annex F to this report.

1.8 Previous Assessments

1.8.1 BOD Bicester Land Quality Assessment Phase One: Desk Study, Aspinwall & Company Ltd, August 1998

This desk study, presented in three volumes (Factual Report, Interpretive Report and Land Quality Statement) covers the entire DSDC Bicester site, which is referred to in the reports as the Base Ordnance Depot (BOD) Bicester.

A number of current and historical activities/issues are identified that may give rise to contamination. Those specific to the site include the old firing range in the centre-north of Area 2, for which there are no clearance records. The report suggests that potential small calibre explosive ordnance could be present in near surface soils at this former range.

The reports also states that the roof of the Garrison Theatre consists of asbestos sheets and gutters, which are noted as being in 'poor' condition in need of replacement according to the September 1996 inspection. There are also records of asbestos in many of the buildings and the underground water main at the St David's Barracks. The report states that the asbestos register

for the site recommends replacement in approximately 50% of the locations where asbestos has been identified, which was taking place as an ongoing programme at the time of writing.

A hand tracing of site plan dating from 1943 included with the report indicates that the vicinity of the site as 'Camp No. 5' and 'Camp No. 6'. The report states that these camps were used to accommodate troops and depot workers, presumably during WWII and the post war period.

It is understood from the reports that large quantities of explosive ordnance have never been stored or used at the site, although small calibre explosive ordnance could be present in near surface soils at the former firing range. The report goes on to state that targets from a pre 1950's rifle range were located in the same area.

In addition, the reports state that the only radioactive sources kept on site are night sights and related equipment at the barracks sites at DSDC Bicester.

The environmental risk assessment carried out as part of the reports concludes that the risk to current site users/workers is low, unless ground conditions are disturbed. Contractors undertaking intrusive works at the site who come into contact with contaminated materials may be at risk, and appropriate health and safety precautions should be adopted.

The risk to soils from metals and explosives in the former rifle range was assessed as moderate, and the risk to humans from asbestos was assessed as moderate/low, but negligible for current users providing it remains undisturbed. The risk to soils, surface waters and humans from PCB containing oils from transformers was assessed as low. The greatest risks identified were to surface waters, which provide a preferential route for the migration of any pollutants present in surface run-off. Groundwater pollution risks were not considered significant at the site.

In summary, Aspinwalls state that the 'vast majority' of the DSDC Bicester site is unlikely to have been contaminated by historical activities, but that current activities, generally associated with fuel storage, may give rise to localised contamination of soils and surface water. A number of sources of potential contamination were identified, few of which are located within Areas 1 or 2, which include the former range, structure(s) with asbestos in their fabric and electrical transformers. Aspinwalls state that it is unlikely that there would be any major constraints to further developments at the site proposed as part of ongoing operations, although there may be a requirement to remove localised sources of ground contamination prior to building construction. If the site was to be sold for redevelopment for commercial/industrial use, some limited remedial works would likely be necessary. In addition, although 'large tracts' of the site would potentially be suitable for housing with gardens, some areas of the site (which particularly relate to the depot areas at the adjacent D&E sites) would not be suitable for housing without some form of remedial work.

1.8.2 DSDC Bicester Land Quality Assessment Phase Two: Intrusive Survey, Enviros Aspinwall Ltd, June 2001

This report, presented in two volumes (LQA Report and Technical Note) covers the potentially contaminated areas of the site prioritised for investigation from the previous Phase One LQA reports. None of the potentially contaminated areas prioritised for investigation are within Areas 1 or 2.

1.9 Historical MOD Practices

1.9.1 On Site

During the development and function of the site, historical MOD practices and activities may have led to contamination issues. The site has had a generally consistent land use since development in the 1940s. Potential activities that may have led to contamination include the following:

- Unrecorded disposal of waste materials in the ground. The MOD historically tended to opt for local waste disposal practices;
- Burning grounds and disposal of ash/ clinker waste, often to ground, as an aggregate material;
- Demolition of former buildings which may have contained ACMs and subsequent retention of some demolition rubble as fill or founding aggregate;
- Use and storage of fuels, oils and other chemicals;
- Use and storage of limited quantities of explosive ordnance probably relating to small arms (for guard/ defence personnel and training purposes); and
- Electrical distribution substation transformers that are likely to have contained oils and polychlorinated biphenyls (PCBs).

1.9.2 Off Site

Historically, land at and surrounding the site has been used for agricultural, transport (road and rail) and various MOD activities (St David's Barracks and the other component sites of the wider DSDC Bicester site).

The above various MOD activities are assessed in the 1998 Aspinwall Phase One LQA and 2010 Entec Phase One LQA, which mention that limited quantities of small arms ammunition and radioactive sources (night sights and related equipment) are stored at the St David's Barracks site and that small arms ammunition is likely to have been used at the former firing range. The rest of the DSDC Bicester site is discussed in detail in the Phase One LQAs, which describes a number of potential issues related to use and storage of fuels and oils, infilled areas and burning grounds, potential radiological contamination and possible small arms ordnance. However, the Phase One LQAs conclude that the majority of the DSDC Bicester site is unlikely to have been contaminated by historical activities.

Historical construction and demolition activities of MOD buildings in the vicinity may have resulted in the presence of some demolition rubble. This could potentially include ACMs.

2. Sources of Information

2.1 Sources of Information

The following sources of information have been used to inform the Land Quality Assessment and have been selected based on the requirements contained in the following MOD documents and from Entec experience of undertaking LQAs:

- Land Quality Assessment (LQA) Management Guide, Defence Estates, April 2007; and
- Detailed Statement of Requirement (LQA Directive), Ref: 13014 dated 3/11/2010.

Public Domain and Non-MOD Sourced Information:

- General mapping/ plans: recent and historical;
- BGS Digital Geological mapping;
- Hydrogeology mapping and Groundwater Vulnerability mapping;
- emapsite™ GroundSure data search (GeoInsight and EnviroInsight reports);
- Local Authority (Cherwell District Council) environmental data search;
- English Heritage (National Monuments Record) Aerial Photographs; and
- Multi-Agency Geographic Information for the Countryside (MAGIC) website www.magic.gov.uk.

Specialist Data Searches:

- A search of records relating to any radiological contamination issues was requested from Dstl ESD. The letter response was received on 5 February 2010, reference ESD/AS/490158 /ENTEC/SH and is included as Annex C; and
- An updated Explosive Ordnance Threat Assessment (EOTA) was commissioned through BACTEC. The report was received on 19 January 2011, reference 3063TA REV_1 and is included as Annex B.

Site and MOD Sourced Information:

- Plans provided by Defence Estates;
- Estate Development Plan (v1.1, 15 August 2008) provided by Defence Estates;
- Phase One and Phase Two LQA Reports undertaken by Aspinwall & Company (1998 and 2001);
- Anecdotal information from Estates Management Personnel; and

- OS Tiles provided by DE Geographical Information Unit.

Site Visit Information:

- Observations and notes from the site walkover; and
- Photographs and visual assessment of the site and surrounding area.

2.2 Presentation of Data within Report

Information is contained in the following annexes:

- Annex A Site Photographs;
- Annex B Explosive Ordnance Threat Assessment;
- Annex C Dstl Radiological Information Letter Response;
- Annex D Selected Historic Aerial Photographs;
- Annex E emapsite™ GroundSure reports;
- Annex F Local Authority Correspondence;
- Annex G Environmental Risk Assessment Table; and
- Annex H Site Asbestos Surveys.

3. Sources of Contamination

3.1 Historical On-site Issues

The following areas of concern from a contaminated land perspective, relating to historical uses of the site, are described below and shown on Figure 3.

3.1.1 Former Rifle Range

A 500 yard rifle range is marked on historic maps from the 1890s to the 1940s to the west of building E2 on the adjacent DSDC Bicester E Site, with the rifle targets and butts marked within Area 2. Small arms ammunition is likely to have been used at the former firing range.

Given that this potential source is present within the site boundary, the former rifle range has been carried forward into the risk assessment.

3.1.2 Historical Nissen Hut Camps

A hand tracing of a 1943 site plan is presented within the Aspinwalls Phase One LQA report indicates the vicinity of the site was 'Camp No. 5' and 'Camp No. 6' at the time. The report states that these camps consisted of Nissen huts used to accommodate troops and depot workers, presumably during WWII and the post war period.

Although Nissen huts were often primarily constructed of corrugated steel, some variants were constructed of ACMs. It is possible that the Nissen huts were demolished in-situ when they were no longer required. In addition, activities in the camps are likely to have involved the disposal of ash from the burning of fuels for heating as well as potentially minor quantities of hydrocarbons (oils, solvents, etc.) from ad-hoc servicing of vehicles and equipment.

Given the above and the evidence of former structures in the vicinity of these historical camps, the camps have been carried forward into the risk assessment.

3.1.3 Historical Infilled Ground

'Unknown Infilled Ground' is marked on an infilled sites plan (c.1840-1997) included with the Cherwell ESD report in three locations within the site boundary: two locations in the north of Area 1 and one location in the far south of Area 1.

The report states that the 'Unknown Infilled Ground' relates to infilled ponds, marshes, rivers, or streams. There is no other information provided in the Cherwell ESD Report, although the GroundSure GeoInsight report shows no records of any surface ground workings, mining, extraction, natural cavities or areas of landfilling in the vicinity of these areas. However, land marked as 'landscaped ground (undivided)' is shown in the vicinity of all of these areas, appearing to represent the shallow ground conditions across the adjacent DSDC Bicester D&E sites.

On the basis of the above, the areas of unknown infilled ground have been carried forward into the risk assessment.

3.2 Historical Off-site Issues

From the recent Entec Phase One LQA for the adjacent DSDC Bicester D&E Sites, there are several historical off-site issues related to D&E Sites, including:

- Former vehicle fuelling areas at E11 and D18 (particularly related to any former/ current underground storage tanks within these areas);
- Former railway workshops within current buildings D6 and D9;
- Former fire training building E20 (particularly related to fuel storage and usage, along with the ad-hoc storage of containers of potential contaminants); and
- Former waste tip near building E15.

The subsequent Entec Phase Two LQA revealed little evidence of significant ground contamination in any of these areas, with the possible exception of the former waste tip adjacent to building E15, some 200 m west of Area 1. Given the results of the Entec assessment, the distance to the former waste tip, the low permeability of the geological strata and the elevation of the site relative to all of the above off-site issues, the historical issues at the D&E Site have not been carried forward into the risk assessment.

According to the EnviroInsight report, there are records of a historic landfill 1 km north of the site boundary. In addition the report provides records of an 'obsolete' petrol station 1.5 km south-east of the site boundary. Given the distance of the historic landfill and obsolete petrol station to the site, and the low permeability of the geological strata beneath the site limiting the potential for dissolved or gaseous contaminant migration, these potential sources have not been carried through into the risk assessment.

3.3 Current and Recent On-site Operations

3.3.1 Areas of Demolition and Disturbed Ground

The following areas of demolition and disturbed ground were observed during the site visit:

- Field forming far western part of Area 1: A small brick building appears to have been demolished in-situ at a location immediately north of the circular road separating Areas 1 and 2 (see Plate 10 in Annex A). A further pile of building rubble was also noted further to the west within this field;
- South-east of Area 1, to immediate south-east of circular road: There is a 10x10 m concrete plinth with a brick surround (representing a probable former building) and a overgrown 10x20 m concrete plinth, representing a probable area of hardstanding (see Plates 5 and 6 in Annex A).

These areas of demolition and disturbed ground have been carried forward into the risk assessment.

3.3.2 Distribution Substations and Transformers

There are two distribution substations (DSS) within Area 1; one adjacent to the Garrison Theatre (see Plate 3 in Annex A) and one adjacent to the roadway loop in the far east of the site (see Plate 7 in Annex A). They both appear to be in good order with no obvious signs of leaks. However, the ground within the DSS compounds has recently been covered with gravel, making it difficult to check for signs of previous leaks. During the site walkover at the adjacent D&E Sites, contractors were noted on site replacing some of the transformers and laying down gravel. They do not recollect there being any obvious signs of major leakage at any of the DSS. According to the contractors, transformers within the DSS compounds are replaced as soon as there is the slightest indication of any leakage onto their respective concrete plinths.

PCBs are known to have been used historically within electrical equipment and smaller units would have held minor quantities. PCBs have generally been withdrawn from use in external transformers. The 1998 Aspinwalls Phase One LQA factual report states that *'information supplied by the Works Services Manager (WSM) indicates that the substations and transformers have all undergone coolant change in the past five years, and that there are therefore no polychlorinated biphenyl (PCB) containing coolants on site. The WSM is not aware of any historic spills or leaks of coolants at substation or transformer sites.'*

Owing to the above, the limited quantities of oils contained within the transformers, the low mobility of PCBs and the negligible permeability of the underlying strata, the DSS are not considered further into the risk assessment.

3.3.3 Modern Containerised Boiler and Fuel Tank

Adjacent to the Garrison Theatre is a modern containerised boiler (see Plate 2 in Annex A) and associated '3/50 FFO' 5000 litre capacity heating oil tank, that appears to be self-bunded (see Plate 1 in Annex A). These units are identical to the others seen across DSDC Bicester D&E sites. The fuel from the tank is transferred via a small diameter underground pipe to the containerised boiler and there was no evidence of any leaks during the site walkover.

Due to the modern nature of the equipment and the absence of any evidence of contamination, the containerised boiler and fuel tank have not been carried forward into the risk assessment.

3.3.4 Asbestos within Structures

Buildings constructed pre 1990 are generally expected to have been built with some asbestos containing material prior to the UK Asbestos Regulations (1985) which prohibited the use of all forms of asbestos.

The Garrison Theatre (see Plate 1 in Annex A) still appears to contain substantial amounts of ACMs, as documented in the asbestos survey included within Annex H and discussed further in Section 1.4.2. PriDE is not aware of asbestos within the other buildings in areas 1 and 2.

3.4 Current and Recent Off-site Operations

From the recent Entec Phase One LQA for the adjacent DSDC Bicester D&E Sites, there are several current off-site issues related to D&E Sites, including:

- Railway lines (site-wide);

- POL stores and POL points (fuel tanks) (site-wide);
- Oil/water interceptors (site-wide);
- Made Ground at BIFT and between D6/D9; and
- Made Ground: stockpile(s) of ash ballast materials.

The site-wide railway lines, oil/water interceptors and stockpiles of ash ballast were not prioritised for further investigation due to the relatively low risks to the sensitive receptors identified. The subsequent Entec Phase Two LQA revealed little evidence of significant ground contamination in the above areas that were investigated, with the possible exception of the vicinity of the fuel tanks near buildings E14/E16, some 200 m south-west of Area 1. Given the results of the Entec assessment, the distance to the E14/E16 fuel tanks, the low permeability of the geological strata and the elevation of the site relative to all of the above off-site issues, the current issues at the D&E Site have not been carried forward into the risk assessment.

According to the EnviroInsight report, there are records of a single Integrated Pollution Prevention and Control (IPPC) Authorisation within 500 m of the site. This authorisation appears to be related to a poultry farm (Ambrosden Farm) located 300 m south-east of Area 1. Given the distance of the poultry farm to the site and the low permeability of the geological strata beneath the site limiting the potential for dissolved or gaseous contaminant migration, these potential sources have not been carried through into the risk assessment.

In addition, and again according to the EnviroInsight report, there are records of a List 2 Dangerous Substance Inventory Site within 500 m of the site. This relates to the Bicester STW 460 m north-west of the site and the 'authorised substance' is iron. Due to the distance of this potential contamination source and the site, this source has not been carried through to the risk assessment.

The EnviroInsight Report also notes four 'other waste sites' within approximately 1.5 km of the site, all of which are metal recycling sites. The closest site is 1 km north of Area 1 and is operated by McGregor Railway Services Ltd for a metal recycling site. Given the distance of these waste sites to the site, and the low permeability of the geological strata beneath the site limiting the potential for dissolved or gaseous contaminant migration, these potential sources have not been carried through into the risk assessment.

No pollution incidents are recorded on site, with the closest pollution incident marked approximately 360 m south-west of Area 1, adjacent to Building D4 at DSDC Bicester D Site. This incident is classed as a 'minor current pollution incidents (2001-)' with no further details are provided. There are also records of nineteen historical and one current pollution incidents within the 500 m search buffer, which generally relate to spillages of sewage, oils, fuels and poultry manure, the closest of which is almost immediately off site to the north-east of Building D9 at DSDC Bicester D site.

Land at, and surrounding, the site continues to be used for various MOD activities including barracks (St David's Barracks). These MOD activities are assessed in the 1998 Aspinwall Phase One LQA, which mentions that limited quantities of small arms ammunition and radioactive sources (night sights and related equipment) are stored at the St David's Barracks. Given the proximity of the St David's Barracks to the site, it has been carried forward into the risk assessment.

4. Preliminary Qualitative Risk Assessment

4.1 Approach

4.1.1 Legislative Framework

The potential risks and liabilities associated with contaminants identified at the site have been assessed using a risk based framework established to support the implementation of the contaminated land regime in the UK.

The regulatory regime for defining, identifying and remediating contaminated land is Part 2A of the Environmental Protection Act (EPA) 1990. It was introduced in England in April 2000 by the Contaminated Land (England) Regulations 2000, which were later updated in 2006. The regulations are in turn supported by Statutory Guidance issued by the Department for the Environment Food and Rural Affairs (DEFRA) in September 2006, DEFRA Circular 01/2006.

Part 2A provides a statutory definition of 'Contaminated Land' and sets out the nature of liabilities that can be incurred by owners of contaminated land and groundwater. According to the Act, 'contaminated land' is defined as:

> *"any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substance in, on, or under the land that:*
>
> - *Significant harm is being caused, or there is significant possibility of such harm being caused; or*
> - *Pollution of controlled waters is being, or is likely to be caused."*

Where harm is attributable to radioactivity, the definition of contaminated land has been modified as:

> *"any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:*
>
> - *Harm is being caused, or*
> - *There is a significant possibility of such harm being caused."*

The following situations are defined where harm is to be regarded as significant:

i) Death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive functions of humans;

ii) Irreversible or other substantial adverse change to an ecological system, or harm which affects any special interest and which endangers the long term maintenance of the population of that species;

iii) Structural failure, substantial damage, or interference with the right of occupation of buildings;

iv) Death, serious disease or other physical damage to livestock or crops;

v) The pollution of controlled waters.

Central to the Part 2A regulatory approach is a rigorous procedure of risk assessment which is used to determine whether land meets the definition of 'contaminated land' in accordance with the Statutory Guidance. Under the risk assessment procedure for such harm to humans, the environment or pollution of controlled waters to be possible, there must be a 'pollutant linkage', as follows:

- A **Source** of pollution (Hazard);
- A **Pathway** for the pollutant to move from source to receptor;
- A **Receptor** (Target) which is affected by the pollutant. This includes human beings, other living organisms, controlled waters, physical systems and built structures which could be affected by the hazard.

In February 2010, Defra announced its decision to review the Statutory Guidance which underpins the contaminated land regime under Part 2A of the Environmental Protection Act 1990 and consider where it could be amended to reflect experience in delivering the regime and developments in scientific understanding.

A proposed new Contaminated Land Statutory Guidance document had been issued by DEFRA for formal consultation, which closes on 15 March 2011. DEFRA has stated that while this work proceeds, Local Authorities should continue to fulfill their legal duty to identify and deal with contaminated land.

For the purpose of assessment within this report the legislation as it currently stands has been considered. However this appraisal may need to be re-assessed should there be changes in the Statutory Guidance.

4.1.2 Assessment Framework

The tiered approach to assessing risks from land contamination is set out in the DEFRA and Environment Agency publication "Model Procedures for the Management of Land Contamination" CLR11.

Entec's approach to undertaking risk assessments is based on a tiered framework in accordance with CLR11, as outlined below:

Table 4.1 Tiered Framework

Tier 1: Preliminary Risk Assessment	• Development of a conceptual model; • Preliminary Risk Assessment examining potential contaminants, pathways and receptors to identify the potential 'pollutant linkages'; • Identification of further risk assessment requirements.
Tier 2: Generic Quantitative Risk Assessment (GQRA)	• Screening of analytical results against generic assessment criteria (GAC) for soils and groundwater including Soil Guideline Values, Environmental Quality Standards, etc., to identify issues that require more detailed consideration; • Identification of further risk assessment or risk management requirements.
Tier 3: Detailed Quantitative Risk Assessment (DQRA)	• Refinement of site conceptual model which may require the collection of additional data; • Application of detailed quantitative risk assessment procedures in accordance with CLR Guidance to further assess potential pollutant linkages: - With respect to human receptors this may involve assessment of site specific exposure scenarios taking into account toxicological properties of substances to derive site specific assessment criteria (SSAC); - With respect to controlled water receptors this may involve simple analytical calculations of groundwater and/or surface water flow and contaminant attenuation to derive remedial target concentrations. • To undertake the assessment proprietary software such as RISC4, RBCA or RAM may be used; • Identification of further risk assessment or risk management requirements.

In general the application of increased tiers of analysis will result in less conservative remediation targets resulting in less costly remedial action. Therefore the cost for increased tiers of assessment is justified where remediation liabilities are potentially high and less costly solutions can be established as acceptable by detailed risk assessment.

This report is based upon a Tier 1 assessment. No quantitative data is available for this site and therefore only the qualitative contaminant→pathway→receptor assessment has been undertaken.

The contaminant→pathway→receptor relationship allows an assessment of potential environmental risk to be determined based on the nature of the source, the degree of exposure of a receptor to a source and the sensitivity of the receptor. On this basis an assessment is made of the environmental liabilities associated with the risk. These can be expressed, for example, in terms of: additional costs associated with site redevelopment or remedial measures; the potential for costs, fines or penalties imposed for breaches of environmental legislation or third party claims; and loss of land value.

The identified potential environmental liabilities have been evaluated with respect to the potential for:

- Impacts on current and future site users;
- Impacts on construction and maintenance workforce;
- Impacts on neighbouring site users;
- Impacts on site buildings and buried services;

- Impacts on groundwater;
- Impacts on surface water bodies;
- Impacts on agricultural receptors; and
- Impacts on ecological receptors.

4.2 Summary of Potential Contamination

4.2.1 On-site Sources

Following the assessment of historical and current activities, there are several potentially contaminative activities which have been identified on the site, namely:

- Former rifle range;
- Historical Nissen hut camps;
- Historical infilled ground; and
- Areas of demolition/ disturbed ground.

4.2.2 Off-site Sources

Following the assessment of historical and current activities, the following potentially contaminative activities which have been identified off site which may have an impact on the site:

- Military use (St David's Barracks).

4.3 Receptors and Pathways

Potential receptors and pathways from identified sources to receptors are as follows:

Table 4.2 Potential Receptors and Pathways

Receptor	Pathway
Site Visitors/Users (Commercial/Industrial)	Dermal contact, direct contact, ingestion, inhalation
Construction and Maintenance Workers	Dermal contact, direct contact, ingestion, inhalation
Future Site Users (Commercial/Industrial)	Dermal contact, direct contact, ingestion, inhalation
Future Site Users (Residential with Gardens/Public Open Space)*	Dermal contact, direct contact, ingestion, inhalation
Neighbouring Site Users	Dermal contact, direct contact, ingestion, inhalation
Groundwater (unproductive strata)	Leaching from soils, transport in groundwater, groundwater contamination
Surface Water (site drainage ditches, Langford Brook)	Leaching from soils, transport in groundwater, groundwater contamination, run-off
Ecological Receptors	Uptake, direct contact
Agricultural Receptors	Uptake, direct contact
Buildings and Buried Services (current and future)	Degradation (chemical attack), direct contact, vapour migration

* The risk assessment has considered a residential with gardens end use as being reasonably protective of public open space end use.

4.4 Environmental Risk Assessment

The preliminary risk assessment and conceptual model have identified a number of potential pollutant linkages (contaminant-pathway-receptor linkages) on the site. These are tabulated in Annex G. Each pollutant linkage has been qualitatively assessed using the following criteria:

i) Potential consequence of pollutant linkage;

ii) Likelihood of pollutant linkage; and

iii) Risk classification.

The 'Potential Consequence of Pollutant Linkage' gives an indication of the sensitivity of a given receptor to a particular source or contaminant of concern under consideration. It is a worst case classification and is based on full exposure via the particular linkage being examined.

'Likelihood of Pollutant Linkage' is an assessment of the probability of the selected source and receptor being linked by the identified pathway. This assessment is ranked based on site-specific conditions.

The 'Risk Classification' column is an overall assessment of the actual risk, which considers the likely effect on a given receptor, taking account of both of the previous rankings.

The criteria are set-out in Table 4.3.

Table 4.3 Risk Assessment Criteria

Potential Consequence of Contaminant (Source)-Receptor Linkage	
Severe	Acute risks to human health. Short-term risk of pollution of sensitive water resource (e.g. major spillage into controlled waters). Impact on controlled waters e.g. large scale pollution or very high levels of contamination. Catastrophic damage to buildings or property (e.g. explosion causing building collapse). Ecological system effects – irreversible adverse changes to a protected location. Immediate risks.
Medium	Chronic risks to human health. Pollution of sensitive water resources (e.g. leaching of contaminants into controlled waters). Ecological system effects - substantial adverse changes to a protected location. 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. Pollution of non-sensitive water resources (e.g. pollution of non-classified groundwater). Damage to buildings, structures and services (e.g. damage rendering a building unsafe to occupy, such as foundation damage). Substantial damage to non-sensitive environments (unprotected ecosystems e.g. crops).
Negligible	Non-permanent health effects to human health (easily prevented by appropriate use of PPE). Minor pollution to non-sensitive water resources. Minor damage to non-sensitive environments (unprotected ecosystems e.g. crops). Easily repairable effects of damage to buildings, structures, services or the environment (e.g. discoloration of concrete, loss of plants in a landscaping scheme).
Likelihood of Contaminant (Source)-Receptor Linkage	
High likelihood	An event is very likely 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.
Likely	It is probable than an event will occur. It is not inevitable, but possible in the short term and likely over the long term.
Low likelihood	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.
Unlikely	It is improbable that an event would occur even in the very long term.
Potential Significance	
Very High Risk	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.
High Risk	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.
Moderate Risk	Possible that harm could arise to a receptor, but low likelihood that such harm would be severe. Harm is likely to be medium. Some remedial works may be required in the long term.
Low Risk	Possible that harm could arise to a receptor. Such harm would at worse normally be mild.
Negligible	Low likelihood that harm could arise to a receptor. Such harm unlikely to be any worse than mild.

The potential significance for each Contaminant-Receptor Linkage is calculated from the following matrix (Table 4.4):

Table 4.4 Potential Significance of Contaminant-Receptor Linkage Matrix

Matrix		Likelihood			
		High Likelihood	**Likely**	**Low Likelihood**	**Unlikely**
Potential consequence	**Severe**	Very High	High	Moderate	Moderate/Low
	Medium	High	Moderate	Moderate/Low	Low
	Mild	Moderate	Moderate/Low	Low	Negligible
	Negligible	Moderate/Low	Low	Negligible	Negligible

Figure 3 shows the areas of potential contamination and Figure 4 shows the accompanying Conceptual Model for the site.

An environmental risk assessment for the site is included in Annex G, which comprises an analysis of potential pollutant linkages (source-pathway-receptor) on the site.

4.4.1 Current Site Users

The site currently consists primarily of open agricultural land and woodland with a car park, sports pitches and a limited number of buildings. The majority of the site is suitable for use by the current users. However, due to the long history and the type of activities undertaken at the site, there are some potential but generally localised sources have been identified and the risks identified for these sources are assessed as **low** to **moderate/low**. A **moderate/low** risk was generally assessed to be associated with the severe but generally unlikely consequence of exposure to unexploded ordnance in the former firing range.

4.4.2 Construction and Maintenance Workers

A pollutant linkage is created during redevelopment activities, as extensive ground disturbance or entry into confined spaces may take place. However, exposures may be controlled by working methods and suitable personal protective equipment (PPE). The exposure pathways include dermal contact, ingestion and inhalation.

It is assumed that ground work would be the subject of a site specific health and safety assessment and appropriate measures would be taken for any redevelopment work at the site. The risks to ground workers during redevelopment cover the range of **low** to **moderate**. The incorporation of appropriate Health and Safety protocols will likely reduce these risks.

The risks during demolition or intrusive work could be greater than this, depending on the potential extent and condition of localised asbestos and work close to any fuel leaks or unexploded ordnance.

4.4.3 Future Site Users (Residential, Commercial and Industrial)

The risk to future site users depends on the type of redevelopment. The future site use is currently not known. For the most sensitive potential end uses, namely residential with gardens the risk to site users in the areas of identified potential contamination is generally **moderate/low**

but are covered by a breadth of risks in the range of **low** to **moderate,** with the **moderate** risks being assessed for source areas including unexploded ordnance at the former firing range.

For potential commercial/industrial end users, the risk is slightly lower, due to the probable placement of hard surfaces and consequent reduced contact with soil, which would reduce/ negate potential pathways for contaminant migration to identified, less sensitive receptors. The exposure frequency and duration to contaminants from outdoor air is also reduced for commercial/ industrial workers. The risks presented to future commercial/ industrial end users have generally been assessed in the range of **low** to **moderate/low**.

4.4.4 Neighbouring Site Users

The site is bounded in the main by DSDC Bicester D&E sites and St David's Barracks. Whilst there is some potential for contaminants to be present on site, the localised nature of much of the identified potential contamination and negligible permeability of the underlying strata means that it is less likely to migrate from the site, especially given the distances in most cases. Consequently, generally **moderate/ low** and **low** risks are considered to be posed to this receptor.

4.4.5 Groundwater

According to the Aquifer and Abstraction License Map provided in the EnviroInsight Report, the entire site is underlain by a Non-Aquifer (Negligibly Permeable), which appears to relate to the Oxford Clay Formation. Consequently, there is a generally **negligible** risk of contaminant migration to groundwater.

4.4.6 Surface Water (Site Drainage Ditches, Langford Brook)

The closest surface water feature to the site is the Langford Brook, which is located approximately 600 m north of Area 1. The Langford Brook discharges into the River Ray approximately 3 km south-west of the site. During the site walkover, a number of dry surface water drainage ditches were noted, principally adjacent to the circular road between areas 1 and 2, although another ditch was noted running northwards within agricultural land in the north of Area 1. It is likely that these ditches would ultimately discharge to the Langford Brook. The risks to surface water have therefore been assessed as generally **moderate/low**.

4.4.7 Ecological Systems

The EnviroInsight Report provides details of three Environmentally Sensitive Areas (ESAs) within the vicinity of the site. These three areas are all part of the same ESA, the Upper Thames Tributaries. The closest of these areas is 450 m south-west of the site boundary. In addition, the site falls within a Nitrate Vulnerable Zone (NVZ). Given the limited potential contamination identified on site and the dilution and attenuation of contaminants given the distance of most of the identified sources to potential receptors, the risk to ecological receptors and is assessed as generally **negligible** to **low**.

4.4.8 Agriculture (Arable and Livestock)

Much of the site is leased by DE to tenant farmers for use as agricultural land. These areas appear to be used for the grazing of livestock at the time of the site visit. However, given the negligible permeability of the underlying strata, risks to agricultural receptors have been

assessed as **negligible** to **low**, although a **moderate/low** risk is assessed for unexploded ordnance within the former rifle range.

4.4.9 Buildings and Buried Services

Risks to buildings and buried services may occur via direct contact, or vapour migration from contaminants in soils accumulating and potentially exploding. The potential presence of localised contamination at the site generally gives rise to **low** to **negligible** risks.

5. Conclusions

5.1 Potential Site Contamination

Following the assessment of historical and current activities, there are several potentially contaminative activities which have been identified both on and off site.

On site sources relate to the former firing range, historical Nissen hut camps and infilling along with demolition and disturbed ground. Off site sources include the adjacent St David's Barracks.

Most of the above identified sources are generally likely to be limited in their extent, with the possible exception of the former Nissen hut camps.

5.2 Environmental Risks

The risks to most human receptors, including current site users/ visitors, construction and maintenance workers, future residential/commercial/industrial users and neighbouring site users have been assessed in the range of **moderate** to **low**, with the **moderate** risks generally associated with future residential users and construction/ maintenance works from source areas including the former firing range and historical Nissen hut camps.

There is a generally **negligible** risk for contaminant migration to groundwater due to the generally negligible permeability strata beneath the site. It is likely that the on-site ditches will ultimately discharge to the Langford Brook, some 600 m north of Area 1. The risks to surface water have therefore been assessed as generally **moderate/low**.

Although a number of ecologically sensitive receptors have been identified in the vicinity of the site, given the limited potential contamination identified on site and the dilution and attenuation of contaminants given the distance of the identified sources to potential receptors, the risk to ecological receptors and vegetation is assessed as generally **negligible** to **low**. Similarly, the risks to agricultural receptors have been assessed as **negligible** to **low**, although a **moderate/low** risk is assessed for unexploded ordnance within the former rifle range.

The potential presence of localised contamination at the site generally gives rise to **low** to **negligible** risks to buildings and buried services.

5.3 Overall Land Quality and Suitability for Redevelopment

In general, it is considered that the land quality at the majority of the site is likely to be generally good, with isolated areas of potentially poor land quality associated with the principal areas used for the former firing range, historical Nissen hut camps and infilling along with demolition and disturbed ground. Therefore, the site is considered to be suitable for its present (predominantly agricultural) use given the current site configuration.

Due to the uncertainty regarding the nature of the some of the areas, including the former firing range, historical Nissen hut camps and infilling along with demolition and disturbed ground, these potential land quality issues have carried forward into the risk assessment. In areas associated with these current and former potentially contaminative uses it is likely that land quality will have been impacted and redevelopment proposals, especially those related to a residential with gardens end use, will need to be tailored to the potential contamination present in these areas.

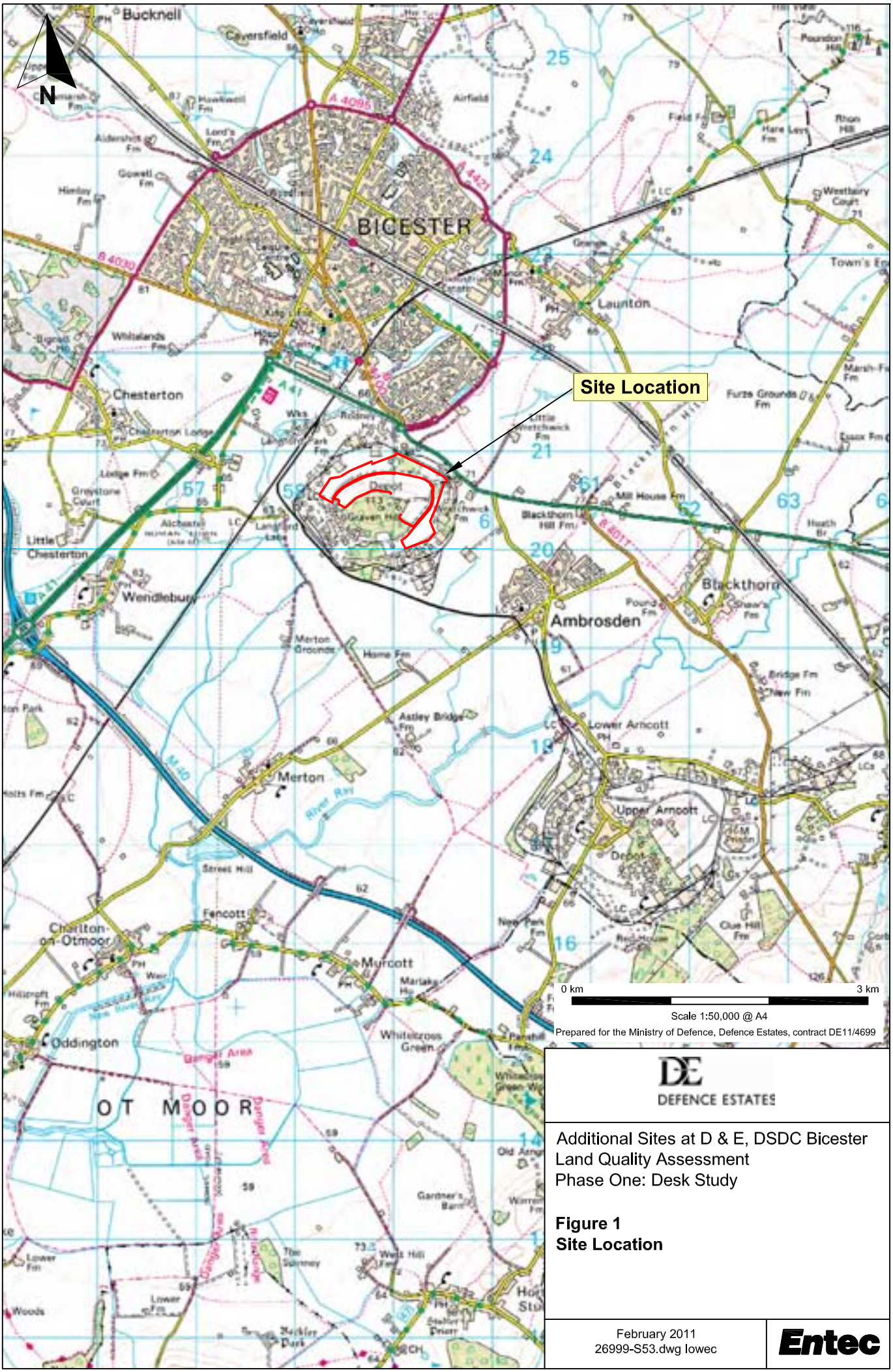
It is considered likely that construction/ redevelopment workers will come into direct contact with areas of potential contamination and all workers should be made aware of potential risks that exist at the site and take suitable measure to avoid or mitigate potential risk. Appropriate personal protective equipment (PPE) should be used and good working practices adhered to during any future investigation or redevelopment work at the site.

Development may involve the removal of the subsurface infrastructure and obstructions. Remediation may be required if following the removal of infrastructure the soils and waters are found to have been impacted by any contamination. Development may also require the removal or alteration of building foundations, building fabric, underground pipework/services and underground voids.

Development of the land is also likely to involve the removal of buildings present on site, some of which are known to contain asbestos within the building fabric. Disposal of all asbestos containing material would need to be carried out by a specialist contractor.

Finally, it should be noted that the high sulphate concentrations present within the Oxford Clay present beneath the site are likely to be detrimental to concrete foundations. Therefore, any new foundations will likely require construction with a Sulphate Resistant Portland Cement.

Figures



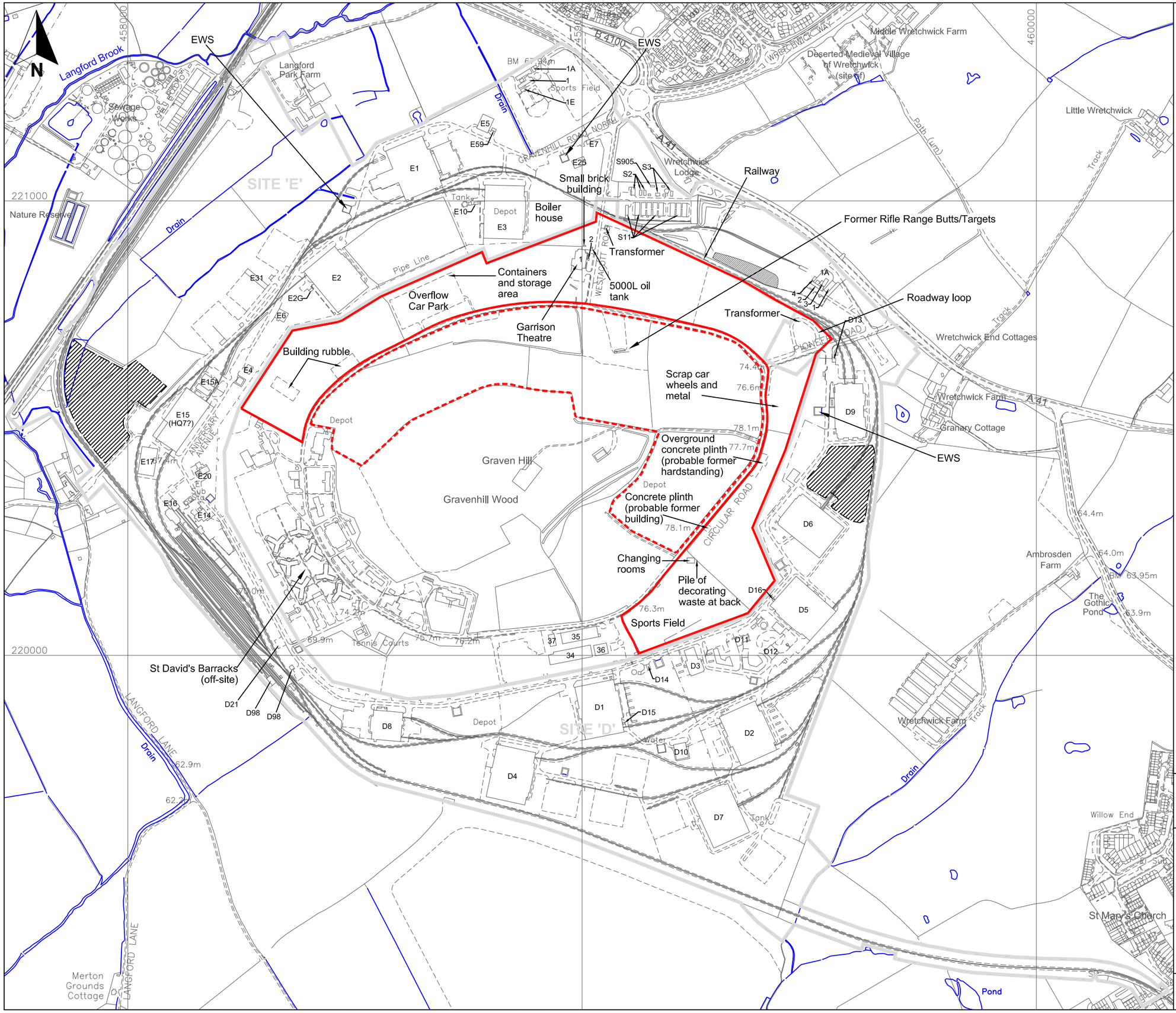
DEFENCE ESTATES

Additional Sites at D & E, DSDC Bicester
Land Quality Assessment
Phase One: Desk Study

Figure 1
Site Location

February 2011
26999-S53.dwg Iowec

Entec



Key

- Additional Area 1 (25.5 ha)
- Additional Area 2 (23.6 ha)
- D and E site boundary
- D14 — Building numbers
- EWS — Emergency water supply

0 m — 400 m

Scale 1:8000 @ A3

Prepared for the Ministry of Defence, Defence Estates, commission FTS3/PTSELM/03

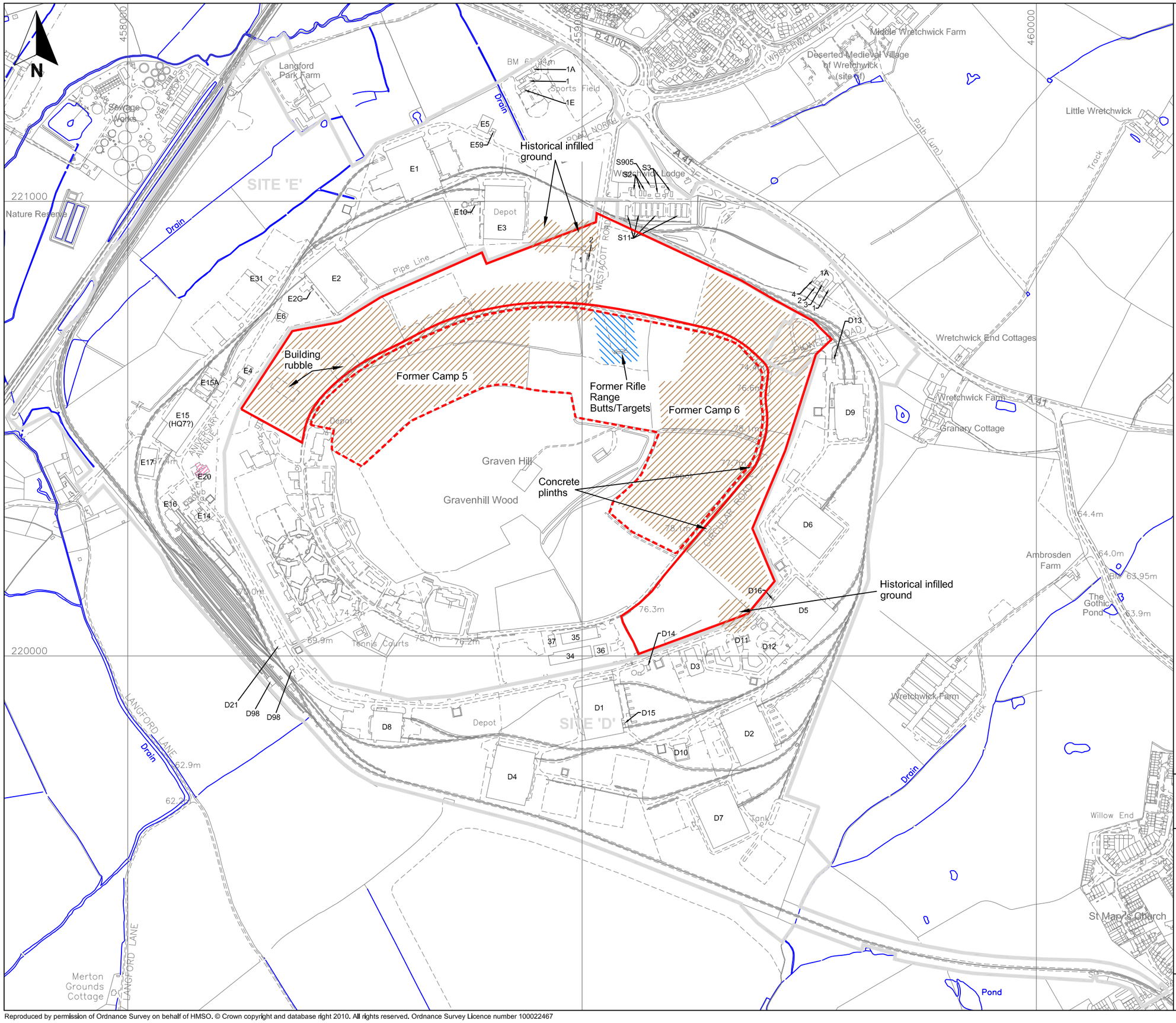
DEFENCE ESTATES

Additional Sites at D & E, DSDC Bicester
Land Quality Assessment
Phase One: Desk Study

Figure 2
Site Layout

March 2011
26999-S54a.dwg lowec

Entec



Key

- Additional Area 1 (25.5 ha)
- Additional Area 2 (23.6 ha)
- D and E site boundary
- Waste disposal/disturbed ground
- Explosive Ordnance/residues and Ordnance metals

Note:
Solid colour denotes potential source.
Coloured hatching or shading is used for areas of uncertainty over contaminant dispersal.

Site wide oil water interceptors not shown.

0 m — 400 m

Scale 1:8000 @ A3

Prepared for the Ministry of Defence, Defence Estates, commission FTS3/PTSELM/03

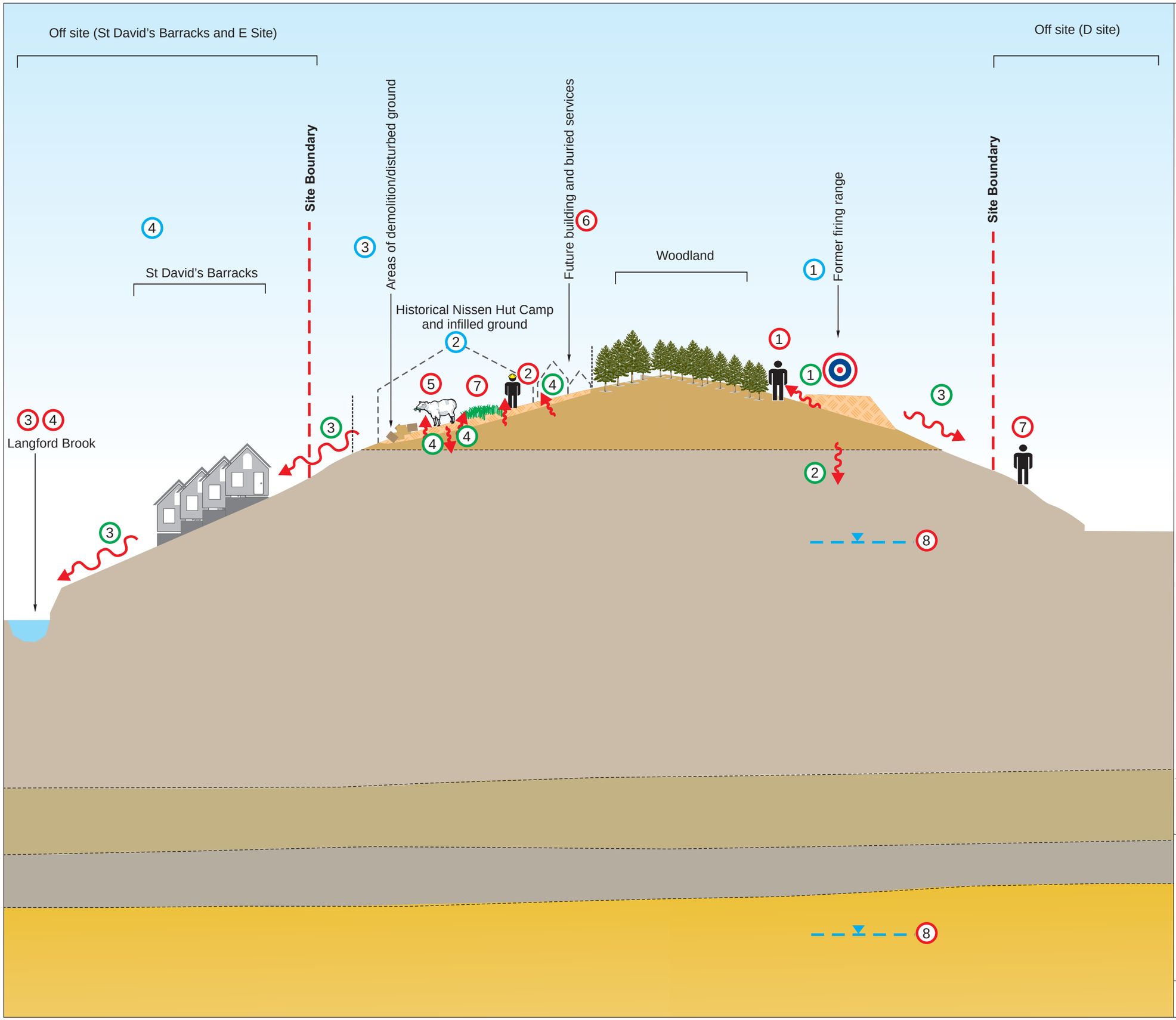
DEFENCE ESTATES

Additional Sites at D & E, DSDC Bicester
Land Quality Assessment
Phase One: Desk Study

Figure 3
Areas of Potential Contamination

February 2011
26999-S55.dwg lowec

Entec



Key

- Made Ground
- Stewartby Member
- Peterborough Member (Oxford Clay Formation)
- Kellaways Sand (Interbedded Sandstone and Siltstone)
- Kellaways Clay (Mudstone)
- Cornbrash (Limestone)

Sources

1. Former Firing Range
2. Historical Nissen hut camps and infilled ground
3. Areas of demolition/disturbed ground
4. St Davids Barracks (off-site)

Pathways

1. Dermal contact, direct, contact, ingestion, inhalation
2. Leaching, transport, groundwater contamination
3. Leching, transport, groundwater contamination, run-off
4. Uptake direct contact

Receptors

1. Current/future site users
2. Construction/maintenence worker
3. Surface water
4. Ecological receptors
5. Agricultural receptors
6. Building and buried services
7. Neighbouring site users
8. Groundwater

Prepared for the Ministry of Defence, Defence Estates, commission FTS3/PTSELM/03

DEFENCE ESTATES

Additional Sites at D & E, DSDC Bicester
Land Quality Assessment
Phase One: Desk Study

Figure 4
Conceptual Model

March 2011
26999-S56a.cdr lowec

Entec

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Plate 2: Boiler Container

Plate 3: Transformer 1

Plate 4: Sports Changing Rooms and Decorating Waste

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Plate 7: Transformer 2

Plate 8: Containers in Car Park

Plate 9: Broken Ground in Car Park

Plate 10: Building Rubble

Annex B
Explosive Ordnance Threat Assessment

45 Pages

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Explosive Ordnance Threat Assessment

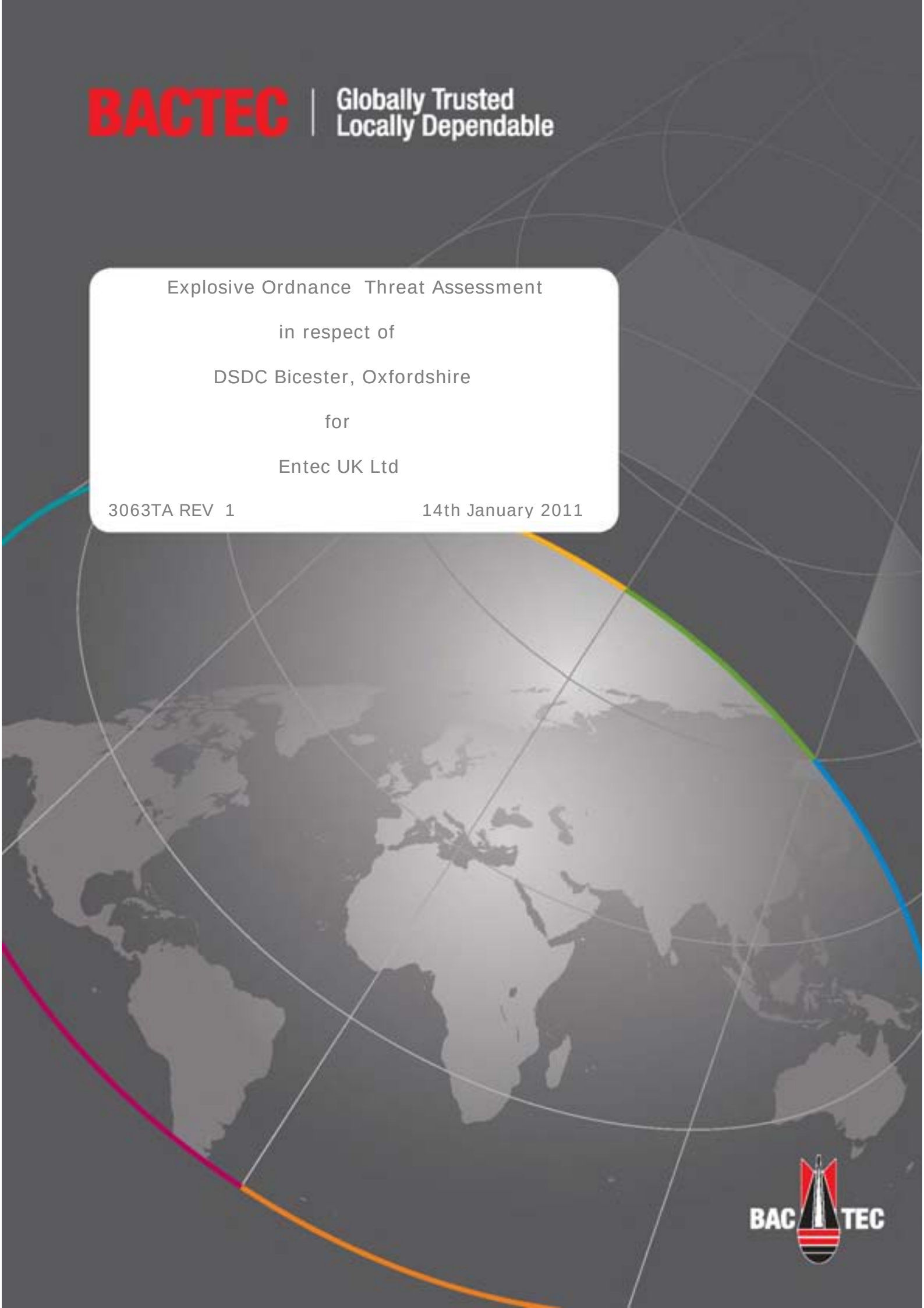
in respect of

DSDC Bicester, Oxfordshire

for

Entec UK Ltd

3063TA REV 1 14th January 2011



Explosive Ordnance Threat Assessment

in respect of

DSDC Bicester, Oxfordshire

for

Entec UK Ltd

3063TA REV_1 14th January 2011

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This Report has been produced in compliance with the Construction Industry Research and Information Association guidelines for the preparation of Detailed Risk Assessments in the management of UXO risks in the construction industry.

Glossary of Terms

AAA	Anti-Aircraft Artillery
ARP	Air-raid Precautions
BDO	Bomb Disposal Officer
EOD	Explosive Ordnance Disposal (current term for “bomb” disposal)
HE	High Explosive
HG	Home Guard
IB	Incendiary Bomb
kg	Kilogram
LCC	London County Council
LM	Land Mine
LSA	Land Service Ammunition (includes grenades, mortars, etc.)
Luftwaffe	German Air Force
m bgl	Metres Below Ground Level
MoD	Ministry of Defence
OB	Oil Bomb
PM	Parachute Mine
RAF	Royal Air Force
SI	Site Investigation
SAA	Small Arms Ammunition (small calibre cartridges used in rifles & machine guns)
UXB	Unexploded Bomb
UXO	Unexploded Ordnance
V-1	“Doodlebug” the first cruise type missile, used against London from June 1944. Also known as ‘Flying Bomb’.
V-2	The first ballistic missile, used against London from September 1944
WWI	First World War (1914 -1918)
WWII	Second World War (1939 – 1945)

Executive Summary

The Site: DSDC Bicester is split over two areas to the immediate south-west of the town of Bicester in Oxfordshire. The northern site, known as Graven Hill is situated approximately 3km north-west of the southern site, Arncott Hill. The two sites are linked by a military railway. Site location maps are presented in Annex A. This report will focus on four specific sites within the boundary of the facility which are referred to as Site A and Site C at the Arncott site and Site D and Site E at the Graven Hill site (within site D and E are two additional potential areas of interest (labelled 1 and 2), on the north side of the hill).

Proposed Works: Site investigation works are planned across the site areas. Final details were not available at the time of the production of this report.

Risk Assessment Methodology: In accordance with CIRIA guidelines this assessment has carried out research, analysed the evidence and considered the risks that the site has been contaminated with unexploded ordnance; that such items remained on site; that they could be encountered during the proposed works and the consequences that could result. Appropriate risk mitigation measures have been proposed.

Explosive Ordnance Risk Assessment: BACTEC concludes that there is a **Low-Medium** risk from unexploded ordnance at the site of the proposed works. This is based on the following factors:

- DSDC Bicester has been a military depot for over 65 years. No evidence could be found to indicate that the purpose of the depot was ever for the storage of explosive ordnance. Nevertheless, as with all historic military facilities, there is always a residual risk of explosive ordnance contamination.
- During the war years, the facility would have been defended, and weaponry in the form of small arms and land service ammunition would have been stored and available for use. Furthermore, as a result of the military association with the area, it is likely that the land on and around the depot would have been utilised for ground training exercises historically.
- The 'house-keeping' of WWII facilities is known to have often been poor with unwanted and unused items of explosive ordnance frequently buried, burnt, lost or otherwise discarded within a facility perimeter. Given the available history of the site, the likelihood of this having occurred within the perimeter of DSDC Bicester itself is not considered high, but cannot be entirely discounted. The risk of encountering LSA and SAA in Proposed Additional Areas 1 and 2 is considered somewhat higher than the background level due to the areas use for US Bolero Army Camps during WWII – it is very unlikely that explosive ordnance would have been stored in large quantities within these camps, but it is likely to have been present and available for use, and potentially therefore buried and/or discarded within these areas.
- It should be noted that several search and clear operations have been undertaken at several locations on the site by 33 Engineer Regiment (EOD) in the post-war period. Although nothing was found, the requirement for and completion of such operations at the cost of the MoD indicates that there was a credible perceived threat/possibility of explosive ordnance contamination being present. It should also be noted that only small sections of DSDC Bicester have been subject to such searches, those searches only providing 12.5% clearance.
- Research indicates that bombing density over the Bicester area was low. Very few references could be found to raids over the region despite there being a number of high profile RAF targets present. ARP records for COD Bicester could not be located (reports of bombing on military land were generally made by military personnel and kept separate from civilian records). It has therefore not been possible to confirm that the facility was not attacked. However, work on the construction of the depot did not commence until after the main period of bombing in this part of the UK.
- The depot employed thousands of people and for the latter part of WWII at least, would have been manned twenty-four hours a day. It is considered very unlikely that evidence of unexploded ordnance would have been overlooked across the site subsequent to construction work beginning in June 1941. Prior to this date, the site comprised open, agricultural land on which it is conceivable that unexploded bombs could have been overlooked had they been dropped. However, given the low bombing density in this part of the county and lack of viable targets within the site area in 1940/early 1941, the likelihood of unexploded bombs having been dropped is considered minimal.

Risk Mitigation Measures: The following risk mitigation measures are recommended to support the proposed works:

All Areas

- Explosive Ordnance Safety and Awareness Briefings to all personnel conducting intrusive works.
- The Provision of Unexploded Ordnance Site Safety Instructions.

In making this assessment and recommending these risk mitigation measures, the proposed works outlined in the 'Scope of the Proposed Works' section were considered. Should the planned works be modified or additional intrusive engineering works be considered, BACTEC should be consulted to see if a re-assessment of the risk or mitigation recommendations is necessary.

Contents

Annexes

Explosive Ordnance Threat Assessment

In Respect of

DSDC Bicester, Oxfordshire

1. Introduction

1.1. Background

Entec UK Ltd has commissioned BACTEC International Limited to conduct an Explosive Ordnance Threat Assessment for the proposed works at DSDC Bicester, Oxfordshire.

Unexploded Ordnance presents a significant threat to construction projects in parts of the UK as a result of enemy actions during the two 20th Century World Wars and historic British and Allied military activity.

DSDC Bicester is a large military facility constructed in 1941 to supply the British Army with equipment and stores, its purpose and layout not changing significantly since this time. As with any historic military base, there is the potential for explosive ordnance contamination to be present, despite the facility not having been designed as an armaments storage depot. This report will assess the historic use of the site, compile and present the available information regarding the potential for an ordnance threat and present recommendations if deemed necessary to reduce or eliminate this threat. The potential for encountering unexploded air-delivered weapons will also be considered.

As a result of a generally increased risk awareness amongst professionals involved in ground engineering works and proactive health and safety measures, the threat to life and limb from unexploded ordnance has been minimised. However even the simple discovery of a suspected device during ongoing works can cause considerable disruption to production and cause unwanted delays and expense.

Such risks can be more fully controlled by a better understanding of the site-specific threat and the implementation of appropriate risk mitigation measures.

2. Construction Industry Duties and Responsibilities

2.1. The UK Regulatory Environment

There is no specific legislation covering the management and control of the UXO risk in the UK construction industry but issues regarding health and safety are addressed under a number of regulatory instruments, as outlined below.

In practice the regulations impose a responsibility on the construction industry to ensure that they discharge their obligations to protect those engaged in ground-intrusive operations (such as archaeology, site investigation, drilling, piling or excavations) from any reasonably foreseeable UXO risk.

2.2. The Health and Safety at Work Act, 1974

The Act places a duty of care on an employer to put in place safe systems of work to address, as far as is reasonably practicable, all risks (to employees and the general public) that are reasonably foreseeable.

2.3. Construction (Design and Management) Regulations 2007

This legislation defines the responsibilities of all parties (primarily the Client, the CDM Co-ordinator, the Designer and the Principal Contractor) involved with works.

Although UXO issues are not specifically addressed the regulations effectively place obligations on all these parties to:

- Ensure that any potential UXO risk is properly assessed
- Put in place appropriate risk mitigation measures if necessary
- Keep all parties affected by the risk fully informed
- Prepare a suitably robust emergency response plan

2.4. Other Legislation

Other relevant legislation includes the “Management of Health and Safety at Work Regulations 1999” and “The Corporate Manslaughter and Corporate Homicide Act 2007”.

3. The Role of the Authorities and Commercial Contractors

3.1. The Authorities

The Police have the responsibilities for co-ordinating the emergency services in the case of an ordnance-related incident on a construction site. They will make an initial assessment (i.e. is there a risk that the find is ordnance or not?) and if they judge necessary impose a safety cordon and/or evacuation and call the military authorities (JSEOD - Joint Services Explosive Ordnance Disposal Operations centre) to arrange for investigation and/or disposal. In the absence of an EOD specialist on site many Police Officers will use the precautionary principle, impose cordon(s)/evacuation and await advice from the JSEOD.

The priority given to the request by JSEOD will depend on their judgement of the nature of the threat (ordnance, location, people and assets at risk) and the availability of resources. They may respond immediately or as resources are freed up. Depending on the on-site risk assessment the item of ordnance may be removed or demolished (by controlled explosion) in-situ. In the latter case additional cordons and/or evacuations may be necessary.

Note that the military authorities will only carry out further investigations or clearances in very high profile or high risk situations. If there are regular ordnance finds on a site the JSEOD may not treat each occurrence as an emergency and will encourage the construction company to put in place alternative procedures (i.e the appointment of a commercial contractor) to manage the situation and relieve pressure from the JSEOD disposal teams.

3.2. Commercial Contractors

In addition to pre-construction site surveys and clearances a commercial contractor is able to provide a reactive service on construction sites. The presence of a qualified EOD Engineer with ordnance recognition skills will avoid unnecessary call-outs to the authorities and the Contractor will be able to arrange for the removal and disposal of low risk ordnance. If high risk ordnance is discovered actions will be co-ordinated with the authorities with the objective of causing the minimum possible disruption to site operations whilst putting immediate, safe and appropriate measures in place.

4. This Report

4.1. Aims and Objectives

The aim of this report is to examine the possibility of encountering any explosive ordnance during the proposed works at the Bicester site. Risk mitigation measures will be recommended, if deemed necessary, to reduce the threat from explosive ordnance during the envisaged works. The report follows the CIRIA Guidelines.

4.2. Risk Assessment Methodology

The following issues will be addressed in the report:

- The risk that the site was contaminated with unexploded ordnance.
- The risk that unexploded ordnance remains on site.
- The risk that ordnance may be encountered during the proposed works.
- The risk that ordnance may be initiated.
- The consequences of initiating or encountering ordnance.

Risk mitigation measures, appropriate to the assessed level of risk and site conditions, will be recommended if required.

4.3. Approach

In preparing this Explosive Ordnance Threat Assessment Report, BACTEC has considered general and, as far as possible, site specific factors including:

- Evidence of German bombing and delivery of UXBs.
- Site history, occupancy and conditions during WWII.
- The legacy of Allied military activity.
- Details of any known EOD clearance activity.
- The extent of any post war redevelopment.
- Scope of the current proposed works.

4.4. Sources of Information

BACTEC has carried out detailed historical research for this Explosive Ordnance Threat Assessment including accessing military records and archived material held in the public domain and in the MoD.

Material from the following sources has been consulted:

- The National Archives, Kew.
- Landmark Maps.
- English Heritage National Monuments Record.
- Relevant information supplied by Entec UK Ltd.
- Available material from 33 Engineer Regiment (EOD) Archive.
- BACTEC's extensive archives built up over many years of research and hands-on Explosive Ordnance Disposal activities in the UK.
- Open sources such as published books, local historical records and the internet.

4.5. Reliability of Historical Records

4.5.1. General Considerations

This report is based upon research of historical evidence. Whilst every effort has been made to locate all relevant material BACTEC cannot be held responsible for any changes to the assessed level of risk or risk mitigation measures based on documentation or other information that may come to light at a later date.

The accuracy and comprehensiveness of wartime records is frequently difficult or impossible to verify. As a result conclusions as to the exact location, quantity and nature of the ordnance threat can never be definitive but must be based on the accumulation and careful analysis of all accessible evidence. BACTEC cannot be held responsible for inaccuracies or gaps in the available historical information.

4.5.2. Bombing Records

During WWII considerable efforts were expended in recording enemy air raids. Air Raid Precautions (ARP) wardens were responsible for making records of bomb strikes either through direct observation or by post-raid surveys. However their immediate priority was to deal with casualties and limit damage, so it is to be expected that records are often incomplete and sometimes contradictory. Record keeping in the early days of bombing was not comprehensive and details of bombing in the early part of the war were sometimes destroyed in subsequent attacks. Some reports may cover a single attack, others a period of months or the entire war.

Records of raids that took place on sparsely or uninhabited areas were often based upon third party or hearsay information and are not always reliable; records of attacks on military or strategic targets were often maintained separately from the general records and have not always survived.

5. The Site

5.1. Site Location and Description

DSDC Bicester is split over two areas to the immediate south-west of the town of Bicester in Oxfordshire. The northern site, known as Graven Hill is situated approximately 3km north-west of the southern site, Arncott Hill. The two sites are linked by a military railway. Site location maps are presented in Annex A.

This report will focus on four specific sites within the boundary of the facility which are referred to as Site A and Site C at the Arncott site and Site D and Site E at the Graven Hill site. Within site D and E are two additional potential areas of interest (labelled 1 and 2), on the north side of the hill.

Site E (grid reference SP 58682 20892) is the northernmost site and comprises the strip of land around the north side of Graven Hill, bounded by a railway line to the north-west and the A41 Aylesbury Road to the north-east. Site D (SP 59191 19919) occupies the area of land around the southern side of Graven Hill, bound to the south by the military rail line. Both sites comprise a dispersed collection of large, square warehouses linked with road and rail sidings. All of the sidings link to a rail depot on the south-western boundary of Site D. The land between the warehouses primarily comprises open grassed areas with the north-western section of Site E occupied by undeveloped agricultural land.

Site C (SP 60731 17579) is situated at the western side of the Arncott site. Railway lines form the north-western and north-eastern boundaries, with Ploughley Road and Murcott Road bordering the area to the east. Site A (SP 63553 17507) is located on the eastern edge of the Arncott site and comprises and irregularly shaped parcel of land bordered by Widnell Lane to the south and the B4011 to the east. As with sites D and E, these areas are occupied by large dispersed warehouses, roads and rail sidings.

Recent aerial photographs and site plan showing the boundary of the site areas is presented in Annex B and C respectively.

6. Scope of the Proposed Works

6.1. General

Site investigation works are planned across the site areas. Final details were not available at the time of the production of this report.

7. History of DSDA Bicester

7.1. General

At the start of WWII the Royal Army Ordnance Corps required a purpose built Central Ordnance Depot (COD) to be able to respond to the requirements of the British Army. Bicester was selected due to its central location and easy access to major sea and air ports.

Construction on the site began in June 1941, took two years to complete and covered 1800 acres. In an effort to protect stock from wartime bombing raids, the depot was split over two sites – Graven Hill to the north and Arncott Hill 3.5km to the south, linked by a military railway. By September 1942, the Headquarters and first storehouse had opened and in 1943, the depot assumed its first role as a main Support Base for future operations in Europe and became an Army Mobilisation Centre (see 1943 plan of the southern section of the depot, Annex D). The Depot achieved its peak activity in the latter part of the war, when some 20,000 troops and members of the ATS were employed here. Since then the Depot has had a number of roles. In 1961 COD Bicester was selected to perform a key role in a major reorganisation of the UK Base Ordnance Installations. The Ordnance Depots at Didcot and Branston, together with their associated 'out-stations' were closed and their functions concentrated at Bicester. Further reorganisation in 1980-82 led to the closure of COD Bicester. In 1992, the facility became known as the Defence Storage and Distribution Centre, Bicester.

The depot is not understood to have ever been used for the storage and distribution of ammunition and explosive ordnance. A local historian, author of *50 Years of COD Bicester*, states that there is 'no record of explosive ordnance ever being stored, processed or disposed of within the confines of the depot perimeter'.

7.2. WWII-era Aerial Photography

Historic aerial photography of the site area was requested from the National Monuments Record Office, Swindon. Images covering sites A, C and D dated August 1945, April 1947 and October 1974 are presented in Annex E. Examination of the wartime images confirms that there are no structures present considered to be associated with the large-scale storage of explosive ordnance. The site was newly opened at this time and appears well-maintained and fully operational. Evidence of camouflaging can be seen on the roofs of some of the warehouse structures, but no signs of damage, clearance or bomb craters are noted.

A large military camp is noted in the central area of the Arncott site, to the east of Site C. A legacy of explosive ordnance contamination is considered more likely in such an encampment, but the area does not fall within any of the designated work zones. A camp is also noted within Potential Additional Area 2, understood to be a US Army Bolero camp. 'Bolero' was the codename used for any facilities associated with the provision of support of the US Army. Four 'Bolero' complexes existed on Craven Hill on and around Additional Areas 1 and 2 – only one is visible of the available photography. Records indicate that that were centred on OS grid references SP 5826 079 (Romney huts), SP 5850 2064 (dispersed Nissen hut camp), SP 5936 2044 (dispersed Nissen hut camp) and SP 5914 2099 (Romney huts gun park).

8. The Threat from Aerial Bombing

8.1. Bicester During WWII

At the start of WWII, Bicester started receiving evacuees from London due to its relatively safe position in the centre of the UK away from major industrial centres, ports and other important strategic infrastructure.

Home Guard units were organised from May 1940 to protect the area from parachutists, patrol the locality and man defensive positions. The Home Guard numbered 1600 men by 1944 in detachments scattered throughout the Bicester area. A range of defences were constructed to repulse the threat of invasion.

Military activity in the area was pronounced with a large number of airfields, the opening of COD Bicester and many military exercises and troop movements being undertaken in the surrounding countryside. The local airfields provided vital training bases for RAF aircrews and many important secret missions were flown from RAF Bicester, situated to the north-east of the town.

8.2. Bombing History of Bicester

At the start of WWII, the Luftwaffe planned to destroy key military installations, including RAF airfields and Royal Navy bases, during a series of daylight bombing raids. After the Battle of Britain these tactics were modified to include both economic and industrial sites. Targets included dock facilities, railway infrastructure, power stations, weapon manufacturing plants and gas works. As a result of aircraft losses, daylight raids were reduced in favour of attacking targets under the cover of darkness.

References could be found to only three bombing raids in the Bicester area, all apparently targeted against the RAF station to the north-east of the town. Very few details of the raids are available, but they appeared to only involve single aircraft and amounted to around 20 incendiary bombs and four high explosive bombs being dropped. No references could be found to the Ordnance Depot being targeted, possibly due to the fact work did not start on the facility until after the main period of bombing in the UK. It should be noted however that no original ARP records for the depot could be located to confirm the lack of air raids.

8.2.1. Abandoned Bombs

A post-air raid survey of buildings, facilities and installations would have included a search for evidence of bomb entry holes. If evidence were encountered, Bomb Disposal Officer teams would normally have been requested to attempt to locate, render safe and dispose of the bomb. Occasionally evidence of UXBs was discovered but due to a relatively benign position, access problems or a shortage of resources the UXB could not be exposed and rendered safe. Such an incident may have been recorded and noted as an Abandoned Bomb.

Given the inaccuracy of WWII records and the fact that these bombs were ‘abandoned’, their locations cannot be considered definitive, nor the lists exhaustive. The MoD states that ‘action to make the devices safe would be taken only if it was thought they were unstable’. It should be noted that other than the ‘officially’ abandoned bombs, there will inevitably be UXBs that were never recorded.

BACTEC holds no records of officially registered abandoned bombs at or near the sites of the proposed works.

8.3. Likelihood of Post-raid UXO Detection

Utilising the available historical bombing it is possible to make an assessment of the likelihood that evidence of unexploded ordnance would have been noted on a site during the war and the incident dealt with or recorded at the time. Factors such as bombing density, frequency of access, ground cover, damage and failure rate have been taken into consideration.

8.3.1. Density of Bombing

Bombing density is an important consideration for assessing the possibility that UXBs remain in an area. A very high density of bombs can for example result in increased levels of damage sustained to structures, greater likelihood of errors in record keeping and a higher risk that UXBs fell over the area.

Research indicates that bombing density over the Bicester area was low. Very few references could be found to raids over the region despite there being a number of high profile RAF targets present. Attempts were made to bomb RAF Bicester, to the north-east of the town, but it appears that none succeeded with only a handful of HE bombs and 20 incendiaries dropped,

all falling outside the station perimeter. ARP records for COD Bicester could not be located (reports of bombing on military land were generally made by military personnel and kept separate from civilian records). It has therefore not been possible to confirm that the facility was not attacked. However, work on the construction of the depot did not commence until after the main period of bombing in this part of the UK. In 1940/41 prior to its construction the site of the facility would not have constituted a viable bombing target.

8.3.2. Frequency of Access and Ground Cover

Unexploded ordnance at sites where human access was infrequent would have a higher chance of being overlooked than at those sites which were subject to greater occupancy. The importance of a site or facility to the war effort is also an important consideration as such sites are likely to have been both frequently accessed and are also likely to have been subject to post-raid checks for evidence of UXO.

The depot employed thousands of people and for the latter part of WWII at least, would have been manned twenty-four hours a day. It is considered very unlikely that evidence of unexploded ordnance would have been overlooked across the site subsequent to construction work beginning in June 1941. Prior to this date, the site comprised open, agricultural land on which it is conceivable that unexploded bombs could have been overlooked had they been dropped. However, given the low bombing density in this part of the county and lack of viable targets within the site area in 1940/early 1941, the likelihood of unexploded bombs having been dropped is considered minimal.

8.3.3. Damage

If structures on a site have been subject to significant bomb or fire damage, rubble and debris are likely to have been present; similarly an HE bomb strike on open ground is likely to have resulted in a degree of soil disturbance. Under such conditions there is a greater risk of the entry holes of unexploded bombs dropped during subsequent raids being obscured and going unnoticed.

If any damage had indeed been sustained to structures within the boundary of the depot, efforts would have been made to repair and rebuild in order to keep the depot running at full capacity. It is also likely that dedicated post-raid searches to check for damage and evidence of unexploded bombs would have been undertaken, given the importance of the facility.

8.3.4. Bomb Failure Rate

There is no evidence to suggest that the bomb failure rate in the region of the site would have been different from the “approximately 10%” figure normally used.

9. The Threat from Allied Military Ordnance

9.1. General

DSDC Bicester has been a military depot for over 65 years. No evidence could be found to indicate that the purpose of the depot was ever for the storage of explosive ordnance. The design and layout of the depot substantiate this. The conventional design of an armaments storage facility comprises a number of small bunded structures designed to minimise the effects of an accidental explosion. No such structures are present within the DSDC depot.

Nevertheless, as with all historic military facilities, there is always a residual risk of explosive ordnance contamination. During the war years, the facility would have been defended and weaponry in the form of small arms and land service ammunition would have been stored and available for use. Furthermore, as a result of the military association with the area, it is likely that the land on and around the depot would have been utilised for ground training exercises historically.

The ‘house-keeping’ of WWII facilities is known to have often been poor with unwanted and unused items of explosive ordnance frequently buried, burnt, lost or otherwise discarded within a facility perimeter. Given the available history of the site, the likelihood of this having occurred within the perimeter of DSDC Bicester is not considered high, but cannot be entirely

discounted. It should be noted that several search and clear operations have been undertaken at several locations on the site by 33 Engineer Regiment (EOD) in the post-war period (see section 9.2.1). Although nothing was found, the requirement for and completion of such operations at the cost of the MoD indicates that there was a credible perceived threat/possibility of explosive ordnance contamination being present. It should also be noted that only small sections of DSDC Bicester have been subject to such searches, those searches only providing 12.5% clearance.

9.2. Land Service and Small Arms Ammunition (LSA and SAA)

Typical examples of LSA are discussed below and presented in Annex F. Such weapons may have been stored and made available for use historically at the DSDC Bicester and could conceivably be encountered during intrusive works within the depot boundary, especially in previously undeveloped areas.

a. Unexploded Munitions – Mortars, Grenades and Explosives. A mortar relies on a striker hitting a detonator for explosion to occur. It is possible that the striker may already be in contact with the detonator and that only a slight increase in pressure would be required for initiation. Similarly, a grenade striker may either be in contact with the detonator or still be retained by a spring under tension, and therefore shock may cause it to function. Mortars and grenades can both be lethal. A grenade can have an explosive range of 15-20m.

b. Fuzes – The fuzes used with munitions fired on ranges are mainly of the direct impact action variety. This means that if they failed to function on impact a needle/pin may have been driven into the detonator or a very sensitive explosive compound leaving the fuze in a dangerous state. An inadvertent impact on the fuze or munition could cause the munition to detonate. The 81mm mortar falls into this category and is known throughout the EOD community as a very dangerous munition to dispose of.

c. Miscellaneous Items – Pyrotechnics come in a variety of types of flares and smoke generating compounds and can include the following:

a. Magnesium
b. Thermite
c. Phosphorus (red – white)
d. Calcium Phosphate
e. Sodium Nitrate
f. Aluminium Powder
g. Sodium Phosphide – phosphorus mixture
h. Magnesium – aluminium phosphide
i. Potassium bisulphate
j. Smoke compounds i.e. HC, FM and FS.

d. Small Arms Ammunition – Ammunition boxes are known to have been processed in certain areas of DSDC Bicester and SAA may be encountered during the proposed intrusive works. However, it should be noted that even if an item functioned the explosion would not be contained within a barrel and detonation would only result in local overpressure and very minor fragmentation from the cartridge case. Images of SAA are presented in Annex F-3.

Items of ordnance do not become inert or lose their effectiveness with age. Time can indeed cause items to become more sensitive and less stable. This applies equally to items submerged in water or embedded in silts, clays or similar materials. The greatest risk occurs when an item of ordnance is struck or interfered with. This is likely to occur when mechanical equipment is used or when unqualified personnel pick up munitions.

9.2.1. EOD Bomb Disposal and Clearance Tasks

Several Explosive Ordnance Clearance Tasks have been undertaken in certain areas of the DSDC site by 33 Engineer Regiment (EOD). The first was a 12.5% search undertaken between 19th and 29th March 1975. The areas covered by this search have been overlaid onto the site map and presented in Annex G. They comprise only small sections of land, jointly comprising approximately 127 acres, and mostly fall outside this report's areas of interest. The operation did not produce any explosive ordnance finds.

The second search was undertaken between the 23rd and 25th November 1981. It covered an area of 1.4 acres centred at OS grid reference SP 595 207 (map not available, but located in the eastern section of Site E). No finds were recorded.

The site was further investigated in 2002. There was a requirement to certify sites A, B and G of the depot free from explosive ordnance contamination for the purposes of alienation (these areas have also been overlaid, Annex G). A desk-top study was undertaken by the Environmental Science Group of the Defence Logistics Organisation for these three areas. No requirement was found to conduct additional proactive EOC operations in sites A and G, but a limited intrusive and visual investigation was undertaken in the south-western corner of Site B. No explosive ordnance was found during this operation and a clearance certificate was issued by the Ministry of Defence stating that sites A, B and G are 'clear, as far as is reasonably practical, of explosive ordnance contamination'.

BACTEC does not hold records of any additional clearance tasks having been undertaken in the remaining areas of the site historically.

9.3. Defending Bicester from Aerial Attack

Both passive and active defences were deployed against enemy bombers attacking targets in the Bicester region.

Passive defences included measures to hinder the identification of targets (such as a lighting blackout at night and the camouflaging of strategic installations); to mislead bomber pilots into attacking decoy sites located away from the city and to force attacking aircraft to higher altitudes with the use of barrage balloons.

Active air defence relied on a coordinated combination of fighter aircraft to act as interceptors, anti-aircraft gun batteries and later the use of rockets and missiles, in order to actively engage and oppose attacking aircraft.

9.3.1. Anti-Aircraft Artillery and Projectiles

At the start of the war two types of AAA guns were deployed: Heavy Anti-Aircraft Artillery (HAA), using large calibre weapons such as the 3.7" QF (Quick Firing) gun and Light Anti-Aircraft Artillery (LAA) using smaller calibre weapons such as 40mm Bofors gun.

During the early war period there was a severe shortage of AAA available and older WWI 3" and modified naval 4.5" guns were deployed alongside those available 3.7" weapons. The maximum ceiling height of fire at that time was around 11,000m (for the 3.7" gun and less for other weapons). As the war progressed improved variants of the 3.7" gun were introduced and, from 1942, large 5.25 inch weapons began to be brought into service. These had significantly improved ceiling heights of fire reaching over 18,000m.

The LAA batteries were intended to engage fast low flying aircraft and were typically deployed around airfields or strategic installations. These batteries were mobile and could be moved to new positions with relative ease when required. The most numerous of these was the 40mm Bofors gun which could fire up to 120 x 40mm HE shells per minute to over 1800m.

The HAA projectiles were high explosive shells, usually fitted with a time delay or barometric pressure fuze to make them explode at a pre-determined height. If they failed to explode or strike an aircraft, they would eventually fall back to earth. Details of the most commonly deployed WWII AAA projectiles are shown below:

Gun type	Calibre	Shell Weight	Shell Dimensions
3.0 Inch	76mm	7.3kg	76mm x 356mm
3.7 Inch	94mm	12.7kg	94mm x 438mm
4.5 Inch	114mm	24.7kg	114mm x 578mm
40mm	40mm	0.9kg	40mm x 311mm

Although the larger unexploded projectiles could enter the ground they did not have great penetration ability and are therefore likely to be found close to WWII ground level. These shells are frequently mistakenly identified as small German air-delivered bombs, but are

differentiated by the copper driving band found in front of the base. With a high explosive fill and fragmentation hazard these items of UXO present a significant risk if encountered. The smaller 40mm projectiles are similar in appearance and effect to small arms ammunition and, although still dangerous, present a lower risk.

Numerous unexploded AAA shells were recovered during and following WWII and are still occasionally encountered on sites today.

There are no recorded HAA batteries in the Bicester area. However, the ordnance depot to the south-east of the town and the airfield to the north-east would both have been equipped with light anti-aircraft guns to defend against attack.

Illustrations of Anti-Aircraft artillery, projectiles and rockets are presented at Annex H.

10. Ordnance Clearance and Post-WWII Ground Works

10.1. General

The extent to which any ordnance clearance activities have taken place on site or extensive ground works have occurred is relevant since on the one hand they may indicate previous ordnance contamination but also may have reduced the risk that ordnance remains undiscovered.

10.2. EOD Clearance

Explosive ordnance clearance operations have been undertaken at certain small areas within the boundary of DSDC Bicester. However, the majority of the facility has not been subject to clearance. Those sections which have been searched were only subject to 12.5% clearance. The risk of encountering explosive ordnance has therefore not been eliminated or significantly reduced as a result of these operations.

10.3. Post war Redevelopment

Examination of the available historical mapping and aerial photography indicates that relatively little development has occurred at DSDC Bicester in the post-war years. The main warehouse structures which were installed in the 1940s are still present, and the primary changes are to ancillary buildings. The majority of open, grassed areas appear never to have been subject to development or significant intrusive works.

11. The Overall Explosive Ordnance Threat Assessment

11.1. General Considerations

Taking into account the quality of the historical evidence, the assessment of the overall threat to the proposed works from unexploded ordnance must evaluate the following risks:

- That the site was contaminated with unexploded ordnance
- That unexploded ordnance remains on site
- That such items will be encountered during the proposed works
- That ordnance may be activated by the works operations
- The consequences of encountering or initiating ordnance

11.2. The Risk that the Site was Contaminated with Unexploded Ordnance

For the reasons discussed in section 8.3, BACTEC believes that there is a minimal risk of Allied explosive ordnance contamination at the DSDC Bicester site, or that unexploded high explosive bombs and/or anti-aircraft projectiles or incendiary bombs fell unnoticed and unrecorded within the site boundary.

- DSDC Bicester has been a military depot for over 65 years. No evidence could be found to indicate that the purpose of the depot was ever for the storage of explosive ordnance. Nevertheless, as with all historic military facilities, there is always a residual risk of explosive ordnance contamination.
- During the war years, the facility would have been defended, and weaponry in the form of small arms and land service ammunition would have been stored and available for use. Furthermore, as a result of the military association with the area, it is likely that the land on and around the depot would have been utilised for ground training exercises historically.
- The 'house-keeping' of WWII facilities is known to have often been poor with unwanted and unused items of explosive ordnance frequently buried, burnt, lost or otherwise discarded within a facility perimeter. Given the available history of the site, the likelihood of this having occurred within the perimeter of DSDC Bicester itself is not considered high, but cannot be entirely discounted. The risk of encountering LSA and SAA in Proposed Additional Areas 1 and 2 is considered somewhat higher than the background level due to the areas use for US Bolero Army Camps during WWII – it is very unlikely that explosive ordnance would have been stored in large quantities within these camps, but it is likely to have been present and available for use, and potentially therefore buried and/or discarded within these areas.
- It should be noted that several search and clear operations have been undertaken at several locations on the site by 33 Engineer Regiment (EOD) in the post-war period. Although nothing was found, the requirement for and completion of such operations at the cost of the MoD indicates that there was a credible perceived threat/possibility of explosive ordnance contamination being present. It should also be noted that only small sections of DSDC Bicester have been subject to such searches, those searches only providing 12.5% clearance.
- Research indicates that bombing density over the Bicester area was low. Very few references could be found to raids over the region despite there being a number of high profile RAF targets present. ARP records for COD Bicester could not be located (reports of bombing on military land were generally made by military personnel and kept separate from civilian records). It has therefore not been possible to confirm that the facility was not attacked. However, work on the construction of the depot did not commence until after the main period of bombing in this part of the UK.
- The depot employed thousands of people and for the latter part of WWII at least, would have been manned twenty-four hours a day. It is considered very unlikely that evidence of unexploded ordnance would have been overlooked across the site subsequent to construction work beginning in June 1941. Prior to this date, the site comprised open, agricultural land on which it is conceivable that unexploded bombs could have been overlooked had they been dropped. However, given the low bombing density in this part of the county and lack of viable targets within the site area in 1940/early 1941, the likelihood of unexploded bombs having been dropped is considered minimal.

11.3. The Risk that Unexploded Ordnance Remains on Site

The sites have not been subject to significant post-war redevelopment or intrusive works. Most of the sections of open ground which were present during WWII are extant today. Where intrusive works have occurred post-war, this will largely have mitigated any risk of encountering ordnance as any contamination is likely to be present at only shallow depths. In areas which have not been subject to intrusive works, there is still a risk that ordnance could remain in situ.

11.4. The Risk that Ordnance may be Encountered during the Works

The most likely scenarios under which a UXO could be encountered during construction works is during piling, drilling operations or bulk excavations for basement levels. The overall risk will depend on the extent of the works, such as the numbers of boreholes/piles (if required) and the volume of the excavations.

The primary threat on the DSDC Bicester sites comes from items such as small arms and land service ammunition, lost, burnt, buried or otherwise discarded. Such items are only likely to be present, and therefore encountered, at shallow depths.

11.5. The Risk that Ordnance may be Initiated

The risk that UXO could be initiated if encountered will depend on its condition, how it is found and the energy with which it is struck. The most violent activity on most construction sites is percussive piling.

As a result items that are shallow buried present a lower risk than those that are deep buried, since the force of impact is usually lower and they are more likely to be observed – when immediate mitigating actions can be taken.

11.6. The Consequences of Encountering or Initiating Ordnance

Clearly the consequences of an inadvertent detonation of UXO during construction operations would be catastrophic with a serious risk to life, damage to plant and a total site shutdown during follow-up investigations.

Since the risk of initiating ordnance is comparatively low if appropriate mitigation measures are undertaken, the most important consequence of the discovery of ordnance will be economic. This would be particularly so in the case of high profile locations and could involve the evacuation of the public. The unexpected discovery of ordnance may require the closing of the site for any time between a few hours and a week with a potentially significant cost in lost time. Note also that the suspected find of ordnance, if handled solely through the authorities, may also involve loss of production since the first action of the Police in most cases will be to isolate the locale whilst awaiting military assistance, even if this turns out to have been unnecessary.

11.7. BACTEC's Assessment

Taking into consideration the findings of this study, BACTEC considers there to be a **Low-Medium** risk from unexploded ordnance during the proposed works at DSDC Bicester:

	Level of Risk			
Type of Ordnance	**Negligible**	**Low**	**Medium**	**High**
German HE UXBs		*		
British AAA		*		
German incendiaries and anti-personnel bombs		*		
LSA/SAA		*		

12. Proposed Risk Mitigation Methodology

12.1. General

BACTEC believes the following risk mitigation measures should be deployed to support the proposed works at the DSDC Bicester site.

12.2. Recommended Risk Mitigation Measures

All Works

- ***Explosive Ordnance Safety and Awareness Briefings to all personnel conducting intrusive works:*** A specialised briefing is always advisable when there is a possibility of explosive ordnance contamination. It is an essential component of the Health & Safety Plan for the site and conforms to requirements of CDM Regulations 2007. All personnel working on the site should be instructed on the identification of UXB, actions to be taken to alert site management and to keep people and equipment away from the hazard. Posters and information of a general nature on the UXB threat should be held in the site office for reference and as a reminder.
- ***The Provision of Unexploded Ordnance Site Safety Instructions:*** These written instructions contain information detailing actions to be taken in the event that unexploded ordnance is discovered. They are to be retained on site and will both assist in making a preliminary assessment of a suspect object and provide guidance on the immediate steps to be taken in the event that ordnance is believed to have been found.

In making this assessment and recommending these risk mitigation measures, the proposed works outlined in the 'Scope of the Proposed Works' section were considered. Should the planned works be modified or additional intrusive engineering works be considered, BACTEC should be consulted to see if a re-assessment of the risk or mitigation recommendations is necessary.

BACTEC International Limited 14th January 2011

Bibliography

The key published documents consulted during this assessment are listed below:

- Bates, H, E., *Flying Bombs over England*, Frogletts Publications Ltd. 1994.
- Dobinson, C., AA Command: Britain's Anti-Aircraft Defences of the Second World War, Methuen. 2001.
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- Fleischer, W., *German Air-Dropped Weapons to 1945,* Midland Publishing. 2004.
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- Price, A., Blitz on Britain, The Bomber Attacks on the United Kingdom 1939 – 1945, Purnell Book Services Ltd. 1977.
- Ramsey, W., *The Blitz Then and Now, Volume 1*, Battle of Britain Prints International Limited. 1987.
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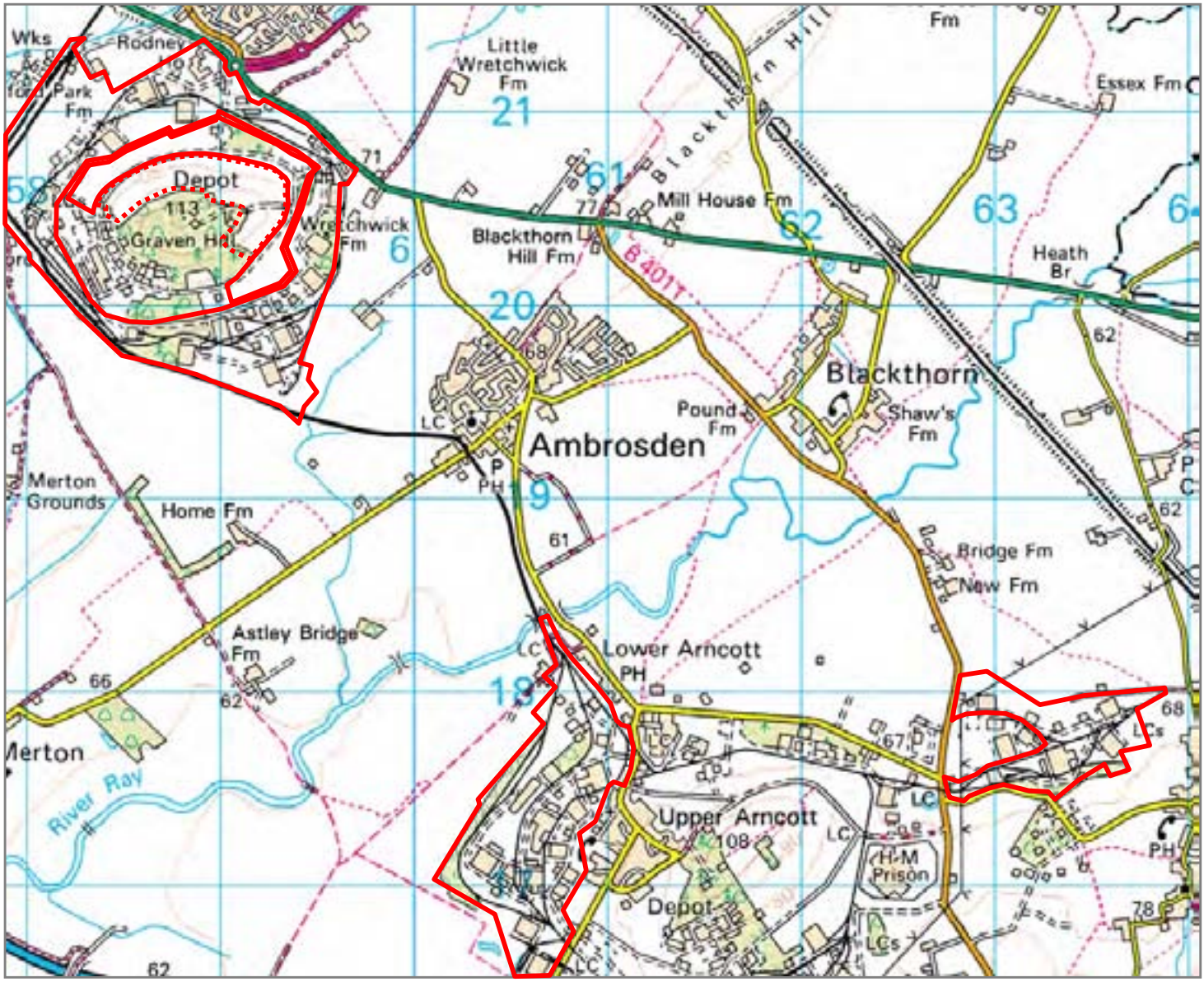
- Whiting, C., Britain Under Fire: The Bombing of Britain's Cities 1940-1945, Pen & Sword Books Ltd. 1999.

Annex A: Site Location Maps

North



Report Reference:	Client:	
3063TA REV_1	Entec UK Ltd	BACTEC
	Project: DSDC Bicester, Oxfordshire	

Annex B: Recent Aerial Photographs of the Site

Approximate site boundary

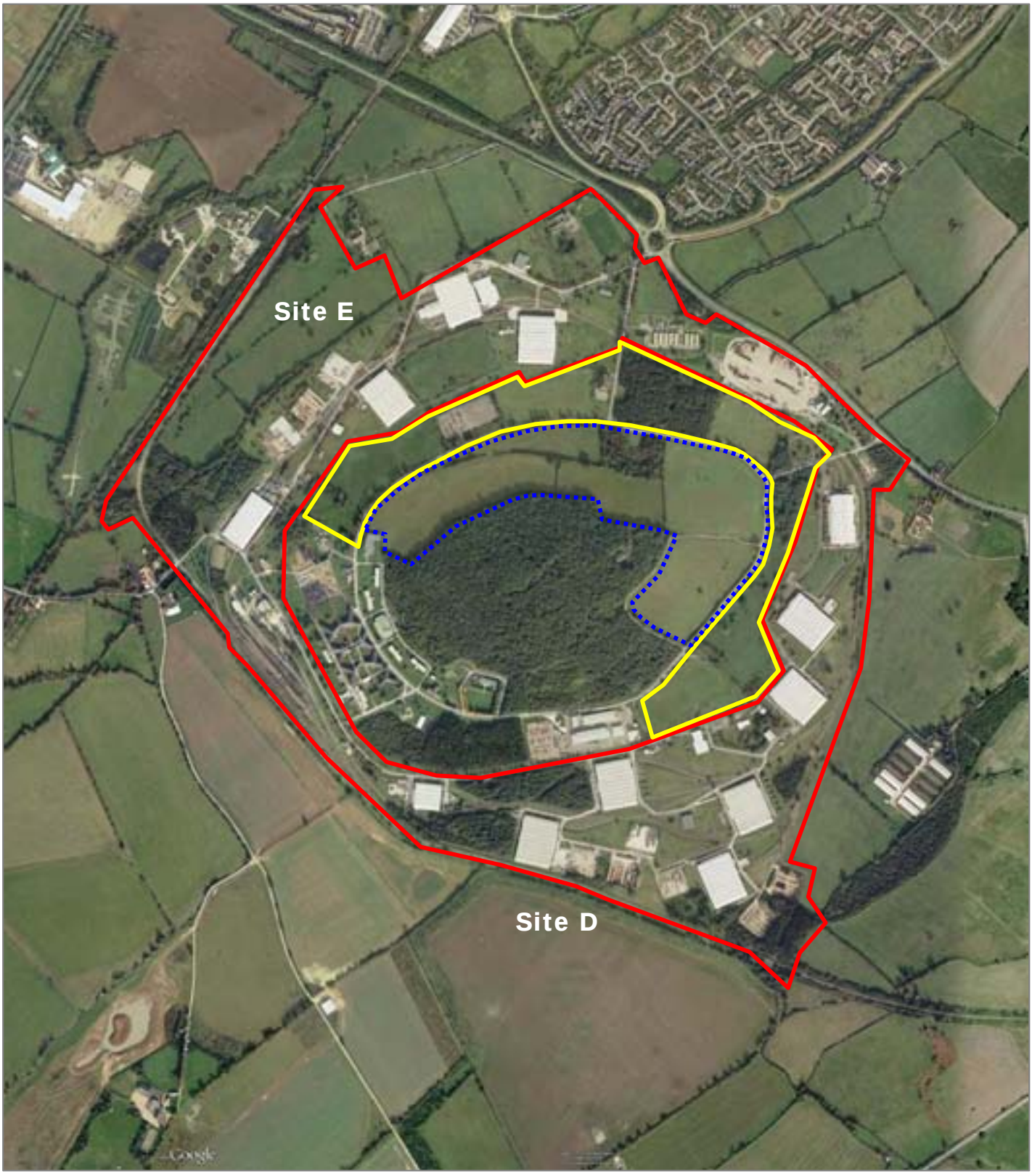
Potential additional area 1

Potential additional area 2

Report Reference:	Client:	
3063TA REV_1	Entec UK Ltd	
	Project: DSDC Bicester, Oxfordshire	

Source: Google Earth ™ Mapping Services

North



Approximate site boundary

Potential additional area 1

Potential additional area 2

Report Reference:	Client:	
3063TA REV_1	Entec UK Ltd	
	Project: DSDC Bicester, Oxfordshire	

Source: Google Earth ™ Mapping Services

North

Approximate site boundary

Report Reference:	Client:	
3063TA REV_1	Entec UK Ltd	BACTEC
	Project: DSDC Bicester, Oxfordshire	

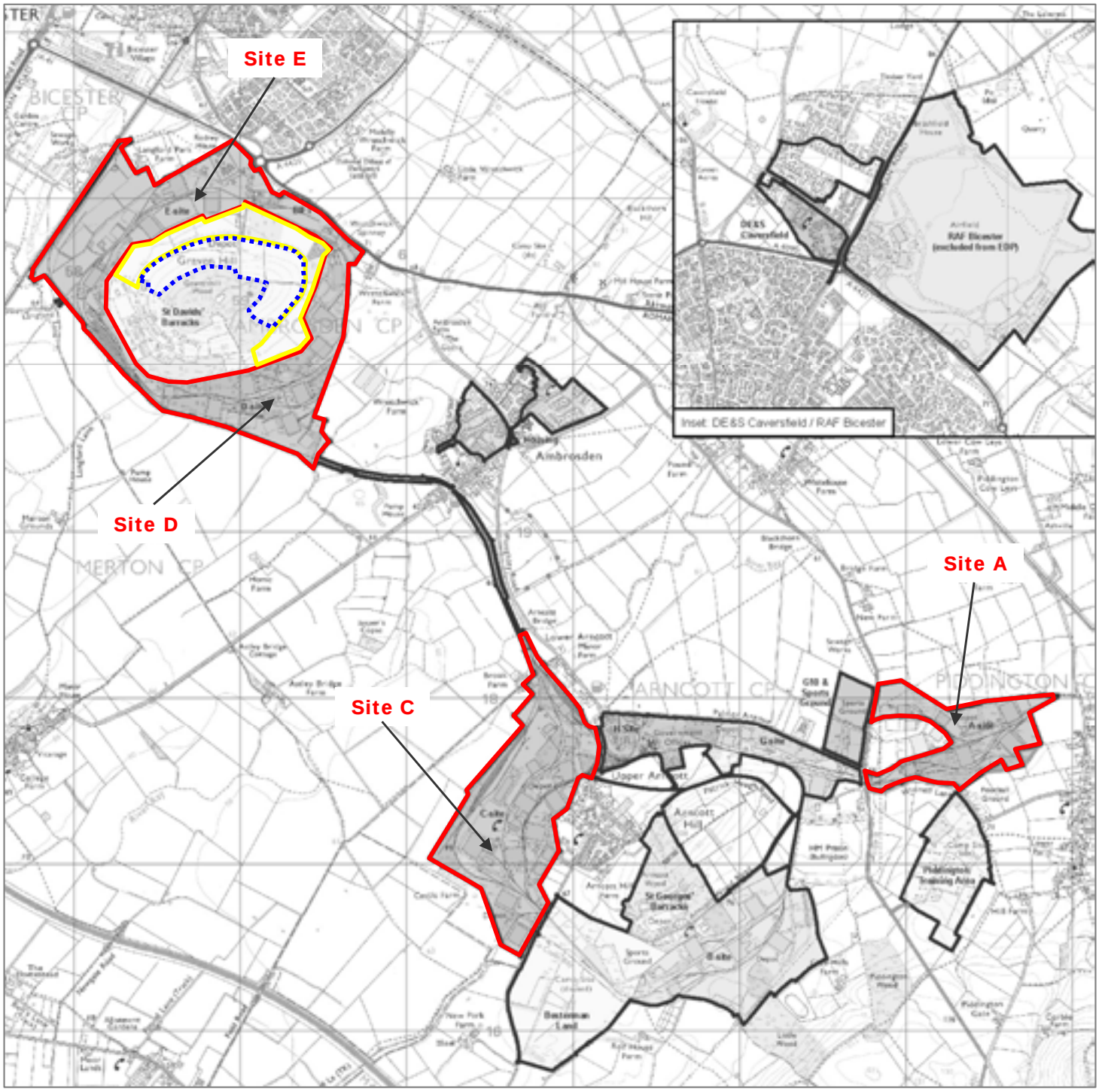
Source: Google Earth ™ Mapping Services

North

Approximate site boundary

Annex C: Site Plan

North



Approximate site boundary

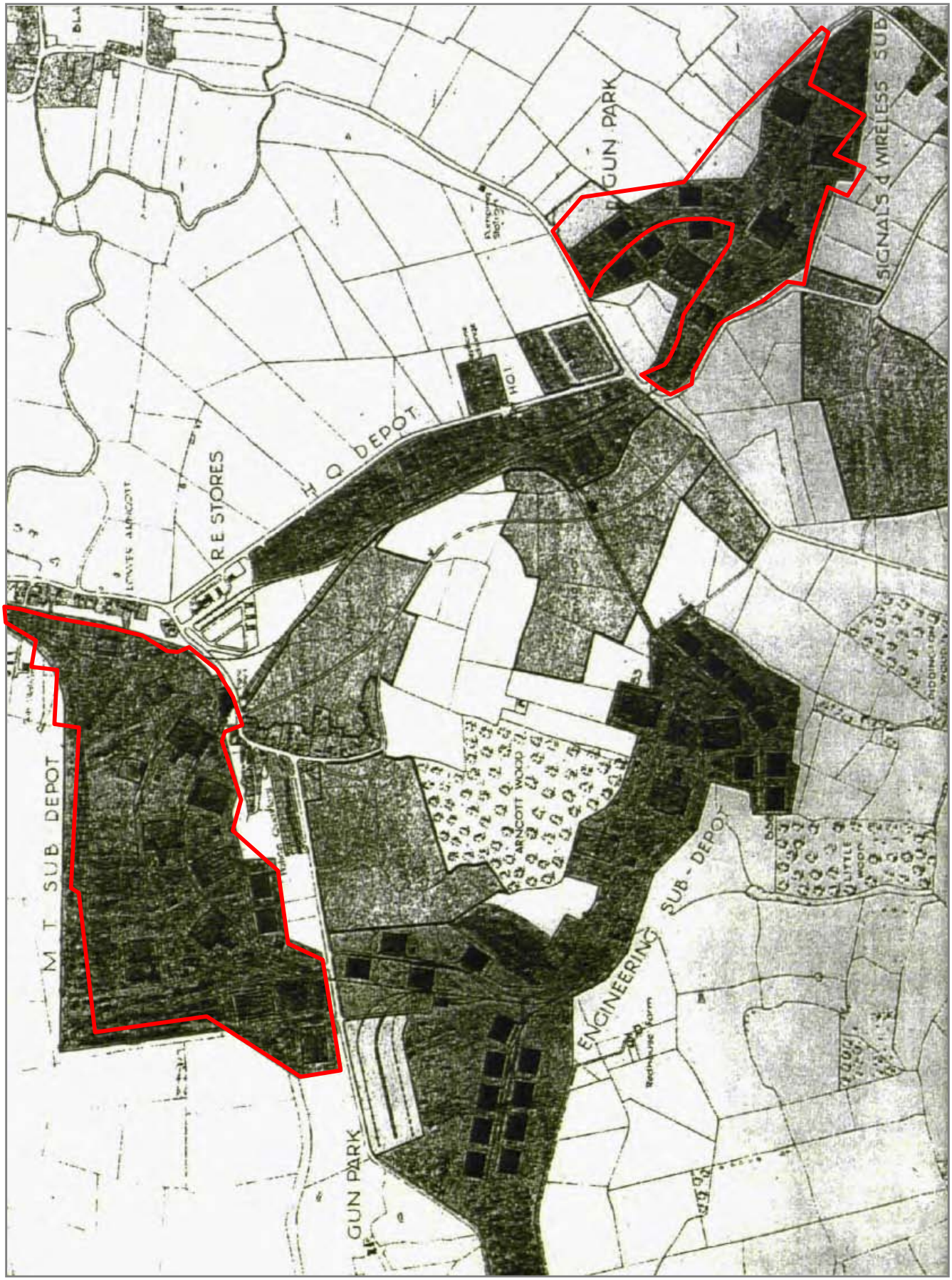
Potential additional area 1

Potential additional area 2

Report Reference:	Client:	
3063TA REV_1	Entec UK Ltd	
	Project: DSDC Bicester, Oxfordshire	

Source: Entec UK Ltd

Annex D: 1943 Map of Arncott Site



Approximate site boundary

Report Reference:	Client:	
3063TA REV_1	Entec UK Ltd	
	Project: DSDC Bicester, Oxfordshire	

Source: Environmental Science Group

Annex E: Historic RAF Aerial Photography

Approximate site boundary

Report Reference: 3063TA REV_1	Client: Entec UK Ltd	
	Project: DSDC Bicester, Oxfordshire	

Source: English Heritage National Monuments Record

North

Approximate site boundary

Report Reference: 3063TA REV_1	Client: Entec UK Ltd	BAC TEC
	Project: DSDC Bicester, Oxfordshire	

Source: English Heritage National Monuments Record

Approximate site boundary

Potential additional area 1

Potential additional area 2

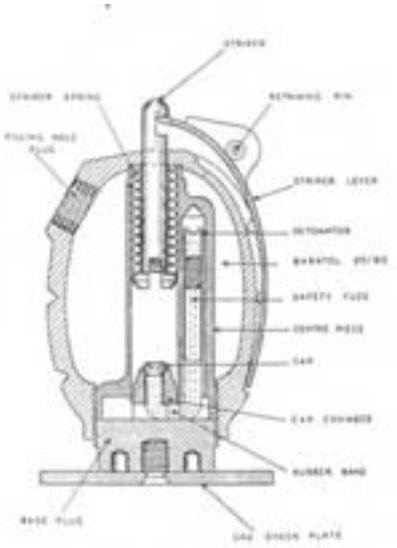
Report Reference: 3063TA REV_1	Client: Entec UK Ltd	
	Project: DSDC Bicester, Oxfordshire	

Source: English Heritage National Monuments Record

Annex F: LSA/SAA

No. 36 'Mills' Grenade

Weight:	0.7kg filled (1lb 6oz)
Type:	Hand or discharger, fragmentation
Dimensions:	95 x 61mm (3.7 x 2.4in)
Filling:	Alumatol, Amatol 2 or TNT
Remarks:	4 second hand-throwing fuse with approximate 30m range. First introduced May 1918.



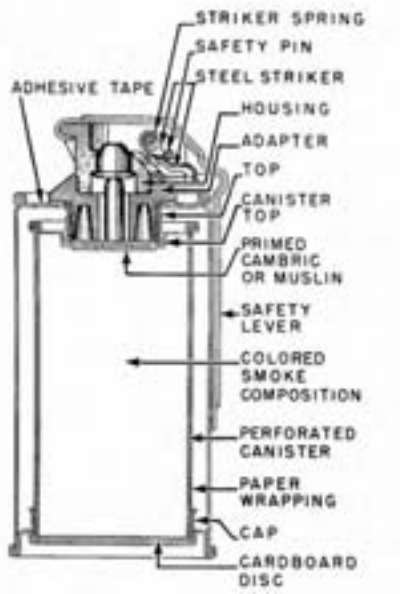
Grenade, .303 inch rifle, No. 36M, Mark I.

No. 69 Grenade

Weight:	0.38kg filled (0.8lb)
Type:	Percussion/Blast
Date Introduced:	December 1940
Remarks:	Black Bakelite body. Blast rather than fragmentation type. After unscrewing the safety cap, a tape is held when throwing the grenade releasing the safety bolt in the throwing motion. Detection is problematic due to its very low metal content.

Typical Smoke Grenade

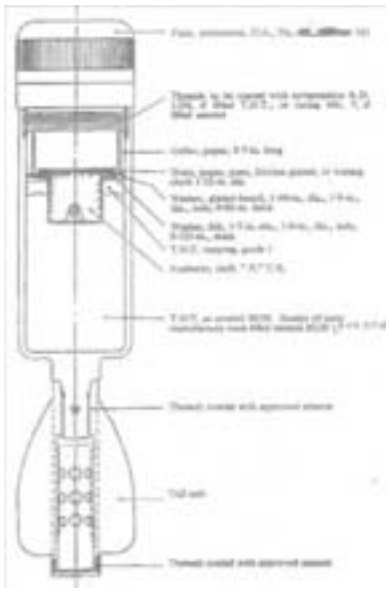
Dimensions:	Approx. 65 x 115mm (2.5 x 4.5in)
Type:	Smoke
Date Introduced:	Current MoD issue
Remarks:	Smoke grenades are used as ground-to-ground or ground-to-air signalling devices, target or landing zone marking devices, and screening devices for unit movement.



Source: BACTEC International Limited and various historical sources

Typical 2 inch High Explosive Mortar

Bomb Weight:	1.02kg (2.25lb)
Type:	High Explosive
Dimensions:	51 x 290mm (2in x 11.4in)
Filling:	200g RDX/TNT
Maximum Range:	457m (500yds)
Remarks:	Fitted with an impact fuze which detonates the fuze booster charge (exploder) and, in turn, the high explosive charge. The main charge shatters the mortar bomb body, producing near optimum fragmentation and blast effect at the target.

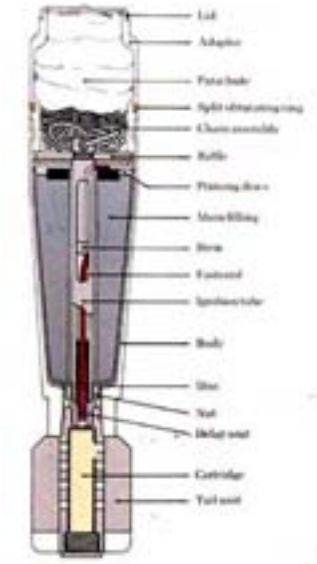


Typical 3 inch Smoke Mortar

Type:	Smoke
Dimensions:	c490 x 76mm (19.3in x 3in)
Filling:	Typically white phosphorous
Maximum Range:	2515m (2,750yds)
Remarks:	On impact, the fuze functions and initiates the bursting charge. The bursting charge ruptures the mortar bomb body and disperses the white phosphorous filler. The white phosphorous produces smoke upon exposure to the air.

Typical 2 inch Illuminating Mortar

Type:	Illum.
Dimensions:	51 x 290mm
Filling:	Various
Remarks:	The expulsion charge ignites and ejects the candle assembly. A spring ejects the parachute from the tail cone. The parachute opens, slowing the descent of the burning candle which illuminates the target.



Source: BACTEC International Limited and various historical sources

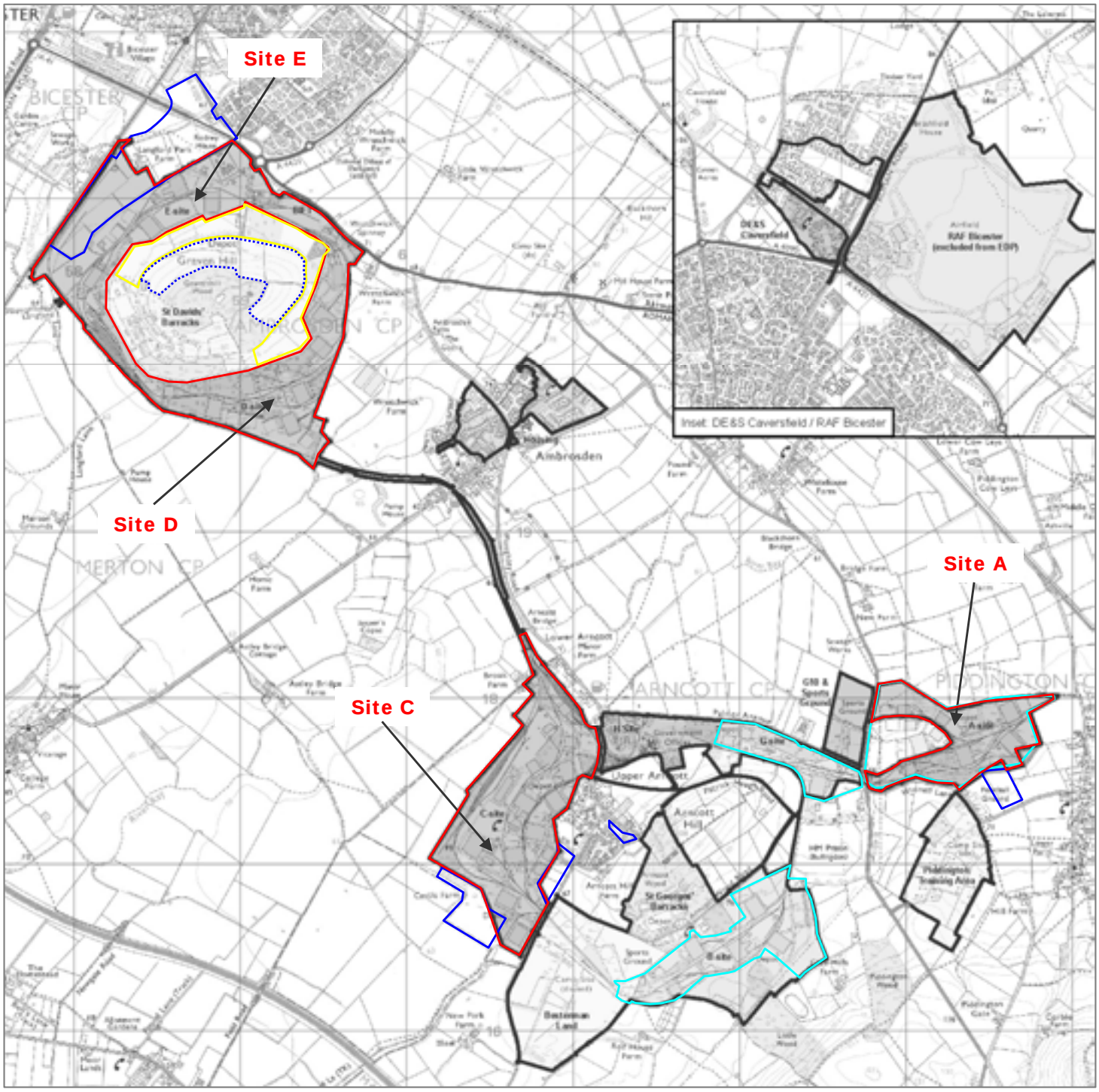
Small arms ammunition and cannon rounds up to 30mm

Recovered British WWII era SAA

Annex G: Map Showing Locations of EOD Clearance Tasks

North

Areas 12.5% Searched 19th Mar 1975 to 29th March 1975



Areas certified by MoD as being clear 'as far as reasonably practical' of explosive ordnance contamination

Areas subject to 12.5% search and clear operations by 33 Engineer Regiment (EOD)

Approximate site boundary

Potential additional area 1

Potential additional area 2

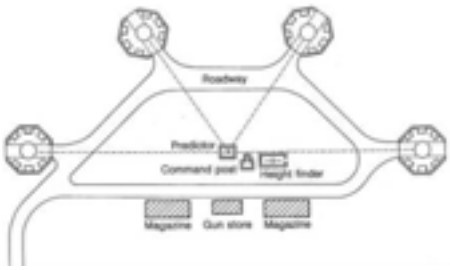
Report Reference:	Client:	
3063TA REV_1	Entec UK Ltd	BACTEC
	Project: DSDC Bicester, Oxfordshire	

Source: BACTEC International Limited

Annex H: Anti-Aircraft Artillery

3.7 inch Anti-Aircraft Projectile

Weight:	12.7kg (28lb)
Dimensions:	94 x 360mm (3.7 x 14.7in)
Carriage:	Mobile and Static Versions
Rate of Fire:	10-20 rounds per minute
Ceiling:	9-18,000m (29-59,000ft)
Muzzle Velocity:	792m/s (2,598ft/s)
Remarks:	4.5 inch projectiles were also commonly utilised



Layout plan for a typical HAA battery site.

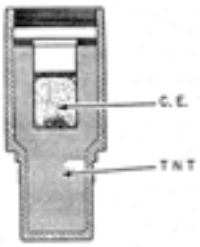
Slade Green's HAA battery, Dartford showing typical size and layout of the installation.

Hyde Park 1939 3.7 Inch QF gun on mobile mounting

3.7 inch AA Projectile Minus Fuze

Rockets / Unrotated Projectiles

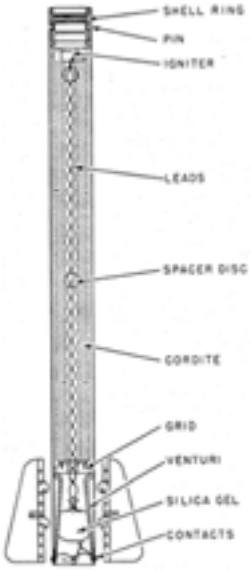
Weight:	Overall: 24.5kg (54lb) Warhead: 1.94kg (4.28lb)
Dimensions:	1930mm x 82.6mm (76 x 3.25in)
Carriage:	Mobile – transported on trailers
Ceiling:	6770m (22,200ft)
Maximum Velocity:	457mps (1,500 fps)



MK II HE Shell (3.5kg)

Rocket Battery in action

Home Guard soldiers load an anti-aircraft rocket at a 'Z' Battery



2" U.P AA Rocket

40mm Bofors Gun Projectile

Weight:	0.86kg (1.96lb)
Dimensions:	40mm x 310mm (1.6in x 12.2in)
Rate of Fire:	120 rounds per minute
Ceiling:	23,000ft (7000m)
Muzzle Velocity:	2,890 ft/s (881m/s)
Remarks:	Mobile batteries – normally few records of where these guns were located

Unexploded 40mm Bofors projectile recovered from a marine environment

40mm Bofors gun and crew at Stanmore in Middlesex, 28 June 1940.

Report Reference: 3063TA REV_1	Client: Entec UK Ltd	
	Project: DSDC Bicester, Oxfordshire	

Source: BACTEC International Limited and various historical sources

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- Lebanon
- Libya
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Website: www.bactec.com

BACTEC

Annex C
Dstl Radiological Desk Study

5 Pages

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Dstl is part of the Ministry of Defence

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SY2 5DE

(For attention of Simon Howard)

Our Ref: ESD/AS/490158/ENTEC/SH
Your Ref: Email from Simon Howard (Entec UK Ltd) dated 7th January 2010

Date: 1 February 2010

PHASE ONE LAND QUALITY ASSESSMENT (DESK STUDY) – DSDC BICESTER

1. In response to your request, Dstl has conducted a search of records relating to any radiological contamination issues at Defence Storage and Distribution Centre (DSDC) Bicester, formerly Base Ordnance Depot (BOD) Bicester. This desk study will provide an input into the Phase One Land Quality Assessment of the afore-mentioned site.

2. It should be noted that the specific area of the site being investigated is A, C, D and E parts of DSDC Bicester. Dstl do not hold any information specifically relating to these areas, but have undertaken an information search for DSDC Bicester as a whole.

Desk Study Methodology

3. Dstl have searched a number of information sources including the MOD radioactive holdings database, archive and published information etc. In addition, a number of people within the Dstl Radiation Protection Advisory Body and site representatives have been consulted in order to obtain any information available relating to radiological issues.

Results of Information Search

4. Findings of the desk study are summarised in Table 1 (Annex A) which includes full references for any information identified. This table also includes information searches which did not yield any relevant information.

5. Dstl records show that a very large number of items of standard military equipment containing radioactive material have been stored at the DSDC Bicester site from at least 1994 to the present day; the site being a major distribution centre for the main storage facility at DSDA Donnington. These include various pieces of instrumentation and check sources containing the following radionuclides: tritium (H-3), nickel-63 (Ni-63), thorium-232 (Th-232), strontium-90 (Sr-90) chlorine-36 (Cl-36) and cobalt-57 (Co-57). In addition, an instrumentation dial from a Canberra cockpit containing radium-226 (Ra-226) has been stored on site since at least 1999.

6. A previous Phase One Radiological Land Quality Assessment was undertaken for the Army Base Repair Organisation (ABRO) Facility at DSDC Bicester. This report noted that a Royal Electrical and Mechanical Engineers (REME) workshop operated at the site until approximately 1986; such facilities being known for work with radioactive material. In addition, there was also a burning ground for disposal of combustible materials on one of the depot sites (specific location not known).

7. The former REME workshop (Building C32) including instrument workshop was subject to a radiological survey in 1998 to determine the extent of any contamination which may be present. No radioactive contamination was identified in the buildings themselves although Ra-226 contamination was detected at a depth of 1.5 metres to the rear of the building (activity concentration: 275 Bq/g). The report concluded by recommending that any future intrusive work in the area should be supported by health physics cover for safety purposes. Dstl do not hold any information to indicate that the area has been subject to remediation.

8. A further radiological survey was undertaken in 1998 of an area in 'A' site planned for re-development. Whilst this survey did identify a number of areas of elevated radiation measurements, subsequent analysis of recovered soil samples indicated that these measurements were due to naturally occurring radioactive material rather than man-made contamination.

9. In addition, low level tritium contamination was identified in the site Armoury (Armourer's workshop) in September 2001, where maintenance work had been carried out on equipment containing gaseous tritium light sources (GTLSs). The area was decontaminated by the Dstl survey team in 2004.

Summary

10. The information gathered in this information search has highlighted that there is Ra-226 contamination present in the ground surrounding building C32 which was formerly operated as a REME workshop. It would be appropriate to carry out further characterisation of this contamination and the surrounding areas. Based on this information and the large number of radioactive items which have been stored on site, the likelihood of contamination being present on other parts DSDC Bicester is deemed to be moderate. In particular, if any additional burning grounds, disposal areas or workshops are identified on the site, these should be subject to a radiological survey.

11. Should you obtain additional historical information which you would like Dstl to comment upon, please do not hesitate to contact me.

Regards

Signed on original

AARON SCARLETT
Health Physicist
Dstl RPA Body

Report prepared by:

KEVIN WHITE
Environmental Technician

Table 1. Information Sources for Phase One LQA (Desk Study) of DSDC Bicester.

INFORMATION SOURCE	COMMENTS	REFERENCE
MOD Radioactive Holdings Database	*Current units holding radioactive material:* • In addition to DSDC Bicester, a number of units are based at the site including 16 Cadet Training Team, 23 Pioneer Regt RLC and the Garrison SP Unit. The site holds a large number of standard items of military equipment containing minor radioactive sources including tritium (H-3), thorium (Th-232), strontium (Sr-90), cobalt (Co-57) and chlorine (Cl-36). A master indicator from a Canberra cockpit containing radium (Ra-226) is also stored on site. *Former units known to hold radioactive material:* • The units previously based at the site include 25 Freight Dist Sqn RLC, 16 Sup Regt RLC, 25 Sqn RCT, 25 Sqn RLC, 602 Signal Troop, BOD (Bicester), BOD (Bicester) - Thatcham Sub Depot and HQ 23 GP RLC. They held standard pieces of military equipment and instruments containing tritium (H-3) and nickel-63 (Ni-63). **NOTE:** The regulatory controls associated with the handling and storage of radioactive material at MOD establishments limits the likelihood of radiological contamination arising.	MOD Radioactive Holdings Database (maintained by Dstl) [date of search: 28/01/2010]
Environment Agency Notifications/Approvals	DSDC Bicester hold a Notification from the Environment Agency for the keeping and use of closed sources (MOD parallel arrangements under the Radioactive Substances Act 1993).	EA Notification No. BS2453
Internet / MOD Intranet Search	An internet search did not reveal any specific information relating to possible radiological contamination issues. A search of the MOD intranet did not return any relevant information regarding the site.	Internet search: [date of search: 29/01/2010] MOD Intranet [date of search: 29/01/2010]

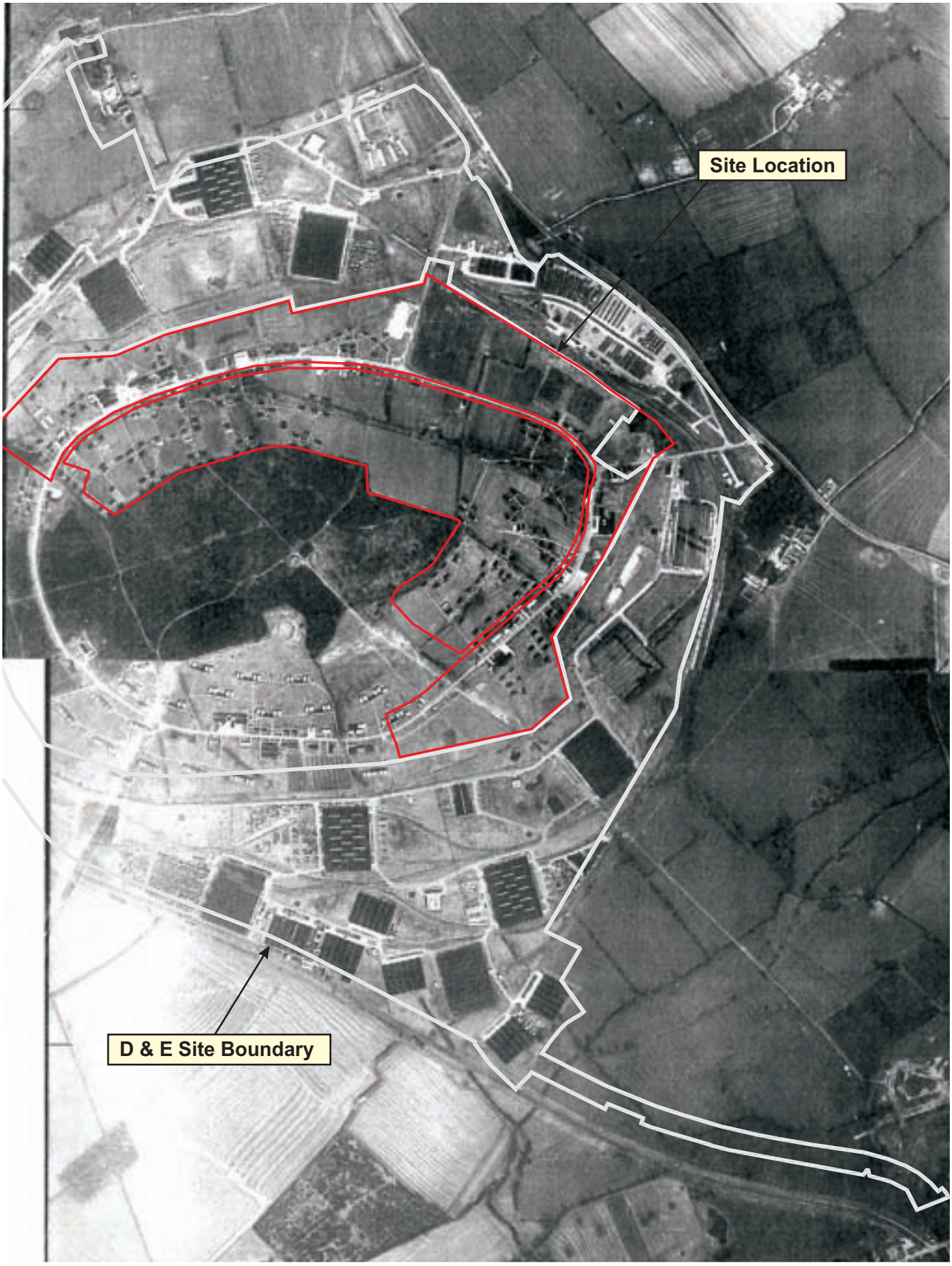
INFORMATION SOURCE	COMMENTS	REFERENCE
Archive Information	A previous phase one land quality assessment was undertaken on the ABRO Facility at DSDC Bicester. This report noted that a Royal Electrical and Mechanical Engineers (REME) workshop operated at the site until approximately 1986; such facilities being known for work with radioactive material. In addition, there was also a burning ground for disposal of combustible materials on one of the depot sites (specific location not known).	Dstl internal records: 490/0103/14780/DRPS dated September 2000
Published Information	There is some published historical information relating to RAF Bicester, but this site is separate from what is now DSDA Bicester.	Bower, M.J.F (1983) 'Action Stations No. 6 Military Airfields of the Cotswolds and the Central Midlands.
Dstl Radiological Surveys	A smear survey was undertaken in the Armourer's workshop in September 2001. This identified a number of areas of tritium contamination in locations where equipment containing GTLSs had been maintained. This area was de-contaminated by the Dstl survey team in 2004. The former instrument shop and areas external to Building C32 were surveyed in April 1998: some Ra-226 contamination was found in one of the trial pit locations at the rear of the building (activity concentration 275 Bq/g). No contamination was found within the building. A further radiological survey was undertaken in 1998 of an area in 'A' site planned for re-development. Whilst this survey did identify a number of areas of elevated radiation measurements, subsequent analysis of recovered soil samples indicated that these measurements were due to naturally occurring radioactive material rather than man-made contamination. The Garrison Support Centre was monitored for concentrations of naturally occurring radon gas in 2008-2009: no significant levels were detected. The rest of DSDC Bicester including A, C, D and E sites are due to be monitored in February 2010.	DRPS/GMH/20068/DSDCB/GP dated 21 September 2001 283/2004 - 2 December 2004 DERA/CHS/DRPS/22/98 dated 28 May 1998 DERA/CHS/DRPS/31/98 dated 1998 ESD/LJK/630007/RADON/0X60DL dated 10 June 2009 Dstl internal records [date of search: 29/01/10]

INFORMATION SOURCE	COMMENTS	REFERENCE
Site Contacts (eg. Radiation Safety Officer)	The Radiation Safety Officer (RSO) for DSDA Bicester was contacted by telephone. No information relating to potential radiological contamination was known, other than what has already been identified.	Telephone Conversation: White (Dstl) / RSO (SHEQ for DSDA Bicester) of 29/01/10.
Information from Radiation Protection Advisory Body.	A number of personnel within the Dstl RPA Body were contacted requesting information on any potential contamination issues. The only additional information available related to the use of the site as a distribution centre for the main storage facility at DSDA Donnington; hence the large number of radioactive items which have been stored on site. Previous advisory visit reports for DSDA Bicester were scrutinised, but no issues relating to radiological contamination were identified.	Email References: Brown (Dstl- Senior Health Physicist) / White (Dstl) of 28/01/10 Clark (Dstl – Senior Health Physicist) / White (Dstl) of 28/01/10 Gibbs (Dstl – Group Leader Radiation Protection) / White (Dstl) of 28/01/10 Hughes (Dstl – DSDA RPA) / White (Dstl) of 28/01/10 Lee (Dstl RAF RPA) / White (Dstl) of 28/01/10 Morgan (Dstl- Senior Health Physicist) / White (Dstl) of 28/01/10 ESD Report No. 257/2007 dated 13 September 2007

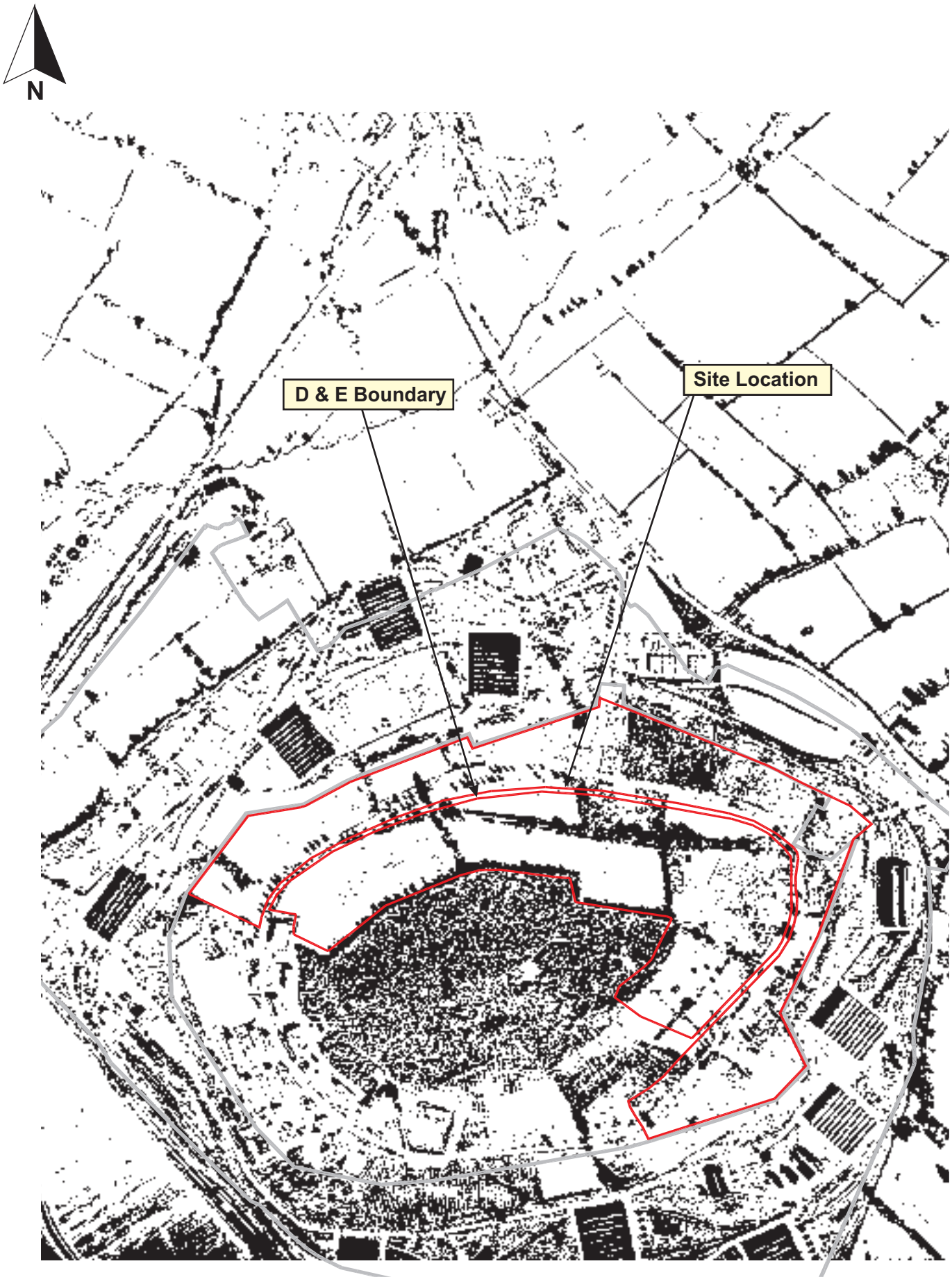
Annex D
Selected Historic Aerial Photographs

5 Pages

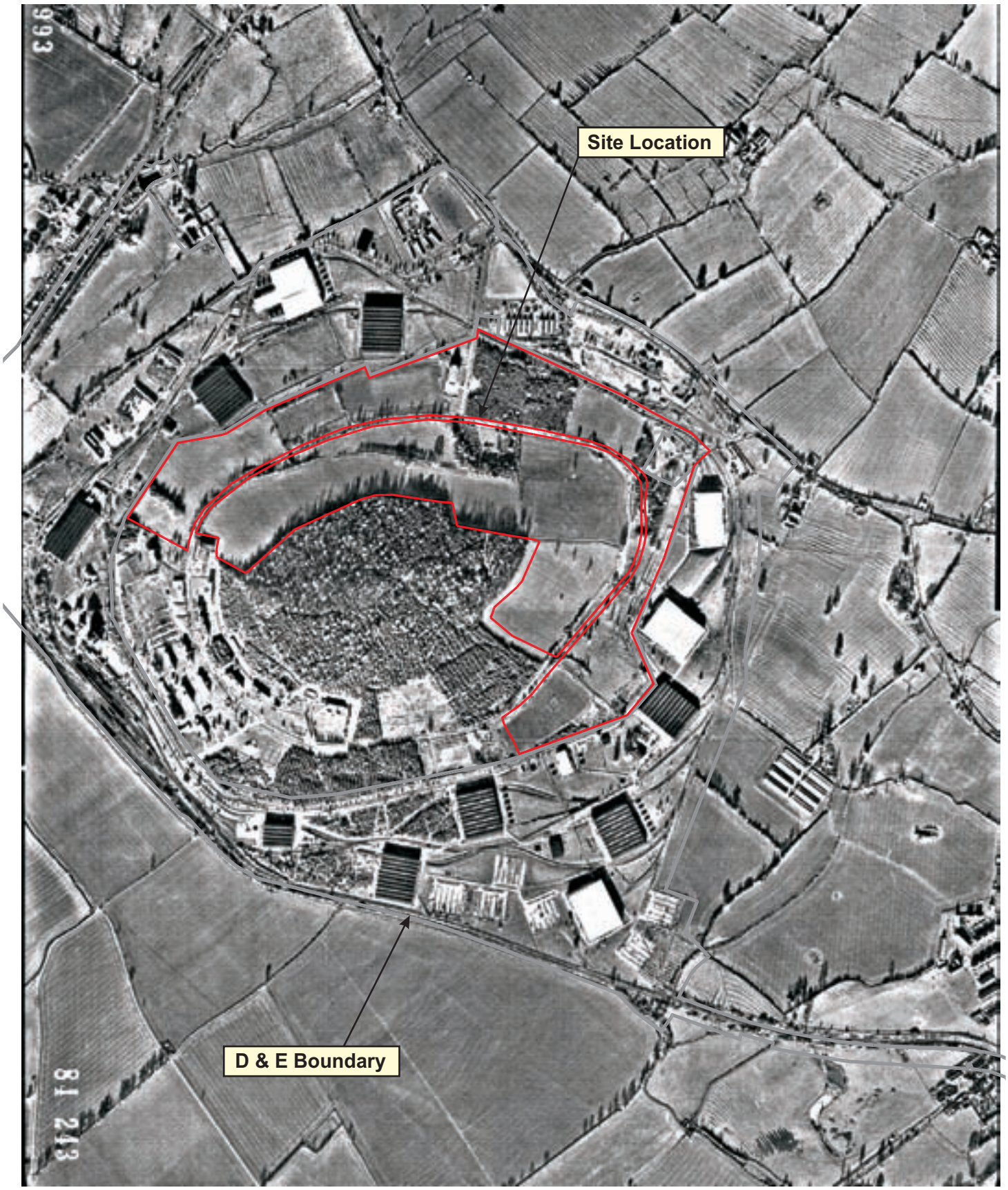
1947



1950



1975



1984

1984

Annex E
emapsite™ Reports

240 Pages

Entec
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Annex F
Local Authority Response

52 Pages

Entec
An AMEC company

Environmental Services Department

Edward Potter BSc (Hons) DMS **Head of Environmental Services**

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Please ask for ***Sean Gregory*** *Our ref* ***sg 01 BicMODD&E CL*** *Your ref* ***26999-01***
Direct Dial ***01295 221622*** *Fax* ***01295 263155*** *Email* ***sean.gregory@cherwell-dc.gov.uk***

19 January 2010

Dear Simon,

RE: BICESTER MOD SITES D AND E – ENVIRONMENTAL SEARCH

Thank you for your request for information relating to the above site. Please find a report detailing the information you requested below relating to sites D and E as detailed on the drawing entitled Bicester – TLB ownership. Information relating to sites A and C will be provided under separate cover.

The information included here is gathered, in part, from the Councils access to data supplied by Landmark and the British Geological Survey and is current up to 01/04/07. All other information has been obtained from a search of records held within the Environmental Services Department.

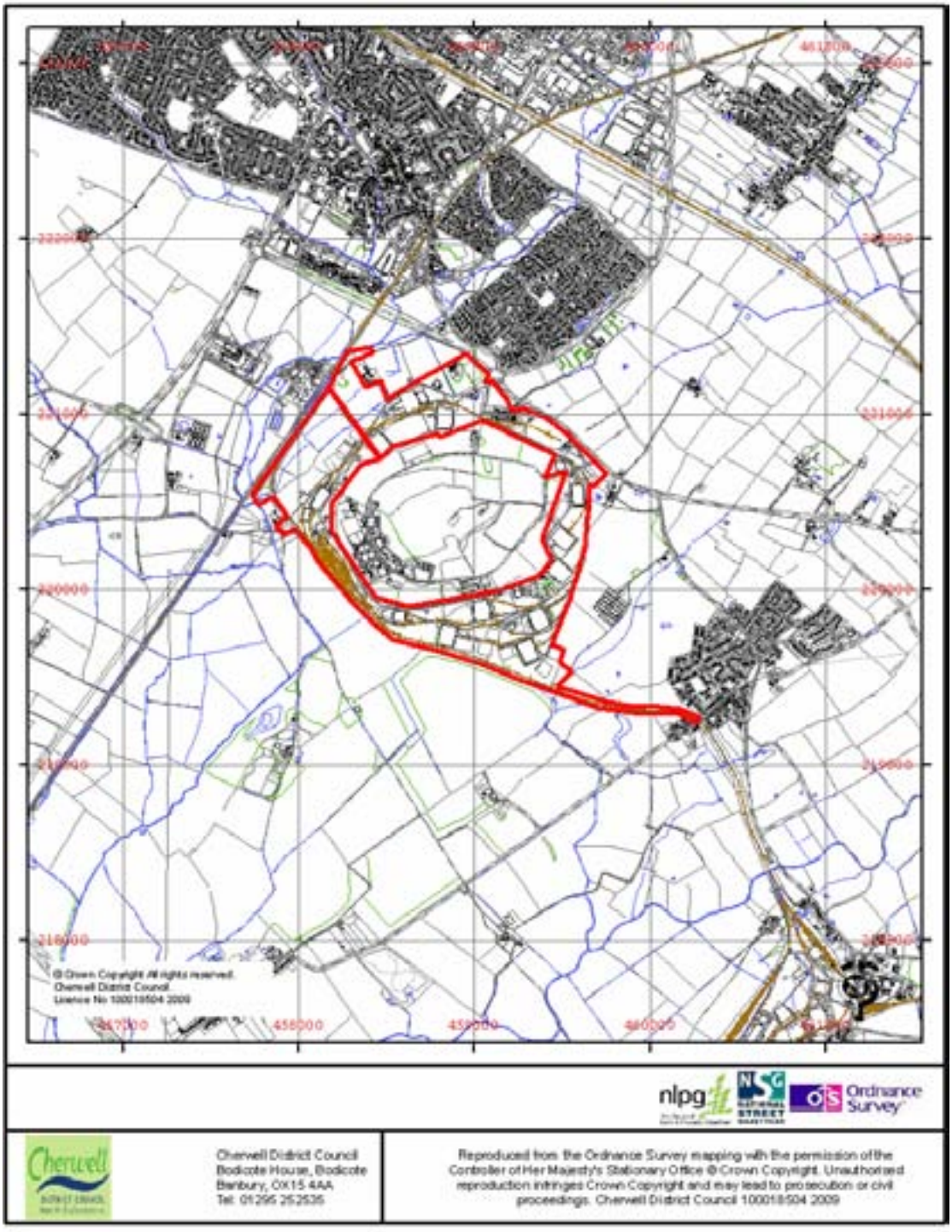
I trust this information is sufficient for your purposes.

Yours sincerely

Sean Gregory
Environmental Protection Officer

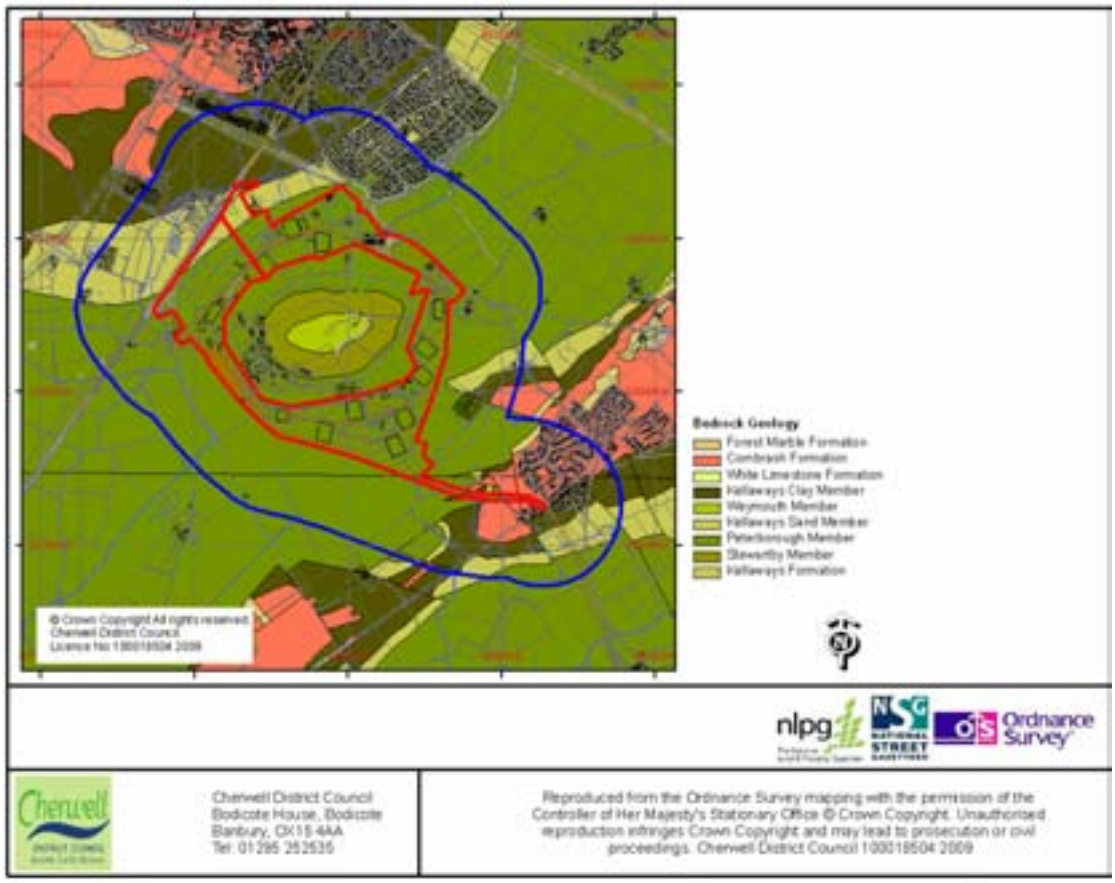
Site report

Report Name: Bicester MOD Sites D and E (Centred at 458821, 220409)
Report Number: sg 10 BicMODD&E CL



Geology

Bedrock Geology



Geological Map, British Geological Survey © NERC

The map shows the site (red) and a search radius of 500 meters (blue).

Geological maps have been extracted from the 1:50000 map series produced by the British Geological Survey.

Bedrock geology is a term used for the main mass of rocks forming the Earth's bedrock and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water. They have formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

Site Results

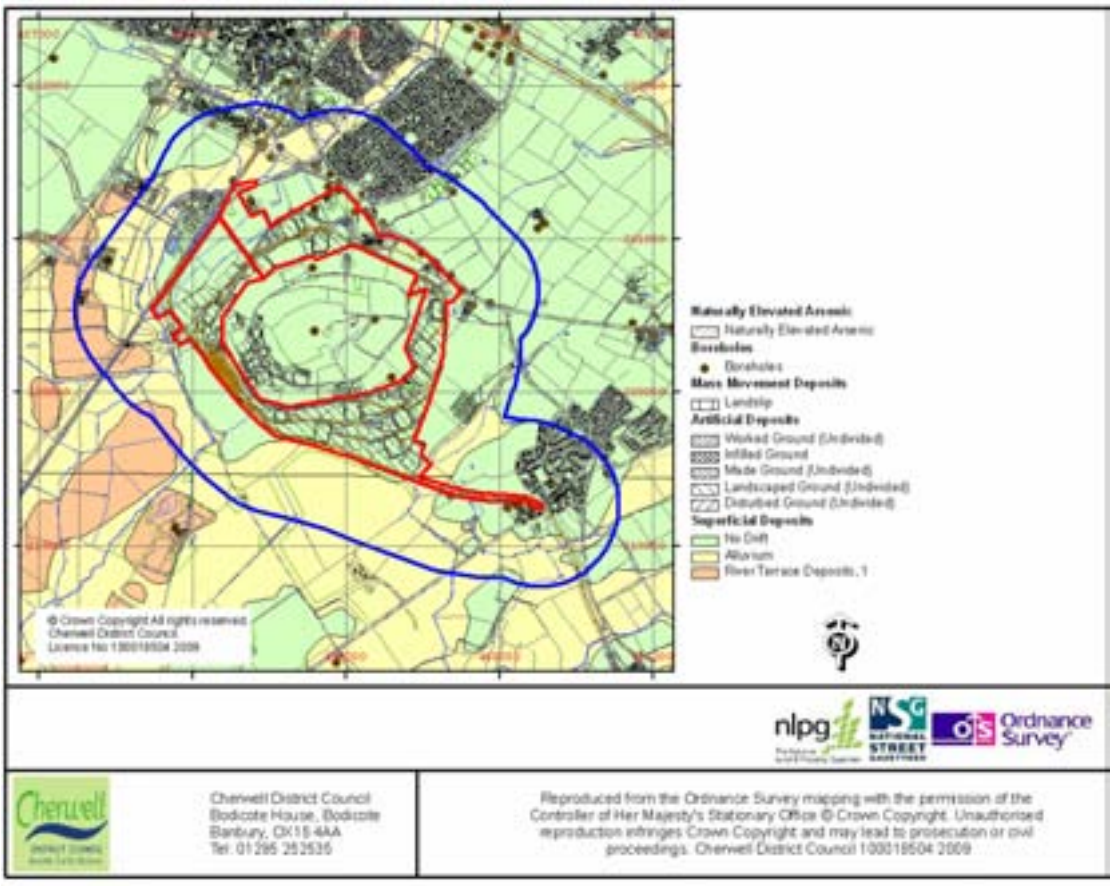
Rock Type
KELLAWAYS SAND MEMBER (SANDSTONE AND SILTSTONE, INTERBEDDED)
KELLAWAYS CLAY MEMBER (MUDSTONE)
PETERBOROUGH MEMBER (MUDSTONE)
CORNBRASH FORMATION (LIMESTONE)

Search Radius Results

Rock Type
KELLAWAYS CLAY MEMBER (MUDSTONE)
CORNBRASH FORMATION (LIMESTONE)
PETERBOROUGH MEMBER (MUDSTONE)

Rock Type
KELLAWAYS SAND MEMBER (SANDSTONE AND SILTSTONE, INTERBEDDED)
FOREST MARBLE FORMATION (LIMESTONE AND MUDSTONE, INTERBEDDED)
WEYMOUTH MEMBER (MUDSTONE)
STEWARTBY MEMBER (MUDSTONE)

Superficial, Artificial, Mass Movement Deposits, Boreholes and Naturally Occurring Arsenic



Geological Map, British Geological Survey © NERC

The map shows the site (red) and a search radius of 500 meters (blue).

Geological maps have been extracted from the 1:50000 map series produced by the British Geological Survey.

Superficial deposits is a term used by the BGS for natural deposits formed during the most recent period of geological time, the Quaternary, which extends 1.8 million years back from the present.

Artificial deposits is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Whilst artificial or man-made deposits are not part of the 'real geology' of solid and superficial deposits it does affect them and needs recording because the near surface ground conditions are important to human activities and economic development.

Borehole information has been extracted from the British Geological Survey register of boreholes.

Superficial Deposits

Site Results

Deposit Type
NO DRIFT

Deposit Type
ALLUVIUM (CLAY, SILT, SAND AND GRAVEL)

Search Radius Results

Deposit Type
NO DRIFT
RIVER TERRACE DEPOSITS, 1 (SAND AND GRAVEL)
ALLUVIUM (CLAY, SILT, SAND AND GRAVEL)

Artificial Deposits

Site Results

Deposit Type
MADE GROUND (UNDIVIDED)
LANDSCAPED GROUND (UNDIVIDED)

Search Radius Results

Deposit Type
WORKED GROUND (UNDIVIDED)
MADE GROUND (UNDIVIDED)
LANDSCAPED GROUND (UNDIVIDED)

Mass Movement Deposits

Site Results

No mass movement deposits at the site

Search Radius Results

No mass movement deposits in the search radius

Faults

Site Results

Description
Normal fault, inferred
Normal fault, inferred
Normal fault, inferred
Normal fault, inferred
Normal fault, inferred

Search Radius Results

Description
Normal fault, inferred
Normal fault, inferred
Normal fault, inferred
Normal fault, inferred
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Normal fault, inferred
Normal fault, inferred

Boreholes

Site Results

Ref	Name	Easting	Northing	Length(m)	Confidential
SP52SE43	C.O.D.BICESTER BH1	458800	0221200	10	N
SP52SE44	C.O.D.BICESTER BH1	458800	0221200	10	N
SP52SE45	C.O.D.BICESTER BH1	458200	0220300	10	N
SP52SE46	C.O.D.BICESTER BH2	458200	0220300	9	N
SP52SE47	C.O.D.BICESTER BH3	458200	0220300	10	N
SP52SE48	C.O.D.BICESTER BH4	458200	0220300	10	N
SP52SE71	COD BICESTER E SITE TP 1	458200	0220300	3	N
SP52SE104	BICESTER SOUTHERN BYPASS TP 18	458954	0221320	1	N
SP52SE107	BICESTER SOUTHERN BYPASS TP 21	459063	0221171	1	N
SP52SE111	BICESTER SOUTHERN BYPASS TP 25	459494	0220910	1	N
SP52SE113	BICESTER SOUTHERN BYPASS TP 27	459600	0220810	2	N

Search Radius Results

Ref	Name	Easting	Northing	Length(m)	Confidential
SP51NE256	AMBROSEDEN	459680	0219330	-1	N
SP61NW129	4-5,NEW ROW AMBROSDEN	460340	0219410	4.26	N
SP61NW130	OLD POST OFFICE AMBROSDEN	460380	0219340	6.09	N
SP61NW134	PARK FARM COTTAGES AMBROSEDEN	460210	0219200	-1	N
SP61NW135	THE TURNER ARMS AMBROSEDEN	460380	0219310	2.43	N
SP61NW139	MERTON ROAD -	460054	0219249	-1	Y

Ref	Name	Easting	Northing	Length(m)	Confidential
SP61NW140	AMBROSDEN TP1 MERTON ROAD - AMBROSDEN TP2	460106	0219275	-1	Y
SP61NW141	MERTON ROAD - AMBROSDEN TP3	460140	0219251	-1	Y
SP52SE1	BICESTER 1	458783	0220812	513.89	N
SP52SE10	GRAVEN HILL BICESTER	459190	0220480	88.39	N
SP52SE27/A	ENHANCEMENT OF WATER SIPPLIES BICESTER B4	458800	0220400	1.4	N
SP52SE27/B	ENHANCEMENT OF WATER SIPPLIES BICESTER B6	458800	0220400	2	N
SP52SE27/C	ENHANCEMENT OF WATER SIPPLIES BICESTER D2	458800	0220400	1.2	N
SP52SE27/D	ENHANCEMENT OF WATER SIPPLIES BICESTER D5	458800	0220400	2	N
SP52SE27/E	ENHANCEMENT OF WATER SIPPLIES BICESTER D6	458800	0220400	1.4	N
SP52SE27/F	ENHANCEMENT OF WATER SIPPLIES BICESTER D7	458800	0220400	1.2	N
SP52SE27/G	ENHANCEMENT OF WATER SIPPLIES BICESTER D9	458800	0220400	1.4	N
SP52SE27/H	ENHANCEMENT OF WATER SIPPLIES BICESTER D11	458800	0220400	1.5	N
SP52SE28	PROMISED LAND FARM BICESTER OXON	457450	0220860	15.24	N
SP52SE72	COD BICESTER NEW FIRE STN TP 1	459300	0220100	3	N
SP52SE73	COD BICESTER NEW FIRE STN TP 2	459300	0220100	3	N
SP52SE74	COD BICESTER NEW FIRE STN TP 3	459300	0220100	3	N
SP52SE75	SEWAGE TREATMENT WORKS BH421/1	458270	0221380	6	N
SP52SE76	SEWAGE TREATMENT WORKS BH421/2	458270	0221380	6	N
SP52SE77	SEWAGE TREATMENT WORKS BH421/3	458270	0221380	7.2	N
SP52SE78	SEWAGE TREATMENT WORKS BH421/4	458270	0221380	11	N
SP52SE79	SEWAGE TREATMENT WORKS BH421/5	458270	0221380	10.2	N
SP52SE80	SEWAGE TREATMENT WORKS BH421/6	458270	0221380	9	N
SP52SE81	SEWAGE TREATMENT WORKS BH421/7	458270	0221380	10	N
SP52SE82	SEWAGE TREATMENT WORKS BH421/8	458270	0221380	8	N
SP52SE90	BICESTER SOUTHERN BYPASS 4	458136	0221748	5	N
SP52SE91	BICESTER SOUTHERN BYPASS 5	458318	0221670	6.2	N
SP52SE92	BICESTER SOUTHERN BYPASS 6	458350	0221688	6	N
SP52SE93	BICESTER SOUTHERN	458430	0221626	7.4	N

Ref	Name	Easting	Northing	Length(m)	Confidential
	BYPASS 7				
SP52SE94	BICESTER SOUTHERN BYPASS 8	458445	0221630	15.45	N
SP52SE95	BICESTER SOUTHERN BYPASS 9	458456	0221600	25	N
SP52SE96	BICESTER SOUTHERN BYPASS 10	458465	0221610	7.95	N
SP52SE97	BICESTER SOUTHERN BYPASS 11	458573	0221598	8.15	N
SP52SE98	BICESTER SOUTHERN BYPASS 12	458514	0221536	8.35	N
SP52SE99	BICESTER SOUTHERN BYPASS 13	458698	0221488	8.5	N
SP52SE100	BICESTER SOUTHERN BYPASS TP 14	458812	0221446	2	N
SP52SE101	BICESTER SOUTHERN BYPASS TP 15	458890	0221344	2	N
SP52SE102	BICESTER SOUTHERN BYPASS TP 16	458898	0221427	2	N
SP52SE103	BICESTER SOUTHERN BYPASS TP 17	458950	0221364	1	N
SP52SE105	BICESTER SOUTHERN BYPASS 19	459115	0221296	10	N
SP52SE106	BICESTER SOUTHERN BYPASS TP 20	459135	0221182	1	N
SP52SE108	BICESTER SOUTHERN BYPASS 22	459178	0221180	10	N
SP52SE109	BICESTER SOUTHERN BYPASS TP 23	459177	0221146	1	N
SP52SE110	BICESTER SOUTHERN BYPASS TP 24	459241	0221101	2	N
SP52SE112	BICESTER SOUTHERN BYPASS TP 26	459588	0220848	2	N
SP52SE114	BICESTER SOUTHERN BYPASS TP 28	459684	0220760	1	N
SP52SE115	BICESTER SOUTHERN BYPASS TP 29	459760	0220668	1	N
SP52SE116	BICESTER SOUTHERN BYPASS TP 30	459944	0220582	1	N
SP52SE159	ALCHESTER HOUSE LANGFORD LANE	457570	0220320	25	N
SP52SE162	LANGFORD FARM BICESTER	458380	0221250	39.62	N
SP52SE167	PROMISED LAND FARM NR.BICESTER	457270	0220600	-1	N
SP52SE168	MIDDLE WRETCHWICK FARM BICESTER	459700	0221310	-1	N
SP52SE169	WRETCHWICK FARM BICESTER	459830	0220570	-1	N
SP52SE218	ROYAL ORDNANCE BICESTER OXFORDSHIRE 1	458790	0221480	9.5	N

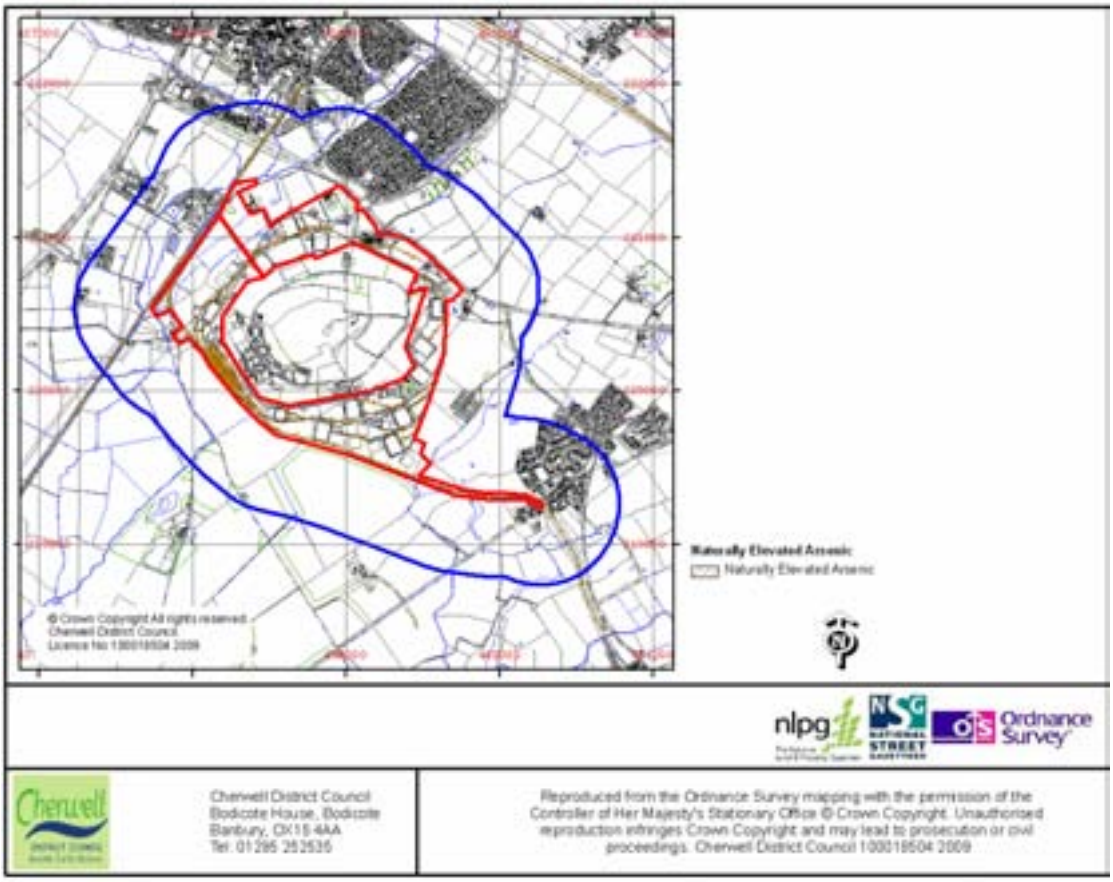
For more information on a particular borehole contact:

Borehole Records Enquiries
British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG

Tel: 0115 9363109
http://www.bgs.ac.uk/enquiries/bharch.html

All depths are in metres. A depth of '-1' indicates that either the depth is unknown or that the borehole is confidential.

Naturally Occurring Arsenic



Geological Map, British Geological Survey © NERC

The map shows the site (red) and a search radius of 500 meters (blue).

The map showing areas of naturally elevated arsenic was derived from the BGS Bedrock Geology map.

Naturally Elevated Arsenic

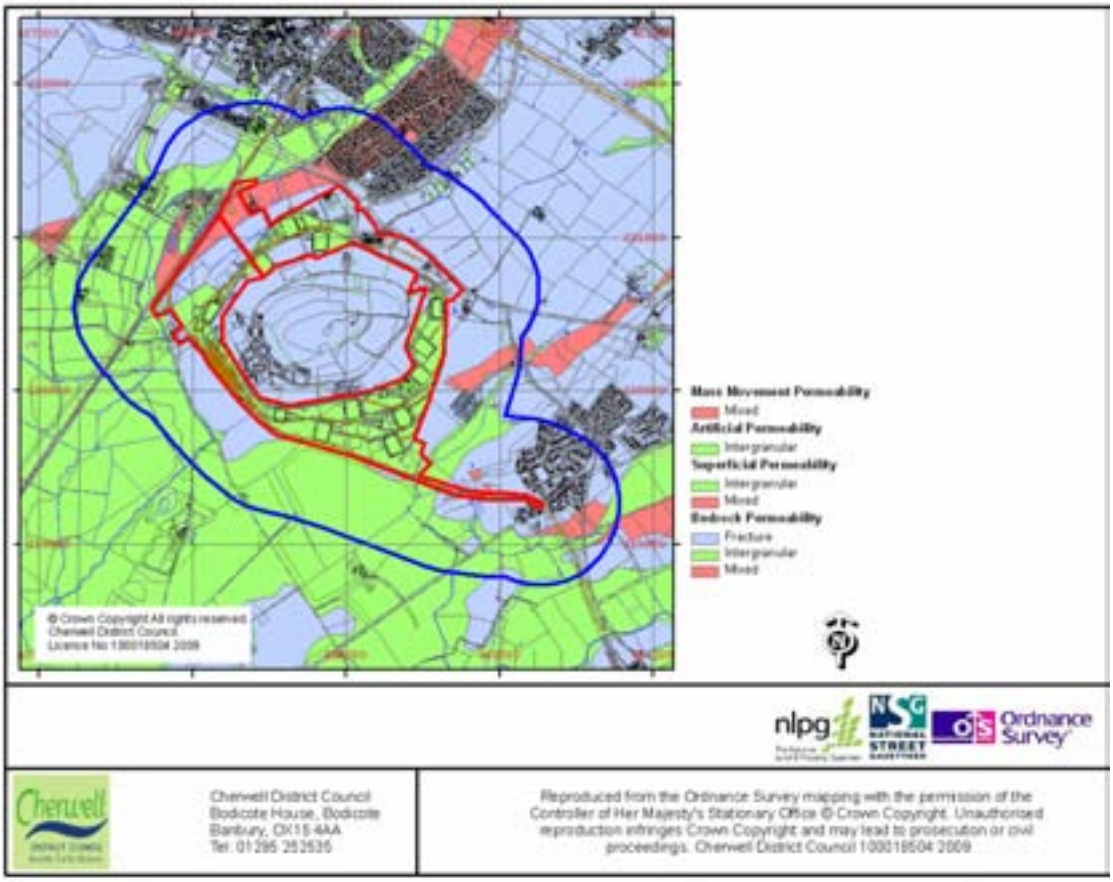
Site Results

No naturally elevated arsenic at the site

Search Radius Results

No naturally elevated arsenic in the search radius

Permeability of Rocks



Geological Map, British Geological Survey © NERC

The map shows the site (red) and a search radius of 500 meters (blue).

Permeability refers to the movement of water, and other fluids, through rocks and the potential for contamination of the underground fresh water supply. Permeability values indicate the vulnerability of the rock to groundwater pollution from the surface and are a measure of the fastest route by which any pollutant could travel through rocks and enter the underground water resource.

Bedrock Permeability

Site Results

Flow Type
Fracture
Mixed

Search Radius Results

Flow Type
Fracture
Mixed

Superficial Permeability

Site Results

Flow Type
Intergranular

Search Radius Results

Flow Type
Intergranular

Artificial Permeability

Site Results

Flow Type
Intergranular

Search Radius Results

Flow Type
Intergranular

Mass Movement Permeability

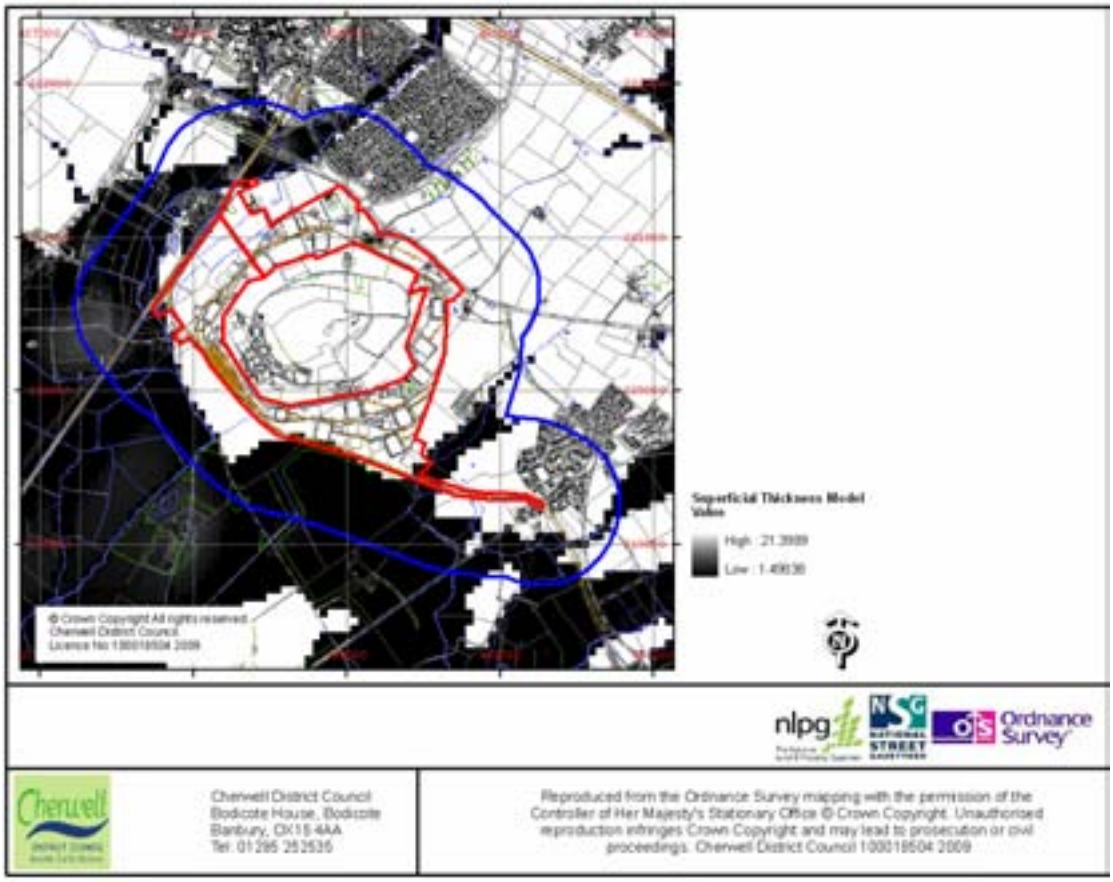
Site Results

No mass movement permeability ratings in the search radius

Search Radius Results

No mass movement permeability ratings in the search radius

Superficial Thickness

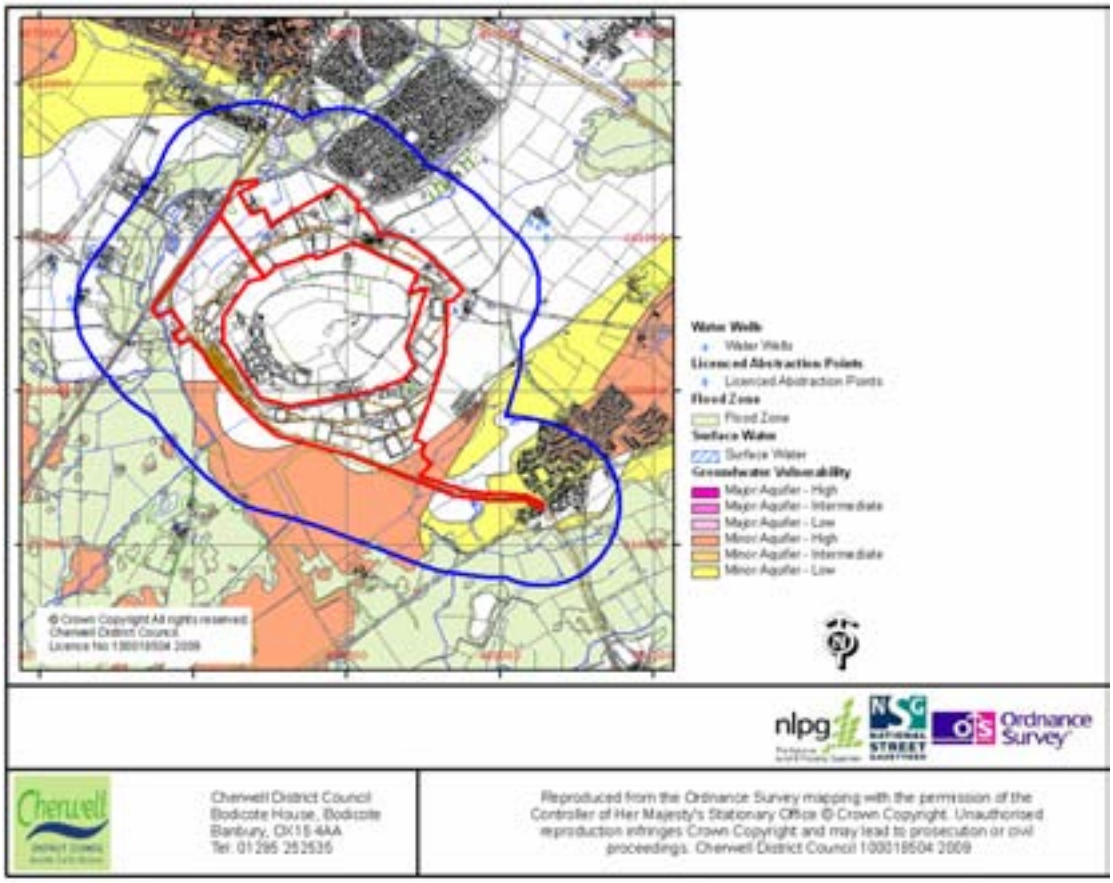


Geological Map, British Geological Survey © NERC

The map shows the site (red) and a search radius of 500 meters (blue).

The superficial thickness elevation model represents the first attempt by BGS to create nationwide models of such data. The models provide only a simple, mathematical interpretation of reality. The complexity of Superficial deposits in Great Britain is such that it is only possible to model indicative values of thickness and elevation. The models should never be used as a substitute for thorough site investigation.
For the purposes of modelling, superficial deposits include sediments deposited during the Quaternary, subsequent Holocene rivers and coastal systems and also modern anthropogenic material. i.e. deposits that are less than 2.6 million years old.

Hydrology



Groundwater Vulnerability and Water Abstraction Licences © Environment Agency

The map shows the site (red) and a search radius of 500 meters (blue).

The British Geological Survey holds a register of both used and disused water wells at it's office in Wallingford, Oxfordshire which date back over 150 years. This register has been interrogated to produce the water well information. Depth information recorded for water wells is measured in metres.

Surface water information was derived from Os MasterMap.

Groundwater vulnerability and Water Abstractions Licenses information comes from the Environment Agency.

Surface Water

Site Results

Description
Inland Water
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Search Radius Results

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Description
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Water Wells

Site Results

No water wells present at the site

Search Radius Results

Reference	Location	Easting	Northing	Depth(m)	Year
SP52SE168/BJ	MIDDLE WRETCHWICK FARM BICESTER	459700	221310	0	
SP52SE10/BJ	GRAVEN HILL BICESTER	459200	220480	88.4	1941
SP52SE169/BJ	WRETCHWICK FARM BICESTER	459830	220570	0	
SP52SE28/BJ	PROMISED LAND FARM ALCESTER	457450	220860	15.2	1983
SP51NE256/BJ	AMBROSEDEN	459680	219330	0	
SP52SE167/BJ	PROMISED LAND FARM , CHESTERTON	457270	220600	3.7	
SP61NW129/BJ	4-5,NEW ROW AMBROSDEN	460340	219410	4.3	
SP61NW130/BJ	OLD POST OFFICE AMBROSDEN	460380	219340	6.1	
SP61NW134/BJ	PARK FARM COTTAGES AMBROSEDEN	460210	219200	0	
SP61NW135/BJ	THE TURNER ARMS AMBROSEDEN	460380	219310	2.4	
SP52SE159/BJ	ALCHESTER HOUSE	457570	220320	25	1995
SP52SE162/BJ	LANGFORD FARM BICESTER	458380	221250	39.6	

Private Water Wells

Site Results

No private water wells present at the site

Search Radius Results

Address1	Address2	Address 3	National Grid Reference	Supply Type	Supply Use
Langford Lane Crossing*	Wendlebury	Bicester	SP5758020303	Borehole	
Promised Land Farm	Wendlebury Road	Chesterton	SP5727320603	Shallow Well	

Water Abstraction Sites

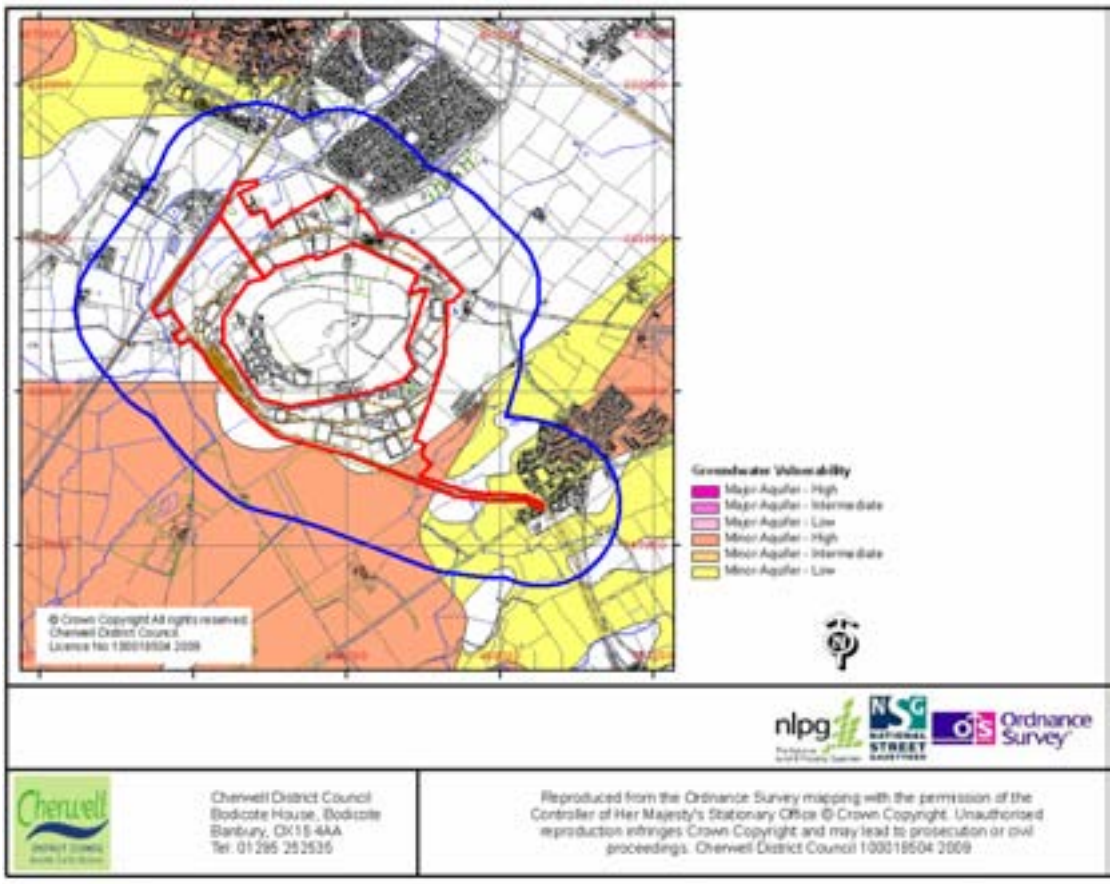
Site Results

No EA licensed water abstraction sites at the site

Search Radius Results

License	Name	Point Name	Easting	Northing	Use
28/39/14/0295	FACCENDA CHICKEN LTD	WENDLEBURY LANE, BICESTER (A)	457400	220800	General Farming & Domestic
28/39/14/0295		WENDLEBURY LANE, BICESTER (A)	457400	220800	

Groundwater Vulnerability



Groundwater Vulnerability data © Environment Agency

The map shows the site (red) and a search radius of 500 meters (blue).

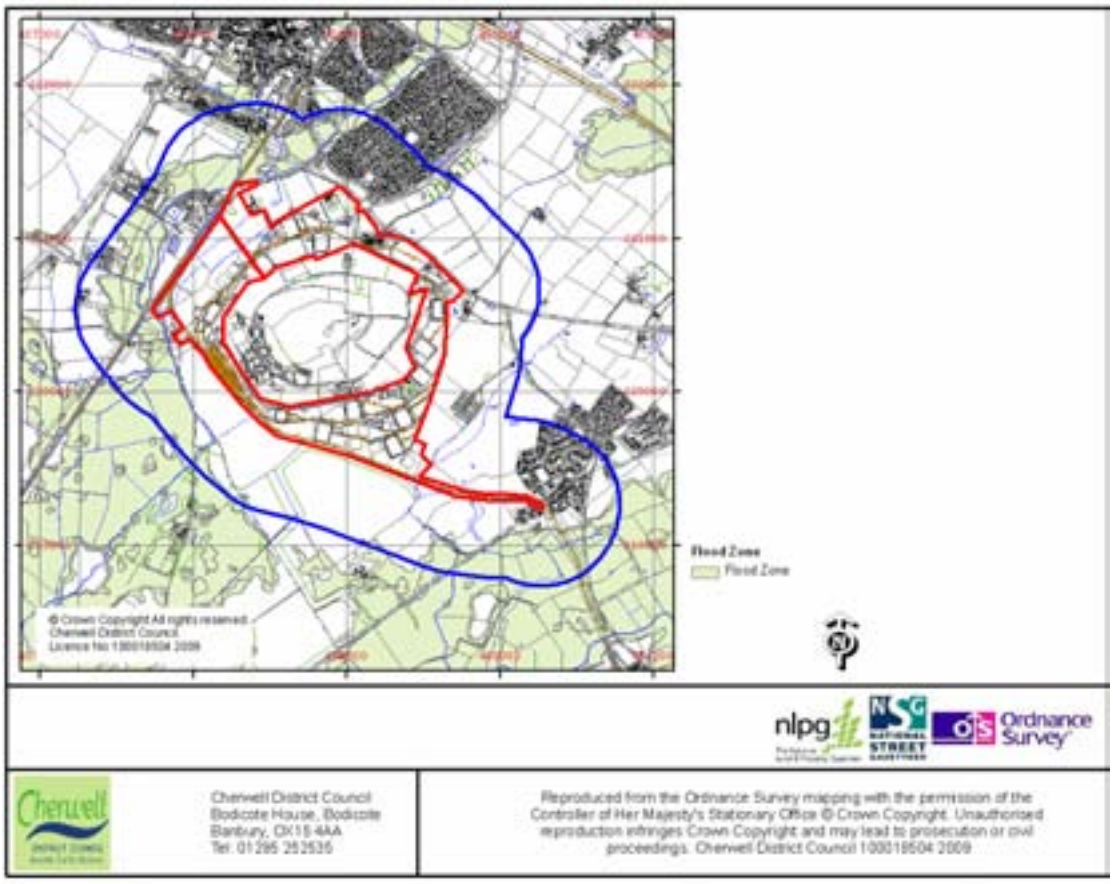
Site Results

Classification
Minor Aquifer - Low
Minor Aquifer - High 1

Search Radius Results

Classification
Minor Aquifer - High 1
Minor Aquifer - Low

Flood Zone



Flood Zone data © Environment Agency

The map shows the site (red) and a search radius of 500 meters (blue).

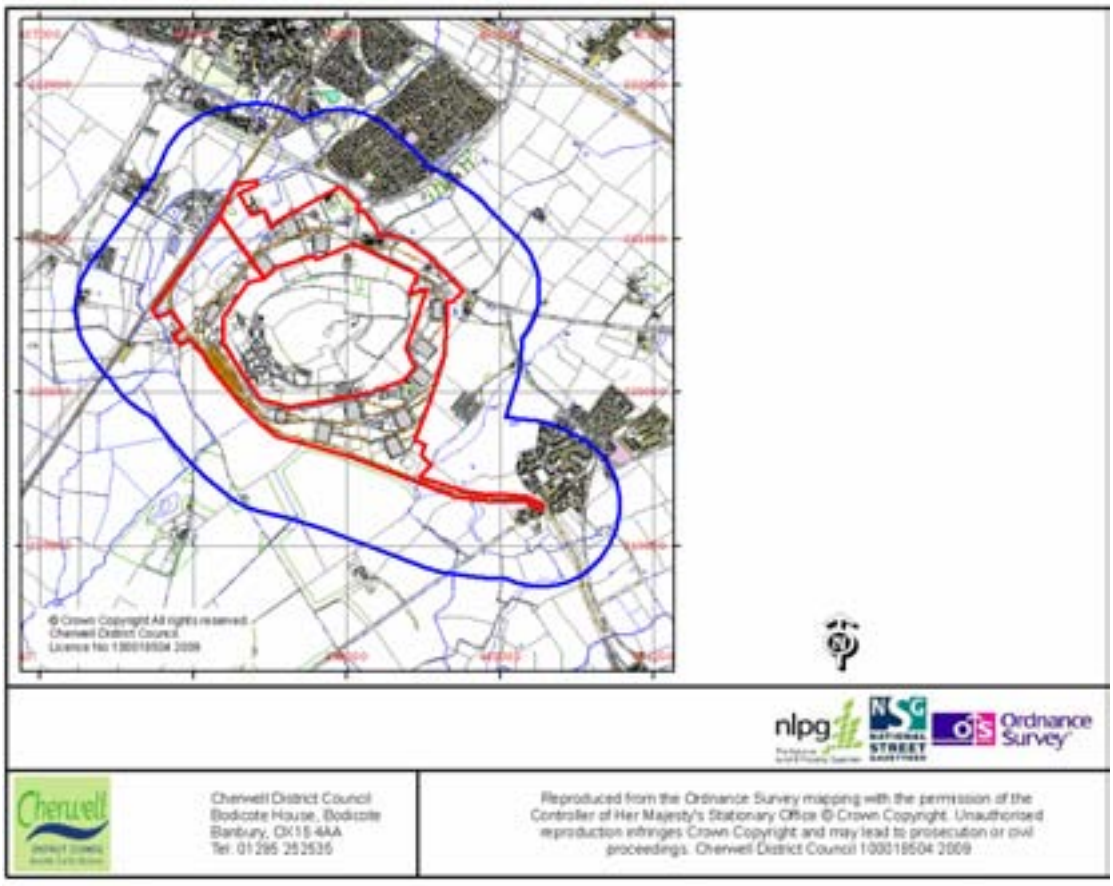
Site Results

Zone Name
ZONE3
ZONE2

Search Radius Results

Zone Name
ZONE3
ZONE2

Current Land Use



The map shows the site (red) and a search radius of 500 meters (blue).

The current land use (c.2005) information is based on information from OS MasterMap, OS Address Point and Aerial photographs.

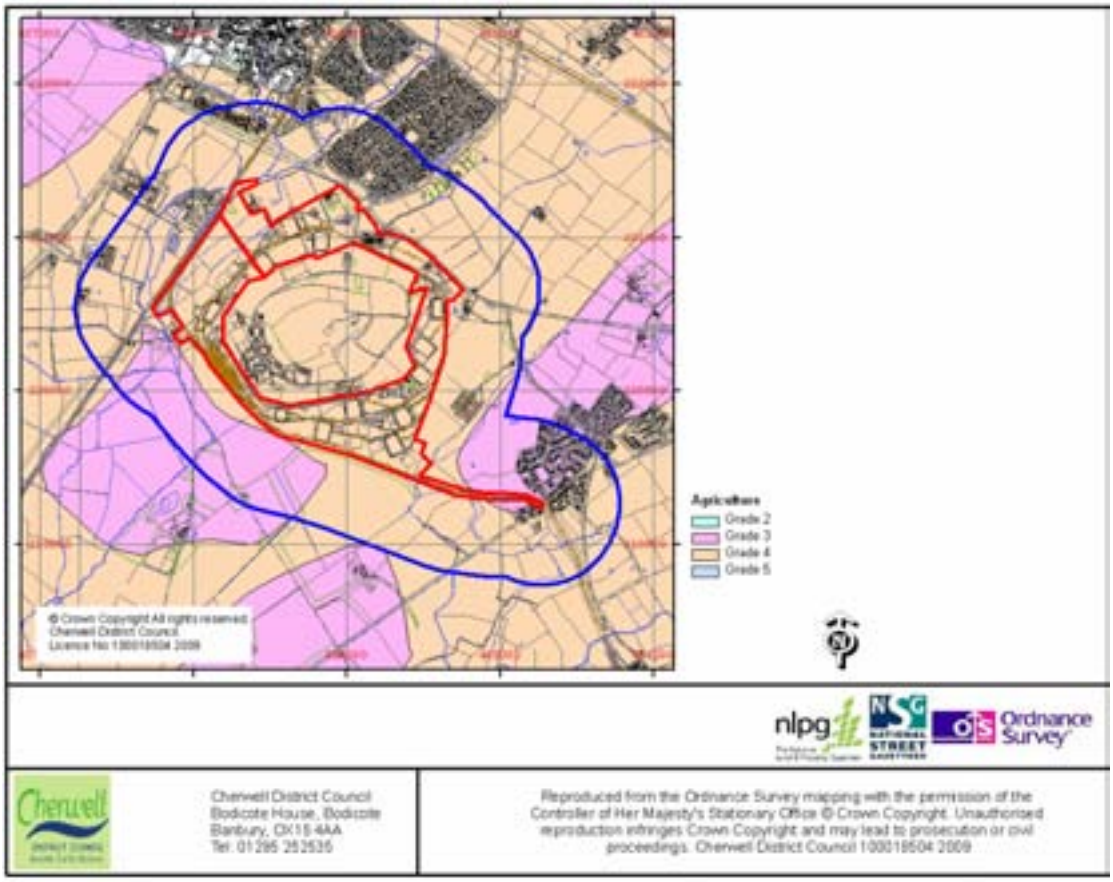
Site Results

Land use
Industrial/Commercial
Sensitive Open Areas
Residential Property
Residential Garden

Search Radius Results

Land use
Industrial/Commercial
Residential Property
Residential Garden
Sensitive Open Areas
Education

Agriculture



The map shows the site (red) and a search radius of 500 meters (blue).

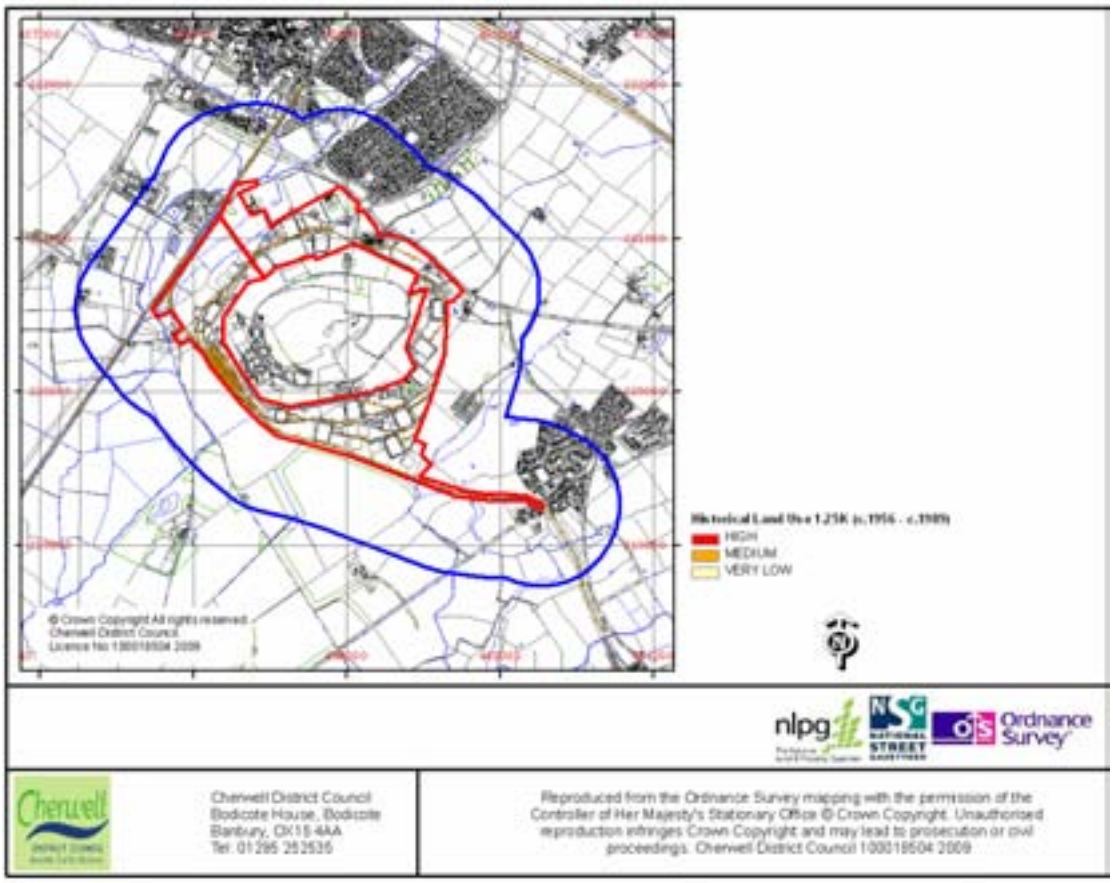
Site Results

Description
GRADE 3
GRADE 4

Search Radius Results

Description
GRADE 3
GRADE 4

Historical Land Use 1.25K (c.1956 - c.1989)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use 1.25K (c.1956 - c.1989) information is based on County Series maps of the entire Cherwell District at a scale of 6 inches to one mile, which were mapped in the period 1956 - 1989.

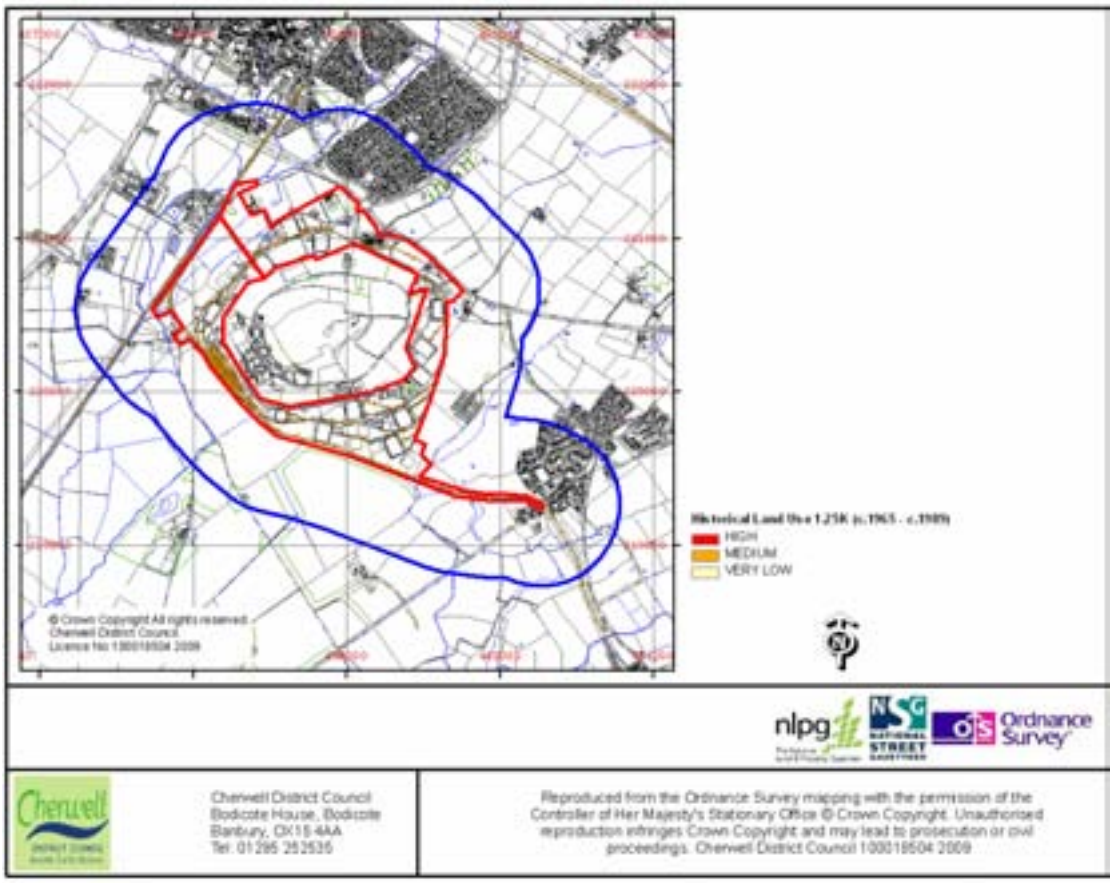
Site Results

No historical land use 1.25K (c.1956 - c.1989) mapped at the site

Search Radius Results

No historical land use 1.25K (c.1956 - c.1989) mapped in the search radius

Historical Land Use 1.25K (c.1965 - c.1989)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use 1.25K (c.1965 - c.1989) information is based on County Series maps of the entire Cherwell District at a scale of 6 inches to one mile, which were mapped in the period 1965 - 1989.

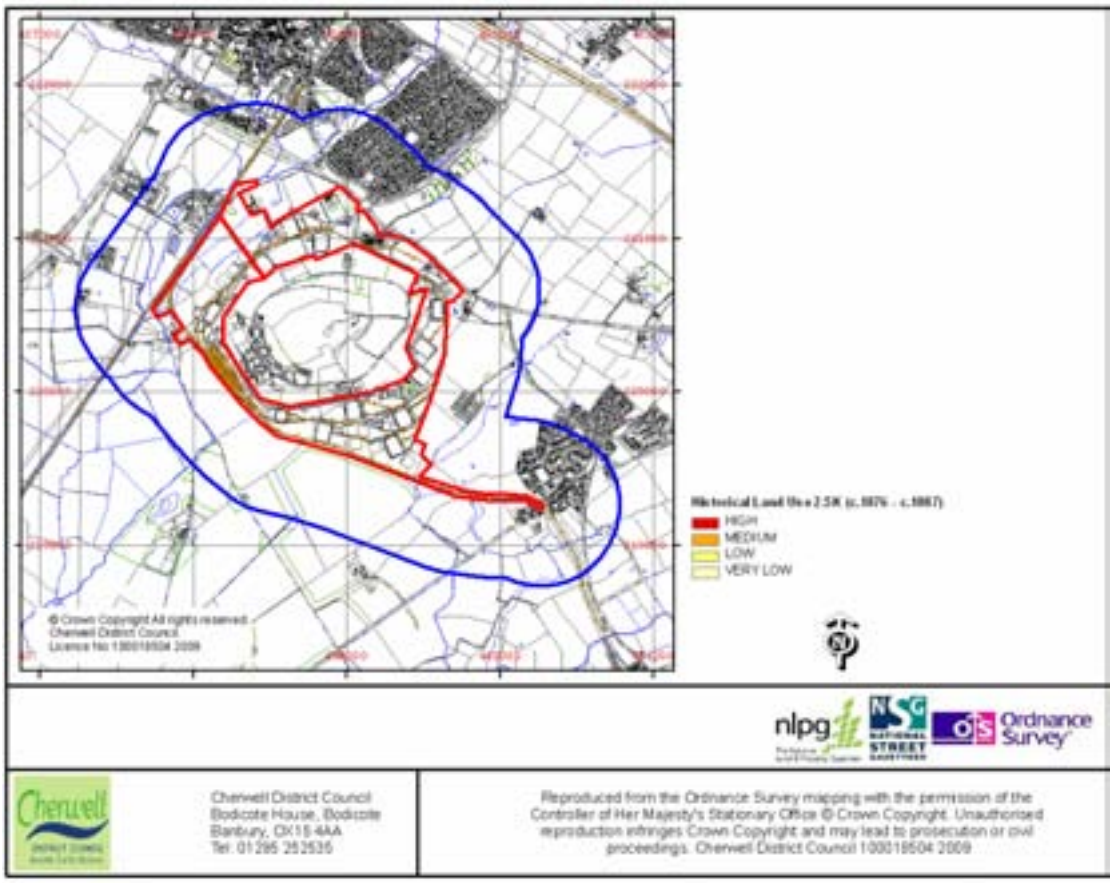
Site Results

No historical land use 1.25K (c.1965 - c.1989) mapped at the site

Search Radius Results

No historical land use 1.25K (c.1965 - c.1989) mapped in the search radius

Historical Land Use 2.5K (c.1876 - c.1887)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use 2.5K (c.1876 - c.1887) information is based on County Series maps of the entire Cherwell District at a scale of 6 inches to one mile, which were mapped in the period 1876 -1887.

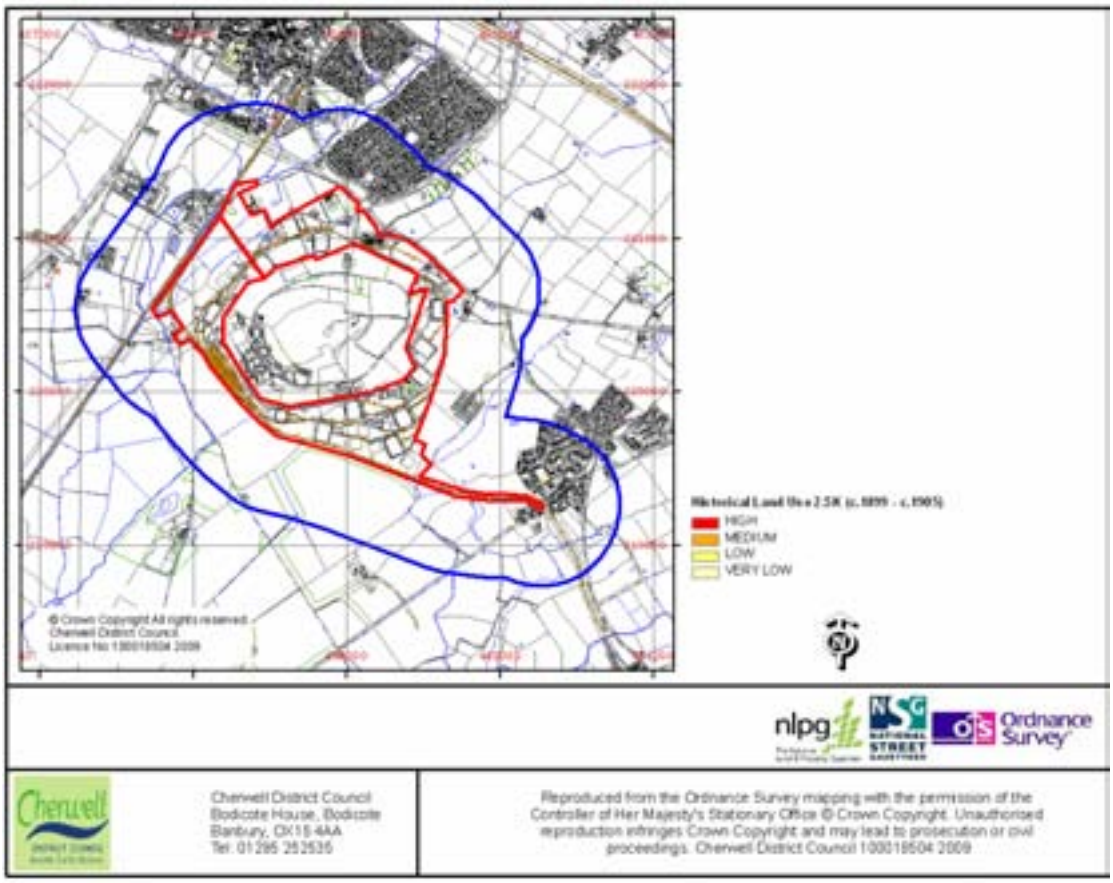
Site Results

No historical land use 2.5K (c.1876 - c.1887) mapped at the site

Search Radius Results

Description	Ranking
Sewerage - Sewage Tank	High

Historical Land Use 2.5K (c.1899 - c.1905)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use 2.5K (c.1899 - c.1905) information is based on County Series maps of the entire Cherwell District at a scale of 6 inches to one mile, which were mapped in the period 1899 -1905.

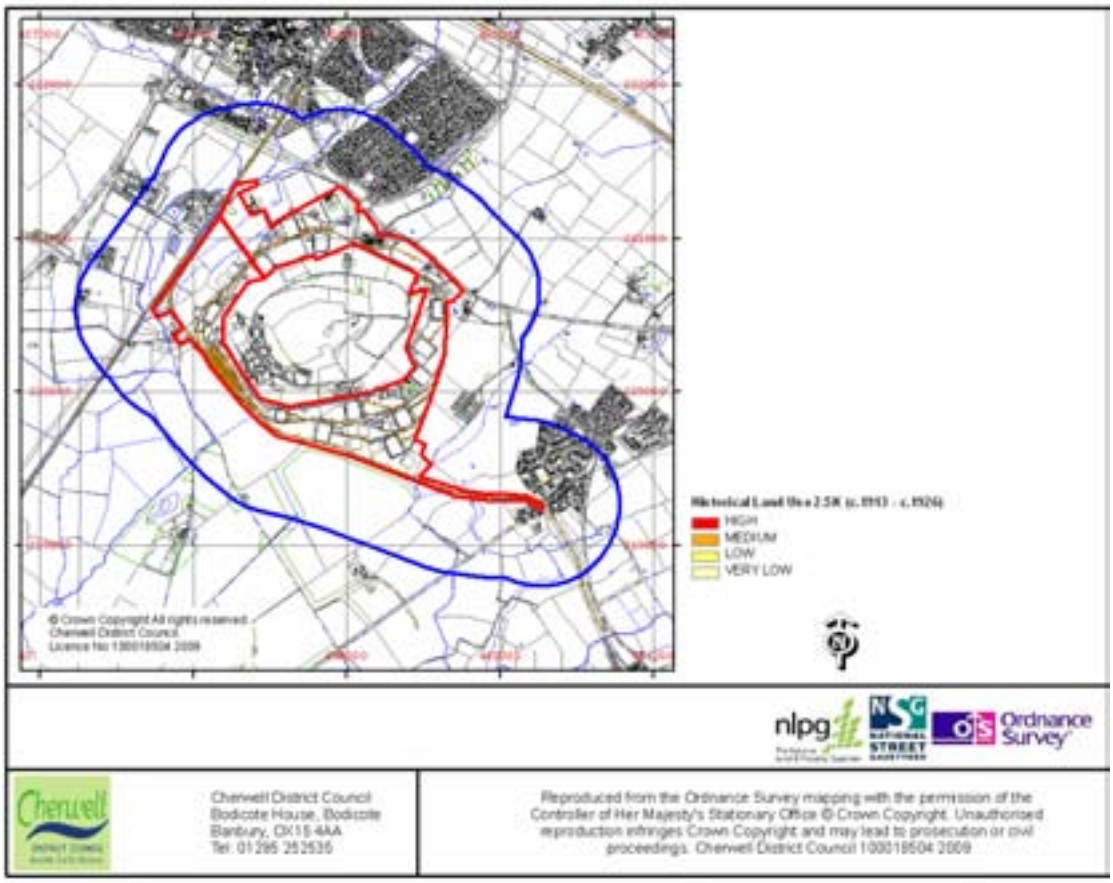
Site Results

No historical land use 2.5K (c.1899 - c.1905) mapped at the site

Search Radius Results

Description	Ranking
C&C - Coal Depot	High
Sewerage - Tank	High
MOD - Firing Range	High
Unknown Filled Ground	High
Grave - Graveyard	Low
Food - Corn Mill	Very Low
Metal Production - Blacksmith	High

Historical Land Use 2.5K (c.1913 - c.1926)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use 2.5K (c.1913 - c.1926) information is based on County Series maps of the entire Cherwell District at a scale of 6 inches to one mile, which were mapped in the period 1913 -1926.

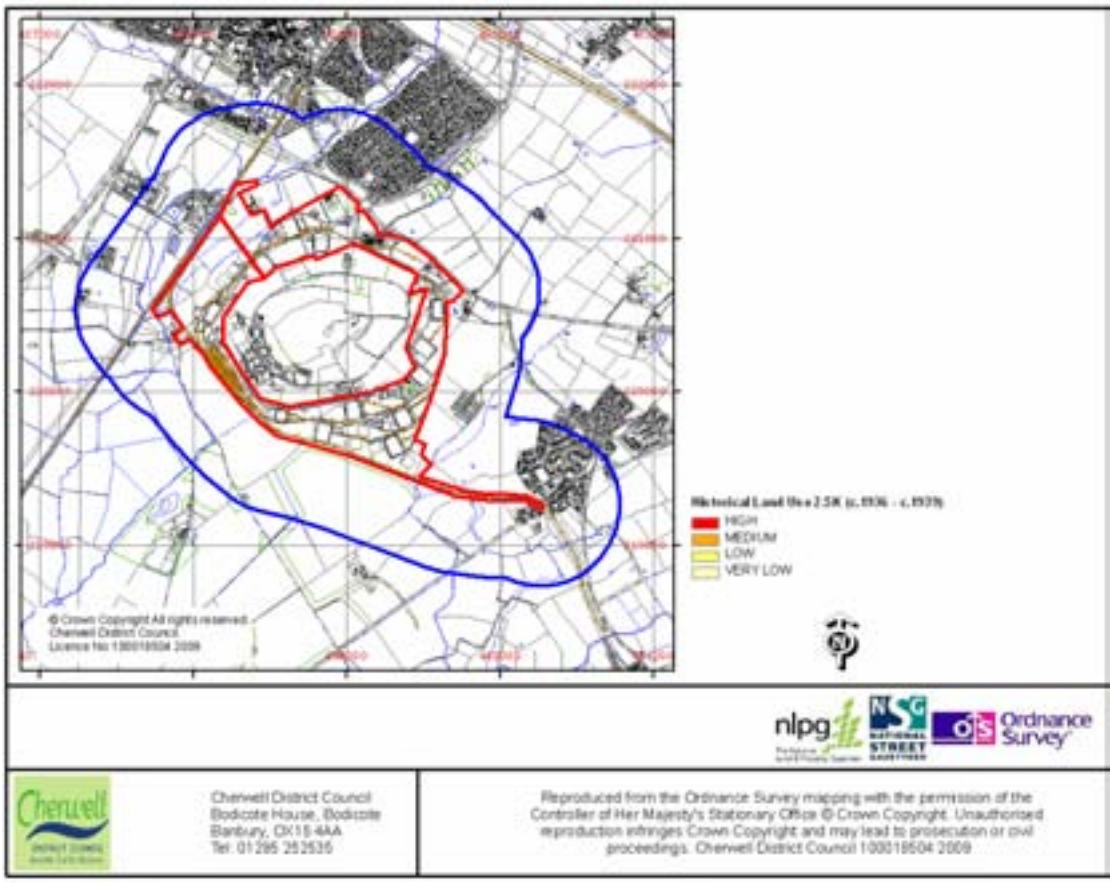
Site Results

No historical land use 2.5K (c.1913 - c.1926) mapped at the site

Search Radius Results

Description	Ranking
Sewage - Tank	High
MOD - Firing Range	High
Food - Corn Mill	Very Low
Metal Production - Blacksmith	High
Grave - Graveyard	Low

Historical Land Use 2.5K (c.1936 - c.1939)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use 2.5K (c.1936 - c.1939) information is based on County Series maps of the entire Cherwell District at a scale of 6 inches to one mile, which were mapped in the period 1936 -1939.

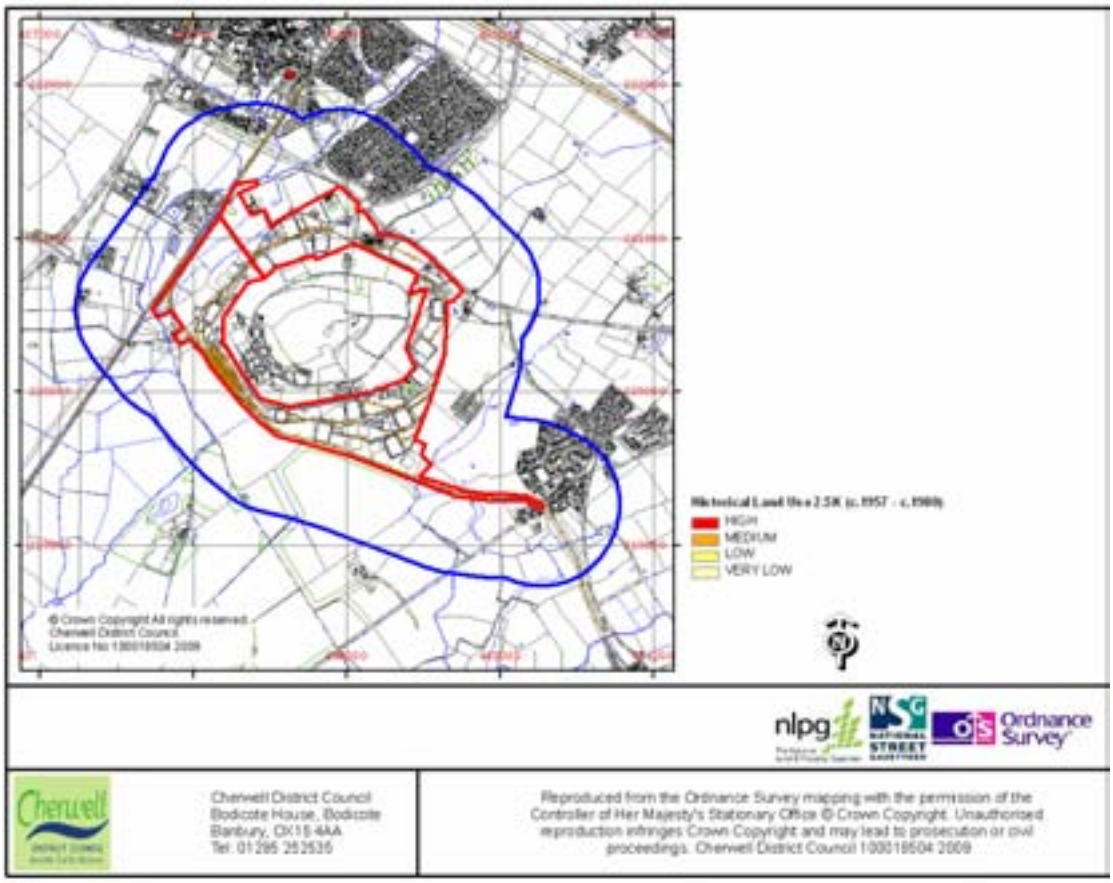
Site Results

No historical land use 2.5K (c.1936 - c.1939) mapped at the site

Search Radius Results

No historical land use 2.5K (c.1936 - c.1939) mapped in the search radius

Historical Land Use 2.5K (c.1957 - c.1980)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use 2.5K (c.1957 - c.1980) information is based on County Series maps of the entire Cherwell District at a scale of 6 inches to one mile, which were mapped in the period 1957 -1980.

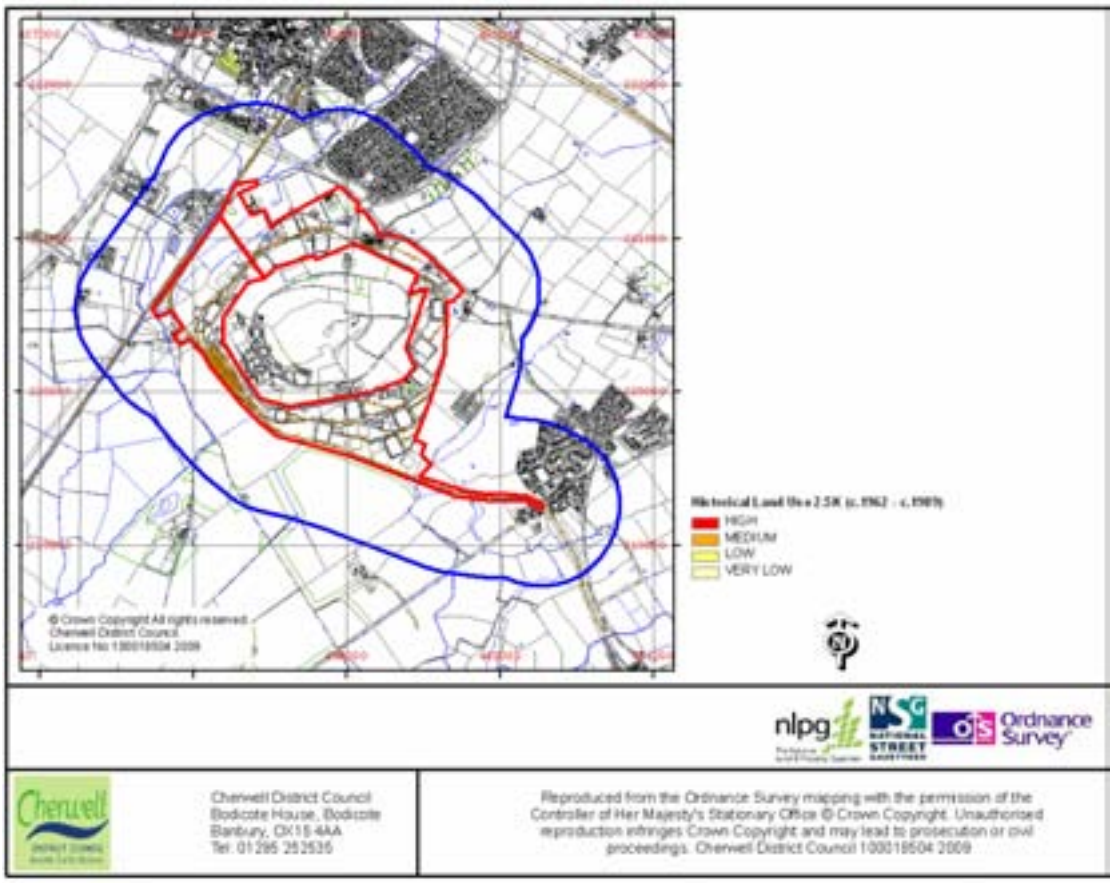
Site Results

No historical land use 2.5K (c.1957 - c.1980) mapped at the site

Search Radius Results

Description	Ranking
Depot - Depot	Medium
Power - Electricity Sub Station	Very Low

Historical Land Use 2.5K (c.1962 - c.1989)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use 2.5K (c.1962 - c.1989) information is based on County Series maps of the entire Cherwell District at a scale of 6 inches to one mile, which were mapped in the period 1962 -1989.

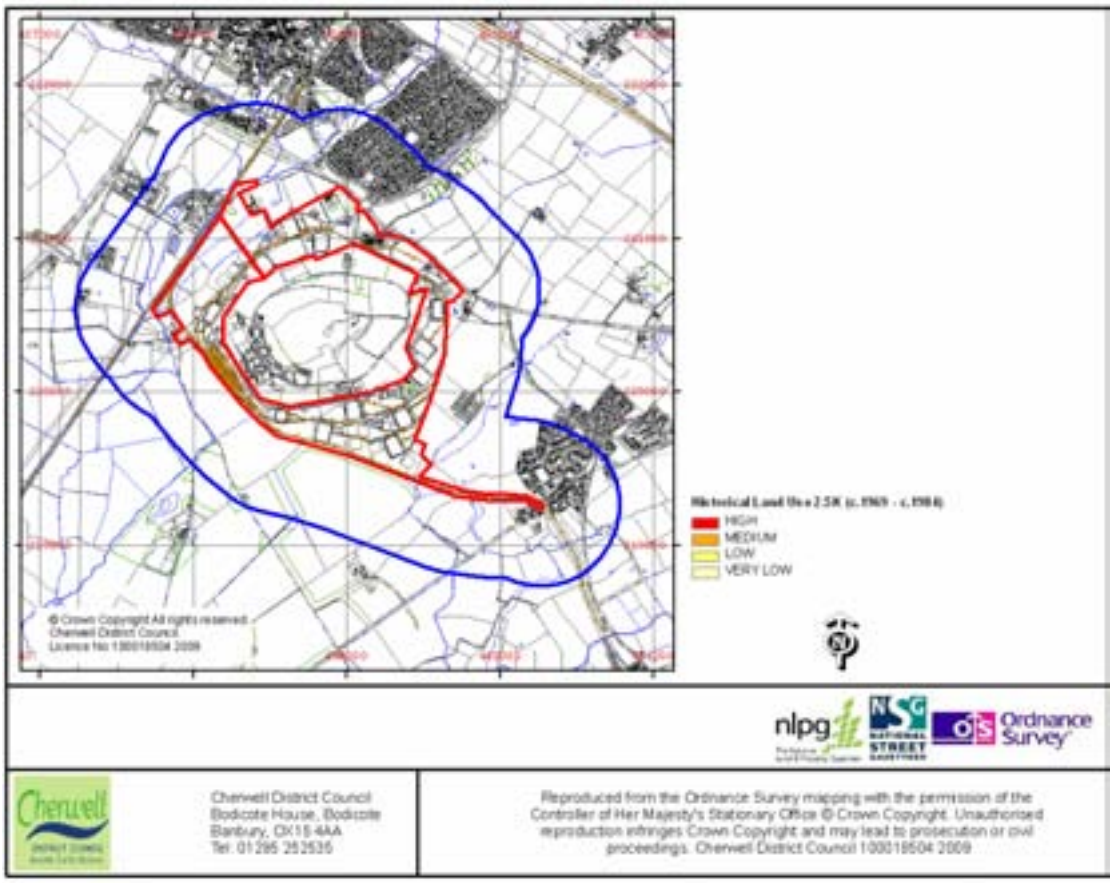
Site Results

No historical land use 2.5K (c.1962 - c.1989) mapped at the site

Search Radius Results

No historical land use 2.5K (c.1962 - c.1989) mapped in the search radius

Historical Land Use 2.5K (c.1969 - c.1984)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use 2.5K (c.1969 - c.1984) information is based on County Series maps of the entire Cherwell District at a scale of 6 inches to one mile, which were mapped in the period 1969 -1984.

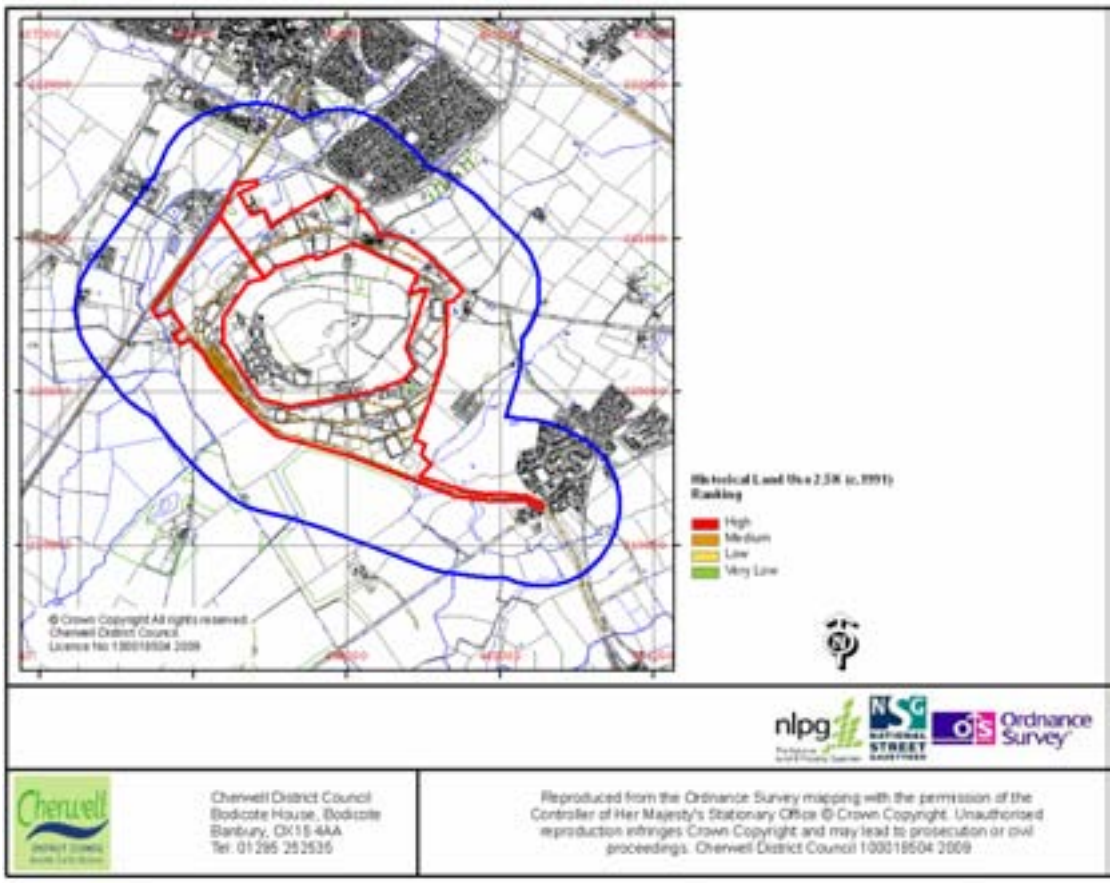
Site Results

No historical land use 2.5K (c.1969 - c.1984) mapped at the site

Search Radius Results

No historical land use 2.5K (c.1969 - c.1984) mapped in the search radius

Historical Land Use 2.5K (c.1991)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use 2.5K (c.1991) information is based on County Series maps of the entire Cherwell District at a scale of 6 inches to one mile, which were mapped in the period 1991.

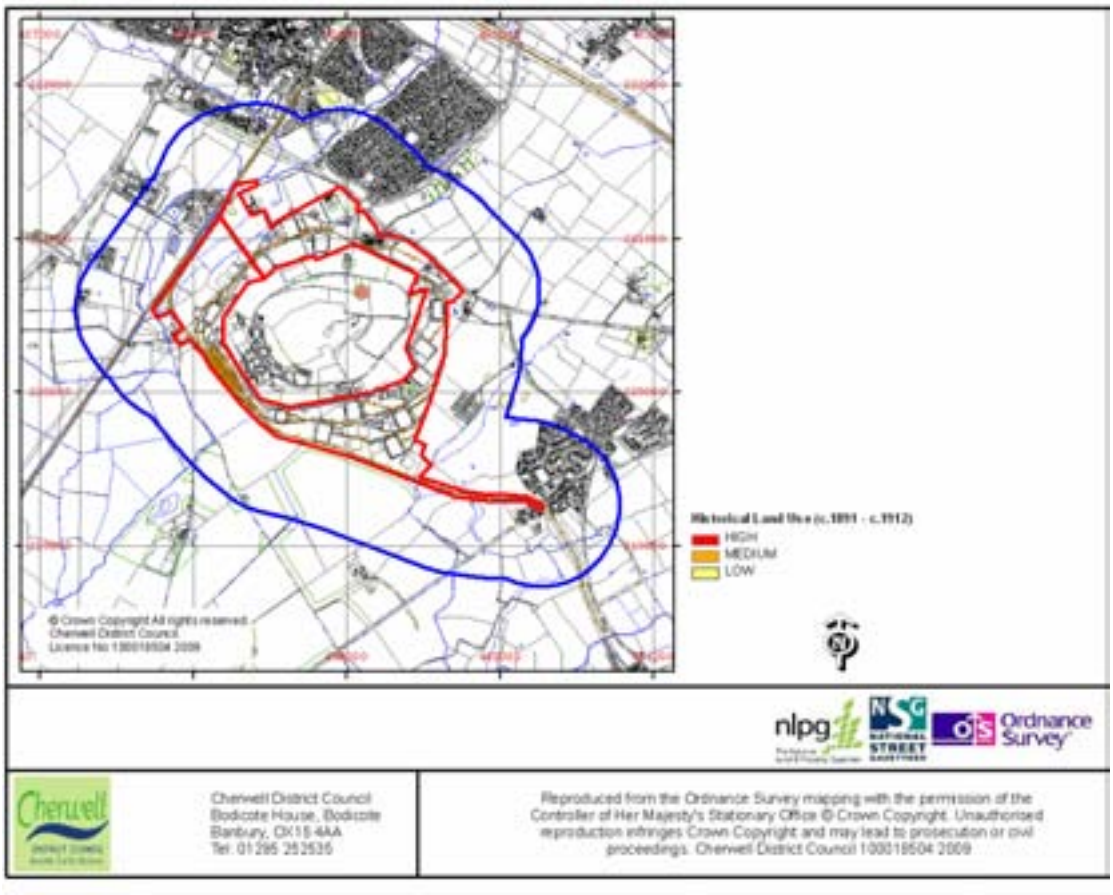
Site Results

No historical land use 2.5K (c.1991) mapped at the site

Search Radius Results

No historical land use 2.5K (c.1991) mapped in the search radius

Historical Land Use (c.1891 - c.1912)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use (c.1891 - c.1912) information is based on County Series maps of the entire Cherwell District at a scale of 6 inches to one mile, which were mapped in the period 1891-1912.

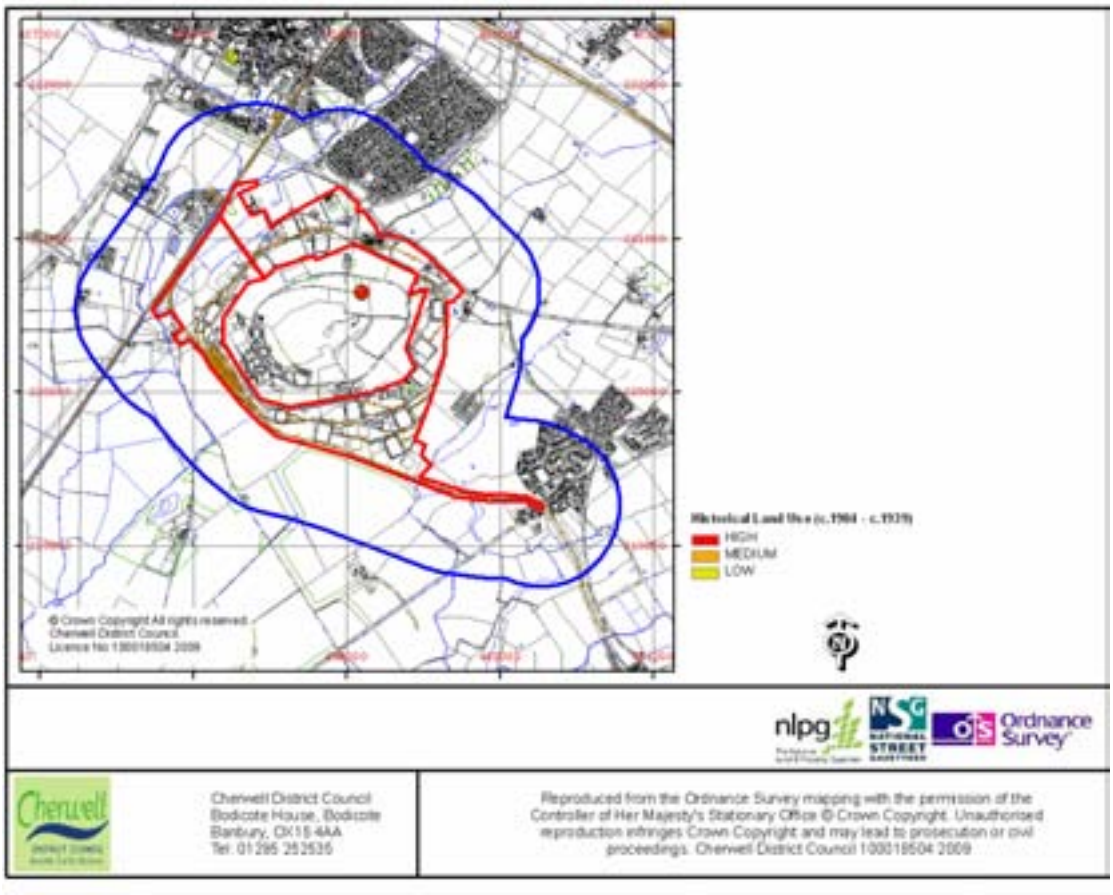
Site Results

Description	Ranking
Railways	MEDIUM

Search Radius Results

Description	Ranking
Military Land	HIGH
General quarrying	LOW
Sewage	MEDIUM
Clay bricks & tiles [manufacture]	LOW
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM

Historical Land Use (c.1904 - c.1939)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use (c.1904 - c.1939) information is based on County Series maps of the entire Cherwell District at a scale of 6 inches to one mile, which were mapped in the period 1904-1939.

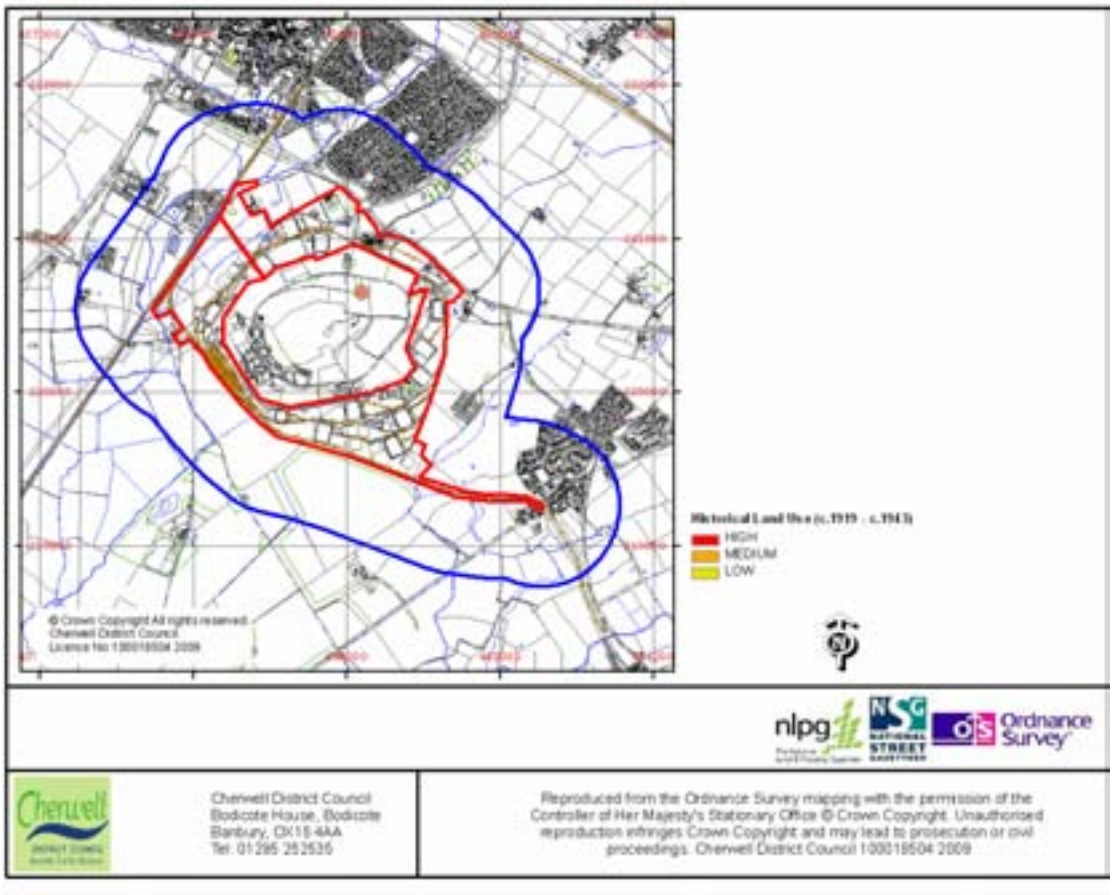
Site Results

Description	Ranking
Railways	MEDIUM

Search Radius Results

Description	Ranking
Military Land	HIGH
Sewage	MEDIUM
Coal storage and depot	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM

Historical Land Use (c.1919 - c.1943)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use (c.1919 - c.1943) information is based on County Series maps of the entire Cherwell District at a scale of 6 inches to one mile, which were mapped in the period 1919-1943.

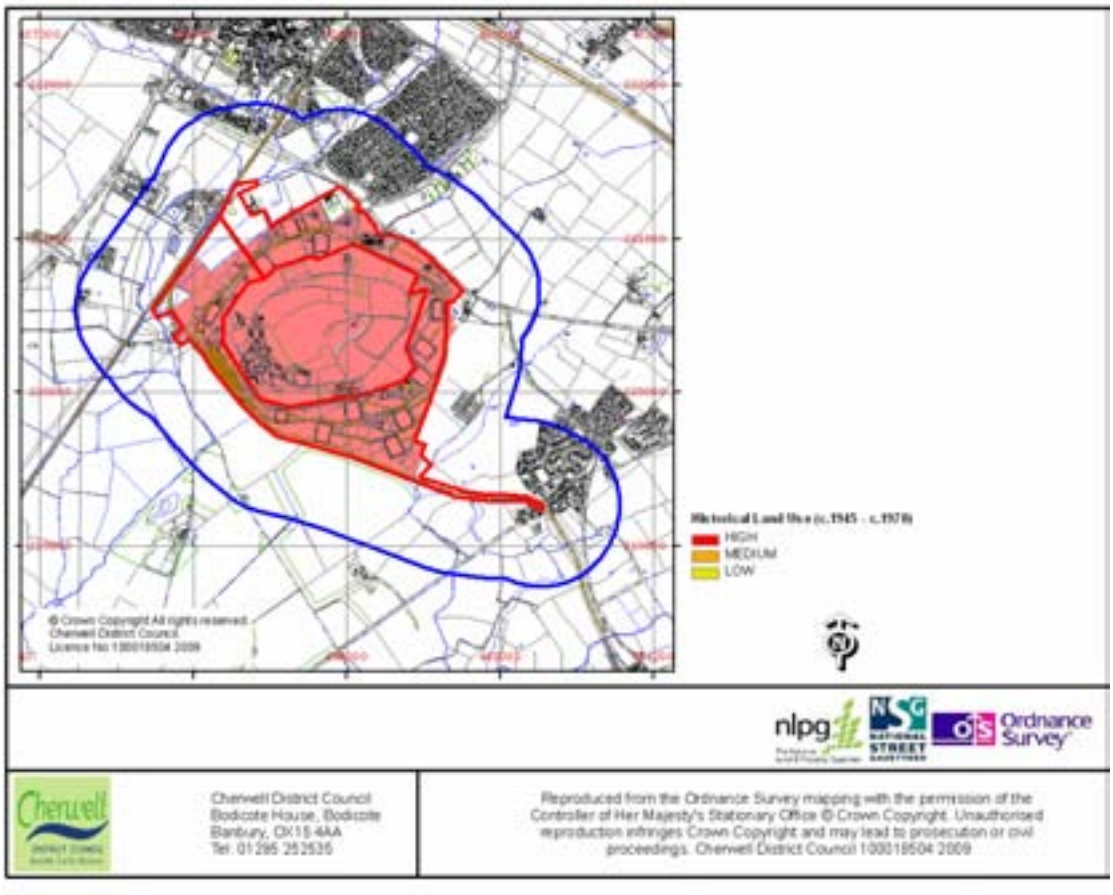
Site Results

Description	Ranking
Railways	MEDIUM

Search Radius Results

Description	Ranking
Military Land	HIGH
Sewage	MEDIUM
Coal storage and depot	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM

Historical Land Use (c.1945 - c.1970)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use (c.1945 - c.1970) information is based on Ordnance Survey National Grid maps of the entire Cherwell District at a scale of 1:10 000, which were mapped in the period 1945-1970.

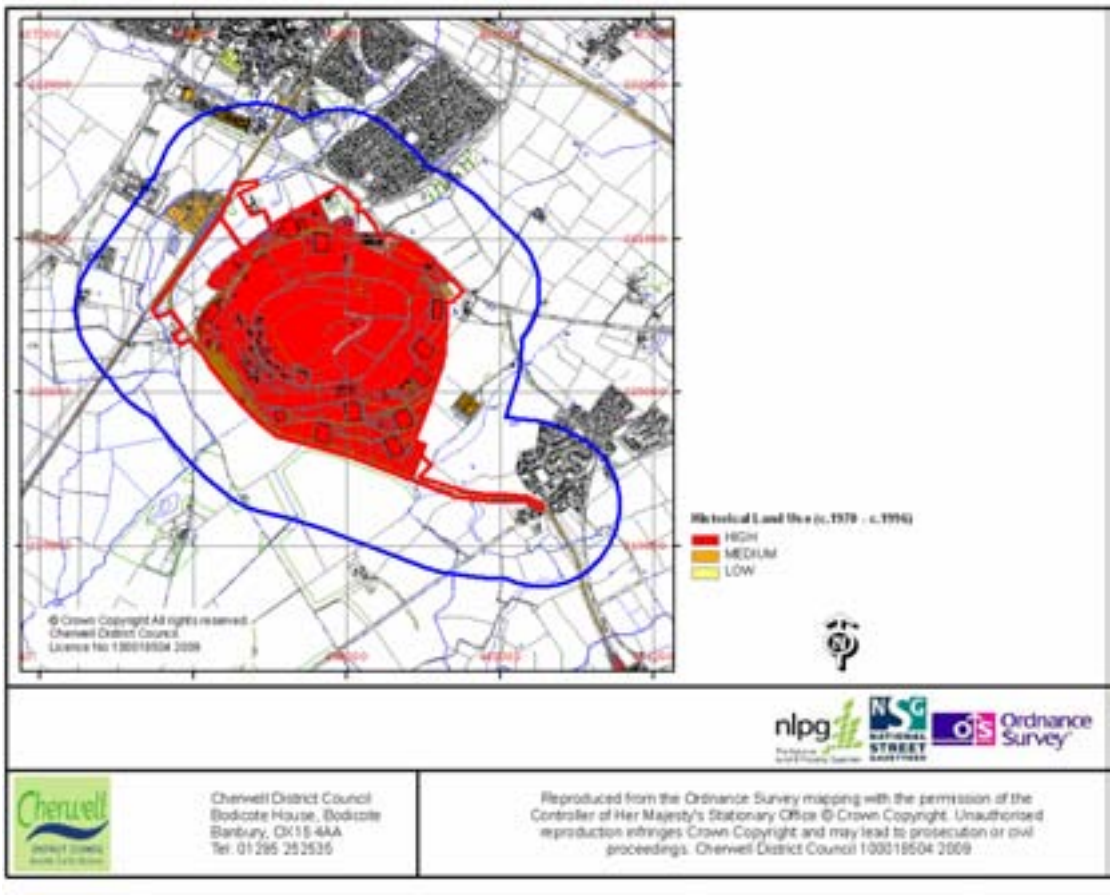
Site Results

Description	Ranking
Military Land	HIGH
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM

Search Radius Results

Description	Ranking
Sewage	MEDIUM
Coal storage and depot	MEDIUM
Military Land	HIGH
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM

Historical Land Use (c.1970 - c.1996)



The map shows the site (red) and a search radius of 500 meters (blue).

The historical land use (c.1970 - c.1996) information is based on Ordnance Survey National Grid maps of the entire Cherwell District at a scale of 1:10 000, which were mapped in the period 1970-1996.

Site Results

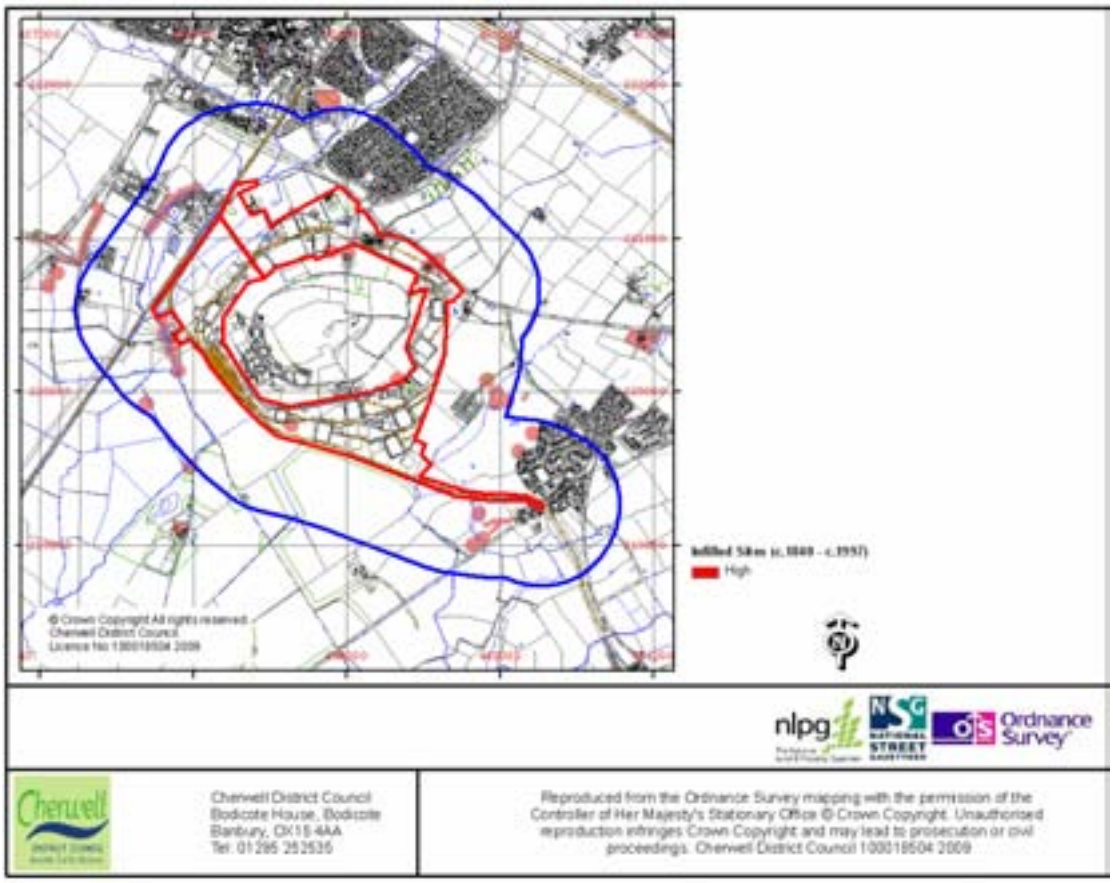
Description	Ranking
Pipelines [transport via]	MEDIUM
Pipelines [transport via]	MEDIUM
Pipelines [transport via]	MEDIUM
Pipelines [transport via]	MEDIUM
Factory or works - use not specified	MEDIUM
Military Land	HIGH
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM

Search Radius Results

Description	Ranking
Pipelines [transport via]	MEDIUM
Pipelines [transport via]	MEDIUM
Factory or works - use not specified	MEDIUM
Military Land	HIGH
Coal storage and depot	MEDIUM

Description	Ranking
Sewage	MEDIUM
Factory or works - use not specified	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM
Railways	MEDIUM

Infilled Sites (c.1840 - c.1997)



The map shows the site (red) and a search radius of 500 meters (blue).

Site Results

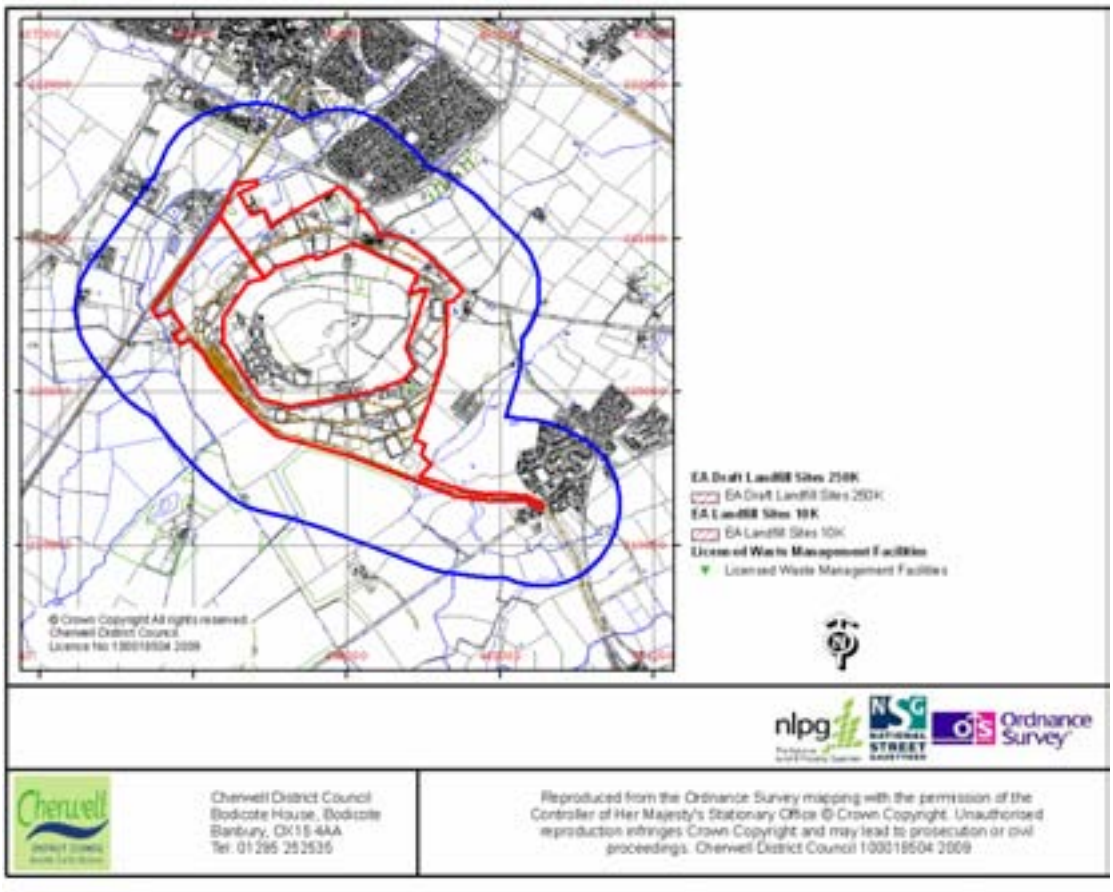
Description	Ranking
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High

Search Radius Results

Description	Ranking
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pit, quarry etc)	High

Description	Ranking
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Area liable to flood	
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pond, marsh, river, stream,doc	High
Unknown Filled Ground (Pit, quarry etc)	High

Landfill Sites and Licensed Waste Management Facilities



The map shows the site (red) and a search radius of 500 meters (blue).

Landfill and waste data derives from Environment Agency data & local knowledge of sites that pre date Environment Agency data.

EA Landfill Sites 10K

Site Results

No EA registered landfills at the site

Search Radius Results

No EA registered landfills in the search radius

EA Draft Landfill Sites 250K

Site Results

No draft landfills at the site

Search Radius Results

Licence Number	Site Name
No Licence	London Road, Bicester

Licensed Waste Management Facilities

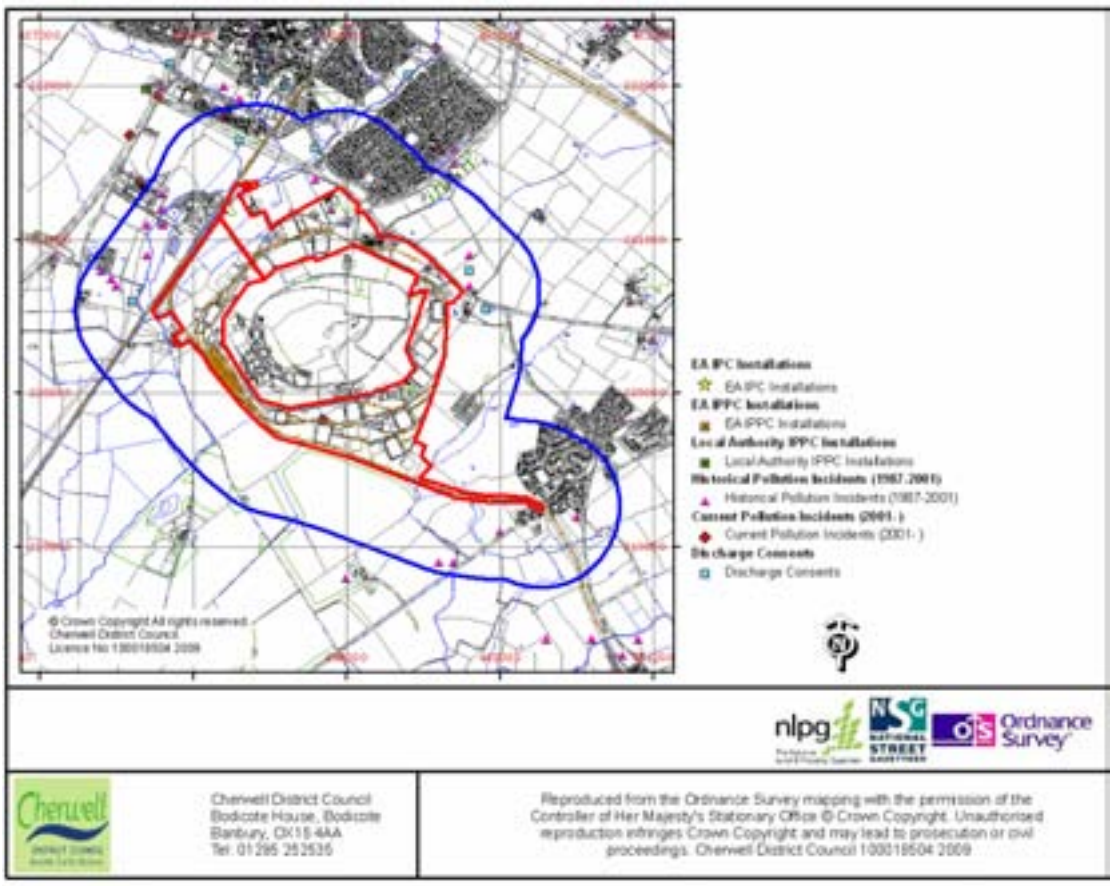
Site Results

No waste sites at the site

Search Radius Results

No waster sites in the search radius

Environmentally Sensitive Data



The map shows the site (red) and a search radius of 500 meters (blue).

All environmentally sensitive data derives from Environment Agency data

EA IPC Installations

Site Results

No IPC Installations at the site

Search Radius Results

No IPC Installations in the search radius

EA IPPC Installations

Site Results

No IPPC Installations at the site

Search Radius Results

No IPPC Installations in the search radius

Local Authority IPPC Installations

Site Results

No IPPC Installations at the site

Search Radius Results

No IPPC Installations in the search radius

Registered Radioactive Substance Sites

Site Results

No Registered Radioactive Substance sites at the site

Search Radius Results

No Registered Radioactive Substance sites in the search radius

Historical Pollution Incidents (1987-2001)

Site Results

Details	NGR	Major Incident
Oil/Diesel/	SP583213	Yes
Oil/Gas oil/GAS OIL	SP 589 212	Yes
Oil/Gas oil/	SP59302100	Miss
Not Yet Known/Not Yet Known/NOT KNOWN	SP58202120	Miss
Not Yet Known/Not Yet Known/NOT KNOWN	SP 592 210	Miss

Search Radius Results

Details	NGR	Major Incident
Sewage/Crude sewage/SEWAGE	SP 5770 2110	Yes
Natural/Rising sludge/	SP582 218	No
Oil/Not known/	SP605 192	No
Oil/Petrol/NONE	SP 598 207	No
Oil/Diesel/DIESEL	SP 5980 2090	Yes
Oil/Other/OIL	SP 588 214	Yes
Oil/Other/	SP578 211	Yes
Sewage/Crude sewage/	SP 596 189	Yes
Sewage/Sewage effluent/	SP578 213	No
Sewage/Sewage effluent/	SP59701890	No
Oil/Diesel/	SP590215	Yes
Not Yet Known/Not Yet Known/NOT KNOWN	SP 600 191	Miss
Oil/Other/OIL	SP 585 217	Yes
Sewage/Sewage sludge/	SP 577 209	No
Not Yet Known/Not Yet Known/NOT KNOWN	SP 575 207	Miss
Agriculture/Poultry manure (solid)/POULT	SP57402080	Yes
Agriculture/Other/Poultry-shed washings	SP57472075	No
Other Pollutant	SP57802120	

Current Pollution Incidents (2001-)

Site Results

Details	NGR	Major Incident

Details	NGR	Major Incident
	SP5835121354	Category 3 (Minor)
#EMPTY	SP58851983	Category 3 (Minor)

Search Radius Results

Details	NGR	Major Incident
Storm dischrge from BSTW	SP5787720338	Category 3 (Minor)

Discharge Consents

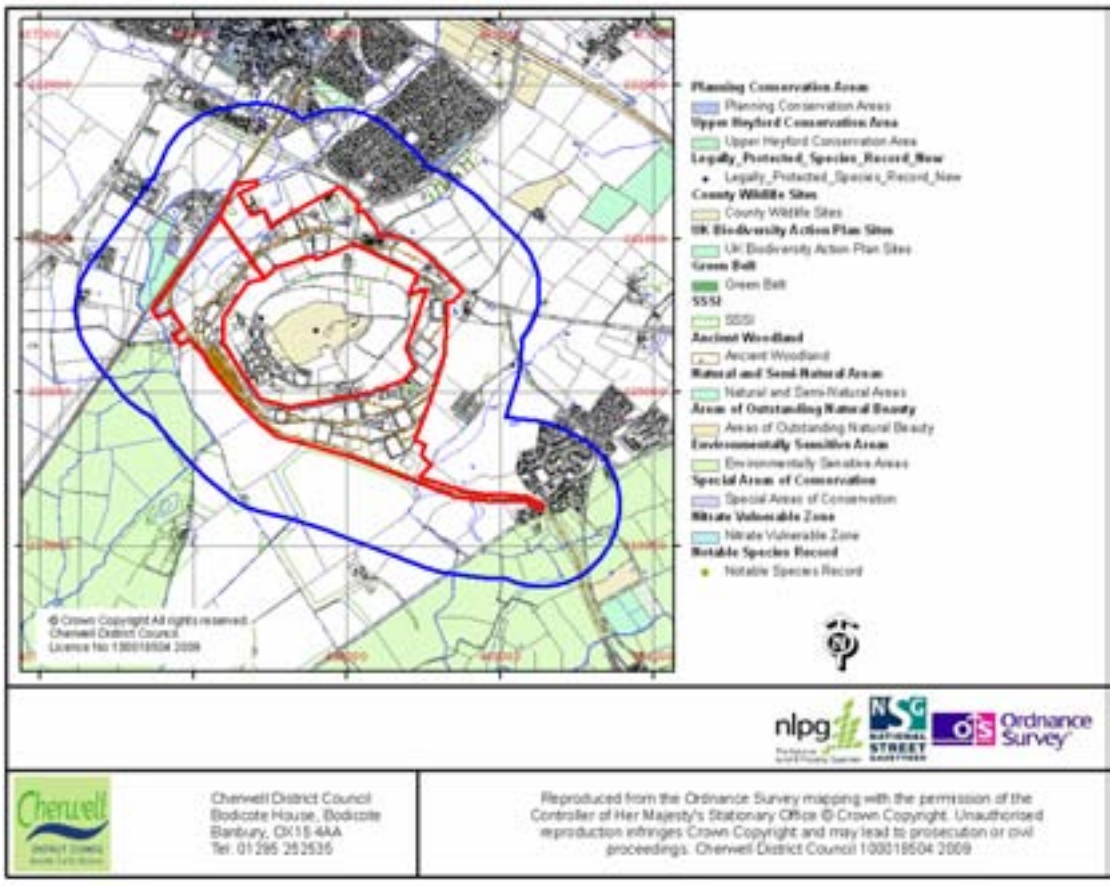
Site Results

No discharge consents at the site

Search Radius Results

License	Name	Easting	Northing	Type
CNTD.0023	THAMES WATER UTILITIES LIMITED	457800	221100	Sewage Disposal Works - water company
CNTW.0555	TESCO STORES LIMITED	458300	221650	Wholesale Dist. Animals and Mats.
CTCR.1723	THAMES WATER UTILITIES LIMITED	457600	220600	Sewage Disposal Works - water company
CNTD.0023	THAMES WATER UTILITIES LIMITED	457800	221100	Sewage Disposal Works - water company
CNTW.0555	TESCO STORES LIMITED	458300	221650	Wholesale Dist. Animals and Mats.
CNTW.0314	SCOTTISH METROPOLITAN PROPERTY PLC.	458500	221700	Undefined or Other
CATM.3010	THE BENNET GIBBONS PARTNERSHIP	459910	220550	Domestic Property (Multiple)
CTCR.0919	SOUTHERN GAS BOARD, 164 ABOVE BAR ST, SOUTHAMPTON	458800	221600	Public Gas Supply
CTCR.1293	BICESTER UDC (THAMES WATER (S+W))	457800	221100	Sewage Disposal Works - water company
CATM.3354	THE BENNETT GIBBONS PARTNERSHIP	459800	220800	Undefined or Other

Sites of Environmental Importance



Scheduled Ancient Monuments data © English Nature

The map shows the site (red) and a search radius of 500 meters (blue).

Information on Ancient Woodland and SSSIs were provided by English Nature.

Ancient Woodland

Site Results

No ancient woodland at the site

Search Radius Results

Description
Ancient & Semi-Natural Woodland

SSSI

Site Results

No SSSIs at the site

Search Radius Results

No SSSIs in the search radius

Planning Conservation Areas

Site Results

No Planning Conservation Areas at the site

Search Radius Results

No Planning Conservation Areas in the search radius

Upper Heyford Conservation Area

Site Results

No Conservation Areas at the site

Search Radius Results

No Conservation Areas in the search radius

Special Areas of Conservation

Site Results

No Special Areas of Conservation at the site

Search Radius Results

No Special Areas of Conservation in the search radius

County Wildlife Sites

Site Results

No Wildlife Sites at the site

Search Radius Results

Site Name	Habitat Type
Graven Hill	Ancient woodland

UK Biodiversity Action Plan Sites

Site Results

No UK Biodiversity Action Plan at the site

Search Radius Results

Site Name	Classification
Bicester Wetland Reserve	Biodiversity Action Plan Priority Habitats
Gravenhill Wood	National Vegetation Classification

Green Belt land

Site Results

No areas of Green Belt at the site

Search Radius Results

No areas of Green Belt in the search radius

Natural and Semi-Natural Areas

Site Results

No Natural and Semi-Natural Areas at the site

Search Radius Results

Site Name
MALLARDS WAY NSN.

Areas of Outstanding Natural Beauty

Site Results

No Areas of Outstanding Natural Beauty at the site

Search Radius Results

No Areas of Outstanding Natural Beauty in the search radius

Environmentally Sensitive Areas

Site Results

Name
Upper Thames

Search Radius Results

Name
Upper Thames

Nitrate Vulnerable Zone

Site Results

No Nitrate Vulnerable Zone at the site

Search Radius Results

No Nitrate Vulnerable Zone in the search radius

Notable Species Records

Site Results

No Notable Species Records at the site

Search Radius Results

Name	Site	Status
Bembidion quadripustulatum	Bicester Sewage Farm Reserve	
Picus viridis	Graven Hill	

Name	Site	Status
Locustella naevia	Graven Hill	
Phylloscopus trochilus	Graven Hill	

Legally Protected Species Record

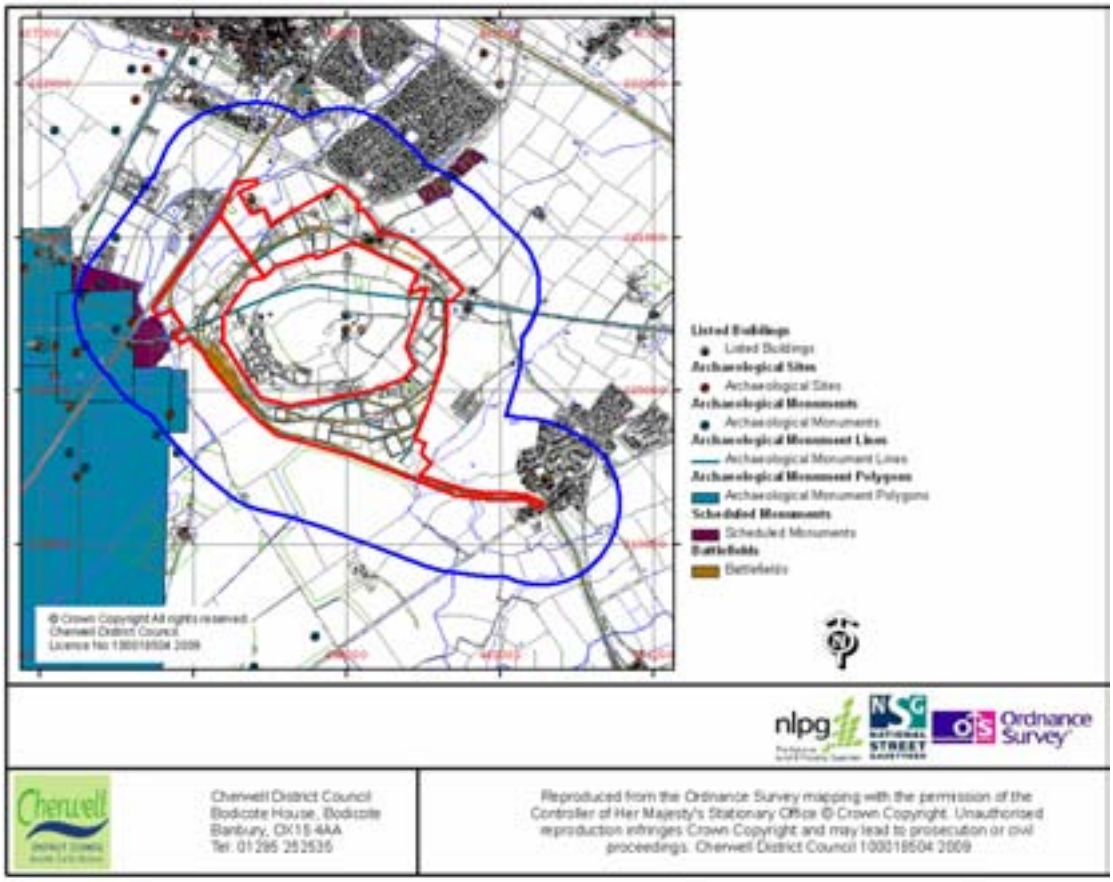
Site Results

No Legally Protected Species Record at the site

Search Radius Results

Name	Site	Status
Hyacinthoides non-scripta	Graven Hill	

Heritage Sites



Scheduled Ancient Monuments data © English Nature

The map shows the site (red) and a search radius of 500 meters (blue).

Listed Buildings

Site Results

No listed buildings at the site

Search Radius Results

Title	Easting	Northing
BARN APPROXIMATEL	459798	220541
WRETCHWICK LODGE	459232	221043
GATEPIERS, GATES	460325	219428
CHURCH OF ST MARY	460300	219409
HEADSTONE APPROXI	460288	219390
	460448	219315
KENNET HOUSE	460320	219382
	460406	219341
LANGFORD PARK FAR	458380	221258
CHURCHYARD CROSS	460330	219408
	460319	219267
KING MEMORIAL APP	460289	219438
PARK FARMHOUSE	460344	219277
WRETCHWICK FARMHO	459823	220650
HOLLY TREE COTTAG	460190	219214

Archaeological Sites

Site Results

Name	Easting	Northing
MERTON GROUNDS	457880	220360

Search Radius Results

Name	Easting	Northing
WENDLEBURY HOLT	457600	220300
GRAVEN HILL	459100	220400
ALCHESTER	457300	220300
NORTH EAST OF ALCHESTER	457600	220450
BICESTER SEWAGE TREATMENT WORKS	458000	221000
GRAVEN HILL TO AMBROSDEN PIPELINE	459000	220400
MERTON/WENDLEBURY	457850	219850
LAND ADJACENT TO PARK RISE/LABURNHAM CLOSE	460200	219460
MERTON/WENDLEBURY	457850	219850
LAND OFF LABURNUM CLOSE	460200	219380

Archaeological Monuments

Site Results

No archaeological monuments at the site

Search Radius Results

Description	Easting	Northing
Traces of building foundations were visible in the field NE of Promised-land Farm in 1841; listed as the possible site of a Roman villa.	457400	220700
Earthwork - prob. PM lynchets	459000	220350
The remains of a churchyard cross. The cross shaft stands directly on its socket stone. This holds the lower part of an octagonal shaft. Above this the shaft has been broken off and the cross head which would have stood upon it is gone.	460320	219400
RB sherds, coin	457500	220400
Linear features and possible fragmentary ditched enclosures visible as cropmarks on aerial photographs.	457500	221000
ORDNANCE DEPOT. From list of sites Graven Hill Depot Recorder- S.C. Jenkins	459000	220500
Ambrosden Hall, Built circa 1673, demolished 1740 (site of)	460170	219420
Pits and ditches with Romano British pottery were found on a building site NW of the road to Blackthorn.	460570	219670

Archaeological Monument Lines

Site Results

Description
Partly dismantled railway. The Buckinghamshire Railway was a merger of two companies proposing lines from Bletchley to Banbury and Aylesbury to Oxford. The Bletchley - Banbury section opened in 1850 and the Oxford - Verney Junction (on the Bletchley - Ba Britain's largest military railway system, opened in 1941, still extant.

Description
Roman road running from Alchester to St Albans (Verulamium).

Search Radius Results

Description
Partly dismantled railway. The Buckinghamshire Railway was a merger of two companies proposing lines from Bletchley to Banbury and Aylesbury to Oxford. The Bletchley - Banbury section opened in 1850 and the Oxford - Verney Junction (on the Bletchley - Ba
Roman road running fron Towcester to Alchester.
Britain's largest military railway system, opened in 1941, still extant.
Roman road running from Alchester to St Albans (Verulamium).

Archaeological Monument Polygons

Site Results

Description
Railway halt on the Bicester Military Railway.
Railway halt on the Bicester Military Railway. Approximate siting only, derived from photograph in NMR Rokeby Collection.

Search Radius Results

Description
Railway halt on the Bicester Military Railway. Not located.
Railway halt on the Bicester Military Railway.
Rectilinear enclosure visible as a crop mark on aerial photographs. Possible Roman parade ground.
Roman field system visible as crop mark.
AS spearhead fd. 1828
Poss Md Manor House, extant 1673 (site of)
System of rectilinear enclosures and trackways visible on air photographs. Probable extramural settlement to the Roman town of Alchester.

Scheduled Monuments

Site Results

No scheduled monuments at the site

Search Radius Results

Name
Alchester Roman site
AMBROSDEN CHURCHYARD CROSS
WRETCHWICK DESERTED MEDIEVAL SETTLEMENT

Battlefields

Site Results

No battlefields at the site

Search Radius Results

No battlefields in the search radius

Important

Annex G
Environmental Risk Assessment Table

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Report Annex: Summary of Potential Environmental Risks

Item No.	Area/ Building	Potential Pollutant (Source)	Potential Receptor	Potential Pathway to Receptor	Associated Hazard	Potential Consequence of S-R Link	Likelihood of Source-Receptor Linkage	Significance: Risk Classification	Comment
1	Former Rifle Range	Metals	Humans (current site users & visitors)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Vicinity of former range is now grassed over, decreasing the likelihood of this pollutant linkage.
2	Former Rifle Range	Metals	Humans (redevelopment workers)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Low	Moderate / Low	The risk to redevelopment workers from ground contamination is greater due to direct contact with potentially contaminated material. The risk may be mitigated through use of appropriate PPE and control measures.
3	Former Rifle Range	Metals	Humans (future users: residential with gardens)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Low	Moderate / Low	Redevelopment to residential end use may result in a greater likelihood of exposure to contamination.
4	Former Rifle Range	Metals	Humans (future users: commercial/industrial)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Redevelopment to commercial/industrial end use is likely to result in a generally low likelihood of contact with residual contamination.
5	Former Rifle Range	Metals	Humans (neighbouring site users)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Migration of contaminants associated with this potential source to neighbouring site users is unlikely, given the surface cover, distance involved and the low permeability of the underlying geology.
6	Former Rifle Range	Metals	Groundwater (unproductive strata)	Leaching Migration	Groundwater contamination	Mild	Unlikely	Negligible	Potential sources is located on unproductive strata.
7	Former Rifle Range	Metals	Surface Water (ditches and Langford Brook)	Leaching Migration Runoff	Water pollution	Medium	Low	Moderate / Low	Thre is a surface water ditch in the vicinity of the source, increasing the likelihood of a PL. However, potential source is located on unproductive strata meaning the only likely pathway is via surface water runoff. Potential source is likely to be at depth beneath grass over soils limiting the potential for surface water runoff.
8	Former Rifle Range	Metals	Ecological receptors	Uptake	Toxic Phytotoxicity	Medium	Unlikely	Low	Migration of contaminants associated with this potential source to nearby receptors is unlikely, given the surface cover, distance involved and the low permeability of the underlying geology.
9	Former Rifle Range	Metals	Agricultural (arable and livestock)	Uptake	Toxic Phytotoxicity	Mild	Low	Low	Likelihood of migration of contaminants associated with this potential source to nearby receptors is low, given the low permeability of the underlying geology.
10	Former Rifle Range	Explosive residues	Humans (current site users & visitors)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Vicinity of former range is now grassed over, decreasing the likelihood of this pollutant linkage.

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Item No.	Area/ Building	Potential Pollutant (Source)	Potential Receptor	Potential Pathway to Receptor	Associated Hazard	Potential Consequence of S-R Link	Likelihood of Source-Receptor Linkage	Significance: Risk Classification	Comment
11	Former Rifle Range	Explosive residues	Humans (redevelopment workers)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Low	Moderate / Low	The risk to redevelopment workers from ground contamination is greater due to direct contact with potentially contaminated material. The risk may be mitigated through use of appropriate PPE and control measures.
12	Former Rifle Range	Explosive residues	Humans (future users: residential with gardens)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Low	Moderate / Low	Redevelopment to residential end use may result in a greater likelihood of exposure to contamination.
13	Former Rifle Range	Explosive residues	Humans (future users: commercial/industrial)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Redevelopment to commercial/industrial end use is likely to result in a generally low likelihood of contact with residual contamination.
14	Former Rifle Range	Explosive residues	Humans (neighbouring site users)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Migration of contaminants associated with this potential source to neighbouring site users is unlikely, given the surface cover, distance involved and the low permeability of the underlying geology.
15	Former Rifle Range	Explosive residues	Groundwater (unproductive strata)	Leaching Migration	Groundwater contamination	Mild	Unlikely	Negligible	Potential sources is located on unproductive strata.
16	Former Rifle Range	Explosive residues	Surface Water (ditches and Langford Brook)	Leaching Migration Runoff	Water pollution	Medium	Low	Moderate / Low	Thre is a surface water ditch in the vicinity of the source, increasing the likelihood of a PL. However, potential source is located on unproductive strata meaning the only likely pathway is via surface water runoff. Potential source is likely to be at depth beneath grass over soils limiting the potential for surface water runoff.
17	Former Rifle Range	Explosive residues	Ecological receptors	Uptake	Phytotoxicity	Medium	Unlikely	Low	Migration of contaminants associated with this potential source to nearby receptors is unlikely, given the surface cover, distance involved and the low permeability of the underlying geology.
18	Former Rifle Range	Explosive residues	Agricultural (arable and livestock)	Uptake	Toxic Phytotoxicity	Mild	Low	Low	Likelihood of migration of contaminants associated with this potential source to nearby receptors is low, given the low permeability of the underlying geology.
19	Former Rifle Range	Unexploded ordnance	Humans (current site users & visitors)	Direct Contact	Explosion	Severe	Unlikely	Moderate / Low	Vicinity of former range is now grassed over, decreasing the likelihood of this pollutant linkage. UXO likely to be limited to small arms ammunition only.
20	Former Rifle Range	Unexploded ordnance	Humans (redevelopment workers)	Direct Contact	Explosion	Severe	Low	Moderate	The risk to redevelopment workers from ground contamination is greater due to direct contact with potentially contaminated material. The risk may be mitigated through use of appropriate control measures. UXO likely to be limited to small arms ammunition only.

Report Annex: Summary of Potential Environmental Risks

Item No.	Area/ Building	Potential Pollutant (Source)	Potential Receptor	Potential Pathway to Receptor	Associated Hazard	Potential Consequence of S-R Link	Likelihood of Source-Receptor Linkage	Significance: Risk Classification	Comment
21	Former Rifle Range	Unexploded ordnance	Humans (future users: residential with gardens)	Direct Contact	Explosion	Severe	Low	Moderate	Redevelopment to residential end use may result in a greater likelihood of exposure to contamination. UXO likely to be limited to small arms ammunition only.
22	Former Rifle Range	Unexploded ordnance	Humans (future users: commercial/industrial)	Direct Contact	Explosion	Severe	Unlikely	Moderate / Low	Redevelopment to commercial/industrial end use is likely to result in a generally low likelihood of contact with residual contamination. UXO likely to be limited to small arms ammunition only.
23	Former Rifle Range	Unexploded ordnance	Humans (neighbouring site users)	Direct Contact	Explosion	Severe	Unlikely	Moderate / Low	Migration of contaminants associated with this potential source to neighbouring site users is unlikely, given the surface cover and distances involved. UXO likely to be limited to small arms ammunition only.
24	Former Rifle Range	Unexploded ordnance	Ecological receptors	Direct Contact	Explosion	Medium	Unlikely	Low	Migration of contaminants associated with this potential source to nearby receptors is unlikely, given the surface cover and distance involved. UXO likely to be limited to small arms ammunition only.
25	Former Rifle Range	Unexploded ordnance	Agricultural (arable and livestock)	Direct Contact	Explosion	Medium	Low	Moderate / Low	Vicinity of former range is now grassed over, although possibility of ploughing increases the likelihood of exposure to contamination. UXO likely to be limited to small arms ammunition only.
26	Historical Nissen Hut Camps and Infilled Ground	Metals	Humans (current site users & visitors)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Vicinity of former camps is now grassed over, decreasing the likelihood of this pollutant linkage.
27	Historical Nissen Hut Camps and Infilled Ground	Metals	Humans (redevelopment workers)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Low	Moderate / Low	The risk to redevelopment workers from ground contamination is greater due to direct contact with potentially contaminated material. The risk may be mitigated through use of appropriate PPE and control measures.
28	Historical Nissen Hut Camps and Infilled Ground	Metals	Humans (future users: residential with gardens)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Low	Moderate / Low	Redevelopment to residential end use may result in a greater likelihood of exposure to contamination.
29	Historical Nissen Hut Camps and Infilled Ground	Metals	Humans (future users: commercial/industrial)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Redevelopment to commercial/industrial end use is likely to result in a generally low likelihood of contact with residual contamination.
30	Historical Nissen Hut Camps and Infilled Ground	Metals	Humans (neighbouring site users)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Migration of contaminants associated with this potential source to neighbouring site users is unlikely, given the surface cover, distance involved and the low permeability of the underlying geology.

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Item No.	Area/ Building	Potential Pollutant (Source)	Potential Receptor	Potential Pathway to Receptor	Associated Hazard	Potential Consequence of S-R Link	Likelihood of Source-Receptor Linkage	Significance: Risk Classification	Comment
31	Historical Nissen Hut Camps and Infilled Ground	Metals	Groundwater (unproductive strata)	Leaching Migration	Groundwater contamination	Mild	Unlikely	Negligible	Potential sources is located on unproductive strata.
32	Historical Nissen Hut Camps and Infilled Ground	Metals	Surface Water (ditches and Langford Brook)	Leaching Migration Runoff	Water pollution	Medium	Low	Moderate / Low	Thre is a surface water ditch in the vicinity of the source, increasing the likelihood of a PL. However, potential source is located on unproductive strata meaning the only likely pathway is via surface water runoff. Potential source is likely to be at depth beneath grass over soils limiting the potential for surface water runoff.
33	Historical Nissen Hut Camps and Infilled Ground	Metals	Ecological receptors	Uptake	Phytotoxicity	Medium	Unlikely	Low	Migration of contaminants associated with this potential source to nearby receptors is unlikely, given the surface cover, distance involved and the low permeability of the underlying geology.
34	Historical Nissen Hut Camps and Infilled Ground	Metals	Agricultural (arable and livestock)	Uptake	Toxic Phytotoxicity	Mild	Low	Low	Likelihood of migration of contaminants associated with this potential source to nearby receptors is low, given the low permeability of the underlying geology.
35	Historical Nissen Hut Camps and Infilled Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Humans (current site users & visitors)	Dermal contact Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Vicinity of former camps is now grassed over, decreasing the likelihood of this pollutant linkage. No obvious evidence of hydrocarbon contamination at surface during site walkover.
36	Historical Nissen Hut Camps and Infilled Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Humans (redevelopment workers)	Dermal contact Ingestion Inhalation	Toxic: carcinogenic impact	Medium	Low	Moderate / Low	The risk to redevelopment workers from ground contamination is greater due to direct contact with potentially contaminated material. The risk may be mitigated through use of appropriate PPE and control measures. Due to the age of any potential contamination, the risk from volatiles/vapours is less due to the weathered nature of the contamination but there is still considered to be a low likelihood of a PL.
37	Historical Nissen Hut Camps and Infilled Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Humans (future users: residential with gardens)	Dermal contact Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Low	Moderate / Low	Redevelopment to residential end use may result in a greater likelihood of exposure to contamination. Due to the age of any potential contamination, the risk from volatiles/vapours is less due to the weathered nature of the contamination but there is still considered to be a low likelihood of a PL.
38	Historical Nissen Hut Camps and Infilled Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Humans (future users: commercial/industrial)	Dermal contact Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	If redevelopment to a commercial/industrial end use occurs in the area of these sources then there is higher likelihood of impact from residual contamination. Due to the age of any potential contamination, the risk from volatiles/vapours is less due to the weathered nature of the contamination.

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Item No.	Area/ Building	Potential Pollutant (Source)	Potential Receptor	Potential Pathway to Receptor	Associated Hazard	Potential Consequence of S-R Link	Likelihood of Source-Receptor Linkage	Significance: Risk Classification	Comment
39	Historical Nissen Hut Camps and Infilled Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Humans (neighbouring site users)	Dermal contact Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Migration of contaminants associated with this potential source to neighbouring site users is unlikely, given the surface cover, distance involved and the low permeability of the underlying geology. No obvious evidence of hydrocarbon contamination at surface during site walkover.
40	Historical Nissen Hut Camps and Infilled Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Groundwater (unproductive strata)	Leaching Migration	Groundwater contamination	Mild	Unlikely	Negligible	Potential sources is located on unproductive strata.
41	Historical Nissen Hut Camps and Infilled Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Surface Water (ditches and Langford Brook)	Leaching Migration Runoff	Water pollution	Medium	Low	Moderate / Low	Thre is a surface water ditch in the vicinity of the source, increasing the likelihood of a PL. However, potential source is located on unproductive strata meaning the only likely pathway is via surface water runoff. Potential source is likely to be at depth beneath grass over soils limiting the potential for surface water runoff.
42	Historical Nissen Hut Camps and Infilled Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Ecological receptors	Uptake Direct contact	Phytotoxicity Toxic	Mild	Unlikely	Negligible	Migration of contaminants associated with this potential source to nearby receptors is unlikely, given the surface cover, distance involved and the low permeability of the underlying geology. No obvious evidence of hydrocarbon contamination at surface during site walkover.
43	Historical Nissen Hut Camps and Infilled Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Agricultural (arable and livestock)	Uptake Direct contact	Phytotoxicity Toxic	Mild	Unlikely	Negligible	Likelihood of migration of contaminants associated with this potential source to nearby receptors is low, given the low permeability of the underlying geology. No obvious evidence of hydrocarbon contamination at surface during site walkover.
44	Historical Nissen Hut Camps and Infilled Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Buildings and Buried Services (current or future)	Direct contact Vapour Migration	Degradation Vapour Accumulation Explosion	Mild	Low	Low	Design of new structures in this area may need to consider this potential contaminant source. No obvious evidence of hydrocarbon contamination at surface during site walkover.
45	Historical Nissen Hut Camps and Infilled Ground	Asbestos	Humans (current site users & visitors)	Inhalation	Toxic: carcinogenic impact	Medium	Unlikely	Low	Vicinity of former camps is now grassed over or hardstanding and appears to be minimally used, decreasing the likelihood of this pollutant linkage.
46	Historical Nissen Hut Camps and Infilled Ground	Asbestos	Humans (redevelopment workers)	Inhalation	Toxic: carcinogenic impact	Medium	Likely	Moderate	The risk to redevelopment workers from ground contamination is greater due to direct contact with potentially contaminated material. The risk may be mitigated through use of appropriate PPE and control measures.

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Item No.	Area/ Building	Potential Pollutant (Source)	Potential Receptor	Potential Pathway to Receptor	Associated Hazard	Potential Consequence of S-R Link	Likelihood of Source-Receptor Linkage	Significance: Risk Classification	Comment
47	Historical Nissen Hut Camps and Infilled Ground	Asbestos	Humans (future users: residential with gardens)	Inhalation	Toxic: carcinogenic impact	Medium	Low	Moderate / Low	Redevelopment to residential end use may result in a greater likelihood of exposure to contamination.
48	Historical Nissen Hut Camps and Infilled Ground	Asbestos	Humans (future users: commercial/industrial)	Inhalation	Toxic: carcinogenic impact	Medium	Unlikely	Low	Redevelopment to commercial/industrial end use is likely to result in a generally low likelihood of contact with residual contamination.
49	Historical Nissen Hut Camps and Infilled Ground	Asbestos	Humans (neighbouring site users)	Migration Inhalation	Toxic: carcinogenic impact	Medium	Unlikely	Low	Migration of contaminants associated with this potential source to neighbouring site users is unlikely, given the surface cover and distance involved.
50	Areas of Demolition/Disturbed Ground	Metals	Humans (current site users & visitors)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Most of these areas are now vegetated and appear to be only minimally used, decreasing the likelihood of this pollutant linkage.
51	Areas of Demolition/Disturbed Ground	Metals	Humans (redevelopment workers)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Low	Moderate / Low	The risk to redevelopment workers from ground contamination is greater due to direct contact with potentially contaminated material. The risk may be mitigated through use of appropriate PPE and control measures.
52	Areas of Demolition/Disturbed Ground	Metals	Humans (future users: residential with gardens)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Low	Moderate / Low	Redevelopment to residential end use may result in a greater likelihood of exposure to contamination.
53	Areas of Demolition/Disturbed Ground	Metals	Humans (future users: commercial/industrial)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Redevelopment to commercial/industrial end use is likely to result in a generally low likelihood of contact with residual contamination.
54	Areas of Demolition/Disturbed Ground	Metals	Humans (neighbouring site users)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Migration of contaminants associated with this potential source to neighbouring site users is unlikely, given the surface cover, distance involved and the low permeability of the underlying geology.
55	Areas of Demolition/Disturbed Ground	Metals	Groundwater (unproductive strata)	Leaching Migration	Groundwater contamination	Mild	Unlikely	Negligible	Potential sources is located on unproductive strata.
56	Areas of Demolition/Disturbed Ground	Metals	Surface Water (ditches and Langford Brook)	Leaching Migration Runoff	Water pollution	Medium	Low	Moderate / Low	Potential source is located on unproductive strata meaning the only likely pathway is via surface water runoff. Potential source is vegetated over, reducing the potential for surface water runoff.
57	Areas of Demolition/Disturbed Ground	Metals	Ecological receptors	Uptake	Phytotoxicity	Medium	Unlikely	Low	Migration of contaminants associated with this potential source to nearby receptors is unlikely, given the surface cover, distance involved and the low permeability of the underlying geology.

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Item No.	Area/ Building	Potential Pollutant (Source)	Potential Receptor	Potential Pathway to Receptor	Associated Hazard	Potential Consequence of S-R Link	Likelihood of Source-Receptor Linkage	Significance: Risk Classification	Comment
58	Areas of Demolition/Disturbed Ground	Metals	Agricultural (arable and livestock)	Uptake	Toxic Phytotoxicity	Mild	Low	Low	Likelihood of migration of contaminants associated with this potential source to nearby receptors is low, given the low permeability of the underlying geology.
59	Areas of Demolition/Disturbed Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Humans (current site users & visitors)	Dermal contact Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Most of these areas are now vegetated and appear to be only minimally used, decreasing the likelihood of this pollutant linkage. No obvious evidence of hydrocarbon contamination during site walkover.
60	Areas of Demolition/Disturbed Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Humans (redevelopment workers)	Dermal contact Ingestion Inhalation	Toxic: carcinogenic impact	Medium	Low	Moderate / Low	The risk to redevelopment workers from ground contamination is greater due to direct contact with potentially contaminated material. The risk may be mitigated through use of appropriate PPE and control measures.
61	Areas of Demolition/Disturbed Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Humans (future users: residential with gardens)	Dermal contact Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Low	Moderate / Low	Redevelopment to residential end use may result in a greater likelihood of exposure to contamination.
62	Areas of Demolition/Disturbed Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Humans (future users: commercial/industrial)	Dermal contact Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	If redevelopment to a commercial/industrial end use occurs in the area of these sources then there is higher likelihood of impact from residual contamination. However, due to the age of any potential contamination, the risk from volatiles/vapours is less due to the weathered nature of the contamination.
63	Areas of Demolition/Disturbed Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Humans (neighbouring site users)	Dermal contact Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Migration of contaminants associated with this potential source to neighbouring site users is unlikely, given the surface cover, distance involved and the low permeability of the underlying geology.
64	Areas of Demolition/Disturbed Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Groundwater (unproductive strata)	Leaching Migration	Groundwater contamination	Mild	Unlikely	Negligible	Potential sources is located on unproductive strata.
65	Areas of Demolition/Disturbed Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Surface Water (ditches and Langford Brook)	Leaching Migration Runoff	Water pollution	Medium	Low	Moderate / Low	Potential source is located on unproductive strata meaning the only likely pathway is via surface water runoff. Potential source is likely to be at depth beneath vegetation reducing the potential for surface water runoff.
66	Areas of Demolition/Disturbed Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Ecological receptors	Uptake Direct contact	Phytotoxicity Toxic	Mild	Unlikely	Negligible	Migration of contaminants associated with this potential source to nearby receptors is unlikely, given the surface cover, distance involved and the low permeability of the underlying geology.

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67	Areas of Demolition/Disturbed Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Agricultural (arable and livestock)	Uptake Direct contact	Phytotoxicity Toxic	Mild	Low	Low	Likelihood of migration of contaminants associated with this potential source to nearby receptors is low, given the low permeability of the underlying geology.
68	Areas of Demolition/Disturbed Ground	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Buildings and Buried Services (current or future)	Direct contact Vapour Migration	Degradation Vapour Accumulation	Mild	Unlikely	Negligible	Very few or no buried services in vicinity - groundworks for redevelopment would likely remove the potential contaminant source.
69	Areas of Demolition/Disturbed Ground	Asbestos	Humans (current site users & visitors)	Inhalation	Toxic: carcinogenic impact	Medium	Unlikely	Low	Vicinity of areas is now vegetated over and appears to be minimally used, decreasing the likelihood of this pollutant linkage.
70	Areas of Demolition/Disturbed Ground	Asbestos	Humans (redevelopment workers)	Inhalation	Toxic: carcinogenic impact	Medium	Low	Moderate / Low	The risk to redevelopment workers from ground contamination is greater due to direct contact with potentially contaminated material. The risk may be mitigated through use of appropriate PPE and control measures.
71	Areas of Demolition/Disturbed Ground	Asbestos	Humans (future users: residential with gardens)	Inhalation	Toxic: carcinogenic impact	Medium	Low	Moderate / Low	Redevelopment to residential end use may result in a greater likelihood of exposure to contamination.
72	Areas of Demolition/Disturbed Ground	Asbestos	Humans (future users: commercial/industrial)	Inhalation	Toxic: carcinogenic impact	Medium	Unlikely	Low	Redevelopment to commercial/industrial end use is likely to result in a generally low likelihood of contact with residual contamination.
73	Areas of Demolition/Disturbed Ground	Asbestos	Humans (neighbouring site users)	Migration Inhalation	Toxic: carcinogenic impact	Medium	Unlikely	Low	Migration of contaminants associated with this potential source to neighbouring site users is unlikely, given the surface cover and distance involved.
74	St David's Barracks (off-site)	Metals	Humans (current site users & visitors)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.
75	St David's Barracks (off-site)	Metals	Humans (redevelopment workers)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.
76	St David's Barracks (off-site)	Metals	Humans (future users: residential with gardens)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.

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Item No.	Area/ Building	Potential Pollutant (Source)	Potential Receptor	Potential Pathway to Receptor	Associated Hazard	Potential Consequence of S-R Link	Likelihood of Source-Receptor Linkage	Significance: Risk Classification	Comment
77	St David's Barracks (off-site)	Metals	Humans (future users: commercial/industrial)	Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact	Medium	Unlikely	Low	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.
78	St David's Barracks (off-site)	Metals	Agricultural (arable and livestock)	Uptake	Toxic Phytotoxicity	Mild	Unlikely	Negligible	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology, the distances involved and the ground cover at the Barracks.
79	St David's Barracks (off-site)	Explosive residues	Agricultural (arable and livestock)	Uptake	Toxic Phytotoxicity	Mild	Unlikely	Negligible	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology, the distances involved and the ground cover at the Barracks.
80	St David's Barracks (off-site)	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Humans (current site users & visitors)	Dermal contact Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact Explosion	Medium	Unlikely	Low	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.
81	St David's Barracks (off-site)	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Humans (redevelopment workers)	Dermal contact Ingestion Inhalation	Toxic: carcinogenic impact Explosion	Medium	Unlikely	Low	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.
82	St David's Barracks (off-site)	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Humans (future users: residential with gardens)	Dermal contact Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact Explosion	Medium	Unlikely	Low	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.
83	St David's Barracks (off-site)	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Humans (future users: commercial/industrial)	Dermal contact Ingestion Inhalation	Toxic: chronic toxicity Toxic: carcinogenic impact Explosion	Medium	Unlikely	Low	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.
84	St David's Barracks (off-site)	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Groundwater (unproductive strata)	Leaching Migration	Groundwater contamination	Mild	Unlikely	Negligible	Potential sources is located on unproductive strata.
85	St David's Barracks (off-site)	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Surface Water (ditches and Langford Brook)	Leaching Migration Runoff	Water pollution	Medium	Low	Moderate / Low	Thre is a surface water ditch in the vicinity of the source, increasing the likelihood of a PL. However, potential source is located on unproductive strata meaning the only likely pathway is via surface water runoff. Potential source is likely to be at depth beneath grass over soils, or hardstanding, limiting the potential for surface water runoff.

Report Annex: Summary of Potential Environmental Risks

Item No.	Area/ Building	Potential Pollutant (Source)	Potential Receptor	Potential Pathway to Receptor	Associated Hazard	Potential Consequence of S-R Link	Likelihood of Source-Receptor Linkage	Significance: Risk Classification	Comment
86	St David's Barracks (off-site)	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Ecological receptors	Uptake Direct contact	Phytotoxicity Toxic	Mild	Unlikely	Negligible	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.
87	St David's Barracks (off-site)	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Agricultural (arable and livestock)	Uptake Direct contact	Phytotoxicity Toxic	Mild	Unlikely	Negligible	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.
88	St David's Barracks (off-site)	Hydrocarbons (fuels, lubricants, solvents and PAHs)	Buildings and Buried Services (current or future)	Direct contact Vapour Migration	Degradation Vapour Accumulation	Mild	Unlikely	Negligible	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.
89	St David's Barracks (off-site)	Asbestos	Humans (current site users & visitors)	Inhalation	Toxic: carcinogenic impact	Medium	Unlikely	Low	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.
90	St David's Barracks (off-site)	Asbestos	Humans (redevelopment workers)	Inhalation	Toxic: carcinogenic impact	Medium	Unlikely	Low	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.
91	St David's Barracks (off-site)	Asbestos	Humans (future users: residential with gardens)	Inhalation	Toxic: carcinogenic impact	Medium	Unlikely	Low	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.
92	St David's Barracks (off-site)	Asbestos	Humans (future users: commercial/industrial)	Inhalation	Toxic: carcinogenic impact	Medium	Unlikely	Low	Likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.
93	St David's Barracks (off-site)	Radiological artefacts	Humans (current site users & visitors)	Dermal Contact Ingestion Inhalation	Toxic: carcinogenic impact	Medium	Unlikely	Low	Dstl report identifies a moderate risk of radiological contamination across Bicester site. However, the likelihood of migration of contaminants associated with this potential source to this receptor is unlikely, given the low permeability of the underlying geology and the ground cover at the Barracks.

Annex H
Site Asbestos Surveys

60 Pages

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HSG 264
MANAGEMENT ASBESTOS SURVEY REPORT
AND
MATERIALS ASSESSMENT

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Project No.
ABP/1651/06/10/SDBB02GHT001
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CONTENTS

1.0 INTRODUCTION

1.1 Client Instructions

ABP Associates Limited was instructed by Interserve Defence Ltd, to undertake a Management survey as defined in HSG 264 "Asbestos: The survey guide", at Building 1 Garrison Briefing Facility, St David's Barracks, MOD Bicester.

The survey comprised of the following buildings; Building 1 Garrison Briefing Facility, St David's Barracks, MOD Bicester (Asset tag: DBB02GHT001) - 1140m^2

The survey was to ascertain if asbestos containing materials (ACM) were present and to report the condition in order for the managers of the building to produce a management plan. In additional to the material assessment, ABP were requested to conduct a priority risk assessment for each ACM located during the survey. This is based on the observations of the surveyor at the time of the survey. The priority assessment used is the Interserve developed system.

Completing the priority risk assessment is outside of the scope of ABP's UKAS accreditation.

Survey works were undertaken on 2nd June 2010 by Mike Mackay. This was carried out in accordance with the requirements of the Control of Asbestos Regulations 2006 and HSG 264.

Any relevant parties, prior to building works of any description commencing, should consult this report.

It is also absolutely essential that any users of this report appreciate that this report **cannot** serve as an exhaustive account of asbestos containing materials throughout the site. Moreover, given the way in which asbestos containing materials (ACM) were used in building constructions, certain ACM may only be detected during the course of major refurbishment or demolition works.

ABP Associates Ltd is a Type C Inspection Body accredited by UKAS (United Kingdom Accreditation Service) to BS EN ISO/IEC 17020:2004 for the *Surveying of Asbestos in Premises*.

It is now mandatory for all persons carrying out work, or organising such work, on buildings constructed prior to 2000 to have asbestos awareness training provided by a competent person / organisation.

1.2 ABP Contact Points

In the event of any queries regarding this report please contact the report author at:

T 02380 866888
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info@abp.uk.com

2.0 MANAGEMENT SUMMARY

2.1 Asbestos Materials Summary

Asbestos containing materials (ACMs) were found in the following locations:

Location	Description of Material	Recommendation
1.24 Store room	Paper lining to pipework	Remove
1.23 Store room	Strongly Presumed - Cement sleeve through ceiling to roof	Mark and Manage
1.23 Store room	Asbestos insulating board to door	Remove
1.23 Store room	Asbestos insulating board to door	Remove
1.22 Light room	Cement sleeve through ceiling to roof x 3	Mark and Manage
1.22 Light room	Asbestos insulating board to door	Remove
1.21 Store room	Asbestos insulating board to door	Remove
1.21 Store room	Strongly Presumed – cement sleeve to ceiling onto roof x 1	Mark and Manage
G18 Lobby/foyer	Gasket to pipes (x8)	Mark and Manage
G18 Foyer	Paper lining to pipes	Mark and Manage
G17	Gasket to pipes	Mark and Manage
G11 Stage	Cement panel above stage (fire break)	Mark and Manage
G11 Stage	Gasket to pipes	Mark and Manage
G14 Female WC	Gasket to pipes	Mark and Manage
G14 Female WC	Paper lining to pipes	Mark and Manage
G13 Lobby	Paper lining to pipe	Mark and Manage
G13 Lobby	Gasket to pipes	Mark and Manage
G15 Male WC	Paper lining to pipe	Mark and Manage
G15 Male WC	Gasket to pipes	Mark and Manage
G16 Lobby	Gasket to Pipes	Mark and Manage
G31 under stairs store room	Paper lining to pipes	Mark and Manage
G30 under stage	Asbestos insulating board panel and debris near door	Remove
G29 Store room	Paper lining to pipes	Mark and Manage
G28 Store room	3m paper lining to pipes	Mark and Manage
1.01	Gasket to flanges	Mark and Manage
1.02	Toilet cistern	Mark and Manage

2.1 Asbestos Materials Summary – Continued

Location	Description of Material	Recommendation
1.05	Gasket to flange	Mark and Manage
1.06 Toilet	Toilet cistern	Mark and Manage
1.07 Shower	Gasket to flange	Mark and Manage
1.08 Lobby	Strongly Presumed – Blanket (fire)	Remove
External EX01	Strongly Presumed - Cement rain pipe and guttering	Mark and Manage
External EX01	Strongly Presumed - Cement debris to corner	Remove
EX02 Porch	Pipe lagging to elbow	Remove
EX02 Porch	Rope (wrapped around pipe lagging)	Remove
EX01	Cement guttering at high level	Mark and Manage
EX02 Porch	Paper lining to pipe	Remove
EX03 Porch	Pipe lagging to elbow	Remove
EX03 Porch	Rope (wrapped around pipe lagging)	Remove
EX01	Strongly Presumed - Cement facia	Mark and Manage
2.01 Roof void	Cement sheeting to roof	Mark and Manage
2.01 Roof void	Insulating panel and debris (to door)	Remove
2.01 Roof void	Durasteel panels	Encapsulate and Mark and Manage
2.01 Roof void	Strongly Presumed - Durasteel panel on top of insulation	Remove
2.01 Roof void	Rope (in switch box x 4) also used as backing packing	Mark and Manage
2.01 Roof void	Cement debris	Remove
2.01 Roof void	Cement panel below walkway	Mark and Manage
2.01 Roof void	Cement fire break	Mark and Manage
EX01 External	Strongly Presumed - Cement cowls x 5 on roof top	Mark and Manage
EX01 External	Strongly Presumed - Cement facia to roof	Mark and Manage

Please refer to the recommendations in appendix B.

2.2 Areas surveyed – No asbestos found.

The areas listed below are within the scope of the work and found not to contain asbestos; however please refer to section 3.3 for restrictions & limitations

1.21	1.22	1.23	1.24
1.20	G11	G12	G13
G14	G15	G16	G17
G18	G19	G25	G26
G27	G28	G29	G30

2.2 Areas surveyed – No asbestos found – Continued

G30A	G31	G32	G33
1.01	1.02	1.03	1.04
1.05	1.06	1.07	1.08
2.01	EX01	EX02	EX03

2.3 General Building Description

Building 1 Garrison Briefing Facility, St David's Barracks, Bicester, is a two storey building with brick elevations and a cement pitched roof with a construction date of the Mid 20th Century.

2.4 Non-accessed Locations and items

All reasonably accessible areas of the premises were accessed (see Section 3.3 for limitations).

3.0 SCOPE OF SURVEY

3.1 Scope of works

A Management Survey was carried out in accordance with HSG 264. This survey report details all areas that were accessed and also lists all known areas where access was not possible at the time of the survey.

It should be assumed that any areas not referred to specifically in this report, have **not** been inspected and therefore any users of this report must presume such areas as containing asbestos. Furthermore, any such areas should be surveyed prior to work of any description, taking place. Survey works were carried out with due diligence and every endeavour was made to obtain access and determine asbestos (or presumed asbestos) materials, so far as is reasonably practicable.

3.2 Objectives

The objectives of the survey were to:

i. Locate and record the extent and product type of any presumed or known asbestos containing materials, as far as reasonably practicable.

ii. Inspect and record information on the accessibility, condition and surface treatment of any presumed or known asbestos containing materials.

iii. Determine and record the asbestos type by collecting a reasonable number of representative bulk samples, or by making a presumption based on the product type, general appearance, age of building etc.

iv. To establish the potential for any types of asbestos containing materials (known or presumed), to release airborne asbestos fibres by the application of the points scoring system in the standard algorithm as detailed in HSG 264.

Asbestos containing materials, whether confirmed by analysis, presumed or strongly presumed are recorded in Appendix A.

3.3 Survey Restrictions and Limitations

The following is a site specific guide, as agreed with the client prior to the survey being undertaken, regarding the various restrictions and limitations connected with this asbestos management survey and should be consulted by users of this report.

Areas, which were not inspected during the management survey unless otherwise stated in the scope of works, include:

1. Inside boilers and concealed panels or insulation behind boilers
2. Live plant, machinery, other similar equipment or installations etc.
3. Air handling units, ducting systems etc.
4. Fixed ceilings (nail fixed tiles), cladding, tongue and groove tiles.
5. Areas containing chemical/biological hazards etc.
6. Service risers/ducts, blocked and inaccessible etc.
7. Nail cavities.
8. Permanently blocked or bricked voids, ducts, cavities etc.
9. Beneath fitted carpets.
10. Live heating appliances.
11. Confined spaces.
12. Roof voids / spaces without adequate crawl / walk boards or where the sheer quantity of stored items prevents access.
13. Unsafe building structures.
14. Contaminated areas.
15. Beneath PVC soffits and fascias (original Asbestos Cement or Asbestos Insulating Board soffits may have been boarded over and therefore concealed).
16. Insulation to live electrical cables.
17. Behind built in cupboards.
18. Beneath floorboards.
19. Within fire doors.
20. Areas concealed behind suspected ACMs, where further investigation will disturb the suspected ACMs.
21. Behind facades (e.g. interlocking concrete tiles).
22. Beneath non-asbestos insulation in good condition.
23. Any other concealed locations where gaining access would cause damage.

Where an area has been previously stripped of asbestos i.e. plant rooms, ducts, etc. and new coverings added, it must be pointed out that asbestos removal operations have improved steadily over the years; improved techniques and more stringent guidance and legislation. Most recent has been the Control of Asbestos Regulations 2006, laying down certain enforceable guidelines. Asbestos removal prior to this regulation would not be of today's standard and therefore debris and residues may be present below new coverings. Every effort will be made to discover if asbestos debris is present. However, a more intrusive survey (Refurbishment/demolition) may be required to fully investigate the extent of possible contamination.

APPENDIX A

ASBESTOS IN BUILDINGS SURVEY – MATERIALS ASSESSMENT ALGORITHM

Asbestos Materials Assessment Algorithm

The Materials Assessment takes into account the type and condition of the ACM and the ease with which it releases fibres if disturbed. Each of the parameters given below have been recorded during the survey.

Product type or debris from product	1 (Low) 2 (Medium) 3 (High)	Composites (plastics, resins, mastics, roofing felts, vinyl floor tiles, paints, decorative finishes, cement etc. AIB, textiles, gaskets, ropes, paper etc. Lagging, spray coatings, loose asbestos etc.
Damage/Deterioration	0 (None) 1 (Low) 2 (Medium) 3 (High)	No visible damage Few scratches / marks, broken edges etc. Significant breakage of non-friable materials or several small areas of damage to friable material. High damage / visible debris.
Surface Treatment	0 (None) 1 (Low) 2 (Medium) 3 (High)	Non-friable composite asbestos / encapsulated cement Enclosed sprays / lagging / board / or bare cement. Bare AIB or encapsulated lagging / spray. Unsealed lagging / spray.
Asbestos Type	NAD 1 2 3	No asbestos detected (NAD) Chrysotile Other Crocidolite
ID level **(Level of Identification)**	ID P SP A	Identified by Laboratory analysis Presumed Strongly presumed Analysed
Rmd **(Recommendation)**	E R MM None/Other	Encapsulate Remove Mark and manage No recommendations required, Other recommendations made (specify)

Materials Assessment Score	Risk of Fibre Release
10, 11, 12	High Risk
7, 8, 9	Medium Risk
5, 6	Low Risk
2, 3, 4	Very Low Risk

The total score is calculated from the sum of the score for product type, damage, surface treatment and asbestos type and the potential for releasing fibres is assigned as detailed below.

The Materials Assessment score has been calculated for each ACM identified and the degree of risk from the material assessment alone is included in this appendix.

Attention is drawn to all occurrences of asbestos identified with a score of **10** or above. Asbestos materials within the aforementioned scoring category will, in most cases, require remedial work.

Interserve Priority Risk Assessment

The priority risk assessments in this report are taken from the Interserve rating system below. Each category is averaged to produce a priority risk assessment score which is combined with the material assessment score to determine the action required as part of the management plan.

Recommendations - Priority Assessment

Normal occupant activity		
Main type of Activity		
Rare disturbance activity	0	Rare disturbance activity (e.g. little used store room) .
Low disturbance activities	1	Low disturbance activities (e.g. office type activity).
Periodic disturbance	2	Periodic disturbance (e.g. industrial or vehicular activity which may contact ACMs).
High levels of disturbance	3	e.g. fire door with asbestos insulating board sheet in constant use.
Secondary activities for area		
Rare disturbance activity	0	Rare disturbance activity (e.g. little used store room).
Low disturbance activities	1	Low disturbance activities (e.g. office type activity).
Periodic disturbance	2	Periodic disturbance (e.g. industrial or vehicular activity which may contact ACMs).
High levels of disturbance	3	e.g. fire door with asbestos insulating board sheet in constant use.
Likelihood of Disturbance		
Location		
Outdoors	0	Outdoors.
Large rooms	1	Large rooms or well-ventilated Areas.
Rooms up to 100m³	2	Rooms up to 100m³.
Confined Spaces	3	Confined Spaces.
Accessibility		
Usually Inaccessible	0	Usually inaccessible or unlikely to be disturbed.
Occasionally	1	Occasionally likely to be disturbed.
Easily disturbed	2	Easily disturbed.
Routinely disturbed	3	Routinely disturbed.
Extend/Amount		
Small Amounts	0	Small Amounts or Items (e.g. strings, gaskets).
<=10	1	=10m² or =10m pipe run.
>10 to <=50	2	>10m² to =50m² or >10m to =50m pipe run.
>50	3	>50m² or >50m pipe run.
Human exposure Potential		
Number of Occupants		
None	0	No Occupants.
1 to 3	1	1 to 3 Occupants.
4 to 10	2	4 to 10 Occupants.
> 10	3	> 10 Occupants.
Frequency of Use		
Infrequent	0	Infrequent Use.
Monthly	1	Used on a Monthly Basis.
Weekly	2	Used on a Weekly Basis.
Daily	3	Used on a Daily Basis.
Average Use Time		
<1 Hour	0	< 1 Hour of Use.
>1 to <3 Hours	1	> 1 to < 3 Hours of Use.
>3 to <6 Hours	2	> 3 to < 6 Hours of Use.
>6 Hours	3	> 6 Hours of Use.
Maintenance Activity		
Type of Maintenance Activity		
Minor Disturbance	0	Minor Disturbance (e.g. possibility of contact when gaining access).
Low Disturbance	1	Low Disturbance (e.g. changing light bulbs in asbestos insulating ceiling).
Medium Disturbance	2	e.g. lifting one or two asbestos insulating board ceilings tiles to access a valve.
High Disturbance	3	e.g. removing a number of AIB's ceilings tiles to replace a valve or for recalling.
Freq of Maintenance Activity		
Unlikely	0	ACM Unlikely to be disturbed for maintenance.
>=1 per Year	1	=1 per Year.
> 1 per Year	2	> 1 per Year.
> 1 per Month	3	> 1 per Month.

APPENDIX A
ASBESTOS IN BUILDINGS MATERIALS AND PRIORITY ASSESSMENT SUMMARY

Project No. : ABP/1651/06/10/SDBB02GHT001			Asset Site: Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester			Date: 04/05/10			Lead surveyor: Mike Mackay			Second surveyor: Paul McAllister				Survey Type: Management					Sampling Strategy: HSG 264			
													Occupant Activity				Human Exposure Potential			Maintenance Activity			ACTION PLAN			
Asset No.	Sub/Asset Building	Area/Room Ref	Description	Sample No.	Photo no	Product Type (or debris from product)	Extent of Damage/Deterioration	Surface Treatment	Asbestos Type	Extent m² or LM	Total Score	Normal Occupant Activity	Location /Indoors/outdoors	Accessibility	Extent/Amount	Number of Occupants	Frequency of Use of Area	Average Time Area is in use	Type of Maintenance Activity	Frequency of Maintenance Activity	TOTAL PRIORITY ASSESSMENT SCORE	TOTAL MATERIAL & PRIORITY ASSESSMENT SCORE (RISK RATING)	Recommended Remedial Action Required (e.g. Mark and Manage, Encapsulation, Remove)	Prioritisation (based on the total material and priority assessment score)	Date of next inspection (Add date or frequency)
RISK ASSESSMENT OF COMBINED MATERIAL AND PRIORITY ASSESSMENT SCORES: 1 TO 4 = VERY LOW, 5 TO 8 = LOW, 9 TO 13 = MEDIUM, 14 TO 18 = HIGH, 19 TO 24 = VERY HIGH																								
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	2.01 Roof Void	Duraziasil Panels	Ref 10	20	2	0	2	1	20	5	1	1	1	2	0	0	0	0	0	2	7	Encapsulate	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	2.01 Roof Void	Duraziasil Panels on top of insulation	S.P.	21	2	1	2	1	1	6	1	1	1	1	0	0	0	0	0	2	8	Remove	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	2.01 Roof Void	Cement Sheeting to Roof	9	18	1	0	1	1	300	3	0	0	0	3	0	0	0	0	0	1	4	Mark And Manage	Very Low Risk	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	2.01 Roof Void	Insulation Panel and Debris to Door	10	19	2	3	3	1	2	9	1	1	1	1	0	0	0	0	0	2	11	Remove	Medium	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	2.01 Roof Void	Rope in switch box and for back packing	11	22	2	0	2	1	1	5	1	1	1	1	0	0	0	0	0	2	7	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	2.01 Roof Void	Cement Debris	Ref 09	24	1	2	0	1	1	4	1	1	1	1	0	0	0	0	0	2	6	Remove	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	2.01 Roof Void	Cement panel below wallway	Ref 09	25	1	0	0	1	80	2	1	1	1	2	0	0	0	0	0	2	4	Mark And Manage	Very Low Risk	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	2.01 Roof Void	Cement Fire Break	Ref 09	23	1	0	0	1	100	3	1	1	1	3	0	0	0	0	0	3	5	Mark And Manage	Low	

Project No. : ABP/1651/06/10/SDBB02GHT001			Asset Site: Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester			Date: 04/05/10			Lead surveyor: Mike Mackay			Second surveyor: Paul McAllister						Survey Type: Management			Sampling Strategy: HSG 264			
													Occupant Activity				Human Exposure Potential			Maintenance Activity			ACTION PLAN		
Asset No.	Sub-Assset Building	Area/Room Ref	Description	Sample No.	Photo no	Product Type (or debris from product)	Extent of Damage/Deterioration	Surface Treatment	Asbestos Type	Extent m² or LM	Total Score	Normal Occupant Activity	Location / Indoor/outdoors	Accessibility	Extent/Amount	Number of Occupants	Frequency of Use of Area	Average Time Area is in use	Type of Maintenance Activity	Frequency of Maintenance Activity	TOTAL PRIORITY ASSESSMENT SCORE	TOTAL MATERIAL & PRIORITY ASSESSMENT SCORE (RISK RATING)	Recommended Remedial Action Required (e.g. Mark and Manage, Encapsulation, Remove)	Prioritisation Based on the total risk/risk and priority assessment score)	Date of next inspection (Add date or frequency)
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.24 Store Room	Paper Lining to Pipework	1	1	2	2	2	1	2	7	1	2	1	2	0	1	0	1	1	4	11	Remove	Medium	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.23 Store Room	Cement Sleeve through ceiling	S.P.	2	1	0	1	1	1	5	1	2	0	0	0	1	0	0	0	2	5	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.23 Store Room	Insulation Panel to door X 2	2	3	2	1	1	1	4	9	1	2	2	1	0	1	0	2	0	4	9	Remove	Medium	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.22 Light Room	Cement Sleeve Through Ceiling X 3	S.P.	Ref 02	1	0	1	1	3	6	1	2	0		0	1	0	0	0	2	8	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.22 Light Room	A/B Panel to Door	Ref 02		2	1	1	1	2	7	1	2	0		0	1	0	2	0	3	10	Remove	Medium	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.21 Switch Room	A/B Panel to Door	Ref 02		2	0	1	1	2	6	1	2	2	2	0	1	0	2	0	4	10	Remove	Medium	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.21 Switch Room	Cement sleeve to ceiling onto roof	S.P.		1	0	1	1	1	4	1	2	0	2	0	1	0	0	0	3	7	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.20 Stair Well	No Asbestos Found								N/F										0				
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.08 Lobby	Fire Blanket	S.P.	9	2	0	0	1	1.5	3	0	1	1	1	0	0	0	0	0	1	4	Remove	Very Low Risk	

Project No. : ABP/1651/06/10/SDBB02GHT001			Asset Site: Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester			Date: 04/06/10			Lead surveyor: Mike Mackay			Second surveyor: Paul McAllister								Survey Type : Management			Sampling Strategy : HSG 264		
													Occupant Activity				Human Exposure Potential			Maintenance Activity			ACTION PLAN		
Asset No.	Sub-Asset/Building	Asset/Room Ref	Description	Sample No.	Photo no	Product Type (or debris from product)	Extent of Damage/Deterioration	Surface Treatment	Asbestos Type	Extent m² or LM	Total Score	Normal Occupant Activity	Location / Indoor/outdoors	Accessibility	Extent/Amount	Number of Occupants	Frequency of Use of Area	Average Time Area is in use	Type of Maintenance Activity	Frequency of Maintenance Activity	TOTAL PRIORITY ASSESSMENT SCORE	TOTAL MATERIAL & PRIORITY ASSESSMENT SCORE (TISK RATING)	Recommended Remedial Action Required (e.g. Mark and Manage, Encapsulation, Removal)	Prioritisation (based on the total material and priority assessment score)	Date of next inspection (Add date or frequency)
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.07 Shower	Gasket to Flange	Ref 04		2	0	0	1	0.5	3.5	1	1	0	1	0	0	0	0	0	2	5	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.06 W.C	Toilet Cistern	Ref 06		1	0	0	2	x1	3	1	1	2	1	0	0	0	0	0	2	5	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.05 Bathroom	Gasket to Flange	Ref 04		2	0	0	1	0.5	3.5	1	1	0	1	0	0	0	0	0	2	5	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.04 Lobby	No Asbestos Found								NAF										0				
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.03 Shower Room	Gasket to Flange	Ref 04		2	0	0	1	0.5	3.5	1	1	0	1	0	0	0	0	0	2	5	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.02 W.C	Toilet Cistern	6		1	0	0	2	x1	3	1	1	2	1	0	0	0	0	0	2	5	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	1.01 Bathroom	Gasket to Flange	Ref 04		2	0	0	1	0.5	3.5	1	1	0	1	0	0	0	0	0	2	5	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	027 Waiting Room	No Asbestos Found								NAF														
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	026 Kitchen	No Asbestos Found								NAF														

Project No. : ABP/1651/06/10/SDBB02GHT001			Asset Site: Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester			Date: 04/08/10			Lead surveyor: Mike Mackay			Second surveyor: Paul McAllister									Survey Type: Management		Sampling Strategy: HSG 264			
													Occupant Activity				Human Exposure Potential			Maintenance Activities			ACTION PLAN		
Asset No.	Sub-Assets/Building	Area/Room Ref	Description	Sample No.	Photo no	Product Type (or debris from product)	Extent of Damage/Deterioration	Surface Treatment	Asbestos Type	Extent m^2 or (LM)	Total Score	Normal Occupant Activity	Location / Indoor/outdoors	Accessibility	Extent/Amount	Number of Occupants	Frequency of Use of Area	Average Time Area is in use	Type of Maintenance Activity	Frequency of Maintenance Activity	TOTAL PRIORITY ASSESSMENT SCORE	TOTAL MATERIAL & PRIORITY ASSESSMENT SCORE (RISK RATING)	Recommended Remedial Action Required (e.g Mark and Manage, Encapsulation, Remove)	Prioritisation (based on the total material and priority assessment score)	Date of next inspection (Add date or frequency)
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G25 First Aid room	Textured coating to walls and ceiling	3	4						NAD										0				
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G19 Cleaners Cupboard	No Asbestos Found								NAF														
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G18 Lobby/foyer	Gasket to pipes x 8	4	5	2	0	0	1	2	3	1	2	1	1	1	1	0	0	0	3	8	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G18 Foyer	Textured coating to walls	As 3	-						NAD										0				
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G18 Foyer	Paper lining to pipes	As 1	-	2	0	1	1	5	4	1	1	1	2	0	0	0	0	0	2	6	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G17	Gasket to pipes	As 4	-	2	0	0	1	2	3	1	1	1	2	0	0	0	0	0	2	5	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G17	Textured coating to walls	Ref 3	-						NAD										0				
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G11 Stage	Textured coating to stage steps	Ref 3	-						NAD										0				
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G11 Stage	Cement panel above stage (fire break)	SP	6	1	0	0	1	1	2	1	1	1	3	0	0	0	0	0	3	5	Mark And Manage	Low	

Project No. : ABP/I651/06/10/SDBB02GHT001			Asset Site: Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester			Date: 04/06/10			Lead surveyor: Mike Mackay			Second surveyor: Paul McAllister								Survey Type: Management			Sampling Strategy: HSG 264		
													Occupant Activity				Human Exposure Potential			Maintenance Activity			ACTION PLAN		
Asset No.	Sub-Asset Building	Area/Room Ref	Description	Sample No.	Photo no	Product Type (or debris from product)	Extent of Damage/Deterioration	Surface Treatment	Asbestos Type	Extent m² or LM	Total Score	Normal Occupant Activity	Location (Indoors/outdoors	Accessibility	Extent Accessed	Number of Occupants	Frequency of Use of Area	Average Time Area is in use	Type of Maintenance Activity	Frequency of Maintenance Activity	TOTAL PRIORITY ASSESSMENT SCORE	TOTAL MATERIAL & PRIORITY ASSESSMENT SCORE (RISK RATING)	Recommended Remedial Action Required (e.g Mark and Manage, Encapsulation, Removal)	Prioritisation (based on the total material and priority assessment score)	Date of next inspection (MAX date or frequency)
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G11 Stage	Gasket to pipes	As 4	-	2	0	0	1	1	3	1	1	1	1	0	0	0	0	0	3	5	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G08 Stairwell all floors	No Asbestos Found								NAF														
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G14 Female WC	Gasket to pipes	As 4	-	2	0	0	1	1	3	1	1	1	1	0	0	0	0	0	3	5	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G14 Female WC	Paper lining to pipes	As 1	-	2	1	0	1	2	4	1	1	1	1	0	0	0	0	0	2	6	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G13 Lobby	Textured coating to walls and ceiling	As 3	-						NAD										0				
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G13 Lobby	Paper lining to pipe	As 1	-	2	1	0	1	5	4	1	1	0	0	0	0	0	0	0	1	5	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G13 Lobby	Gasket to pipes	As 4	-	2	0	0	1	0.5	3.5	1	1	0	0	0	0	0	0	0	1	5	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G12 Store Room	No Asbestos Found								NAF														
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G15 Male WC	Paper lining to pipe	As 1	-	2	1	0	1	2	4	1	1	0	0	0	0	0	0	0	1	5	Mark And Manage	Low	

Project No. : ABP/1651/06/10/SDBB02GHT001			Asset Site: Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester			Date: 04/09/10			Lead surveyor: Mike Mackay			Second surveyor: Paul McAllister						Survey Type: Management			Sampling Strategy: HSG 264			
													Occupant Activity			Human Exposure Potential			Maintenance Activity			ACTION PLAN			
Asset No.	Sub-Asset/Building	Area/Room Ref	Description	Sample No.	Photo no	Product Type (or debris/non product)	Extent of Damage/Deterioration	Surface Treatment	Asbestos Type	Extent m² or LM	Total Score	Normal Occupant Activity	Location / Indoors/outdoors	Accessibility	Extent/Amount	Number of Occupants	Frequency of Use of Area	Average Time Area is in use	Type of Maintenance Activity	Frequency of Maintenance Activity	TOTAL PRIORITY ASSESSMENT SCORE	TOTAL MATERIAL & PRIORITY ASSESSMENT SCORE (PAS/ RATING)	Recommended Remedial Action Required (e.g Mark and Manage, Encapsulation, Remove)	Prioritisation (based on the total material and priority assessment score)	Date of next inspection (At risk state or beginning)
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G15 Male WC	Gasket to pipes	As 4	-	2	0	0	1	2	3	1	1	0	0	0	0	0	0	0	1	4	Mark And Manage	Very Low Risk	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G16 Lobby	Gasket to pipes	As 4	-	2	0	0	1	0.5	3.5	1	1	0	0	0	0	0	0	0	1	5	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G23 Plant Room	No Asbestos Found								NAF														
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G22 Store Room	No Asbestos Found								NAF														
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G21 Under stairs store room	Paper lining to pipes	As 1	-	2	0	0	1	3	6	0	1	0	1	0	0	0	0	0	1	7	Mark And Manage	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G20 Under stage	Asbestos insulating panel to door and debris near door	6	7	2	3	2	1	1	6	1	1	0	1	0	0	0	0	0	2	10	Remove	Medium	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G29 Storeroom	Textured coating to walls and ceiling	As 3	-						NAD										0				
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G29 Storeroom	Paper lining to pipes	Rel 1		2	0	0	1	20	3	1	1	1	1	0	0	0	0	0	0	3	Mark And Manage	Very Low Risk	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	G28 Storeroom	Paper lining to pipes	As 1	-	2	0	0	1	4	3	1	1	1	1	0	0	0	0	0	2	5	Mark And Manage	Medium	

Project No. : ABP/1651/06/10/SDBB02GHT001			Asset Site: Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester			Date: 04/05/10			Lead surveyor: Mike Mackay					Second surveyor: Paul McAllister					Survey Type: Management				Sampling Strategy: HSG 264		
													Occupant Activity				Human Exposure Potential			Maintenance Activity			ACTION PLAN		
Asset No.	Sub-Asset Building	Area/Room Ref	Description	Sample No.	Photo no	Product Type (or debris from product)	Extent of Damage/Deterioration	Surface Treatment	Asbestos Type	Extent m² or LM	Total Score	Normal Occupant Activity	Location / Indoors/outdoors	Accessibility	Extent/Amount	Number of Occupants	Frequency of Use of Area	Average Time Area is in use	Type of Maintenance Activity	Frequency of Maintenance Activity	TOTAL PRIORITY ASSESSMENT SCORE	TOTAL MATERIAL & PRIORITY ASSESSMENT SCORE (RISK RATING)	Recommended Remedial Action Required (e.g. Mark and Manage, Encapsulation, Remove)	Prioritisation (based on the total material and priority assessment score)	Date of next inspection (Add date or frequency)
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	External EX01	Cement rain pipe and guttering	SP	9	1	0	1	1	22	3	0	0	1	2	0	0	0	0	0	1	4	Mark And Manage	Very Low Risk	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	External EX01	Cement debris to corner	SP	10	1	2	1	1	1	5	1	0	2	1	0	1	0	0	0	2	7	Remove	Low	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	EX02 Porch	Pipe lagging to elbow	7	11	3	3	3	1	0.5	10	1	0	2	1	0	1	0	0	0	2	12	Remove	Medium	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	EX02 Porch	Rope lagging wrapped around pipe lagging	9	12	2	2	2	1	0.5	7	1	0	2	1	0	1	0	0	0	2	9	Remove	Medium	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	External EX01	Cement guttering at high level	SP	13	1	0	1	1	10	3	0	0	1	1	0	0	0	0	0	1	4	Mark And Manage	Very Low Risk	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	EX02 Porch	Paper lining to pipe	As 1	14	2	2	2	1	1	7	1	0	1	1	0	0	0	0	0	2	9	Remove	Medium	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	EX03 Porch	Pipe lagging to elbow	As 7	15	3	3	3	1	1	10	1	0	1	1	0	0	0	0	0	2	12	Remove	Medium	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	EX03 Porch	Rope lagging wrapped around pipe lagging	As 8	16	2	2	2	1	0.5	7	1	0	1	1	0	0	0	0	0	2	9	Remove	Medium	
SDBB02GHT001	Building 1 Garrison Briefing Facility, St Davids Barracks, MOD Bicester	EX01	Cement face	SP	17	1	0	1	1	50	3	1	0	1	1	0	0	0	0	0	2	5	Mark And Manage	Low	

APPENDIX B RECOMMENDATIONS

Location	ACM	Recommended Actions
1.24 Store room	Paper lining to pipework	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.
1.23 Store room	Insulation panel to door x 2	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.
1.22 Light room	Asbestos Insulating board to door	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.
1.21 Store room	Asbestos Insulating board to door x 1	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.
G30 under stage	Asbestos insulating board panel and debris near door	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.
1.08 Lobby	Strongly Presumed – Blanket (fire)	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.
External EX01	Strongly Presumed - Cement debris to corner	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.

APPENDIX B RECOMMENDATIONS – Continued

Location	ACM	Recommended Actions
EX02 Porch	Pipe lagging to elbow	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.
EX02 Porch	Rope (wrapped around pipe lagging)	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.
EX02 Porch	Paper lining to pipe	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.
EX03 Porch	Pipe lagging to elbow	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.
EX03 Porch	Rope (wrapped around pipe lagging)	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.
2.01 Roof void	Insulating panel and debris (to door)	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.

APPENDIX B RECOMMENDATIONS – Continued

Location	ACM	Recommended Actions
2.01 Roof void	Strongly Presumed – Durasteel panel on top of ... insulation	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.
2.01 Roof void	Cement debris	Remove If any works are planned which may disturb this material, then it should be removed by suitably trained personnel and disposed of in accordance with the Hazardous Waste regulations.
2.01 Roof void	Durasteel panels	Encapsulate Encapsulate/ Enclose to seal the damaged/ bare sections; this should be undertaken by a Licensed Asbestos Removal Contractor. If any works are planned which may disturb this material, then it should be removed by a Licensed Asbestos Removal Contractor and disposed of in accordance with the Hazardous Waste regulations. And Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by a Licensed Asbestos Removal Contractor and disposed of in accordance with the Hazardous Waste regulations.
1.23 Store room	Strongly Presumed - Cement sleeve through ceiling to roof	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by a Licensed Asbestos Removal Contractor and disposed of in accordance with the Hazardous Waste regulations.
1.22 Light room	Cement sleeve through ceiling to roof x 3	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works

APPENDIX B RECOMMENDATIONS – Continued

Location	ACM	Recommended Actions
1.21 Store room	Strongly Presumed – cement sleeve to ceiling onto roof x 1	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works.
G18 Lobby/foyer	Gasket to pipes (x8)	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works
G18 Foyer	Paper lining to pipes	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by a Licensed Asbestos Removal Contractor and disposed of in accordance with the Hazardous Waste regulations.
G17	Gasket to pipes	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works
G11 Stage	Cement panel above stage (fire break)	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works

APPENDIX B RECOMMENDATIONS – Continued

Location	ACM	Recommended Actions
G11 Stage	Gasket to pipes	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works
G14 Female WC	Gasket to pipes	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works.
G14 Female WC	Paper lining to pipes	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by a Licensed Asbestos Removal Contractor and disposed of in accordance with the Hazardous Waste regulations.
G13 Lobby	Paper lining to pipe	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by a Licensed Asbestos Removal Contractor and disposed of in accordance with the Hazardous Waste regulations.
G13 Lobby	Gasket to pipes	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works

APPENDIX B RECOMMENDATIONS – Continued

Location	ACM	Recommended Actions
G15 Male WC	Paper lining to pipe	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by a Licensed Asbestos Removal Contractor and disposed of in accordance with the Hazardous Waste regulations.
G15 Male WC	Gasket to pipes	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works
G31 understairs store room	Paper lining to pipes	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by a Licensed Asbestos Removal Contractor and disposed of in accordance with the Hazardous Waste regulations.
G29 Store room	Paper lining to pipes	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by a Licensed Asbestos Removal Contractor and disposed of in accordance with the Hazardous Waste regulations.
G28 Store room	3m paper lining to pipes	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by a Licensed Asbestos Removal Contractor and disposed of in accordance with the Hazardous Waste regulations.

APPENDIX B RECOMMENDATIONS – Continued

Location	ACM	Recommended Actions
1.01	Gasket to flanges	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works
1.02	Toilet cistern	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works
1.03 Shower room	Gasket to flanges	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works
1.05	Gasket to flange	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works.
1.06 Toilet	Toilet cistern	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works

APPENDIX B RECOMMENDATIONS – Continued

Location	ACM	Recommended Actions
1.07 Shower	Gasket to flange	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works
External EX01	Strongly Presumed - Cement rain pipe and guttering	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works
EX01	Cement guttering at high level	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works
EX01	Strongly Presumed - Cement facia	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works
2.01 Roof void	Cement sheeting to roof	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works

APPENDIX B RECOMMENDATIONS – Continued

Location	ACM	Recommended Actions
2.01 Roof void	Rope (in switch box x 4) also used as backing packing	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by a Licensed Asbestos Removal Contractor and disposed of in accordance with the Hazardous Waste regulations.
2.01 Roof void	Cement panel below walkway	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works
2.01 Roof void	Cement fire break	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works
EX01 External	Strongly Presumed - Cement cowls x 5 on roof top	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works
EX01 External	Strongly Presumed - Cement facia to roof	Mark and manage Reinspect every 12 months to monitor condition by a competent person. If any works are planned which may disturb this material, then it should be removed by suitably trained operatives and disposed of in accordance with the Hazardous Waste regulations. The utilization of a Licensed Asbestos Removal Contractor is not required for the above works

APPENDIX C

CERTIFICATES OF BULK ANALYSIS

Bulk Sampling and Identification

Bulk samples, where taken, were labelled, double bagged and analysed by a laboratory accredited by UKAS to BS EN ISO/IEC 17025 using plane and polarised light microscopy and dispersion staining techniques, as outlined in accordance with the *HSE's Asbestos: Analysts' guide for sampling, analysis and clearance procedures.(HSG248)*

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Your Ref: ABP/1651
Date: 08 June 2010

ASBESTOS FIBRE IDENTIFICATION REPORT

CLIENT: Asbestos Building Projects Ltd
Office 209, Fourelle House, Central Crescent, Marchwood Industrial Park, Marchwood, Southampton, SO40 4BJ

SITE ADDRESS: Garrison Briefing Centre/Theatre, MOD Bicester

SAMPLED BY: Client

DATE SAMPLED/RECEIVED: 07 June 2010

DATE ANALYSED: 07 June 2010

ANALYST: R. Mazzaino

ANALYTICAL PROCEDURE

Fibre identification was carried out in accordance with the documented 'in house' methods based on the HSE Guidance Note HSG 248. These employed stereo microscopy, polarised microscopy and dispersion staining techniques.

RESULTS

Sample No	Sample Ref.	Location	Asbestos Detected	Asbestos Type
1	1002973 1 FI	1.24. Paper lagging.	Yes	Chrysotile
2	1002973 2 FI	1.23. Insulation board door panel.	Yes	Chrysotile
3	1002973 3 FI	G.25. Textured coating.	No	
4	1002973 4 FI	G.18. Foyer. Gasket.	Yes	Chrysotile
5	1002973 5 FI	Beneath stage. Loose insulation board.	Yes	Chrysotile
6	1002973 6 FI	1.02. Cistern.	Yes	Amosite

NOTES:

1-Sample(s) were examined for the presence of 6 types of asbestos fibre: crocidolite (blue), amosite (brown), chrysotile (white), anthophyllite, actinolite, and tremolite.

2-Samples collected by the client are evaluated using information provided by the client. For samples collected by the client the date of receipt is deemed to be the same as the date sampled.

3-Envirochem is a UKAS accredited laboratory for sampling and identification of asbestos containing materials.

4-Comments, observations and opinions are outside the scope of UKAS accreditation.

5-The analytical method as the HSG248 does not quantify the amount of asbestos present, therefore UKAS accreditation does not permit quantification.

6-If, during fibre identification, only 1 or 2 fibres are seen and identified as asbestos, then the term 'trace asbestos identified' is used.

SIGNATURE: v.macdonald

(Authorised signatory)

PRINT NAME: Vicki Macdonald

Reg. No. 2378228 England. Registered Office: Envirochem, 12 The Gardens, Broadcut, Fareham, Hampshire, PO16 8SS.

ENVIROCHEM
Analytical Laboratories Ltd.
12 The Gardens
Broadcut, Fareham
Hampshire
PO16 8SS

Tel: (01329) 287777
Fax: (01329) 287755
www.envirochem.co.uk
office@envirochem.co.uk

UKAS TESTING 1227

Our Ref: 1002973 FI 11
Your Ref: ABP/1651
Date: 08 June 2010

ASBESTOS FIBRE IDENTIFICATION REPORT

CLIENT: Asbestos Building Projects Ltd
Office 209, Foxcelle House, Central Crescent, Marchwood Industrial Park, Marchwood, Southampton, SO40 4BJ

SITE ADDRESS: Garrison Briefing Centre/Theatre, MOD Bicester

SAMPLED BY: Client

DATE SAMPLED/RECEIVED: 07 June 2010

DATE ANALYSED: 07 June 2010

ANALYST: R. Mazzaoui

ANALYTICAL PROCEDURE

Fibre identification was carried out in accordance with the documented 'in-house' methods based on the HSE Guidance Note HSG 248. These employed stereo microscopy, polarized microscopy and dispersion staining techniques.

RESULTS

Sample No	Sample Ref.	Location	Asbestos Detected	Asbestos Type
7	1002973 7 FI	Ex.02. Pipe lagging	Yes	Chrysotile
8	1002973 8 FI	Ex.02. Rope pipe lagging	Yes	Chrysotile
9	1002973 9 FI	2.01. Roof void. Cement	Yes	Chrysotile
10	1002973 10 FI	2.01. Roof void. Insulation board	Yes	Chrysotile
11	1002973 11 FI	2.01. Roof void. Rope to elevated boxing.	Yes	Chrysotile

NOTES:

1-Sample(s) were examined for the presence of 6 types of asbestos fibre: crocidolite (blue), amosite (brown), chrysotile (white), anthophyllite, actinolite, and tremolite.

2-Samples collected by the client are evaluated using information provided by the client. For samples collected by the client the date of receipt is deemed to be the same as the date sampled.

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4-Comments, observations and opinions are outside the scope of UKAS accreditation.

5-The analytical method in the HSG 248 does not quantify the amount of asbestos present, therefore UKAS accreditation does not permit quantification.

6-If, during fibre identification, only 1 to 2 fibres are seen and identified as asbestos, then the term 'trace asbestos identified' is used.

SIGNATURE: v.macdonald Vicki Macdonald

(Authorised signatory)

PRINT NAME:

Reg. No: 2375228 England. Registered Office: Envirochem, 12 The Gardens, Broadcut, Fareham, Hampshire, PO16 8SS.

APPENDIX D

MANAGEMENT PLAN GUIDANCE

The asbestos materials assessments produced from the survey, as presented in this report, should be developed into a risk assessment which can then formulate the basis of the management plan, required under Regulation 4 of the Control of Asbestos Regulations 2006.

A priority assessment on each confirmed or presumed case of asbestos should be made.

B.1 Priority Assessment

A priority assessment assesses the likelihood of asbestos containing materials being disturbed, taking into account the following:

i. Routine maintenance work
ii. Planned refurbishment work
iii. Potential for disturbance
iv. Potential for human exposure
v. Activity from occupants or visitors to the building.

Whilst ABP Associates Limited will have obtained certain relevant information in order to assist in the compilation of the assessment, it remains the duty of the client under Control of Asbestos Regulations 2006, to ensure the full implementation of the assessment.

ABP Associates Limited is willing to provide further assistance to the client in preparing a detailed and accurate assessment on behalf of and/or in conjunction with the client.

For further information please contact:

Name: Richard Pomeroy (Director)
Office Tel. No. 02380 866888
Mobile Tel. No: 07745 728951
info@abp.uk.com

ABP Associates Limited has recorded the likelihood of disturbance to the asbestos containing materials with consideration given to the normal activities within the building at the time of the survey. This information is contained within the asbestos materials assessments in *Appendix A*.

B.2 Management Plan

On completion of the risk assessments, the management plan should then be developed in order to control the risk to occupants and visitors to the building.

The management plan will include the following:

1. Specific details of the location and condition of known or presumed asbestos containing materials, and in what way they are recorded and updated as required, (refer to materials assessment).

2. Priority/risk assessments and scores.

3. A list of action priorities.

4. Options regarding the management of asbestos containing materials would be, repair, encapsulate or removal. These decisions will be dependent on the risk of exposure to airborne asbestos fibres and as such consideration must be given to the activities carried out within the building and the proximity of the asbestos. These arrangements must be made in order to ensure compliance with the Control of Asbestos Regulations 2006, etc.

5. Timescales for implementation of the management plan.

6. Arrangements to inspect asbestos containing materials at least on a 12 monthly basis and more frequent dependent on certain situations.

7. Information to employers and employees own responsibilities.

8. Training of employees/management.

9. Appropriate planning to implement policies.

10. Protocol to ensure provision of information to all relevant bodies.

11. Infrastructure within the company regarding persons responsible for the monitoring and /or amendments of the plan.

12. Agreed periodic review of the plan.

APPENDIX E
PHOTOGRAPHS

Photo 1 – 1.24 Store Room – Sample 1: Paper lining to pipework – Chrysotile

Photo 2 – 1.23 Store Room – Strongly Presumed asbestos to cement sleeve through ceiling to roof

Photo 3 – 1.23 Store Room – Sample 2: Insulation panel to door x2 – Chrysotile

Photo 4 – 1.20 Stairwell – Sample 3: Non-asbestos textured coating to walls and ceiling

Photo 5 – G18 Lobby/foyer – Sample 4: Gasket to pipes (x8) - Chrysotile

Photo 6 – G11 Stage – Strongly Presumed asbestos to cement panel above stage (fire break)

APPENDIX E
PHOTOGRAPHS – Continued

Photo 7 – G30 under stage – Strongly Presumed Asbestos insulating board panel and debris near door

Photo 8 – 1.08 Lobby – Strongly Presumed asbestos blanket (fire)

Photo 9 – External EX01 – Strongly Presumed cement rain pipe and guttering

Photo 10 – External EX01 – Strongly Presumed cement debris to corner

Photo 11 – EX02 Porch – Sample 7: Pipe lagging to elbow – Chrysotile

Photo 12 – EX02 Porch – Strongly Presumed asbestos to rope (wrapped around pipe lagging)

APPENDIX E
PHOTOGRAPHS – Continued

Photo 13 – EX01 – Strongly Presumed asbestos to cement guttering at high level

Photo 14 - EX02 Porch – As Sample 1: Paper lining to pipe - Chrysotile

Photo 15 – EX03 Porch – As Sample 7: Pipe lagging to elbow – Chrysotile

Photo 16 – EX03 Porch – As Sample 8: Rope (wrapped around pipe lagging) – Chrysotile

Photo 17 – EX01 – Strongly Presumed asbestos to cement facia

Photo 18 – 2.01 Roof Void – Sample 9: Cement sheeting to roof – Chrysotile

APPENDIX E
PHOTOGRAPHS – Continued

Photo 19 – 2.01 Roof Void – Sample 10: Insulation panel and debris to door – Chrysotile

Photo 20 – 2.01 Roof Void – As Sample 10: Durasteel panels – Chrysotile

Photo 21 – 2.01 Roof Void – Strongly Presumed asbestos to Durasteel panel on top of 2m insulation

Photo 22 – 2.01 Roof Void – Sample 11: Rope (in switch box x4) also used as backing packing

Photo 23 – 2.01 Roof Void – Sample 11: Rope (in switch box x4) also used as backing packing

Photo 24 – 2.01 Roof Void – As Sample 9: Cement debris – Chrysotile

APPENDIX E
PHOTOGRAPHS – Continued

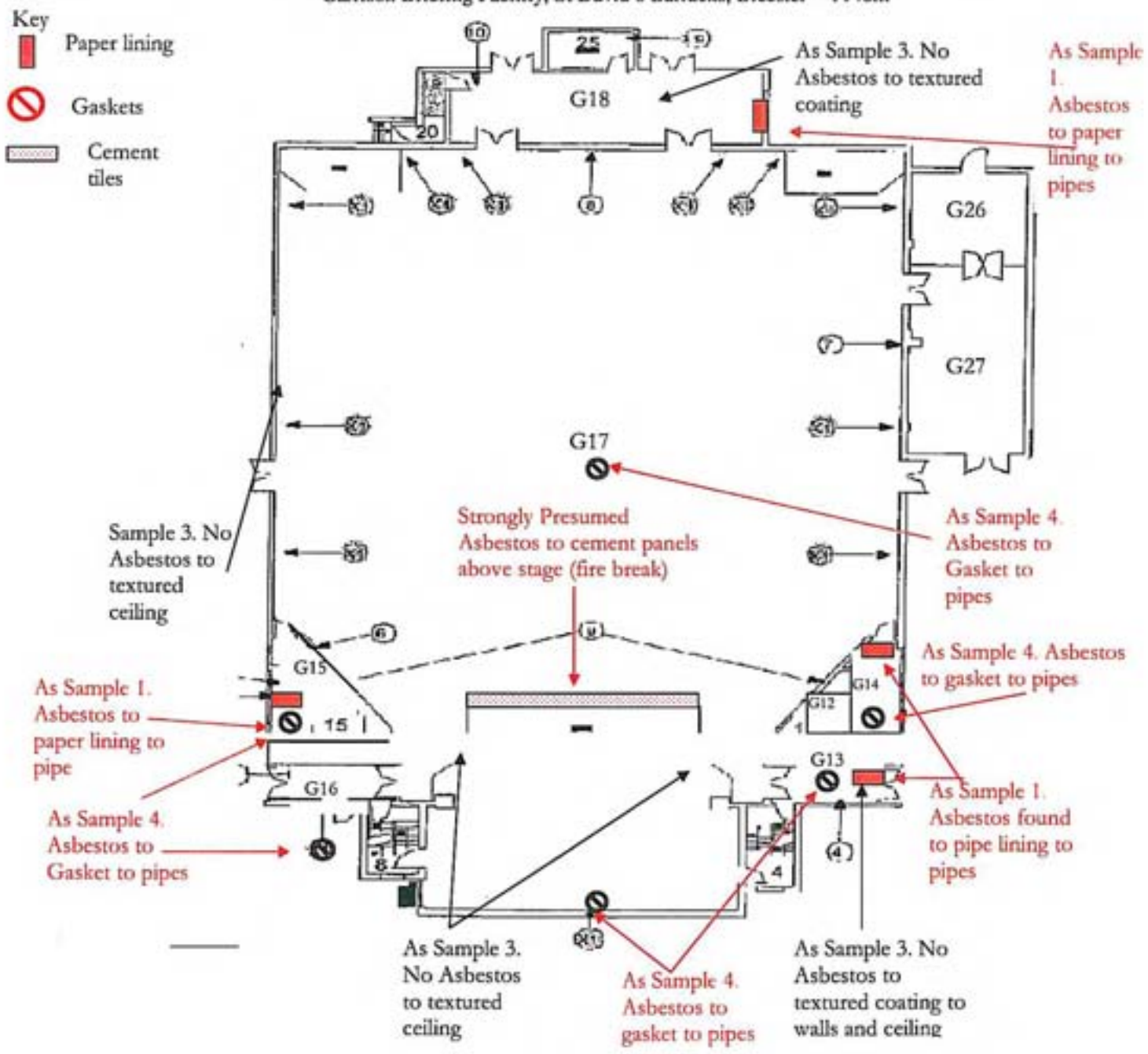
Photo 25 – 2.01 Roof Void – As Sample 9:
Cement panel below walkway – Chrysotile

Photo 26 – EX01 External – Strongly
Presumed asbestos to cement cowls x5 on roof top

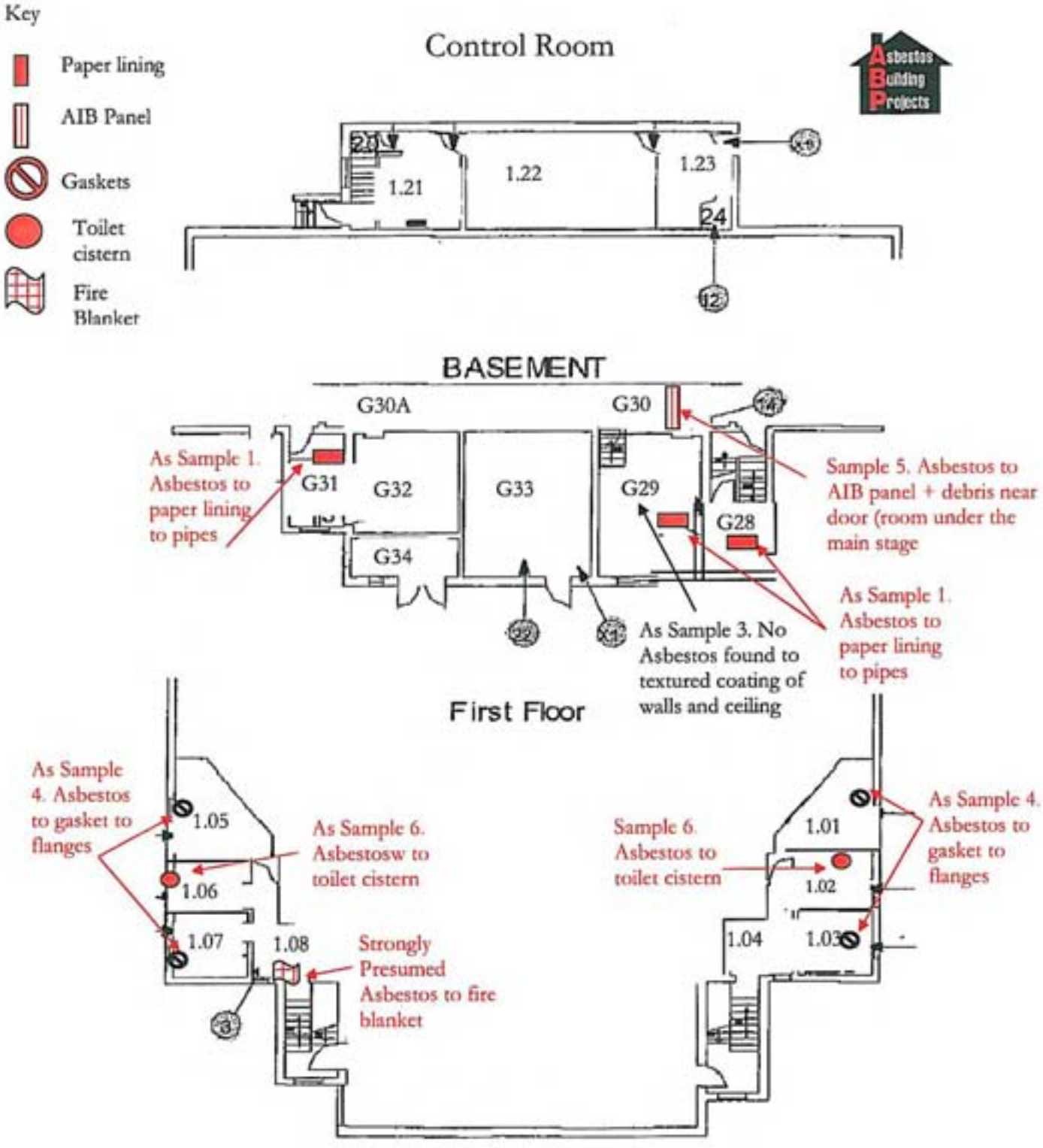
Photo 27 – EX01 External – Strongly
Presumed cement facia to roof

APPENDIX F - SITE DRAWING – NOT TO SCALE

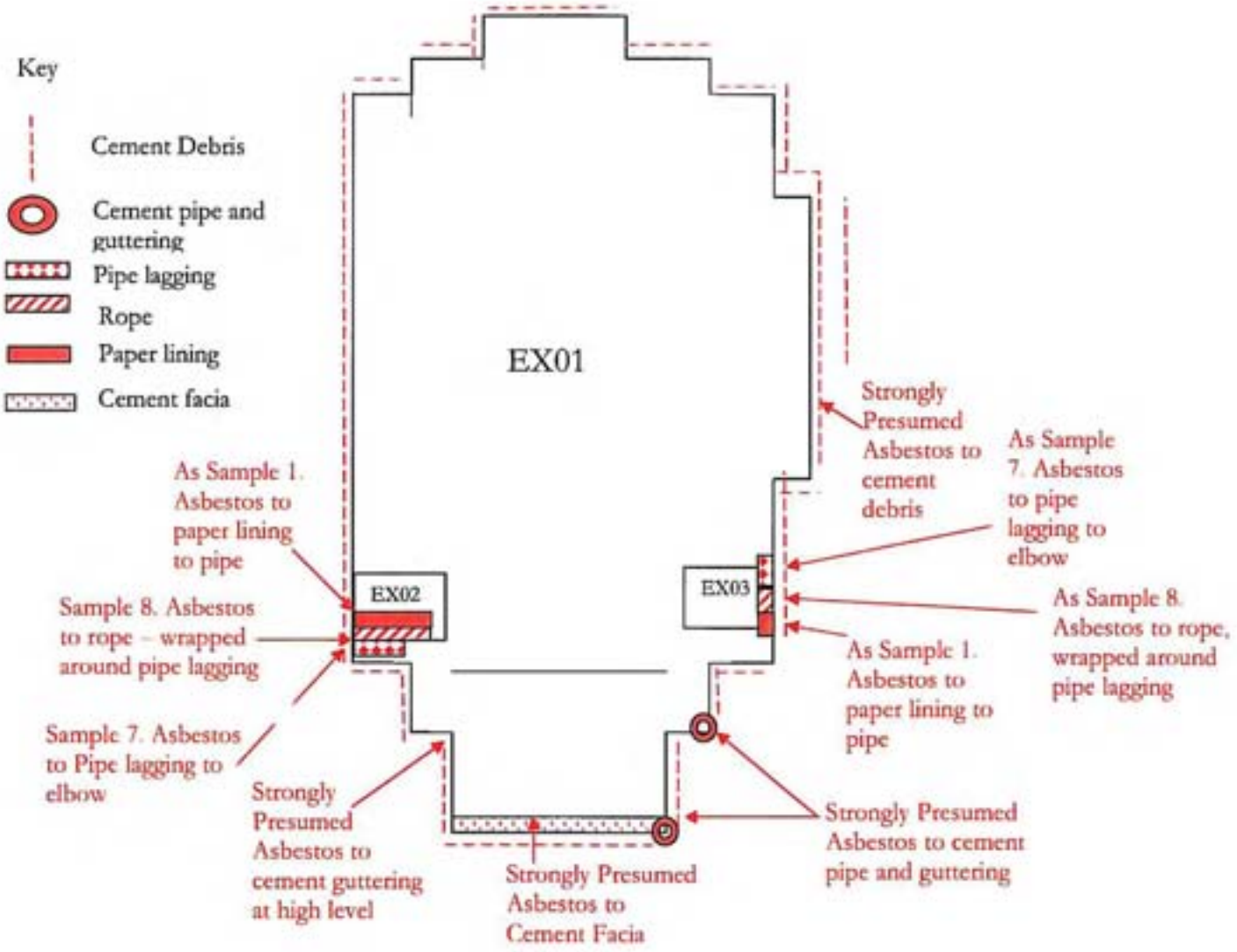
Garrison Briefing Facility, St David's Barracks, Bicester - 1140m²



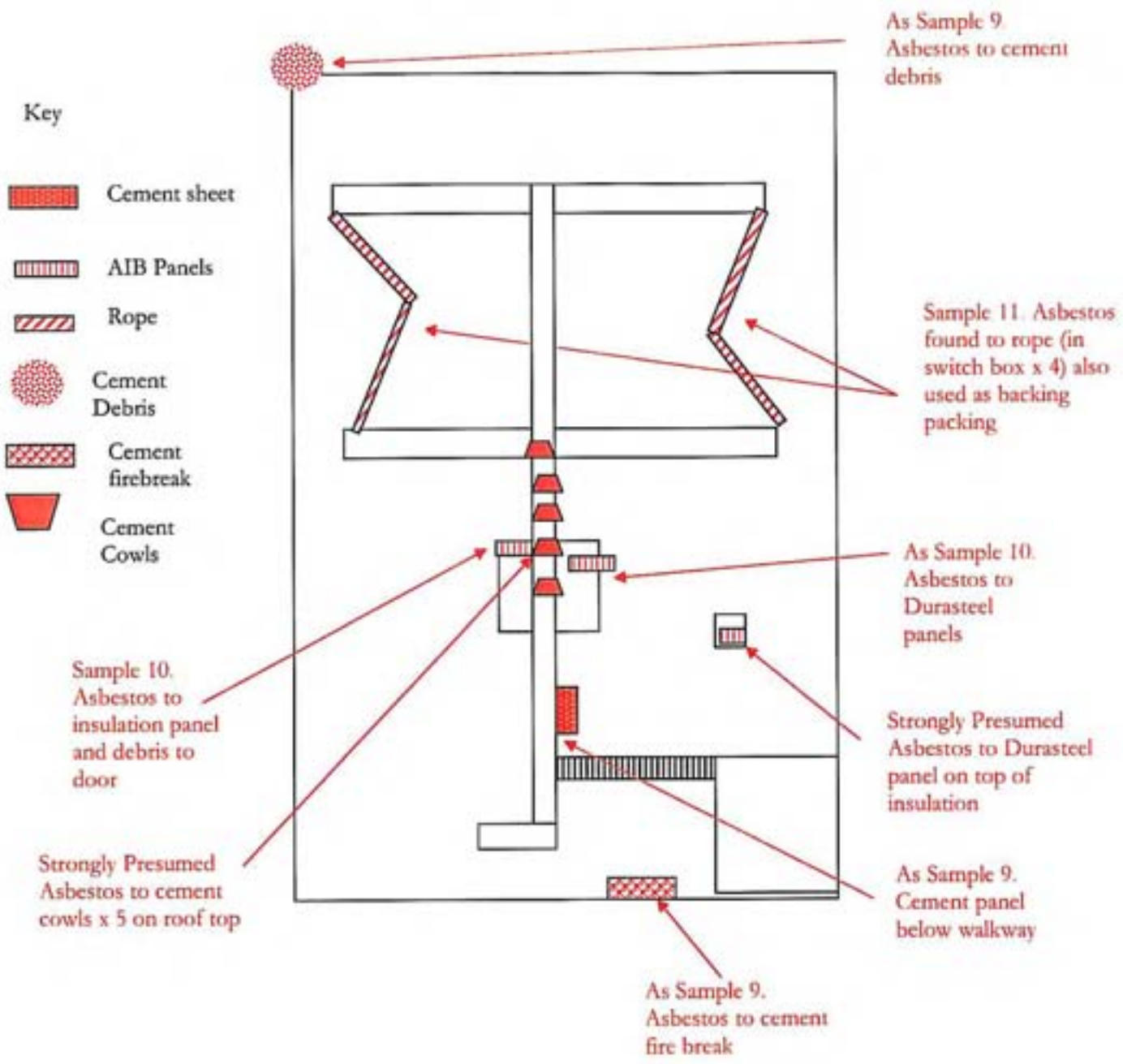
Ground Floor Plan


Key
Paper lining
AIB Panel
Gaskets
Toilet cistern
Fire Blanket
Control Room
Asbestos Building Projects
1.21
1.22
1.23
24
BASEMENT
G30A
G30
G31
G32
G33
G29
G28
G34
As Sample 1. Asbestos to paper lining to pipes
Sample 5. Asbestos to AIB panel + debris near door (room under the main stage
As Sample 1. Asbestos to paper lining to pipes
As Sample 3. No Asbestos found to textured coating of walls and ceiling
First Floor
As Sample 4. Asbestos to gasket to flanges
1.05
As Sample 6. Asbestosw to toilet cistern
1.06
1.07
1.08
Strongly Presumed Asbestos to fire blanket
Sample 6. Asbestos to toilet cistern
1.01
1.02
1.04
1.03
As Sample 4. Asbestos to gasket to flanges

External Floor Plan



Rood Void


Key
Cement sheet
AIB Panels
Rope
Cement Debris
Cement firebreak
Cement Cowls
As Sample 9 Asbestos to cement debris
Sample 11. Asbestos found to rope (in switch box x 4) also used as backing packing
As Sample 10. Asbestos to Durasteel panels
Sample 10. Asbestos to insulation panel and debris to door
Strongly Presumed Asbestos to Durasteel panel on top of insulation
Strongly Presumed Asbestos to cement cowls x 5 on roof top
As Sample 9. Cement panel below walkway
As Sample 9. Asbestos to cement fire break

APPENDIX B

RECOMMENDATIONS

No asbestos containing materials (ACMs) were found during this survey; however please refer to section 3.3 for restrictions & limitations.

APPENDIX C

CERTIFICATES OF BULK ANALYSIS

Bulk Sampling and Identification

Bulk samples, where taken, were labelled, double bagged and analysed by a laboratory accredited by UKAS to BS EN ISO/IEC 17025 using plane and polarised light microscopy and dispersion staining techniques, as outlined in accordance with the *HSE's Asbestos: Analysts' guide for sampling, analysis and clearance procedures.(HSG248)*

UKAS INSPECTION
402

www.abp.uk.com

HSG 264
MANAGEMENT ASBESTOS SURVEY REPORT
AND
MATERIALS ASSESSMENT

CLIENT
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Building 001
Bicester
OX25 1PN

SURVEY SITE
Building SDBB02GHT002 Portakabin WC Adjacent Briefing Centre
St David's Barrack
RAF Bicester

Report Author
Mike Mackay

Technical Reviewer
Sara Mason

Project No.
ABP/1651/06/10/SDBBO2GHT002
Report 1 (Revision 0)
Report Issue Date: 27/08/10

ABP Associates Ltd is a UKAS Accredited Inspection Body for the Surveying of Asbestos in Premises
ABP Associates Ltd is a UKATA Registered Member
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CONTENTS

1.0 INTRODUCTION

1.1 Client Instructions

ABP Associates Limited was instructed by Interserve Defence Ltd, to undertake a Management survey as defined in HSG 264 "Asbestos: The survey guide", at Building SDBB02GHT002 Portakabin WC Adjacent Briefing Centre, St David's Barrack, RAF Bicester.

The survey comprised of the following buildings;
Building SDBB02GHT002 Portakabin WC Adjacent Briefing Centre, St David's Barrack, RAF Bicester (Asset tag: SDBBO2GHT002) – Approx 15m^2

The survey was to ascertain if asbestos containing materials (ACM) were present and to report the condition in order for the managers of the building to produce a management plan. In additional to the material assessment, ABP were requested to conduct a priority risk assessment for each ACM located during the survey. This is based on the observations of the surveyor at the time of the survey. The priority assessment used is the Interserve developed system.

Completing the priority risk assessment is outside of the scope of ABP's UKAS accreditation.

Survey works were undertaken on 29/06/10 by Mike Mackay. This was carried out in accordance with the requirements of the Control of Asbestos Regulations 2006 and HSG 264.

Any relevant parties, prior to building works of any description commencing, should consult this report.

It is also absolutely essential that any users of this report appreciate that this report **cannot** serve as an exhaustive account of asbestos containing materials throughout the site. Moreover, given the way in which asbestos containing materials (ACM) were used in building constructions, certain ACM may only be detected during the course of major refurbishment or demolition works.

ABP Associates Ltd is a Type C Inspection Body accredited by UKAS (United Kingdom Accreditation Service) to BS EN ISO/IEC 17020:2004 for the *Surveying of Asbestos in Premises*.

It is now mandatory for all persons carrying out work, or organising such work, on buildings constructed prior to 2000 to have asbestos awareness training provided by a competent person / organisation.

1.2 ABP Contact Points

In the event of any queries regarding this report please contact the report author at:

T 02380 866888
F 02380 668549
info@abp.uk.com

2.0 MANAGEMENT SUMMARY

2.1 Asbestos Materials Summary

No asbestos containing materials (ACMs) were found during this survey; however please refer to section 3.3 for restrictions & limitations.

2.2 Areas surveyed – No asbestos found.

Ground Floor	External
G01 Ladies WC	EX01 Main
G02 Men's WC	

2.3 General Building Description

Portacabin – WC facility

2.4 Non-accessed Locations and items

All reasonably accessible areas of the premises were accessed (see Section 3.3 for limitations).

3.0 SCOPE OF SURVEY

3.1 Scope of works

A Management Survey was carried out in accordance with HSG 264. This survey report details all areas that were accessed and also lists all known areas where access was not possible at the time of the survey.

It should be assumed that any areas not referred to specifically in this report, have **not** been inspected and therefore any users of this report must presume such areas as containing asbestos. Furthermore, any such areas should be surveyed prior to work of any description, taking place. Survey works were carried out with due diligence and every endeavour was made to obtain access and determine asbestos (or presumed asbestos) materials, so far as is reasonably practicable.

3.2 Objectives

The objectives of the survey were to:

i. Locate and record the extent and product type of any presumed or known asbestos containing materials, as far as reasonably practicable.

ii. Inspect and record information on the accessibility, condition and surface treatment of any presumed or known asbestos containing materials.

iii. Determine and record the asbestos type by collecting a reasonable number of representative bulk samples, or by making a presumption based on the product type, general appearance, age of building etc.

iv. To establish the potential for any types of asbestos containing materials (known or presumed), to release airborne asbestos fibres by the application of the points scoring system in the standard algorithm as detailed in HSG 264.

Asbestos containing materials, whether confirmed by analysis, presumed or strongly presumed are recorded in Appendix A.

3.3 Survey Restrictions and Limitations

The following is a site specific guide, as agreed with the client prior to the survey being undertaken, regarding the various restrictions and limitations connected with this asbestos management survey and should be consulted by users of this report.

Areas, which were not inspected during the management survey unless otherwise stated in the scope of works, include:

1. Inside boilers and concealed panels or insulation behind boilers
2. Live plant, machinery, other similar equipment or installations etc.
3. Air handling units, ducting systems etc.
4. Fixed ceilings (nail fixed tiles), cladding, tongue and groove tiles.
5. Areas containing chemical/biological hazards etc.
6. Service risers/ducts, blocked and inaccessible etc.
7. Nail cavities.
8. Permanently blocked or bricked voids, ducts, cavities etc.
9. Beneath fitted carpets.
10. Live heating appliances.
11. Confined spaces.
12. Roof voids / spaces without adequate crawl / walk boards or where the sheer quantity of stored items prevents access.
13. Unsafe building structures.
14. Contaminated areas.
15. Beneath PVC soffits and fascias (original Asbestos Cement or Asbestos Insulating Board soffits may have been boarded over and therefore concealed).
16. Insulation to live electrical cables.
17. Behind built in cupboards.
18. Beneath floorboards.
19. Within fire doors.
20. Areas concealed behind suspected ACMs, where further investigation will disturb the suspected ACMs.
21. Behind facades (e.g. interlocking concrete tiles).
22. Beneath non-asbestos insulation in good condition.
23. Any other concealed locations where gaining access would cause damage.

Where an area has been previously stripped of asbestos i.e. plant rooms, ducts, etc. and new coverings added, it must be pointed out that asbestos removal operations have improved steadily over the years; improved techniques and more stringent guidance and legislation. Most recent has been the Control of Asbestos Regulations 2006, laying down certain enforceable guidelines. Asbestos removal prior to this regulation would not be of today's standard and therefore debris and residues may be present below new coverings. Every effort will be made to discover if asbestos debris is present. However, a more intrusive survey (Refurbishment/demolition) may be required to fully investigate the extent of possible contamination.

APPENDIX A

ASBESTOS IN BUILDINGS SURVEY – MATERIALS ASSESSMENT ALGORITHM

Asbestos Materials Assessment Algorithm

The Materials Assessment takes into account the type and condition of the ACM and the ease with which it releases fibres if disturbed. Each of the parameters given below have been recorded during the survey.

Product type or debris from product	1 (Low) 2 (Medium) 3 (High)	Composites (plastics, resins, mastics, roofing felts, vinyl floor tiles, paints, decorative finishes, cement etc. AIB, textiles, gaskets, ropes, paper etc. Lagging, spray coatings, loose asbestos etc.
Damage/Deterioration	0 (None) 1 (Low) 2 (Medium) 3 (High)	No visible damage Few scratches / marks, broken edges etc. Significant breakage of non-friable materials or several small areas of damage to friable material. High damage / visible debris.
Surface Treatment	0 (None) 1 (Low) 2 (Medium) 3 (High)	Non-friable composite asbestos / encapsulated cement Enclosed sprays / lagging / board / or bare cement. Bare AIB or encapsulated lagging / spray. Unsealed lagging / spray.
Asbestos Type	NAD 1 2 3	No asbestos detected (NAD) Chrysotile Other Crocidolite
ID level **(Level of Identification)**	ID P SP A	Identified by Laboratory analysis Presumed Strongly presumed Analysed
Rmd **(Recommendation)**	E R MM None/Other	Encapsulate Remove Mark and manage No recommendations required, Other recommendations made (specify)

Materials Assessment Score	Risk of Fibre Release
10, 11, 12	High Risk
7, 8, 9	Medium Risk
5, 6	Low Risk
2, 3, 4	Very Low Risk

The total score is calculated from the sum of the score for product type, damage, surface treatment and asbestos type and the potential for releasing fibres is assigned as detailed below.

The Materials Assessment score has been calculated for each ACM identified and the degree of risk from the material assessment alone is included in this appendix.

Attention is drawn to all occurrences of asbestos identified with a score of **10** or above. Asbestos materials within the aforementioned scoring category will, in most cases, require remedial work.

Interserve Priority Risk Assessment

The priority risk assessments in this report are taken from the Interserve rating system below. Each category is averaged to produce a priority risk assessment score which is combined with the material assessment score to determine the action required as part of the management plan.

Recommendations - Priority Assessment

Normal occupant activity		
Main type of Activity		
Rare disturbance activity	0	Rare disturbance activity (e.g. little used store room) .
Low disturbance activities	1	Low disturbance activities (e.g. office type activity).
Periodic disturbance	2	Periodic disturbance (e.g. industrial or vehicular activity which may contact ACMs).
High levels of disturbance	3	e.g. fire door with asbestos insulating board sheet in constant use.
Secondary activities for area		
Rare disturbance activity	0	Rare disturbance activity (e.g. little used store room).
Low disturbance activities	1	Low disturbance activities (e.g. office type activity).
Periodic disturbance	2	Periodic disturbance (e.g. industrial or vehicular activity which may contact ACMs).
High levels of disturbance	3	e.g. fire door with asbestos insulating board sheet in constant use.
Likelihood of Disturbance		
Location		
Outdoors	0	Outdoors.
Large rooms	1	Large rooms or well-ventilated Areas.
Rooms up to 100m³	2	Rooms up to 100m³.
Confined Spaces	3	Confined Spaces.
Accessibility		
Usually inaccessible	0	Usually inaccessible or unlikely to be disturbed.
Occasionally	1	Occasionally likely to be disturbed.
Easily disturbed	2	Easily disturbed.
Routinely disturbed	3	Routinely disturbed.
Extend/Amount		
Small Amounts	0	Small Amounts or Items (e.g. strings, gaskets).
<=10	1	=10m² or =10m pipe run.
>10 to <=50	2	>10m² to =50m² or >10m to =50m pipe run.
>50	3	>50m² or >50m pipe run.
Human exposure Potential		
Number of Occupants		
None	0	No Occupants.
1 to 3	1	1 to 3 Occupants.
4 to 10	2	4 to 10 Occupants.
> 10	3	> 10 Occupants.
Frequency of Use		
Infrequent	0	Infrequent Use.
Monthly	1	Used on a Monthly Basis.
Weekly	2	Used on a Weekly Basis.
Daily	3	Used on a Daily Basis.
Average Use Time		
<1 Hour	0	< 1 Hour of Use.
>1 to <3 Hours	1	> 1 to < 3 Hours of Use.
>3 to <6 Hours	2	> 3 to < 6 Hours of Use.
>6 Hours	3	> 6 Hours of Use.
Maintenance Activity		
Type of Maintenance Activity		
Minor Disturbance	0	Minor Disturbance (e.g. possibility of contact when gaining access).
Low Disturbance	1	Low Disturbance (e.g. changing light bulbs in asbestos insulating ceiling).
Medium Disturbance	2	e.g. lifting one or two asbestos insulating board ceilings tiles to access a valve.
High Disturbance	3	e.g. removing a number of ACB's ceilings tiles to replace a valve or for recalling.
Freq of Maintenance Activity		
Unlikely	0	ACM Unlikely to be disturbed for maintenance.
>=1 per Year	1	=1 per Year.
> 1 per Year	2	> 1 per Year.
> 1 per Month	3	> 1 per Month.

APPENDIX A
ASBESTOS IN BUILDINGS MATERIALS AND PRIORITY ASSESSMENT SUMMARY

Project No. : ABP/29/06/10/SDBB02GHT002			Asset Site: Building SDBB02GHT002 Portakabin WC Adjacent Briefing Centre, St David's Barrack, RAF Brawdy.			Date: 29/06/10			Lead surveyor: Mike Mackay			Second surveyor: Janine Fella				Survey Type: Management				Sampling Strategy: HSG 264			
													Occupant Activity				Human Exposure Potential			Maintenance Activity			ACTION PLAN			
Asset No.	Sub-Area/Building	Area/Room Ref	Description	Sample No.	Photo no	Product Type (or debris from product)	Extent of Damage/Deterioration	Surface Treatment	Asbestos Type	Extent m² or LM	Total Score	Normal Occupant Activity	Location / Indoor/outdoors	Accessibility	Extent/Amount	Number of Occupants	Frequency of Use of Area	Average Time Area is in use	Type of Maintenance Activity	Frequency of Maintenance Activity	TOTAL PRIORITY ASSESSMENT SCORE	TOTAL MATERIAL & PRIORITY ASSESSMENT SCORE (RISK RATING)	Recommended Remedial Action Required (e.g. Mark and Manage, Encapsulation, Remove)	Prioritisation (based on the total material and priority assessment score	Date of next inspection (Add date or frequency)
RISK ASSESSMENT OF COMBINED MATERIAL AND PRIORITY ASSESSMENT SCORES: 1 TO 4 = VERY LOW, 5 TO 8 = LOW, 9 TO 13 = MEDIUM, 14 TO 18 = HIGH, 19 TO 24 = VERY HIGH																								
SDBB02GHT002	Portakabin WC Adjacent Briefing Centre, St David's Barrack, RAF Brawdy	G.01 Ladies W.C	No asbestos found.								NAT													
SDBB02GHT002	Portakabin WC Adjacent Briefing Centre, St David's Barrack, RAF Brawdy	G.02 Gents W.C	No asbestos found.								NAT													
SDBB02GHT002	Portakabin WC Adjacent Briefing Centre, St David's Barrack, RAF Brawdy	EX01 Main	Textured Coating to External Wall	1	1	0	0	0	0	50M2	NAT	0	0	0	0	0	0	0	0	0	0	0	None	None	

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1227

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Fax: (01329) 287755
www.envirochem.co.uk
office@envirochem.co.uk

Our Ref: 1004549 Fl 1
Your Ref: ABP/1651
Date: 8 July 2010

ASBESTOS FIBRE IDENTIFICATION REPORT

Client: Asbestos Building Projects Ltd
Office 209, Fourelle House, Central Crescent, Marchwood Industrial Park, Marchwood, Southampton, SO40 4BJ

Site address: Garrison Theatre Portacabin, MOD Bicester
Sampled by: Client
Date sampled / received: 8 July 2010
Date analysed: 9 July 2010
Analyst: M. Sarwa

ANALYTICAL PROCEDURE

Fibre identification was carried out in accordance with the documented 'in-house' methods based on the HSE Guidance Note HSG 248. These employed stereo microscopy, polarized microscopy and dispersion staining techniques.

RESULTS

Sample no.	Sample ref.	Location	Asbestos detected	Asbestos type
1	1004549 1 Fl	EX01. Textured coating and bitumen to walls	No	

NOTES:
1-Sample(s) were examined for the presence of 6 types of asbestos fibre: crocidolite (blue), amosite (brown), chrysotile (white), anthophyllite, actinolite, and tremolite.
2-Samples collected by the client are evaluated using information provided by the client. For samples collected by the client the date of receipt is deemed to be the same as the date sampled.
3-Envirochem is a UKAS accredited laboratory for sampling and identification of asbestos containing materials.
4-Comments, observations and opinions are outside the scope of UKAS accreditation.
5-The analytical method in the HSG248 does not quantify the amount of asbestos present, therefore UKAS accreditation does not permit quantification.
6-If, during fibre identification, only 1 or 2 fibres are seen and identified as asbestos, then the term 'trace asbestos identified' is used.

SIGNATURE:
Authorised signatory
PRINT NAME:

Reg. No.2378228 England. Registered Office: Envirochem, 12 The Gardens, Broadcut, Fareham, Hampshire, PO16 8SS

APPENDIX D

MANAGEMENT PLAN GUIDANCE

The asbestos materials assessments produced from the survey, as presented in this report, should be developed into a risk assessment which can then formulate the basis of the management plan, required under Regulation 4 of the Control of Asbestos Regulations 2006.

A priority assessment on each confirmed or presumed case of asbestos should be made.

B.1 Priority Assessment

A priority assessment assesses the likelihood of asbestos containing materials being disturbed, taking into account the following:

i. Routine maintenance work
ii. Planned refurbishment work
iii. Potential for disturbance
iv. Potential for human exposure
v. Activity from occupants or visitors to the building.

Whilst ABP Associates Limited will have obtained certain relevant information in order to assist in the compilation of the assessment, it remains the duty of the client under Control of Asbestos Regulations 2006, to ensure the full implementation of the assessment.

ABP Associates Limited is willing to provide further assistance to the client in preparing a detailed and accurate assessment on behalf of and/or in conjunction with the client.

For further information please contact:

Name: Richard Pomeroy (Director)
Office Tel. No. 02380 866888
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info@abp.uk.com

ABP Associates Limited has recorded the likelihood of disturbance to the asbestos containing materials with consideration given to the normal activities within the building at the time of the survey. This information is contained within the asbestos materials assessments in *Appendix A*.

B.2 Management Plan

On completion of the risk assessments, the management plan should then be developed in order to control the risk to occupants and visitors to the building.

The management plan will include the following:

1. Specific details of the location and condition of known or presumed asbestos containing materials, and in what way they are recorded and updated as required, (refer to materials assessment).

2. Priority/risk assessments and scores.

3. A list of action priorities.

4. Options regarding the management of asbestos containing materials would be, repair, encapsulate or removal. These decisions will be dependent on the risk of exposure to airborne asbestos fibres and as such consideration must be given to the activities carried out within the building and the proximity of the asbestos. These arrangements must be made in order to ensure compliance with the Control of Asbestos Regulations 2006, etc.

5. Timescales for implementation of the management plan.

6. Arrangements to inspect asbestos containing materials at least on a 12 monthly basis and more frequent dependent on certain situations.

7. Information to employers and employees own responsibilities.

8. Training of employees/management.

9. Appropriate planning to implement policies.

10. Protocol to ensure provision of information to all relevant bodies.

11. Infrastructure within the company regarding persons responsible for the monitoring and /or amendments of the plan.

12. Agreed periodic review of the plan.

APPENDIX E

PHOTOGRAPHS

Photo 1 – External EX01 Main, Sample 1; Textured coating to external walls – No asbestos detected.

APPENDIX F - SITE DRAWING – NOT TO SCALE

Building SDBB02GHT002 Portakabin WC Adjacent Briefing Centre, St David's Barrack, RAF Bicester (Asset tag: SDBBO2GHT002) – Approx 15m^2