Defence Estates

HMS Daedalus, Lee-on-Solent Land Quality Assessment

Phase Two: Radiological Investigation
Project No 05502

Draft Report

8 April 2003

Entec UK Limited for the
Ministry of Defence under
commission DE11/4471
February 2001

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Defence Estates
Blakemore Drive
Sutton Coldfield
West Midlands
B75 7RL

Main Contributors

Reg 13(1) [redacted]

Issued by

Reg 13(1) [redacted]

Approved by

Reg 13(1) [redacted]

Accepted by DE Task Officer

.....
Name

Accepted by Project Sponsor

.....
Name

Entec UK Limited

Northumbria House
Regent Centre
Gosforth
Newcastle upon Tyne
NE3 3PX
England
Tel: +44 (0) 191 272 6100
Fax: +44 (0) 191 272 6592

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Land Quality Statement for the Radiological Investigation of HMS Daedalus

Introduction and Objectives

In 2001 Entec reviewed Phase One and Phase Two Land Quality Assessment Reports, prepared in 1995 by WSP for HMS Daedalus, Lee-on-the-Solent, Hampshire. This identified the potential for radiological contamination to exist across the site at certain locations due to historical activity. Following this review the Ministry of Defence appointed Entec UK Ltd to undertake a further Phase Two walkover survey for radioactive contamination targeting specific areas of concern identified in the review.

Site Description

HMS Daedalus is a former airfield, barracks and training establishment of around 200 ha situated between Stubbington and Lee-on-Solent, Hampshire. The site is understood to have been vacated by the Royal Navy around five years ago, although various buildings are let to local commercial businesses, while the airfield remains operational for private and commercial light aircraft. The airfield occupies the majority of the site (approximately 170 ha) and comprises three runways, while the southern portion of the site can be described as the former Technical Area (approximately 30 ha) comprising a range of buildings including former hangers, workshops, administrative buildings and barrack accommodation. Some of the hangers and open areas are currently let to local businesses for storage and distribution operations.

Environmental Setting and Site Sensitivity

The site is directly underlain by Made Ground (to 0.4-1.2 m bgl), Brickearth (around 0.3-2.2 m thick), Plateau and Terrace Gravels (2.5-5.5 m thick) and the Bracklesham Group (around 10 m thick).

Groundwater is present within the Terrace Gravels at 3.5-3.8 m bgl. The direction of groundwater flow being southwards towards the sea. Over eastern parts of the site, shallow groundwater flow may be eastwards to the catchment of the River Alver.

The River Alver is the closest surface water body located immediately beyond the eastern boundary. The River Alver originates at this point from a spring possibly associated with the water bearing gravels in the region. The sea (the Solent) lies approximately 50 m to the south west of the site at it's nearest point.

The site lies immediately above Plateau and Terrace Gravels which along with the Bracklesham Group, are classed as a Minor Aquifer. Contamination within the soil can migrate directly to the aquifer which is therefore assessed as being of moderate to high sensitivity. Due to its close proximity to the eastern boundary of the site, the River Alder is also of moderate to high sensitivity. The sensitivity of the sea is considered to be low/moderate due to its capacity to attenuate and dilute potential contaminants.

Sources of Information

The information used in this assessment includes the following:

- WSP Phase One/Two LQA. This report assessed data from site maps and records, discussions with site staff, Ordnance Survey historical maps, the Environment Agency, Army Historical Branch, and other maps and records.
- Entec's Technical Note (Entec Ref. 03385n010i1, dated 5 January 2001) which comprised a gap analysis of the WSP reports.

Site Investigation

Historical activities involving the maintenance of luminised aircraft instrumentation have the potential to result in radiological contamination through the ad-hoc disposal to ground through burning and burial of radium luminised instruments, paints and other residues. Locations particularly vulnerable to contamination include areas adjacent to workshops and maintenance facilities, aircraft hangers, burning grounds and waste disposal areas.

The site investigation was targeted upon identifying the extent of radiological contamination through a radiological walkover survey of those areas assessed as having a high potential of being radiologically contaminated.

The locations for investigation were identified following a review of the available documentary information and a visit to the site.

The investigation was based upon a 100% radiological walkover survey of the areas assessed as being most at risk and a 50% walkover of other areas of concern.

Extent of Radiological Contamination

Overall the walkover survey found the majority of the potentially high risk areas to be free from radiological contamination. However, at 28 locations surrounding former workshops, hangers and burning grounds point sources of elevated radioactivity were recorded.

There are localised areas where surface soils contain radium 226 contamination at activity concentrations in excess of the Radioactive Substances Act (RSA) threshold level of 0.37 Bq/g and exceeding guideline screening levels of 0.34 Bq/g corresponding to the 0.3 mSv/yr National Radiological Protection Board (NRPB) recommendation for the exposure of the general public to a new source of radioactivity.

Radiological Risks to Current and Future Site Users

Overall risks to current and future site users are assessed as low to moderate.

The worst case scenario for current site users relates to site personnel relaxing in areas of elevated radiological readings, while for future site use the worst case scenario is children playing in an area of radioactive contamination or ingesting contaminated soils. For children playing the likely exposure through irradiation for typical scenarios is assessed as being well within the 0.3 mSv/yr NRPB recommended dose constraint for exposure of the public to a new radioactive source. The risk from irradiation is therefore low.

Exposure resulting from ingestion of radioactively contaminated material is a much greater potential hazard than external radiation dose, however, this requires physical contact with exposed soils and regular ingestion. Due to the distributed and localised nature of the

contamination the likelihood of regular ingestion is low and overall the risk is consequently assessed as moderate.

Although overall the risks are low to moderate there are very localised spots, usually associated with artefacts e.g. instruments, that exceed the dose criteria for intervention proposed by NRPB. So although the likelihood of adverse health impact is low intervention is required to remove these risks, provide public confidence in the safety of the site and reduce the potential exposure to a dose level less than 0.3 mSv/yr.

Risks to construction workers can be effectively managed through the use of appropriate personal protective equipment.

Suitability for Redevelopment

The site is suitable to redevelopment to any end use subject to further intrusive and sampling investigation to ensure all contamination is identified and remedial works are implemented to address the risks associated with the localised occurrences of radium.

Contents

1. Introduction

1.1 Terms of Reference

Entec's Technical Note (Entec Ref. 03385n010i1, dated 5 January 2001) reviewed Phase One and Phase Two Land Quality Assessment Reports, prepared in 1995 by WSP for Defence Estates for the site of HMS Daedalus, Lee-on-the-Solent, Hampshire. The Technical Note identified the potential for radiological contamination to exist across the site at certain locations due to historical activity. Following this review the Ministry of Defence required a further investigation of the potential for radiological contamination at HMS Daedalus.

Entec UK Ltd (Entec), under its Environmental Term Contract with Defence Estates (DE), was appointed to undertake a further Phase Two walkover survey, targeting specific areas of concern identified in the Technical Note.

This report details the results of the walkover survey for radioactive contamination conducted during February 2003. It includes a summary of the previous LQA and any other additional information obtained relating to on-site radiological issues.

1.2 Background and Objectives

1.2.1 The Site

HMS Daedalus is a former airfield, barracks and training establishment of around 200 ha situated between Stubbington and Lee-on-Solent, Hampshire. The site is understood to have been vacated by the Royal Navy around five years ago, although various buildings are let to local commercial businesses, while the airfield remains operational for private and commercial light aircraft. The airfield occupies the majority of the site (approximately 170 ha) and comprises three runways, one of which is operational, manned air traffic control tower and various hangers currently housing small businesses, private aircraft and the coast guard helicopter service. The southern portion of the site can be described as the former Technical Area (approximately 30 ha) comprising a range of buildings including former hangers, workshops, administrative buildings and barrack accommodation. Some of the hangers and open areas are currently let to local businesses for storage and distribution operations. Figure 1.1 shows the site location plan while Figure 1.2 shows the site layout plan.

1.3 Objectives

The Entec Technical Note reviewed Phase One and Phase Two Land Quality Reports carried out by WSP. In addition the following radiological reports were also reviewed by Entec following enquiries to DERA (Radiation Protection Services (DRPS):

- Radiological Survey of HMS Daedalus Fire Training Ground; DRPS, 24 April 1996;

- Confirmation of Clearance at the Daedalus Site: letter report of radiological survey to confirm clearance of radiological material from the Fire Training Ground following clearance by Wastechem; DRPS, 9 March 1998.

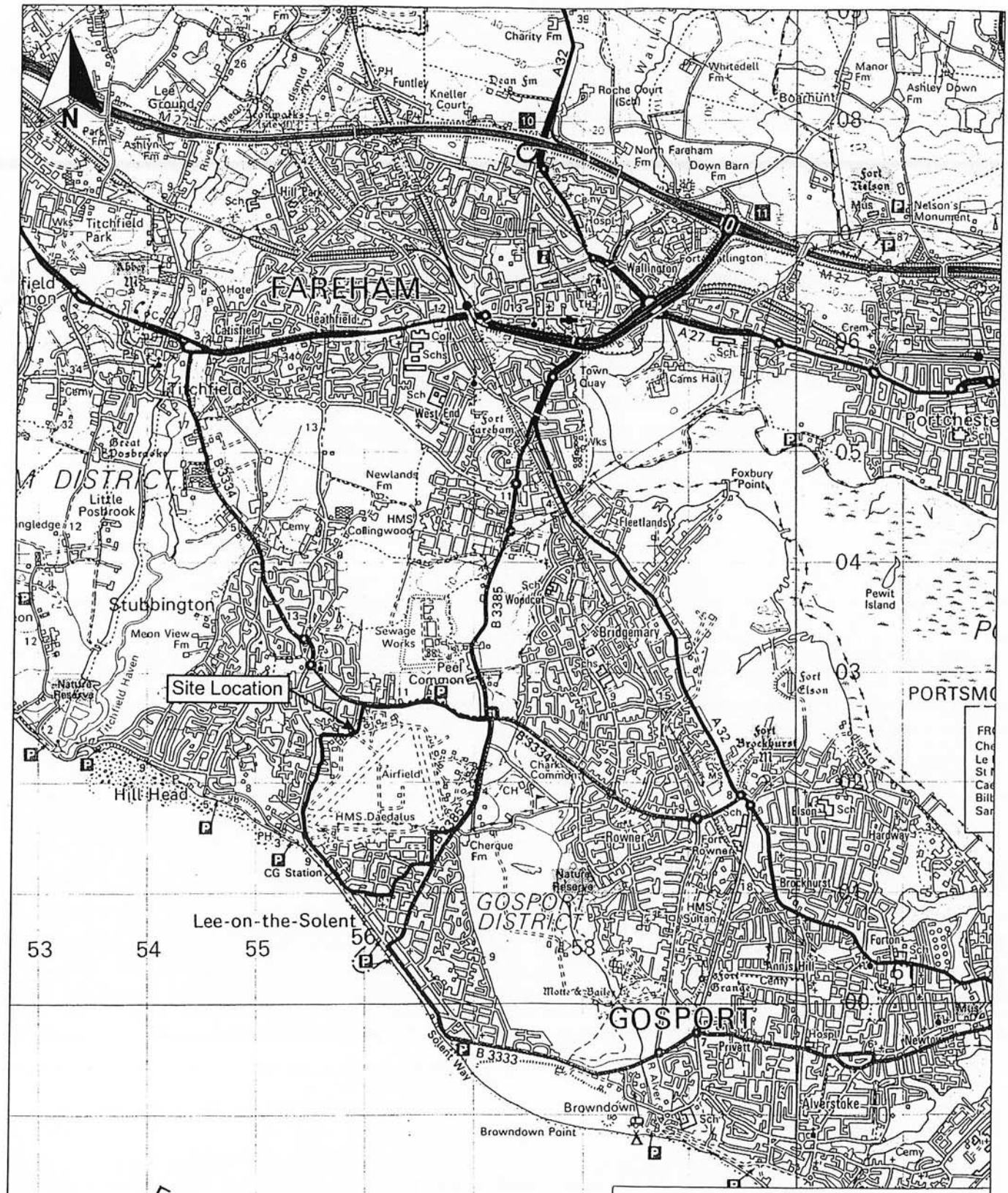
The Technical Note concluded that in addition to the radium contamination identified at the Fire Ground, there was the potential for similar contamination to exist in other high risk areas associated with aircraft maintenance and waste disposal activities.

The objective of this investigation was to assess those areas of the site considered to be at higher risk of being radiologically contaminated. This was achieved by the following methodology.

i) review of former land use and building designation to identify areas of concern on the site;

ii) undertaking a radiological walkover survey, focusing on areas of concern identified from the review;

iii) qualitative assessment of the risks to humans from radiological contamination identified.



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HMS Daedalus, Lee-on-Solent
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Figure 1.1
Site Location Map

April 2003
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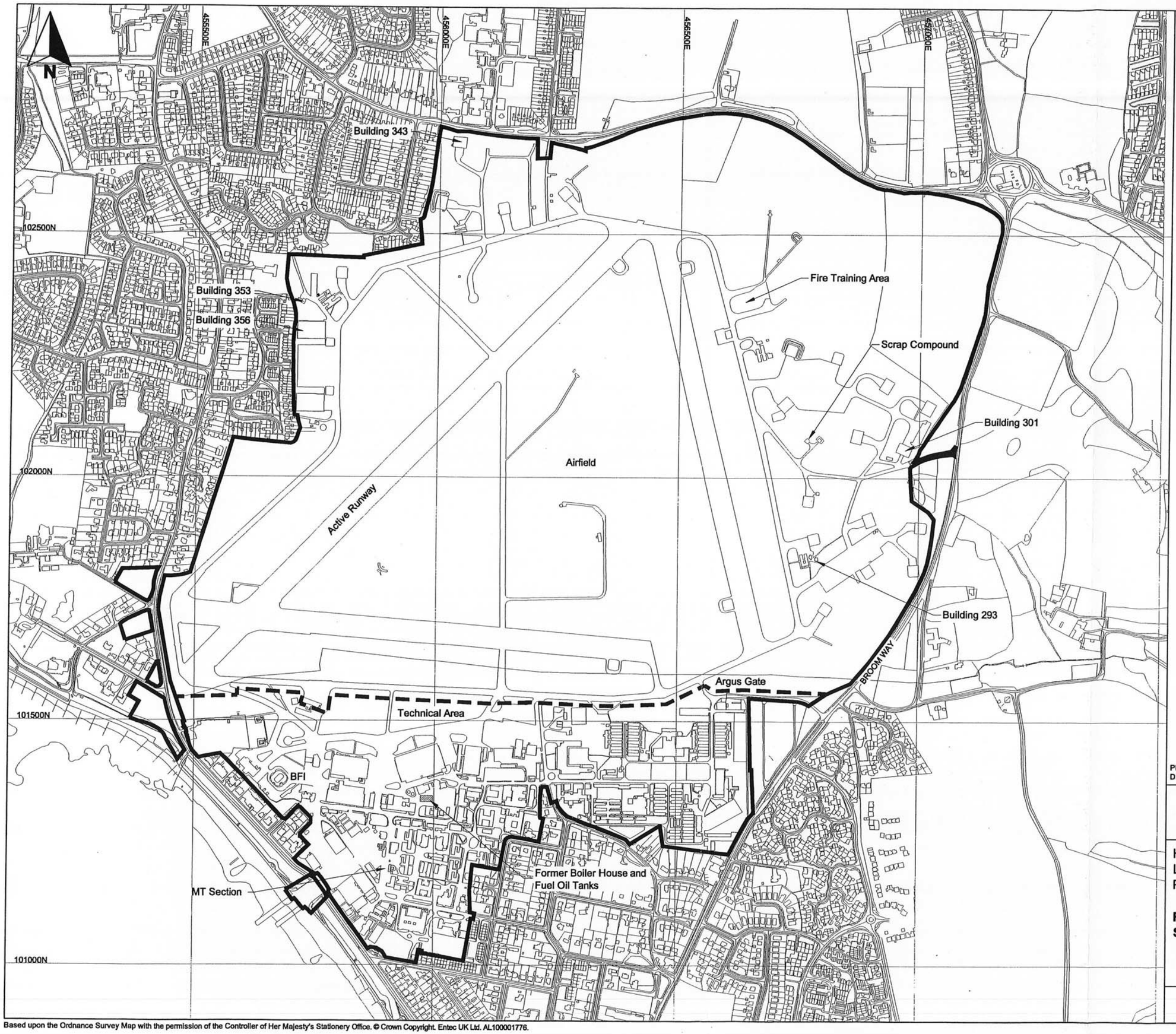

Key

- Site boundary
- Internal boundary

0 m — 400 m

Scale 1:7500 @ A3

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HMS Daedalus, Lee-on-Solent
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Figure 1.2
Site Layout Plan

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2. Site Setting

2.1 Introduction

The information in this section has been primarily derived from the WSP Phase One/Two LQA.

2.2 Environmental Setting

2.2.1 Site Setting

The site lies on the fringes of the urban sprawl of Lee-on-the Solent, with the south western boundary lying approximately 50 m from the sea. Site access is via a secure gate house (24 hr private security) on Argus Road leading from Broom Way. Land in the surrounding area predominantly comprises residential properties to the north, west and south, with a plot of allotments on the eastern boundary parallel to the access gate and woodland/open ground located beyond Broom Way that lies immediately to the east of the site.

2.2.2 Site Description

The site is divided for the purposes of this report into two discrete areas; the Airfield and the Technical Area. The airfield occupies the majority of the site (approximately 170 ha) and comprises three runways, one of which is operational, manned air traffic control tower and various hangers. The southern portion of the site can be described as the former Technical Area (approximately 30 ha) comprising a range of buildings including former hangers, workshops, administrative buildings and barrack accommodation.

2.2.3 Geology

The geological and hydrogeological regime was established in the WSP study from previous site investigation data as comprising a downward sequence summarised as follows:

- Made Ground (to 0.4-1.2 m bgl): reworked natural ground with brick and concrete;
- Brickearth (around 0.3-2.2 m thick): soft to firm silty sandy clay with scattered fine gravel;
- Plateau and Terrace Gravels (2.5-5.5 m thick): medium dense and dense sandy fine to coarse flint gravel with occasional sand horizons;
- Bracklesham Group (around 10 m thick): medium dense silty fine sands with firm to stiff laminated clays.

2.2.4 Hydrogeology

Groundwater is present within the Terrace Gravels at 3.5-3.8 m bgl. The direction of groundwater flow is expected to be southwards towards the sea. Over eastern parts of the site, shallow groundwater flow may be eastwards to the catchment of the River Alver.

2.2.5 Hydrology

The River Alver is the closest surface water body located immediately beyond the eastern boundary near Bldg 302. The River Alver originates at this point from a spring possibly associated with the water bearing gravels in the region and drains to the Solent to the west of Gosport.

The sea(the Solent) lies approximately 50 m to the south west of the site at it's nearest point.

2.2.6 Overall Site Sensitivity

The site lies directly above Plateau and Terrace Gravels which along with the Bracklesham Group, are classed as a Minor Aquifer. Contamination within the soil can migrate through permeable strata directly to the aquifer which is consequently considered to be of moderate to high sensitivity. Due to its close proximity to the eastern boundary of the site, the River Alder is also of moderate to high sensitivity. Any contamination on the site could migrate to the sea either in shallow groundwater in the Plateau and Terrace Gravels or in the River Alder. However, the sea is considered to be of low/moderate sensitivity due to its capacity to attenuate and dilute potential contamination.

3. Potential Radiological Sources of Contamination

3.1 Site Operations

3.1.1 Historical Site Operations

Historical site operations which have been identified as having the potential to cause contamination are discussed below. Table 3.1 lists the areas/buildings where there is a risk of radiological contamination of soils within the vicinity of the building based on their historical use. The MOD Building List is presented in Appendix A.

Aircraft Hangers: It is possible that radium luminised instruments were maintained and parts stored within the hangers used for aircraft repairs. Luminised dials, instrumentation and paints may have been disposed of in the locality of these hangers.

Fire Training Area: It is likely that obsolete and unrepairable planes (hardware) were burnt for fire training purposes in this area, located on the eastern portion of the airfield. Entec is aware that Dstl have already undertaken a radiological survey and subsequent remedial works to remove radiological sources identified within this area.

Burning Grounds/Waste Disposal Areas: Three potential waste burial/burning grounds have been identified on the south eastern portion of the airfield. Such areas may contain radium residues depending on the nature of the material burnt/buried.

Workshops and Maintenance Facilities: It is likely that radium luminised instrumentation would have been repaired and stored along with radium luminising paints. Historically it was common practice for the ad-hoc disposal of waste items and paints to ground locally around these facilities.

Anecdotal Evidence: During the walkover survey a member of the Coast Guard ground team familiar with the historic use of the site indicated that a crash investigation team was based in one of two Hangers (Bldg. 343 and 344) and that plane wrecks were reassembled in these locations. It is likely that plane debris may have been temporarily stored outside these hangers with the potential for radium luminised instrumentation to have been released to ground.

3.1.2 Current Site Operations

There are no current site operations capable of giving rise to further radiological contamination.

Table 3.1 Potential Areas of Radiological Contamination

MOD Building No	Site Location	Former MOD Use	Potential Radiological Issues
348, 356, 358	North eastern corner of airfield	Aircraft Hangers	Ad hoc disposal of radium luminised instrumentation and paints to ground surrounding the facility.
332, 339, 343, 344	Far north eastern corner of airfield	Aircraft Hangers	Ad hoc disposal of radium luminised instrumentation and paints to ground surrounding the facility. Anecdotal evidence suggests plane wrecks repaired in hangers 344 and 343.
286, 287, 289, 290, 291, 292, 296, 299, 301, 303, 304, 305, 306, 307	Eastern area of airfield	Aircraft Hangers	Ad hoc disposal of radium luminised instrumentation and paints to ground surrounding the facility.
N/A	North eastern edge of airfield	Former Fire Training Area	Release of radium luminised instruments and residues to ground from burnt aircraft debris.
302	Eastern boundary of airfield	Naval Aviation Technical Management School	Possible ad hoc disposal of luminised dials and instrumentation to ground surround the facility.
N/A	East of Bldg 302 West of Bldg 289 South of Bldg 286	Potential former burning ground	Possible presence of luminised instrumentation and radium residues from burning of such materials.
N/A	Surrounding Bldg 344, 306 and to north of Bldg 305	Mounds of reworked Made Ground	Possible presence of luminised instrumentation or residues within Made Ground comprising the mounds.
382	Eastern area of airfield	Former scrap metal compound	Possible presence of discarded metal parts containing luminised material.
31, 40	Former Technical Area	IHU Hanger	Ad hoc disposal of radium luminised instrumentation and paints to ground surrounding the facility.
35, 37	Former Technical Area	MT Hanger	Ad hoc disposal of radium luminised instrumentation and paints to ground surrounding the facility.
39	Former Technical Area	MT Workshops	Ad hoc disposal of radium luminised instrumentation and paints to ground surrounding the facility.
51	Former Technical Area	Engineer's Workshop	Ad hoc disposal of radium luminised instrumentation and paints to ground surrounding the facility.
67, 68, 73, 154	Former Technical Area	Large maintenance hangers	Ad hoc disposal of radium luminised instrumentation and paints to ground surrounding the facility.
153	Former Technical Area	Workshop	Ad hoc disposal of radium luminised instrumentation and paints to ground surrounding the facility.
155	Former Technical Area	Workshop	Ad hoc disposal of radium luminised instrumentation and paints to ground surrounding the facility.

Table 3.1 (continued) Potential Areas of Radiological Contamination

MOD Building No	Site Location	Former MOD Use	Potential Radiological Issues
193	Former Technical Area	Workshop	Ad hoc disposal of radium luminised instrumentation and paints to ground surrounding the facility.
221	Former Technical Area	Field Gun Drill Shed	Possible maintenance of luminised gun sights and possible disposal to surrounding ground.
227	Former Technical Area	Incinerator	Possible indiscriminate disposal of metallic luminised parts and residues within ashes to areas surrounding the facility.

The Building No and use refers to the designated MOD Building Nos and use for HMS Daedalus as listed on the Building Schedule (Ref. 2116/10/16/22752, dated March 1973).

4. Site Investigation Works

4.1 Objectives

This radiological investigation was designed following a review of available documentary information and a visit to the site. The primary objective of the study was to ascertain the nature and extent of radiological contamination at potentially high risk areas across the site. The radiological survey was intended to build upon the work completed by Dstl Radiological Protection Services (DRPS).

The investigation comprised a radiological walkover survey of potential areas of radiological contamination (Table 3.1) identified from previous reports and a review of the MOD building list identifying former building uses.

4.2 Scope of Works

The scope of works comprised the following:

- 100% coverage of high risk areas. Where the target related to a built structure such as a hanger, the 100% walkover incorporated a 3 m strip surrounding the footprint of the building, particularly focusing around doorways where disposal may have occurred to ground;
- 50% coverage of a 20 m buffer zone surrounding the target;
- where point sources were identified the 100% coverage was extended to 5 m around the point with a respective extension to the 50% buffer zone.

All of the works were supervised by an Entec Environmental Consultant qualified as a Radiological Protection Supervisor.

4.3 Radiological Walkover

The radiological walkover was carried out using a Nuclear Electric Bicron G2 probe coupled to an Electra ratemeter. The G2 is a 51 mm x 51 mm sodium iodide scintillation detector which detects gamma radiation and was calibrated to indicate activity concentrations of radium-226 in surface soils. The instrument is sensitive to very small increases above background radiation levels. The probe was calibrated to respond in counts per second (cps) to a specific activity concentration of radium-226 in the form of a nominally homogeneous source material (1 Bq/g corresponding to 500 cps above background). Probe readings for an individual point source will vary depending upon its activity and depth of burial.

Probe readings were adjusted to take account of natural background radiation, which was determined on site in an area known to be free from contamination. This was found to lie in the range 100 to 150 cps. Probe readings were taken as close to the ground surface as practicable, typically at a height of 50-100 mm.

The G2 probe was calibrated to respond to radium-226 as follows:

i) In counts per second, per becquerel per gram of radium-226 for volumes of material with a homogeneous concentration of radium-226. This calibration is specific to, for example, contaminated ash or clinker.

ii) In cps, per becquerel for point sources of varying radioactivity at varying depths. This is used, for example, for luminised instruments or dials.

iii) In cps, per microsievert per hour for radium-226 does rates in order to assess the external radiological hazard. 1600 cps is equivalent to 1μSv/hr.

Quantitative calibration of the instrumentation has been determined for a wide range of isotopes, as sites may be subject to the presence of, for example, elevated concentrations of natural uranium. Typical background results for this instrument are in the region of 100 cps. Average background count rates were checked daily at areas remote from potential contamination.

The areas covered by the walkover survey are shown on Drawing 1.

5. Land Quality Assessment

5.1 Assessment Approach

5.1.1 Current Regulatory Framework

The principal legislation governing the identification and remediation of contaminated land is Part IIa of the Environmental Protection Act 1990 which was implemented in April 2000. However, under current legislation the Part IIa regime does not apply to harm or water pollution attributed to radioactivity. The principal legislation currently governing radioactivity is the Radioactive Substance Act 1993 (RSA) which deals with the protection of the public and the environment from the discharge or disposal of radioactive substances.

The RSA defines activity concentrations for various isotopes above which material is legally defined as being 'radioactive'. In the case of radium-226, which is the suspected isotope giving rise to the point sources identified at HMS Daedalus, that threshold activity concentration is 0.37 becquerels per gram (Bq/g). The RSA is administered in England and Wales by the Environment Agency.

From a health and safety perspective, the Ionising Radiation Regulations 1999 (IRR), govern the protection of workers and the members of the public from hazards from the use of radioactive materials in the workplace. Dose limits are set and individual exposure in the workplace is monitored to ensure that these limits are not exceeded.

Accumulation and disposal of radioactive waste is covered by the RSA and associated exemption orders. In the case of contaminated soils the 'Phosphatic Substances, Rare Earths, etc. Exemption Order 1962' should apply. Under the terms of this exemption, materials having a Ra-226 activity concentration between 0.37 and 4.9 Bq/g is designated 'exempt waste' and may be disposed of at a suitably licensed landfill site. Material having more than 4.9 Bq/g Ra-226 is designated Low Level Waste (LLW) and must be consigned to BNFL Drigg for disposal. Accumulation of LLW on any site requires prior RSA Authorisation from the Environment Agency. Excavation and packaging of such waste as part of a remediation programme would constitute 'accumulation' and hence would require an Authorisation.

5.1.2 Proposed Regulatory Framework

A consultation paper was published in 1998 outlining a possible approach to applying the Part IIa Contaminated Land regime to radioactively contaminated land. This is currently under development and technical support material to assist in this process was published by the Environment Agency in 1999.

The proposed regime for the control of radioactively contaminated land is to follow the framework established in Part IIA EPA 1990 for chemically contaminated land. This sets out the nature of liabilities that can be incurred by owners of contaminated land and groundwater, and allows for the identification of chemically contaminated land, which poses a threat of significant harm to human health or the environment, or the pollution of controlled waters. Central to the regulatory system is a rigorous procedure of risk assessment which is used to

determine the existence of "contaminated land", according to the definition. The approach also embodies the established principles of "sustainable development" and the "polluter pays", with a "suitable for use" approach to the remediation requirements.

Contaminated Land Definition

According to Part IIa, "contaminated land" is defined as that which is in such a condition that:

- **significant harm** is being caused or there is a **significant possibility** of such harm being caused; or
- **pollution of controlled waters** is being, or is **likely to be**, caused.

The definition of what harm is to be regarded as significant is set out in statutory guidance and includes defined effects to human beings, ecological systems and property.

Under the risk assessment procedure, for such harm to the non-aquatic environment or pollution of controlled waters to be possible, there must be a "pollution linkage", as follows:

- a **source** (contaminant);
- a **pathway** by which the receptor which is or would be exposed or affected;
- a **receptor** which is or would be affected by the contaminant. This includes human beings, other living organisms, controlled waters (including groundwater beneath the site) and property.

If any part of this linkage is absent, no harm is possible and so the land is not "contaminated". In the context of contaminated land, "risk" can be defined as a combination of two factors:

- the probability, or frequency of occurrence of a defined hazard (for example, exposure to a property of a substance with the potential to cause harm);
- the magnitude (including the seriousness) of the consequences to a specified receptor.

Remediation and Intervention

The proposed regime for radioactively contaminated land will operate within the conceptual framework established by the International Commission on Radiological Protection (ICRP), in their Publication 60 (1990). In this approach regulatory action will only take place on the established ICRP "intervention" basis, where unacceptable risks associated with the current use of land arise.

Remediation of chemically and radioactively contaminated land has historically been performed in the case of a " change of use" to make land fit for the future use. However, the newly chemically contaminated land legislation makes the provision for the land that is identified to be causing, or pose a risk of causing "harm" or pollution of controlled waters, to be remediated, irrespective of changes of use. Such an approach is proposed for radioactively contaminated land, and fits into the ICRP "intervention" framework.

Intervention refers to decreasing the overall radiation exposure by influencing the existing situation; by removing existing sources, modifying pathways, or reducing the number of exposed individuals. There are two principals which guide the practice:

- *Justification*. The proposed intervention should do more good than harm, i.e. the reduction of detriment resulting from the reduction dose should be sufficient to justify the harm and the costs, including social costs, of the intervention;
- *Optimisation*. The form scale and duration of the intervention should be optimised so that the net benefit of the reduction of dose, (the benefit of the reduction in radiation detriment, less the detriment associated with the intervention), should be maximised.

5.1.3 Assessment Framework

The approach taken in this investigation is to undertake the assessment fully in line with the current regulatory framework but also being consistent and cognisant of the regulatory approach under development based on risk assessment.

Entec's general approach to undertaking a risk assessment in line with the regulations is based on a tiered framework as outlined below:

Tier 1:
- qualitative 'Source (hazard)' - Pathway - Receptor (target) risk assessment to identify the 'pollutant linkages' of most concern;
- screening of analytical results against conservative generic guidelines to identify issues that require more detailed consideration.

Tier 2:
- application of simple site specific quantitative risk assessment procedures to clarify risks of concern;
- for soil contamination this may involve quantitative consideration of potential site specific exposure scenarios taking into account toxicological properties of substances to derive site specific safe levels;
- for groundwater this may involve simple analytical calculation of groundwater flow and contaminant attenuation to ascertain if a risk is posed to a groundwater receptor and to allow acceptable levels at the site to be defined. Tier 2 may also involve the collection of additional data.

Tier 3:
- more complex 'fate and transport' modelling of contaminant behaviour in the sub surface and groundwater. More detailed quantitative human health risk assessment.

This report is based upon a preliminary Tier 1 assessment. The walkover survey has indicated that radiological point sources above background exist at isolated locations across the site. However, no intrusive investigation, sampling and laboratory analysis has yet been undertaken to ascertain the specific characteristics of the sources. Consideration of site specific exposure scenarios have been considered to ensure that the interpretation is robust for the current and planned use of the site.

5.1.4 Assessment Guidelines

In undertaking the assessment the following screening levels have been applied.

Radioactive Substances Act (1993)

The threshold activity concentration above which radium is legally defined as being radioactive is 0.37 Bq/g.

National Radiological Protection Board Recommendations

Dose criteria used in intervention situations have been discussed in 'Criteria for the Designation of the Radioactively Contaminated Land', DETR (1990). The following have been recommended by the NRPB:

- a dose constraint of 0.3 mSv/yr for exposure to a 'new' source of radioactively corresponding to annual risk of 10^{-5} of fatal cancer;
- dose limits for members of the public of 1.0 mSv/yr. (dose constraint for the general public under the Ionising Radiation Regulations);
- a 10 mSv/yr dose (risk 5 x 10^{-4}/yr) above which intervention is always justified on risk grounds.

For the dose criteria of 10 mSv/yr and 0.3 mSv/yr screening levels in terms of activity concentrations have been proposed for two situations:

i) Uniform surface contamination i.e. radionuclides widely and fairly uniformly distributed in the top 15 cm of soil.

ii) Surface patches and buried contamination where radionuclides are distributed in the top 15 cm of soil over an area of less than about 20% of the site or radionuclides are at a depth greater than 15 cm.

For radium 226 this results in the following guideline activity concentrations (Bq/g) for the most restrictive land use i.e. residential (Table 5.1).

Table 5.1 Screening Levels for Radium (Bq/g)

	10 mSv/yr	0.3 mSv/yr
Uniform Surface Contamination	11.47	0.34
Surface Patches and Buried Contamination	57.35	1.72

For residential use the most conservative level protective of risk to site users is therefore 0.34 Bq/g.

5.1.5 Assessment Approach

The areas of potential contamination were delineated on the basis of surface probe readings. Any readings above background (100 to 150 cps) were indicative of possible contamination and noted as radiological point sources.

5.2 Radiological Walkover Survey

The findings of the radiological walkover are listed in Table 5.2 and marked on Drawing 1 which also indicates the extent of the radiological survey.

Background probe measurements ranged from 90-150 cps over grassed areas of the site.

Due to the historical military operational use of the site, it is assumed that the radiological finds are associated with radium 226. The health physics instrumentation used during this walkover survey was calibrated such that 500 cps (above background) was equivalent to 1 Bq per gram of radium 226 (see section 4.3).

5.2.1 Airfield

Aircraft Hangers

The immediate area (approximately 25 m buffer zone) surrounding the majority of the aircraft hangers were found to be free from radiological material, with background probe measurements ranging between 100-140 cps. However, radiological point sources (R3-R8) were identified within the vicinity of three aircraft hangers (Bldg Nos 292, 289, 296), associated with probe measurements of 158-630 cps above background, corresponding to 0.32 to 1.26 Bq/g (assuming radium 226).

Fire Training Area

Probe measurements were found to be consistent with background levels ranging from 110-150 cps.

Burning Grounds/Waste Disposal

Two radiological point sources (R1 and R2) were identified within a former burning ground, located to the south of Bldg 286. The radiological point sources were noted at 1410 cps and 2280 cps, corresponding to 2.82 Bq/g and 4.56 Bq/g respectively.

A single radiological point source (R9), of probe measurement 158 cps above background, corresponding to 0.32 Bq/g was identified within an area of open space where the observed local topography suggests that buried wastes may be present.

Former Scrap Metal Compound

A single radiological point source (R28) was identified within this former facility at 405 cps above background, corresponding to 0.81 Bq/g.

5.2.2 Technical Area

Hanger/Workshop Facilities

The walkover survey identified eighteen radiological point sources (R10-R27) located in four distinct clusters surrounding former maintenance/workshop hanger facilities (Blgd Nos 68, 73, 154 and 155). The radiological finds were indicated at between 300-27 000 cps above background, corresponding to between 0.36 to 54 Bq/g.

Former Incinerator

An ashy bed at surface was located to the south east of the incinerator, probe measurements ranged between 180 to 280 cps, corresponding to 0.12 to 0.32 Bq/g, possibly associated with naturally occurring radionuclides.

Table 5.2 Areas of Radiological Contamination

Radiological Find–Probe Measurement Above Background (120 cps)	Site Area	Adjacent Building (Bldg No)	Former MOD Use	Comments
R1 = 410 cps R2 = 2280 cps	Eastern area of airfield	Approximately 50 m south of Bldg 286	Potential former burning ground	Burnt ashy material evident at surface
R3 = 187 cps R4 = 220 cps	Eastern area of airfield	Bldg 292	Aircraft Hanger	
R5 = 230 cps R6 = 630 cps	Eastern area of airfield	North east corner of Bldg 289	Aircraft Hanger	
R7 = 238 cps R8 = 260 cps	Eastern area of airfield	North of Bldg 296	Aircraft Hanger	
R9 = 158 cps	Eastern area of airfield	Approximately 60 m north of Bldg 291	Open space	Possible location of buried waste due to topographical observations
R10 = 780 cps	Technical area	Northwest corner of Bldg 68	Large maintenance hanger/workshop	
R11 = 1068 cps R12 = 1380 cps R13 = 1080 cps R14 = 2880 cps R15 = 1080 cps R16 = 180 cps	Technical area	Southwest corner of Bldg 73	Large maintenance hanger/workshop	
R17 = 410 cps	Technical area	North east corner of Bldg 154	Large maintenance hanger/workshop	
R18 = 955 cps R19 = 780 cps	Technical area	West side of Bldg 389	Former workshop	
R20 = 330 cps R21 = 430 cps R22 = 480 cps R23 = 210 cps R24 = 210 cps R25 = 80 cps R26 = 1280 cps R27 = 95 cps	Technical area	North east of Bldg 154	Large maintenance hanger/workshop	
R28 = 405 cps	Eastern area of airfield	Bldg 382	Former scrap metal compound	
Probe measurements (100-160 cps) slightly elevated above background.	Technical area	Approximately 30 m south east of Bldg 227	Incinerator ash	Ashy bed at surface, possibly associated with naturally occurring radionuclides

The Building No and Former MOD Use refers to the designated MOD Building Nos and use for HMS Daedalus as listed on the Building Schedule (Ref 2116/10/16/22752, dated March 1973). All probe measurements are reported in the units of counts per second (cps) above background (120 cps) and denoted by the letter "R" followed by a numeric marker. The radiological material is assumed to be radium 226 (probe calibration factor = 500 cps per Bq/g).

5.3 Radiological Risk Assessment

5.3.1 Introduction

As outlined in the assessment approach in Section 5.1 a preliminary tier one qualitative risk assessment has been undertaken. The assessment is in line with the current regulatory framework for radioactive substances but also cognisant of the developing approach for radioactively contaminated land aligning with Part IIa of the EPA.

5.3.2 Conceptual Model

The risks posed by radiological contamination have been assessed by considering the various **source - pathway - receptor pollutant linkages** that can exist on the site. The collective interplay of the various pollutant linkages is referred to as the 'conceptual model'.

Summary of Contamination

Surface soils in a number of areas of the site have been found to contain localised elevated count rates predominantly associated with point sources believed to be radium 226 contamination associated with luminised instruments, paints and other artefacts. Activity concentrations in excess of the RSA threshold of 0.37 Bq/g and the screening level of 0.34 Bq/g (corresponding to the 0.3 mSv/yr NRPB dose constraint for a new source) have been recorded.

Receptors and Pathways

With respect to radiological contamination the principal receptor of concern are humans using the site. Health risks are of concern to three identified target groups, namely current site users, workers involved in ground disturbance (e.g. construction or utility workers), and possible future site users following redevelopment.

There are three exposure pathways, primarily of concern, namely external radiation dose, internal dose by ingestion, and internal dose by inhalation.

Radium compounds found in soils are substantially insoluble and are unlikely to constitute a risk to other targets, such as groundwater.

5.3.3 Risks to Site Users

This section summarises the health risks to the three groups of site user identified above. Table 5.3 lists the potential source - pathway - receptors pollutant linkages and assesses their significance according to the risk classification outlined below in Table 5.4.

Table 5.3 Risk Classifications

Potential Consequence of Source-Receptor-Linkage	
Severe	Irreparable damage to buildings, structures or the environment. A significant change to the number of one or more species or particular ecosystem(s). Damage to human health. Substantial pollution of sensitive water resources.
Moderate	Damage to sensitive buildings, structures or the environment. A change to population densities of non-sensitive species. Non-permanent health effects to humans. Pollution of non-sensitive water resources or small-scale pollution of sensitive water.
Mild	Easily repairable effects of damage to buildings or structures. Some change to population densities but with no negative effects on the function of the ecosystem. Slight short-term health effects to humans. Insubstantial pollution to non-sensitive water resources.
Negligible	Very slight non-structural damage or cosmetic harm to buildings or structures. No significant changes to population densities in the environment or in any ecosystem. No measurable effect on humans. Insubstantial pollution to non-sensitive water resources.

Likelihood of Source-Receptor Linkage	
Certain	100%
Almost Certain	95 – 99%
Probable	55 – 94%
Possible	45 – 54%
Unlikely	5 – 44%
Nil Chance	0 - 4%

Risk Classification of Potential Significance	
Very High Risk	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without appropriate remedial action.
High Risk	Harm is likely to arise to a designated receptor from an identified hazard at the site without remedial action.
Moderate Risk	It is possible that without appropriate remedial action, harm could arise to a designated receptor but it is relatively unlikely that any such harm would be severe and if any harm were to occur it is more likely that such harm would be relatively mild.
Low Risk	It is possible that harm could arise to a designated receptor from an identified hazard but it is likely that at worst, that this harm, if realised, would normally be mild.
Negligible Risk	The presence of an identified hazard does not give rise to the potential to cause significant harm.

Current Site Users

Although HMS Daedalus is under MOD ownership the site relinquished it's military status several years ago and is currently utilised by a variety of light industrial businesses operated by civilian personnel. The airfield operates a single runway for light aircraft, while the redundant hangers are used to house private light aircraft and gliders.

For current site use the worst case scenario envisages site personnel relaxing in the areas identified as containing elevated background readings. For example, for an adult resting in an

area of radioactive contamination of known dose rate of 1.875 μ Sv/hr (i.e. R14 3000 cps) for 10 hours per week would result in an annual dose through external radiation of 938 μ Sv. However, given that the nature of the contamination at HMS Daedalus comprises a scatter of discrete point sources with a wide range of activity levels, it can be seen that this assessment is speculative. Never the less this simple assessment illustrates that to receive an external radiation dose exceeding the more conservative 0.3 mSv/yr threshold requires an unlikely scenario. On this basis the risk is assessed as moderate.

Exposure resulting from ingestion of a radioactive source is a much greater potential hazard than external radiation dose, but requires physical contact with exposed soils and regular ingestion. Due to the distributed and localised nature of the contamination the likelihood of such an occurrence is low and overall the risk is assessed as moderate.

Although overall the risks are low to moderate there are very localised spots usually associated with artefacts, that exceed the dose concentration for intervention proposed by NRPB. So although the likelihood of adverse health impact is low intervention is required to remove those risks, provide public confidence in the safety of the site and reduce potential exposure dose levels to less than 0.3 mSv/yr.

Site Construction Workers (Involved in Ground Disturbance)

Construction workers involved in ground disturbance have a greater risk of direct contact and ingestion of radioactively contaminated material. However, exposure is transient and the long term weighted exposure is small. Risks can be effectively managed by use of appropriate personal protective equipment (PPE) and on this basis exposure by irradiation is assessed as a low risk and ingestion a moderate risk.

Future Site Users

The redevelopment of HMS Daedalus presents a variety of future land uses which may include residential, hotel use, light commercial, leisure, sports, business, storage, general light industrial use and continued light aviation use.

For future site use the areas indicated to contain radioactive materials could be incorporated into a garden area. In this instance scenarios of greatest concern are children playing on the area and ingesting soil. Additionally potential exposure risks include uptake into vegetables grown in the garden.

Risks for this scenario are assessed as moderate since although the potential consequence of ingestion is severe, due to the distributed and localised nature of the contamination the likelihood of regular ingestion is very low. On a risk basis, intervention is warranted for the same reasons as for current site users to reduce potential dose to less than 0.3 mSv/yr.

Table 5.4 Summary of Potential Significance of Environmental Risks

Area/Building	Potential Pollutant (Source)	Potential Receptor	Potential Pathway to Receptor	Associated Hazard	Potential Consequence of S-R Link	Likelihood of Source-Receptor Linkage	Potential Significance: Risk Classification
All identified areas	Ionising Radiation (potential radium-226) associated with Made Ground	Humans (Site Users)	External radiation	Health Impact (Cancer)	Mild	Possible	Low
			Ingestion		Severe	Possible	Moderate
			Inhalation		Severe	Very unlikely	Negligible
		Humans (Redevelopment/ Maintenance Workers)	External radiation	Health Impact (Cancer)	Mild	Almost certain	Low*
			Ingestion		Severe	Possible	Moderate*
			Inhalation		Severe	Unlikely	Low*
		Humans (Future Users)	External radiation	Health Impact (Cancer)	Mild	Possible	Moderate
			Ingestion		Severe	Possible	Moderate
			Inhalation		Severe	Very Unlikely	Low

* Risks to redevelopment workers may be managed by following correct procedures including use of suitable Personal Protective Equipment (PPE) during excavation or other works.

6. Conclusions

6.1 Site Sensitivity

The HMS Daedalus site is under MOD ownership but is open to public access as some of the buildings are rented out to local businesses. The site is therefore of high sensitivity with respect to uncontrolled use and access by the general public.

With respect to groundwater the site is of moderate to high sensitivity. The site is directly underlain by Plateau and Terrace Gravels and the Bracklesham Group, both of which are water-bearing and classified as a Minor Aquifer. Due to the permeable nature of the overlying strata, contamination may migrate directly into the aquifer, however, at present the aquifer is not utilised for water supply purposes.

With respect to the River Alver surface watercourse, the site is of moderate to high sensitivity due to it's proximity to the site.

The sea lies approximately 50 m at its nearest point from the south eastern site boundary and is deemed as being of low/moderate sensitivity due to its capacity at attenuate and dilute potential contamination.

6.2 Extent of Radiological Contamination

Overall the walkover survey found the majority of the potentially high risk areas to be free from radiological contamination. However, at 28 locations surrounding former workshops, hangers and burning grounds point sources of elevated radioactivity were recorded.

There are localised areas where surface soils contain radium 226 contamination at activity concentrations in excess of the Radioactive Substances Act (RSA) threshold level of 0.37 Bq/g and exceeding guideline screening levels of 0.34 Bq/g corresponding to the 0.3 mSv/yr National Radiological Protection Board (NRPB) recommendation for the exposure of the general public to a new source of radioactivity.

6.3 Radiological Risks to Current and Future Site Users

Overall risks to current and future site users are assessed as low to moderate.

The worst case scenario for current site users relates to site personnel relaxing in areas of elevated radiological readings, while for future site use the worst case scenario is children playing in an area of radioactive contamination or ingesting contaminated soils. For children playing the likely exposure through irradiation for typical scenarios is assessed as being well within the 0.3 mSv/yr NRPB recommended dose constraint for exposure of the public to a new radioactive source. The risk from irradiation is therefore low.

Exposure resulting from ingestion of radioactively contaminated material is a much greater potential hazard than external radiation dose, however, this requires physical contact with

exposed soils and regular ingestion. Due to the distributed and localised nature of the contamination the likelihood of regular ingestion is low and overall the risk is consequently assessed as moderate.

Although overall the risks are low to moderate there are very localised spots, usually associated with artefacts e.g. instruments, that exceed the dose criteria for intervention proposed by NRPB. So although the likelihood of adverse health impact is low intervention is required to remove these risks, provide public confidence in the safety of the site and reduce the potential exposure to a dose level less than 0.3 mSv/yr.

Risks to construction workers can be effectively managed through the use of appropriate personal protective equipment.

6.4 Suitability for Redevelopment

The site is suitable to redevelopment to any end use subject to further intrusive and sampling investigation to ensure all contamination is identified and remedial works are implemented to address the risks associated with the localised occurrences of radium.

Drawing

N

455500E

456000E

456500E

457000E

102500N

102000N

101500N

101000N

Former Air Crash Investigation Facility

Fire Training Area

Potential Former Burning Area

Uneven Ground noted during Site Works

Airfield

Active Runway

Potential Former Burning Area

BROOM WAY

Argus Gate

Former Maintenance Hanger

See Detail B for closer view of radiological points

Technical Area

Former Incinerator

Former Engineer's Workshop

Former Hanger

See Detail A for closer view of radiological points

Surface Ash Bed evident during Site Works

Former Workshop

Former MT Hanger

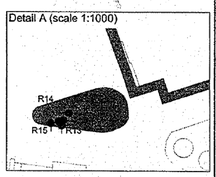
Former MT Workshop

I.D. Point	Count Rate (c.p.s)	Comment/ Location
R1	530	Former burning zone
R2	2400	Former burning zone
R3	307	Adjacent to hanger side door, suspected to be point
R4	340	Near to hanger, suspected to be point
R5	350	Building 289 point source
R6	750	Building 289 point source
R7	358	Building 296 point source
R8	380	Building 296 point source
R9	278	Between building 291 and 301, elevated above background and change topography/ veg possible buried waste
R10	900	Building 68 point source
R11	1188	Corner of building 73 in grass verge.
R12	1500	Point sources
R13	1200	
R14	3000	
R15	1200	
R16	300	Corner of building 73 in small soil mound, possibly arisings from service trench nearby.
R17	530	Grass area near building 134 point sources.
R18	1075	
R19	900	
R20	450	
R21	550	
R22	600	
R23	330	
R24	330	Grass area near building 134 point sources
R25	200	
R26	1400	
R27	215	Possible point sources at depth

Key

- Site boundary
- Internal boundary
- Denotes 100% walkover coverage NB - A 3m wide footprint was surveyed around buildings with grassed surround. Where hardstanding existed the drainage runs doorways groves for doors and seamm across hangar doors was carried out
- Denotes 50% walkover coverage NB - This was carried out at a 20m wide strip surrounding all 100% zones. Also used to survey grassed areas in Technical Area to add extra confidence to survey
- Denotes 10% walkover due to wooded area with dense bramble undergrowth and boggy wet ground

Detail A (scale 1:1000)



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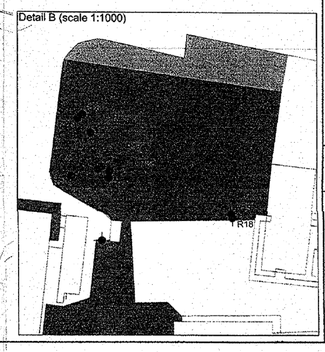

0 m 200 m

Scale 1:4000 @ A1

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DEFENCE ESTATES

HMS Daedalus, Lee-on-Solent
Land Quality Assessment
Phase 2: Radiological Investigation

Drawing 1
Site Plan Showing Extent of Walkover Survey and Radiological Finds

April 2003
03385-503.dwg drewc

Entec

Appendix A
MOD Building List

17 Pages

TABLE 5/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potential Environmental Hazard
1	Ross House (offices)	-	very unlikely	negligible
2	RNSES (ex NATEC) offices/ workshops. Demolished.	Oils, greases, solvents	likely	high
3	RNSES (ex NATEC) offices/ workshops.	Oils, greases, solvents, adhesives (isocyanates)	likely	high
4	RNSES (ex NATEC) drying room, formerly "power pen" .	-	very unlikely	negligible
5	Explosives store - defunct	explosives residues	possible	moderate
6	Explosives store - defunct SEMO oil store	explosives residues, oil, fuel in external store	possible	moderate
7	Explosives store - defunct - RNSES store	explosives residues	possible	moderate
8	Expeditions store - demolished	-	very unlikely	negligible
9	Explosives store	explosives residues	possible	moderate
10	Aviation Fuel Store - AVCAT	hydrocarbons	likely	high
11, 12 & 13	Air raid shelters - demolished 1973	-	unlikely	low
14	Kingston Villa - BFI & driving centre	Fuel oil, diesel, ethylene glycol from drum store	likely	high
15	Crash Tender Bay - Fire station	Hydrocarbons, foam chemicals	possible	low
16	Control Tower - Air Traffic Control	-	unlikely	negligible
17	Freight store - demolished	-	unlikely	negligible
18	Explosives store - Ammunition	Explosives residues	possible	moderate
20	Explosives store - Ammunition	Explosives residues	possible	moderate
21	Explosives store - Ammunition	Explosives residues	possible	moderate
22, 23	IHU Whycroft House & annex	-	very unlikely	negligible
24	Main inflam store	Hydrocarbons, solvents, paints, sealants	likely	high
25	Air raid shelter - demolished	-	unlikely	low
26	Reading room - demolished	-	very unlikely	negligible
27	Substation No 3	transformer oils. PCBs	possible	moderate
28	Store DOE - demolished	-	unlikely	low
29	Air raid shelter - demolished	-	unlikely	low
30	Stores - demolished	-	unlikely	low
31	Hanger (50% MOD/50% MT) - Garage and store	Fuel, oils, metals, solvents, degreasers, benzene	likely	high
32	IHU Control Tower	-	unlikely	low

TABLE 5/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potential Environmental Hazard
33	Security Section Store	-	unlikely	low
34	M.T Oil Store	Oils	possible	moderate
35	M.T Workshops	Fuel, oils, metals, solvents, degreasers, benzene	likely	high
36	The Brambles	-	very unlikely	negligible
37	M.T. Workshops	Fuel, oils, metals, solvents, degreasers, benzene	likely	high
38	DOE/PSA Offices	-	very unlikely	negligible
39	M.T. Workshops + Offices	Fuel, oils, metals, solvents, degreasers, benzene, battery acids	likely	high
40	GLEAC Hanger/Classrooms, formerly 760 Squadron ETSS	Fuel oil, fuels, oils, metals, solvents, degreasers, benzene	possible	moderate
41	Paint stores N.end building 40 - demolished	Paints, solvents, thinners	likely	high
42	Oil store N.end building 40 - demolished	Oils	likely	high
43	PSA Store - main store	-	unlikely	low
44a	PSA Store - cement store	-	unlikely	low
44b	PSA Store - Inflam store	Chemicals, residues	possible	moderate
45	CBM Canvas Shop - Repair shop	Adhesives, solvents	possible	moderate
46	CBM Messroom/Battery Room & Rope store, formerly CBM store and crewroom	Bituminous residues, acids	possible	moderate
47	PSA Offices & Workshops	-	unlikely	low
48	PSA Workshop/Plant Room - formerly DOE paint and joiners shop.	Paints, thinners, solvents, wood treatment chemicals	possible	moderate
49	Ex PSA Technical Offices	-	very unlikely	negligible
50	PSA Store - overflow	-	unlikely	low
51	SMEO Offices & Workshops - formerly MT workshops incl. MT petrol pumps.	Fuels, oils, metals, solvents, degreasers	likely	high
52	SMEO Steam Plant Room	Fuel oil, water treatment chemicals	possible	moderate
53	Workshop store PSA/DOE - demolished	-	unlikely	low
54	CBM/PSA Del Toilet Block	-	unlikely	low
55	SMEO Stores	-	unlikely	low

TABLE 5/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potenti... Environmen Hazarc
56	MT offices & toilets on site 57 & 58	-	unlikely	low
57	Chapel - demolished	-	very unlikely	negligibl
58	Cooks hut - demolished	-	very unlikely	negligible
59	Old canteen - demolished	Petrol, diesel	likely	high
60	B/Masters Timber Store	Wood treatment chemicals	possible	moderate
61	B/Master Offices/Workshops	Oils, metals	unlikely	low
62	B/Master Paint Store	Paint, solvents incl. toluene and xylene	likely	high
63	Civilian Canteen - Demolished 1991	-	very unlikely	negligibl
64	Lloyds Bank	-	very unlikely	negligibl
65	PSA Inflam Store	Chemical residues	possible	moderate
66	PSA Timber Store	Wood treatment chemicals	unlikely	low
67	Esmonde Hanger - metal store, plant room and workshops. Converted to workshops in 1968.	Metals (welding slag), oils, solvents, degreasers, fuels, dope paints, thinners	likely	high
68	Swann Hanger - changing room, gym/theatre/offices & stores, workshops	Metals (welding slag), oils, solvents, degreasers, fuels. External, fuels, oils	likely	high
69	Swann Toilet Block	-	very unlikely	low
70	MASIB Inflam Store - hazardous store	Various chemicals	possible	moderat
71	MASIB Naval Store - catering	-	very unlikely	negligibl
72	Practical Wiring Classroom	-	very unlikely	negligible
73	Dunning Hanger - offices & workshops	Diesel and lubricating oil from drum store. External, fuel, oils	likely	high
74	Central Boiler House - main steam plant	General chemicals, solvents, paints, acids, water treatment chemicals, hydrocarbons	possible	moderat
75	Gas Meter House - gas intake point	-	unlikely	low
76	POL Oil Fuel Storage	Diesel	unlikely	low
77	POL Oil Fuel Storage	Diesel	unlikely	low
78	Hetwell Bungalow - Bandroom	External, pathogens	unlikely	low
79	NATEC Inflam store - demolished	Chemicals residues	possible	moderate
80	NATEC tool control - demolished	-	unlikely	low
81	Central Boiler House - demolished	Coal residues, FFO	likely	high

TABLE 5/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potential Environment Hazard
82	Fuel tank - demolished	FFO	likely	high
83	Fuel tank - demolished	FFO	likely	high
84	Canoe Club - Recreational	-	unlikely	low
85	BSM Workshop - Repair	Oils, metals	possible	moderate
86	Vine Cottage - accommodation, office & lay apart store	-	very unlikely	negligible
87	Norbury House - Armouring	-	very unlikely	negligible
88	Contract Caterers Offices - Compass offices - formerly stationery store.	-	very unlikely	negligible
89	Contract Caterers Restroom	-	very unlikely	negligible
90	Unknown. S of 89 - demolished	-	very unlikely	negligible
91	Triumph Galley Complex - Dining hall, includes a boiler house.	Fuel oil	unlikely	low
92	Anson Block	-	very unlikely	negligible
93	'Q' cleansing station - demolished	Detergent, solvent residues	possible	moderate
94	Air Raid Shelter & Joiners Store	-	unlikely	low
95	DOE office and store - demolished	-	unlikely	low
96	MT Tyre Store/Power House - formerly standby generator room. Former Lee-on-the-Solent Power Station.	Coal and oil residues. Transformer oils, PCBs	likely	high
97	Blake Block	External, pathogens	unlikely	low
98	Toilet block - DOE - demolished	-	unlikely	low
99	MT Petrol store & Office	Petrol	likely	high
100	Crane Bay & Garages	Fuel, oils, degreasers	possible	moderate
101	Education Centre/A.M.S - on site of former dinghy packing store	-	very unlikely	negligible
102	Flying clothing store and general mess	-	very unlikely	negligible
103	Icarus Club	-	very unlikely	negligible
104	PSA Main Office Complex	-	very unlikely	negligible
105	Wardroom Annexe Plantroom - formerly wardroom boiler house	Fuel oil	unlikely	low
106	'P' cleansing station - demolished	Detergents, solvents	possible	moderate
107	Wardroom Annexe	-	very unlikely	negligible
108	Wardroom Tennis Courts	-	very unlikely	negligible
109	Air raid shelter - demolished	-	unlikely	low

TABLE 5/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potenti... Environmen Hazar
110	Air raid shelter - demolished	-	unlikely	low
111	Westcliffe Lodge	-	very unlikely	negligib
112	Air raid shelter	-	unlikely	low
113	Air raid shelter - demolished	-	unlikely	low
114	Air raid shelter - demolished	-	unlikely	low
115	Police Search Hut	-	unlikely	low
116	Eagle Block	External - hydraulic oils	possible	moderate
117	Indoor Squash Courts	-	very unlikely	negligibl
118	Wardroom	-	very unlikely	negligible
119	Westcliffe Lodge	-	very unlikely	negligibl
120	Air raid shelter - demolished	-	unlikely	low
121	Exmouth Block	-	very unlikely	negligibl
122	Toilet - demolished	-	unlikely	low
123	Fire Store	-	unlikely	low
124	Roman Catholic Church	-	very unlikely	negligible
125	Church of England	-	very unlikely	negligibl
126	Church of Scotland	-	very unlikely	negligible
127	Church Amenities Hall	-	very unlikely	negligibl
128	Eagle Club	-	very unlikely	negligible
129	NAAFI Store	-	very unlikely	negligibl
130	NAAFI Shop	-	very unlikely	negligible
131	Main Gate Guard Room	-	very unlikely	negligibl
132	MOD Police Offices	-	very unlikely	negligible
133	Fire Booster Pump House	-	unlikely	negligibl
134	Trailer Pump House - demolished	-	unlikely	low
135	Barbers Shop - formerly also cobblers shop	-	unlikely	low
136	Air raid shelter - demolished	-	unlikely	low
137	Duncan Block	-	very unlikely	negligibl
138	Laundromat - formerly laundry	Bleaches, dyes, detergents	possible	moderate
139	Cunningham Block	-	very unlikely	negligibl
140	Laundry - demolished	Bleaches, dyes, detergents	possible	moderate
141	No 1 Substation - formerly ambulance garage block	Fuel oil, transformer oil, PCBs	likely	high

TABLE 5/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potential Environment Hazard
142	Frobisher Block	-	very unlikely	negligible
143	Air raid shelter - demolished	-	unlikely	low
144	Store	-	unlikely	low
145	Model Club/Photographic Centre	Ethyls, methyls, trichloroethane	possible	moderate
146	Sick Bay	-	possible	low
147	Grenville Block - Accommodation	-	very unlikely	negligible
148	Keppel Block	-	very unlikely	negligible
149	Keppel Block	-	very unlikely	negligible
150	Keppel Block	-	very unlikely	negligible
151	Low level water storage tank	-	very unlikely	negligible
152	YSM Workshop & store - demolished	Oils, metals	unlikely	low
153	MASU Offices	-	unlikely	negligible
154	Overlord Hanger	Fuel, oils, degreasers, solvents, benzene	likely	high
155	MASU Workshops/Paint Bay	Paints, solvent, thinners, internal and external	likely	high
156	MASU Inflam Store - disused	External, oil, internal, chemical residues	likely	high
157	Air raid shelter - demolished	-	unlikely	low
158	MASU Inflam Store	Chemical residues	unlilkely	low
159	NBCD/Grounds Staff Store	Fuel, herbicide	possible	moderate
160	Contract Cleaners Restroom	-	very unlikely	negligible
161	Small Arms Indoor Range	External, fuel, oil, hydraulic fluids. Internal, lead fume	likely	high
162	WO/CPOS Mess/Hawke Block	-	very unlikely	negligible
163	Air raid shelter - demolished	-	unlikely	low
164	LRS Workshop	Oil, degreaser, metals	possible	moderate
165	Wykeham Hall	-	very unlikely	negligible
166	Dental Block	Mercury.	possible	moderate
167	Boxing Gymnasium	-	very unlikely	negligible
168	Air raid shelter - demolished	-	unlikely	low
169	WRNS/Princess Marina Block	-	very unlikely	negligible
170	WRNS Cycle Shop	-	very unlikely	negligible
171	Gas Meter House	-	very unlikely	negligible

TABLE 5/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potential Environment Hazard
172	AES Computer Store - formerly welfare cycle store	-	very unlikely	negligible
173	Troubridge Block 4	-	very unlikely	negligible
174	Troubridge Block 3	-	very unlikely	negligible
175	Troubridge Block 2	-	very unlikely	negligible
176	Troubridge Block 1	-	very unlikely	negligible
177	Troubridge Block 5	-	very unlikely	negligible
178	Troubridge Block 6	-	very unlikely	negligible
179	Troubridge Block 7	-	very unlikely	negligible
180	Troubridge Block 8	-	very unlikely	negligible
181	Troubridge Block 10	-	very unlikely	negligible
182	Troubridge Block 9	-	very unlikely	negligible
183	Troubridge Block 11	-	very unlikely	negligible
184	Air raid shelter - demolished	-	unlikely	low
185	Septic Tank	Pathogens	possible	moderate
186	Sewage Pump House	Lubricating oils	unlikely	low
187	Wameford Block	-	very unlikely	negligible
188	Somerville Block 1	-	very unlikely	negligible
189	Somerville Block 2	-	very unlikely	negligible
190	Somerville Block 3	-	very unlikely	negligible
191	Somerville Block 4	-	very unlikely	negligible
192	Somerville Block 5	-	very unlikely	negligible
193	Somerville Block	-	very unlikely	negligible
194	Somerville Block	-	very unlikely	negligible
195	Air raid shelter - demolished	-	unlikely	low
196	Air raid shelter - demolished	-	unlikely	low
197	Air raid shelter - demolished	-	unlikely	low
198	Air raid shelter - demolished	-	unlikely	low
199	Air raid shelter - demolished	-	unlikely	low
200	Air raid shelter - demolished	-	unlikely	low
201	Air raid shelter - demolished	-	unlikely	low
202	Car Club	Fuel, oils, degreaser	possible	moderate
203	Rodney Block 9	-	very unlikely	negligible
204	Rodney Block 8	-	very unlikely	negligible

TABLE 5/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potential Environment Hazard
205	Rodney Block 7	-	very unlikely	negligible
206	Rodney Block 6	-	very unlikely	negligible
207	Rodney Block 5	-	very unlikely	negligible
208	Rodney Block 4	-	very unlikely	negligible
209	Rodney Block 3	-	very unlikely	negligible
210	Rodney Block 2	-	very unlikely	negligible
211	Rodney Block 1	-	very unlikely	negligible
212	Rodney Block 10	-	very unlikely	negligible
213	Rodney Block	-	very unlikely	negligible
214	Rodney Block	-	very unlikely	negligible
215	Vernon Block 1	-	very unlikely	negligible
216	Vernon Block 2	-	very unlikely	negligible
217	Vernon Block 3	-	very unlikely	negligible
218	Vernon Block 4	-	very unlikely	negligible
219	Vernon Block 5	-	very unlikely	negligible
220	Instructional Cinema - demolished 1994	FFO	likely	high
221	Field Gun Drill Shed	External - herbicide	possible	moderate
222	Vernon Boiler House	Fuel oil	possible	moderate
223	Cleansing Station	Detergent, solvent residues	possible	moderate
224	Field Gun Accommodation	-	unlikely	low
225	Field Gun Workshop	Oils, metals, degreaser	possible	moderate
226	Field Gun Offices/Mess	-	very unlikely	negligible
227	Gas Meter House	-	unlikely	low
228	Onslow Block	-	very unlikely	negligible
229	Onslow Block	-	very unlikely	negligible
230	Onslow Block	-	very unlikely	negligible
231	Onslow Block 1	-	very unlikely	negligible
232	Onslow Block 2	-	very unlikely	negligible
233	Onslow Block 3	-	very unlikely	negligible
234	Onslow Block 4	-	very unlikely	negligible
235	Onslow Block 5	-	very unlikely	negligible
236	Onslow Block 6	-	very unlikely	negligible
237	Civilian Cleaners Restroom	-	very unlikely	negligible

TABLE 5/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potential Environmental Hazard
238	Nelson Block 6	-	very unlikely	negligible
239	Nelson Block 5	-	very unlikely	negligible
240	Nelson Block 4	-	very unlikely	negligible
241	Nelson Block 3	-	very unlikely	negligible
242	Nelson Block 2	-	very unlikely	negligible
243	Nelson Block 1	-	very unlikely	negligible
244	Nelson Block	-	very unlikely	negligible
245	Nelson Block	-	very unlikely	negligible
246	Nelson Block	-	very unlikely	negligible
247	Victorious Workshops	External, coal residues, fuel oils, solvents, degreasers, metals	likely	high
248	Heat Engine Laboratory	Metals, oils, degreaser	possible	moderate
249	R & IT Training Block	-	very unlikely	negligible
250	Mountbatten Block	-	very unlikely	negligible
251	Mountbatten Block	-	very unlikely	negligible
252	Mountbatten Block	-	very unlikely	negligible
253	Mountbatten Block 1	-	very unlikely	negligible
254	Mountbatten Block 2	-	very unlikely	negligible
255	Mountbatten Block 3	-	very unlikely	negligible
256	Mountbatten Block 4	-	very unlikely	negligible
257	Mountbatten Block 5	-	very unlikely	negligible
258	Mountbatten Block 6	-	very unlikely	negligible
259	Keyes Block 6	-	very unlikely	negligible
260	Keyes Block 5	-	very unlikely	negligible
261	Keyes Block 4	-	very unlikely	negligible
262	Keyes Block 3	-	very unlikely	negligible
263	Keyes Block 2	-	very unlikely	negligible
264	Keyes Block 1	-	very unlikely	negligible
265	Keyes Block	-	very unlikely	negligible
266	Keyes Block	-	very unlikely	negligible
267	Air raid shelter - demolished	-	unlikely	low
268	Cleansing Station - demolished	Detergent and solvent residues	possible	moderate
269	No 8 Substation	lubricant oils, PCBs	possible	moderate

TABLE 5/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potential Environmental Hazard
270	Boyd Block Annexe	-	very unlikely	negligible
271	Boyd Block	-	very unlikely	negligible
272	PO's mess/Jervis Block	-	very unlikely	negligible
273	Grounds Staff Office/Store	Diesel, lubricating and hydraulic oils, herbicide	likely	high
274	Grounds Staff Stores	Diesel, lubricating and hydraulic oils, herbicide	likely	high
275	Grounds Staff Stores	Diesel, lubricating and hydraulic oils, herbicide	likely	high
276	Ground staff store - demolished	Diesel, lubricating and hydraulic oils, herbicide	likely	high
277	Kingsland House	-	very unlikely	negligible
278	Tennis Courts	-	very unlikely	negligible
279	Air raid shelter - demolished	-	unlikely	low
280	Rugby club - demolished	-	very unlikely	negligible
281	Air raid shelter - demolished	-	unlikely	low
282	Air raid shelter - demolished	-	unlikely	low
283	Air raid shelter - demolished	-	unlikely	low
284	Air raid shelter - demolished	-	unlikely	low
285	Argus Gate Guard Room	-	very unlikely	negligible
286	"A" Hanger, Fromson Type	Fuel, oils internal and external. Degreasers, solvents, benzene, metals	likely	high
287	"C" Hanger, Fromson Type	Fuel, oils internal and external. Degreasers, solvent, benzene, metals	likely	high
288	MASU Store - formerly B hangar	Fuel,oils - internal and external. Degreasers, solvent, benzene, metals	likely	high
289	"D" Hanger, Fromson Type	Fuels, oils internal and external.	likely	high
290	"E" Hanger, Fromson Type	Oils, kerosene, hydraulic fluids, degreasers, solvent, benzene, metals	likely	high
291	"F" Hanger, Fromson Type	Fuel, oils, internal and external. Degreasers, solvents, benzene, metals	likely	high
292	"B" Hanger, Fromson Type	Fuel, oils, internal and external. Degreasers, solvents, benzene, metals	likely	high

TABLE 6/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potential Environment Hazard
293	Workshop, Unoccupied - formerly MARTSU	Metals, oils, solvents	likely	high
294	Toilet Block, Unoccupied - formerly MARTSU	-	unlikely	low
295	Offices, Unoccupied - formerly MARTSU including boiler house	Fuel, metals	possible	moderate
296	"G" Hanger, Fromson Type	Fuel, oils, internal and external. Degreasers, solvents, benzene, metals	likely	high
297	No 7 Substation	Transformer oils	possible	moderate
298	Dutch barn workshed (134) - demolished	Oils, degreaser, metals	possible	moderate
299	"O" Hanger, Blister Type	Fuel, oils, internal and external. Degreasers, solvents, benzene, metals	likely	high
300	MASU Workshop	oils, degreaser, metal	possible	moderate
301	"N" Hanger, Blister Type	Fuel, oils, internal and external. Degreasers, solvents, benzene, metals	likely	high
302	MASU Offices & Workshops Formerly Guided Weapons building, up to 1966	Adhesives, sealants, acrylic paints, external hydraulic fluids, radioactivity	possible	moderate
303	"M" Hanger, Blister Type	Fuel, oils, internal and external. Degreasers, solvents, benzene, metals	likely	high
304	"L" Hanger, Blister Type	Fuel, oils, internal and external. Degreasers, solvents, benzene, metals	likely	high
305	"K" Hanger, Blister Type	Fuel, oils, internal and external. Degreasers, solvents, benzene, metals	likely	high
306	"J" Hanger, Blister Type	Fuel, oils, internal and external. Degreasers, solvents, benzene, metals	likely	high
307	"H" Hanger, Blister Type	Fuel, oils, internal and external. Degreasers, solvents, benzene, metals	likely	high
308	SUAS Offices - formerly included optica flight	Fuel, oils	possible	moderate
309	SUAS Offices	-	very unlikely	negligible
310	SUAS Inflam Store	Dope, solvents, greases, thinners, oils	likely	high
311	SUAS Store - flying clothing	Oils from drum store	possible	moderate

TABLE 6/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potential Environmental Hazard
312	NAAFI (52)	-	very unlikely	moderate
313	Weapons store - unoccupied	Explosives, chemicals residues. Herbicide, fertilizers, oils, fuel	possible	moderate
314	Torpedo warheads (151) - unoccupied	Explosives, chemicals residues. Herbicide, fertilizers, oils, fuel	possible	moderate
315	Ready-use live bombs (150) - unoccupied	Explosives, chemicals residues. Herbicide, fertilizers, oils, fuel	possible	moderate
316	Live bombs and depth charges (148B) - unoccupied	Explosives, chemicals residues. Herbicide, fertilizers, oils, fuel	possible	moderate
317	Live bombs and depth charges (148C - unoccupied	Explosives, chemicals residues. Herbicide, fertilizers, oils, fuel	possible	moderate
318	Smoke floats (147) - unoccupied	Explosives, chemicals residues. Herbicide, fertilizers, oils, fuel	possible	moderate
319	Live bombs and depth charges (148C - unoccupied	Explosives, chemicals residues. Herbicide, fertilizers, oils, fuel	possible	moderate
320	Pyrotechnics (149) - unoccupied	Asbestos	likely	high
321	UHF Receiver Station - Disused	Asbestos	likely	high
322	Unoccupied - possibly related to 321	Asbestos	likely	high
323	N. Camp Accommodation (141) - demolished	Asbestos	likely	high
324	N. camp mess block (144) 0 demolished	Asbestos	likely	high
325	N. camp Accommodation (145) - demolished	Asbestos	likely	high
326	N. camp Accommodation (140) - demolished	Asbestos	likely	high
327	N. camp Accommodation (140) - demolished	Asbestos	likely	high
328	N. camp Accommodation (140) - demolished	Asbestos	likely	high
329	N. camp Accommodation (140) - demolished	Asbestos	likely	high
330	N. camp Accommodation (140) - demolished	Asbestos	likely	high

TABLE 6/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potential Environmental Hazard
331	N. camp Accommodation (140) - demolished	Asbestos	likely	high
332	"U" Hanger, Fromson Type	Fuel, oils internal and external. Degreasers, solvents, benzene, metal	likely	high
333	N. camp Accommodation (140) - demolished	Asbestos	likely	high
334	N. camp Accommodation (140) - demolished	Asbestos	likely	high
335	N. camp Accommodation (140) - demolished	Asbestos	likely	high
336	N. camp Accommodation (140) - demolished	Asbestos	likely	high
337	N. camp Accommodation (140) - demolished	Asbestos	likely	high
338	N. camp Accommodation (140) - demolished	Asbestos	likely	high
339	"T" Hanger, Fromson Type	Fuel, oils internal and external. Degreasers, solvents, benzene, metals	likely	high
340	No 6 Substation	Transformer oil, PCBs	possible	modera
341	Ground staff dutch barn - demolished	-	unlikely	low
342	Ground staff dutch barn, formerly workshed (134) demolished	-	unlikely	low
343	"R" Hanger, Blister Type	Fuel, oils internal and external. Degreasers, solvents, benzene, metals	likely	high
344	"P" Hanger, Blister Type	Fuel, oils internal and external. Degreasers, solvents, benzene, metals	likely	high
345	Toilet, formerly Latrine (34)	-	unlikely	low
346	AIU Offices	-	very unlikely	negligib
347	Compass Bay	-	very unlikely	negligible
348	"Q" Hanger, Fromson Type	Fuel, oils internal and external. Degreasers, solvents, benzene, metals	likely	high
349	Offices, formerly squadron offices (139)	-	very unlikely	negligib
350	SAR Store/Bristows	Asbestos	likely	high
351	SAR Offices/Bristows	-	very unlikely	negligib
352	SAR Offices/Bristows	-	very unlikely	negligible

TABLE 5/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potential Environmental Hazard
353	North-West Boiler House	Hydrocarbons, asbestos	likely	high
354	Air raid shelter (250)	-	unlikely	low
355	Squadron oil store	Oils	likely	high
356	No 4 Bellman Hanger	External - lead on old firing range. Internal - fuel, oils (internal and external) degreasers, solvents, benzene, metals	likely	high
357	MASIB air stores	-	unlikely	low
358	No 1 Bellman Hanger	External - lead on old firing range. Internal - fuel, oils (internal and external) degreasers, solvents, benzene, metals	likely	high
359	Air raid shelter	-	unlikely	low
360	Glider Club Gas Bottle Store	-	unlikely	low
361	No 4 Substation - formerly EME cable compound (191)	Transformer oil	possible	moderate
362	Static Water Tank	Herbicide, fuel, oil.	likely	high
363	Unoccupied - formerly 25 yard range (131)	Lead	possible	moderate
364	Unoccupied - formerly 25 yard range (131)	Lead	possible	moderate
365	Air raid shelter, formerly bomb store (138) - demolished	Explosives residues	possible	moderate
366	FVIO	-	unlikely	low
367	A/Field Back-up Comms Bldg	-	very unlikely	negligible
368	Janvrin House	-	very unlikely	negligible
369	Coxhams Cottage	-	very unlikely	negligible
370	Newton House	-	very unlikely	negligible
371	Dean House	-	very unlikely	negligible
372	Squash Courts, Kings Road	-	very unlikely	negligible
373	VCC, Manor Way	-	very unlikely	negligible
374	MASU Toilet Block	-	unlikely	low
375	ASDEG for Wykeham Hall - formerly generator house	Fuel oil, lubricating oils.	possible	moderate
376	Bosums Yard toilet	-	unlikely	low
377	ILS localiser Building	-	very unlikely	negligible
378	ILS Glide Path building	-	very unlikely	negligible

TABLE 5/1 Assessment of Potential Contamination in Buildings

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Pote... Environme... Haz...
379	Contractors Compound	Assorted waste materials, arsenic, fuel oil	likely	high
380	SAR Inflam Store	Chemical residues	possible	mode...
381	UHF ASDEG Building	Oils from drum store, asbestos	possible	moder...
382	Scrap Metal Compound	Metals, PCBs, lubricants, refrigerants	likely	high
383	Grounds Staff Rest Room	-	very unlikely	negligi...
384	Jervis Block 1	-	very unlikely	negligi...
385	Jervis Block 2	-	very unlikely	negligi...
386	Gas Cylinders Compound	-	unlikely	negligi...
387	Phot Sect. Store/Toilet Bk	Acids, bleaches, formaldehyde, ammonium thyosulfate, K hydroquinone	possible	moder...
388	Junior Rates	-	possible	moder...
389	Ardent Block, NBCD Section. Battle damage unit on site of former aircraft pens (1944)	-	very unlikely	negligi...
390	Fire ground and scrap aircraft store.	Fuel, oils, burnt insulation residues, metals, chemical foams, radium.	very likely	very hi...
391	2nd Fire Ground	Fuel, arsenic, insulations residues	very likely	very high
392	Long wall at main fire ground	Coal, metals, PAH	likely	high
393	Airfield	Herbicides, fuel and oil	possible	moderate

Table 6/2 1944 PLAN WITH EARLY NUMBERING

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potential Environmer Hazard
2 x 123	Marines quarters - against boundary fence south of 344	-	very unlikely	negligible
127	latrines - against boundary fence south of 344	-	unlikely	low
102	Ammunition store - west of 363 & 364 - demolished	Chemical and explosives residues	possible	moderate
132	Transformer store - adjacent and south of 361 - demolished	Transformer oils, PCBs	likely	high
260	Defence Post - west of 365 - demolished	-	very unlikely	negligible
122	Pavilion - north of a turning to runway	-	very unlikely	negligible
154	Storage section office - west of 378 - demolished	-	very unlikely	negligible
155	WT Stores - west of 378 - demolished	-	unlikely	low
156	Armouring - west of 378 - demolished	-	unlikely	low

Table 6/2 Cont'd AREA IN MIDDLE OF AIRFIELD ON SITE OF MILVIL FARM (1944 PLAN)

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potential Environmenta Risk
34	Latrines	-	unlikely	low
37	WRNS Cooks Hut	-	very unlikely	negligible
134	Workshed	-	unlikely	low
136	Dispersed office and stores	-	very unlikely	negligible
158	Marines quarters	-	very unlikely	negligible
159	Impliment store	-	unlikely	low
160	Farm buildings	-	unlikely	low
161	Bessoneau hangar	Fuel, oils, internal and external. Degreasers, solvents, benzene, metals	likely	high
162	Polar diagram base	-	unlikely	low
163	Radar test hut	-	unlikely	low
164	Radar work shed	-	unlikely	low
4 x 260	Defence posts	-	very unlikely	negligible

Table 6/2 1944 PLAN WITH EARLY NUMBERING

Building Ref	Building	Contamination	Likelihood of Potential Ground Contamination	Potent Environmer Hazar
102	Ammunition store - west and north west of Swann hangar (Building 68)	chemical residues	unlikely	low
106	Tanker sheds - west and north west of Swann hangar (Building 68)	Fuel, oils	likely	high
188	Link trainer - west and north west of Swann hangar (Building 68)	-	unlikely	low
253	Air raid shelter (Admiralty) - west and north west of Swann hangar (Building 68)	-	unlikely	low
113	Incindiary ammunition store - west and north west of Swann hangar (Building 68)	Chemical residues	unlikely	low
44B	Machine gun test butt - west and north west of Swann hangar (Building 68)	Lead	possible	moderate

Air photo of 2/12/1944 shows aircraft pens to north west of Milvil Farm in centre of airfield.