Ministry of Defence

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[redacted]

17 December 2018

Ref. FOI 2018/14811

Dear [redacted]

Thank you for your email of 16 November 2018 requesting the following information:

"I now refine as below, being the first I requested:- a. Location and co-ordinates of where radium 226 identified."

Your request has been dealt with under the Environmental Information Regulations 2004 (EIR).

A search for the information has now been completed within the Ministry of Defence (MOD) and I can confirm that information in scope of your request is held.

The information you have requested can be found enclosed at Annex A.

Under regulation 9(1) of the EIR (Advice and Assistance) you may find it helpful to note that some personal information has been redacted under regulation 13 for data protection reasons.

If you have any queries regarding the content of this letter, please contact this office in the first instance.

If you wish to complain about the handling of your request, or the content of this response, you can request an independent internal review by contacting the Information Rights Compliance team, Ground Floor, MOD Main Building, Whitehall, SW1A 2HB (e-mail CIO-FOI-IR@mod.gov.uk). Please note that any request for an internal review should be made in writing within 40 working days of the date of this response.

If you remain dissatisfied following an internal review, you may raise your complaint directly to the Information Commissioner under the provisions of Section 50 of the Freedom of Information Act. Please note that the Information Commissioner will not normally investigate your case until the MOD internal review process has been completed. The Information Commissioner can be contacted at: Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF. Further details of the role and powers of the Information Commissioner can be found on the Commissioner's website at https://ico.org.uk/.

Yours sincerely,

DIO Secretariat

Defence Estates

HMS Daedalus

Land Quality Assessment

Radiological Survey Report
Project No 05002

Final Report

31 May 2007

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

DEFENCE ESTATES
Delivering Estate Solutions to Defence Needs

Report for

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Defence Estates

HMS Daedalus

Land Quality Assessment

Radiological Survey Report
Project No 05002

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Land Quality Statement for Radiological Survey at HMS Daedalus

Introduction and Terms of Reference

Entec UK Ltd. (Entec) was commissioned by Defence Estates (DE) to undertake a radiological survey of the HMS Daedalus site, in November 2004. The purpose of the work was to assess radiological land quality at the site, and the health and environmental risks that any radioactive contamination may present currently or in association with changing the use of the land. It comprised a surface walkover investigation conducted by Entec between November 2004 and January 2005, followed by intrusive investigation in September 2005. This work was undertaken under contract DE11/4471 between Entec UK Ltd and Defence Estates.

Site Location, Description and History

HMS Daedalus is a former airfield, barracks and training establishment of around 200 ha situated between Stubbington and Lee-on-Solent, Hampshire.

The airfield was used by the Royal Navy (Fleet Air Arm) from first construction of the site in 1913 to closure of the site in 1996. Currently various buildings are let to local commercial businesses, while the airfield remains operational for private and commercial light aircraft. The airfield control tower and other facilities are leased by the Maritime and Coastguard Agency and Hampshire Constabulary. The airfield occupies the majority of the site (approximately 170 ha) and comprises three runways in triangular alignment, while the southern portion of the site, is the former Technical Area (approximately 30 ha) and comprises a range of buildings including hangars, workshops, administrative buildings and barrack accommodation. Some of the hangars and open areas are currently let to local businesses for storage and distribution operations.

Environmental Setting and Site Sensitivity

The general sequence of deposits at the site comprises made ground, overlying brickearth deposits of silty sandy clay. These are underlain by Plateau and Terrace Gravels over the Bracklesham Beds.

The Plateau and Terrace Gravels are classified as minor aquifer. Low permeability non-water bearing drift deposits occur at the surface (Brickearth) across much of the site. Groundwater was encountered within the Plateau and Terrace Gravels at 3.5-3.8 m bgl.

The Solent is in part located adjacent to the southwest of the site. A tributary of the River Alver lies approximately 30 m to the east of the site. The River Alver discharges to the Solent approximately 3 km downstream of the site at Stokes Bay.

Groundwater is considered to be of moderate sensitivity due to the likely high permeability of the Plateau and Terrace Gravel. It is possible that the aquifer provides baseflow to the River Alver to the east of the site, and any mobile contaminants could potentially enter this surface water. In addition, groundwater may also be in continuity with coastal waters in the Solent.

Sources of Information

The development of the site and surrounding area and associated environmental information has been derived from the following sources:

- 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;
- 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;
- Entec Phase Two Radiological Investigation (ref: 03385rr056i1, dated 8 April 2003) which detailed findings of a selective radiological survey.

Radiological Survey

The radiological survey comprised a surface walkover using sensitive radiological monitoring instruments, giving 100% coverage of all accessible parts of the site not covered with buildings or hard paving. The bulk of the survey work was carried out using GPS-linked equipment, allowing simultaneous digital recording of probe readings and national grid co-ordinates. The intrusive investigation comprised the excavation of 69 shallow trial pits, with radiological monitoring of sub-surface soils.

Overall Land Quality

The statutory regime for the identification and remediation of contaminated land comprises Part IIA of the Environmental Protection Act 1990, supported by the Contaminated Land (England) Regulations (2000) and Statutory Guidance (DETR Circular 02/2000). From August 2006 the contaminated land regime was extended to include radioactivity in DEFRA Circular 01/2006.

Statutory control of radiological issues also lies within the framework of the Radioactive Substances Act 1993 (RSA93) and the Ionising Radiation Regulations 1999 (IRR99). These legislative instruments are administered in England respectively by the Environment Agency and the Health and Safety Executive.

Although predominantly free from radioactive contamination, a number of point radioactive sources were discovered within the Daedalus site, with surface probe measurements indicating a maximum activity concentration of 4 Bq/g and a maximum contact dose rate of 1.3 μSv/h.

Environmental Risk Assessment

Radioactive contamination at Daedalus represents a low risk in the context of current site use, and as such the site is suitable for a continuation of current use without the need for further action. However, if the site is to be redeveloped for other uses, especially residential, then some remedial action is recommended to remove minor quantities of radioactively contaminated material. A total of 0.2 m^3 of Low Level Waste and 7.5 m^3 of 'exempt' waste has been identified by the intrusive investigation as requiring off-site disposal.

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1. Introduction

1.1 Terms of Reference

Entec UK Ltd. (Entec) was commissioned by Defence Estates (DE) to undertake a radiological survey of the HMS Daedalus site, on 2 November 2004. This commission was carried out under the Specialist Environmental Term Contract DE 11/4471 between Entec and DE.

DE require an assessment of radiological land quality at the Daedalus site, and of the health and environmental risks that any contamination may present currently or in association with changing the use of the land. The findings are presented in this report, the Phase Two Land Quality Assessment Radiological Survey.

Entec carried out a radiological survey as part of a Phase Two Land Quality Assessment (LQA) in 2003, which assessed the potential for radioactive contamination to exist in parts of the Daedalus site, and recommended further action to confirm the conclusions presented. The LQA identified several areas of potential concern, arising from workshop activities in the Technical Area of the site; and from historical waste disposal. A summary of the earlier Phase 2 LQA is included in this report.

The new radiological survey described in this report covers the whole site, but is concerned only with radioactive contamination. Aspects of non-radioactive contamination will be dealt with in a separate report.

This report presents and interprets the findings of the surface radiological survey and the subsequent intrusive investigation.

1.2 Site Location

HMS Daedalus is a former airfield, barracks and training establishment of around 200 ha situated between Stubbington and Lee-on-Solent, Hampshire. The site was vacated by the Royal Navy about 1997. Currently 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 in a triangular alignment. The southern portion of the site is the former Technical Area (approximately 30 ha) and comprises a range of buildings including hangars, workshops, administrative buildings and barrack accommodation. Some of the hangars and open areas are currently let to local businesses for storage and distribution operations.

Figure 1 indicates the location of the site and the MOD boundary.

1.3 Site Description

1.3.1 General Description

HMS Daedalus is located between Lee on the Solent and Stubbington, Hampshire. The site is a former airfield, barracks and training establishment extending to around 200 ha.

Access to the site is currently by Argus Gate off Broom Way (B3385) to the east of the site. The site is divided into two distinct areas as follows:

- airfield and associated former aircraft hangars (northern area);
- former workshops, accommodation blocks and aircraft hangars (southern technical area).

The northern airfield is mainly grassed (85% of area) with hardstanding on the runways, taxiways, hangar surrounds (10% of area) and buildings (5% of area).

The southern technical area comprises workshops, hangars and other buildings (30% of area), and associated hardstanding (50% of area), with local grassed areas (20% of area).

The site is currently occupied in part by tenants conducting a wide variety of activities, including the following:

- light aircraft repair and storage;
- gliding club;
- warehousing and storage;
- vehicle repairs;
- hovercraft museum; and
- helicopter search and rescue base.

The Site Layout Plan is shown in Figure 2.

1.3.2 Services and Drainage

Plans detailing the services present at the site were provided by Defence Estates, Portsmouth. MOD electricity cables, water supply pipes, telecommunication cables and drainage pipes are present at the site. An Excavation and Underground Site Services Clearance Certificate was issued on 19 February 2003 by Interserve, acting as Works Services Manager (WSM).

1.4 Site History

A detailed description of the historical development of the site is presented in the Phase One LQA report prepared by WSP for Defence Works Services, a predecessor to Defence Estates. A summary of site development is presented in Table 1.1.

Table 1.1 Summary of Site Development

Date	Description of Development
Pre 1917	Agricultural land.
1917	Site developed as Royal Navy Air Station (RNAS) Lee on the Solent, becoming HM Naval Seaplane Training School.
1919	Site activities run down, but remained RAF and Naval Co-operation School.
1932	Development to Headquarters of Coastal Area, aerodrome construction, new barracks, hangars and technical buildings.
1939	Formation of HMS Daedalus, airfield improvements, perimeter track construction, air-raid shelters, trenches, runway extension and airfield expansion.
1946	Slipway abandoned, Fleet Air Arm (FAA) Field Gun Crew HQ established.
1959	FAA technical training establishment established, Air Electrical School established as HMS Ariel.
1965	Site renamed HMS Daedalus.
1988	Bristows Helicopters commenced operations at site on behalf of HM Coastguard.
1996	Site no longer in military use. Buildings throughout the site leased to various private businesses. Many buildings no longer maintained or in use. Airfield in use for police and other private light aircraft flights. Bristows helicopters operational at site on behalf of HM Coastguard.

1.5 Environmental Setting

1.5.1 Topography

The site lies at a ground elevation of approximately 5 m to 10 m Above Ordnance Datum (AOD). The ground surface rises gently from the coast at the southwestern boundary to a plateau centrally within the airfield. Land at the eastern boundary slopes down eastwards towards a tributary of the River Alver.

Adjacent land uses are as follows:

- West - residential housing with gardens;
- North - school and agricultural land;
- East - residential housing with gardens, agricultural land;
- South - Residential housing and Lee on the Solent seafront beyond.

1.5.2 Geology

The geological regime was established in the Desk Study from published geological and previous site investigation data. The British Geological Survey 1:50 000 geological map for Portsmouth indicates that the site is underlain by Plateau Gravel over the Bracklesham Beds. Brickearth is indicated within the north of the airfield overlying the Plateau Gravel.

The general sequence of deposits based on previous LQA investigations at the site is 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.

1.5.3 Hydrogeology

The groundwater vulnerability map for north west Hampshire indicates that the site is underlain by a minor aquifer. These aquifers seldom produce large quantities of water for abstraction, but they are important for local supplies and in supplying base flow to rivers. The groundwater vulnerability map indicates that low permeability non-water bearing drift deposits occur at the surface (Brickearth) across much of the site.

Groundwater was encountered in previous LQA ground investigations within the Plateau and Terrace Gravels at 3.5-3.8 m bgl. The direction of groundwater flow is anticipated to be southwards towards the sea. In localised eastern areas of the site, shallow groundwater flow is anticipated to be eastwards towards the River Alver.

1.5.4 Hydrology

The Solent is in part located adjacent to the south west of the site in the vicinity of the slipway. A tributary of the River Alver lies approximately 30 m to the east of the site. The River Alver discharges to the Solent approximately 3 km downstream of the site at Stokes Bay.

1.6 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.

The site sensitivity in respect of radioactivity should be viewed in terms of the potential impact on human health from external exposure to ionising radiation, or internal exposure following ingestion or inhalation of radioactive material. Although the results of such exposure could be severe, the likelihood of significant exposure in the context of current site usage is low.

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, radium salts being substantially insoluble, migration in groundwater is considered unlikely to occur.

With respect to the River Alver surface watercourse, the site is of moderate to high sensitivity due to its proximity to the site. As above, however, migration of radium contamination into the River Alver is considered unlikely to occur.

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

2. Potentially Contaminative Activities

2.1 Historical Site Operations

HMS Daedalus was an operational naval airfield for most of the 20th century. As such the repair and maintenance of military aircraft and equipment would certainly have been carried out on site during this period.

Radioactive contamination on this site is most likely to have arisen from the uncontrolled disposal prior to the 1960s of wastes containing radium. The radium was a constituent of luminous paint used on aircraft cockpit instruments, compasses, gun-sights, etc. prior to the 1960s. Repair, maintenance and scrapping of such equipment generated waste instruments and components that were often disposed of on site, either by burial or incineration followed by spreading or burial of the ash.

Consequently there is the potential for radium contamination to be present on or near the ground surface in the vicinity of former maintenance workshops, or within Made Ground in any areas where waste (especially ash) disposal was carried out historically.

Potential non-radioactive contamination is considered in a separate report.

2.2 Current Site Operations

It is considered extremely unlikely that recent or current site operations will have resulted in any radioactive ground contamination.

3. Site Investigation

3.1 Previous Investigations

3.1.1 2001 Phase 1 Desk Study

Entec's 2001 desk study included a review of 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 Defence Scientific and Technical Laboratory Radiation Protection Services (DRPS), MODs radiological protection specialists:

- 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 desk study 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.

3.1.2 2003 Phase 2 LQA

A programme of further radiological investigation was undertaken in 2003 to assess those areas of the site considered to be at highest 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.

The scope of works conducted by Entec in 2003 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.

The findings of this investigation were presented in Entec's 2003 LQA, which concluded that the majority of the potentially high risk areas were free from radiological contamination. However, at 28 locations surrounding former workshops, hangars and burning grounds point sources of elevated radioactivity were recorded. These included 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.

On consideration of these findings, it was considered by DE that a full radiological survey of the whole of the Daedalus site was justified.

3.2 Radiological Walkover Survey 2004/5

3.2.1 Investigation Aim

This radiological survey covering the whole site followed on from the 2003 partial walkover survey, which was targeted at specific areas where the presence of radioactive contamination was thought to be most likely, on the basis of the site history. In the earlier survey, the bulk of the site had been deemed to be low risk and was not surveyed. A new survey of the whole airfield area was required by Defence Estates to provide confidence to future purchasers and occupiers of the site.

The work described in this Section was carried out between November 2004 and January 2005.

3.2.2 Scope of Work

All areas of soft landscaping were covered, with the exception of a field in the north east of the site which was ploughed at the time. It was unlikely that this field required surveying, as it had never been used for any purpose other than agriculture. However, as a precaution, the border of the field (a strip approximately 2 m wide) was surveyed. An area of densely overgrown land on the northern border of the site was also not surveyed due to difficulty of access.

The coverage of the survey is shown on Figure 2. Areas covered with hard surfacing (concrete, tarmac or buildings) were not surveyed.

3.2.3 Instrumentation and Methodology

The methodology adopted for the new study was a 100% surface gamma radiation survey covering all accessible parts of the site, using sensitive detection equipment, either hand-held or mounted on a wheeled carriage, such that any radioactive anomalies could be identified.

The instruments used for the survey were predominantly 3-inch sodium iodide scintillation detectors linked to a GPS device and datalogger. This 'Radsurvey' system uses instruments manufactured to Entec specification by Southern Scientific Ltd, containing GPS-linked 3-inch sodium iodide scintillation detectors, together with data logging and spectrographic capabilities. These instruments are capable of detecting gamma radiation anomalies on the surface or buried within the upper 0.3 m of the soil profile, or deeper for highly active sources. They are also capable of in situ spectrographic analysis, enabling identification of the contaminating isotopes. All data are automatically recorded in the field and can be downloaded to laptop computer.

The methodology of the survey involved movement of the detector close to the ground surface in a pattern of parallel lines 2 m apart at a rate of approximately 1 m/s. The detector was programmed to take an average reading each second, over a zone of influence extending approximately 1 m radially from the detector. In this way 100% coverage of the survey area was achieved.

The bulk of the surveyed area was covered using the GPS-linked equipment. The remainder comprised small areas such as grass verges around buildings and pockets overgrown rough ground where access was especially difficult or where the GPS signal was obscured. Coverage in these areas was achieved using lighter Ludlum or Electra 2-inch probes without the GPS connection, readings being recorded manually. Any radioactive anomalies detected using the non-GPS equipment were subsequently resurveyed using the GPS-linked system, so that their locations and probe readings could be recorded electronically.

3.3 Intrusive Investigation 2005

3.3.1 Investigation Aim

The intrusive investigation followed on from the surface radiological walkover survey and was designed to target all of the radiological anomalies detected during the walkover. The aims and methodology of the intrusive investigation were described in Entec's Technical Note ref: 03385n129i1, issued in draft to DE in June 2005. In summary, the principal aims of the investigation were as follows:

- In areas where surface probe readings were below the 'exempt waste' threshold but greater than 1.5 times background to investigate whether or not any radioactive materials of higher activity were present at depth, and if so to delineate their extent;
- In areas where surface probe readings were above the 'exempt waste' threshold to investigate the spatial extent of any materials contaminated in excess of the exempt waste threshold, and to ascertain whether any of it would fall into the LLW classification;
- To take a soil sample to confirm the isotopic fingerprint of the radioactive contamination;
- To quantify the volumes and of both exempt waste and LLW for the purposes of designing and costing a remediation strategy (for details of waste categories, see Section 4.1).

The intrusive investigation works were carried out between the 19 and 30 September 2005.

3.3.2 Scope of Work

To allow radiological contamination to be identified and quantities to be estimated, excavations targeted each of the fourteen numbered hot-spots, together with the twenty-four alphabetically denoted zones of elevated radiological activity, as shown on Figure 3. A total of 69 shallow trial pits were excavated, with radiological monitoring of both excavated arisings and in situ sub-surface soils. Further investigations of additional minor anomalies, including an off-site field, were also undertaken. The locations of all trial pits are shown on Figure 4.

3.3.3 Services Clearance

For the purposes of the intrusive work, permits to dig were issued by Defence Estates. All locations were agreed with the DE site manager prior to digging. Due to the real risk of hitting buried services, especially in the southern technical area, locations were also scanned with a cable avoidance tool (CAT) before digging. A single permit was issued for the northern area, following ordnance clearance for agreed exploratory locations within the airfield.

The nature of the investigation prevented the option of adjusting the position of exploratory locations to avoid services. Exploratory locations were predetermined based upon previously identified surface radiological anomalies.

Therefore, in the vicinity of known services excavations were proceeded with extreme and where required by hand. All excavations were closely supervised by an experience environmental engineer and even where no services were thought to be present, careful digging employed. As detailed in Section 3.3.3, the survey methodology required excavations to be undertaken in shallow layers to assist both the identification and classification of potential radiological wastes, this also allowed the potential for services or field drains not shown on any plans to be observed prior to damage.

Prior to mobilisation for the intrusive works DE agreed to accept responsibility for any damage to buried services, providing that Entec used due care, abided by DE rules and reported any damage immediately.

3.3.4 Instrumentation and Methodology

Radioactive anomalies identified during the surface walkover were marked on the ground and DE clearance or a permit to dig obtained where required. For locations within the airfield, ordnance clearance was undertaken by Bactec prior to intrusive works.

During excavation, radiological monitoring was undertaken using Ludlum or G2 probes without GPS or data logging capabilities, with readings being recorded manually onto the trial pit logs. Monitoring was undertaken both in-situ within excavations, of the excavated spoil from hand dug pits and bucket monitoring of the arisings for trial pits. To assist estimation of waste for sentencing purposes, each excavated bucket, with a maximum capacity of 0.1 m^3, was deemed to be the typical 'averaging volume' based upon an average of four probe readings.

As a minimum, one trial pit was dug in each area of anomalies shown on Figure 3. For large, diffuse anomaly areas, trial pits were arranged within the area to provide a representative coverage. The majority of trial pits were excavated using a JCB 3CX with a backhoe excavator bucket. Due to physical access restrictions hand dug pits (HDP) were excavated in a few areas.

All pits were located in soft landscape areas; no breaking out of concrete or tarmac was required. Average surface activity readings were recorded on the trial pit logs prior to excavation in each location. Turf was stripped carefully using a toothless bucket, to allow neat reinstatement following completion of each trial pit. The general methodology adopted involved the excavation of the soil beneath the turf in layers of approximately 100 mm-200 mm. Each layer, including the turf, was monitored with the probe, both in situ and in the bucket, in order to identify the contamination distribution. Probe readings in each layer were recorded on the trial pit log. All trial pit logs are included in Annex A. Details recorded on the logs have been used to estimate the volumes of material within each waste category.

Radioactive contamination was expected to take two forms; either discrete point sources or diffuse sources. In the case of point sources, these took the form of either a single source responsible for a given anomaly or multiple point sources, sometimes associated with distinct artefacts. When removed from the ground, in-situ readings tended to reduce to background levels. Following excavation and logging, any artefacts found were replaced in the pit together with excavated arisings in reverse order. In the case of diffuse sources, usually ash beds, the top and bottom depths were recorded, together with average and maximum probe readings. Excavations were either extended or additional trial pits excavated to delineate the affected area accurately.

Excavations were terminated once no further activity concentration above 0.34 Bq/g could be detected. All excavations were backfilled with arisings in reverse order of excavation and compacted with the bucket of the JCB, prior to replacement of the cut turf.

Health and Safety Monitoring

Serial numbered thermo-luminescent dosemeters (TLDs) were issued to environmental engineers supervising the excavations. TLDs allow whole body dose and skin dose from external radiation to be recorded. Following site works all TLDs were returned to the Health Protection Agency for dose assessment.

3.3.5 Quality Assurance

Operating Procedures

The monitoring equipment is operated on site according to written procedures developed by Entec, governing instrument set-up, response checking, survey protocols and data management.

Spatial Data

Spatial data are recorded automatically using the GPS facility, once per second concurrently with the detector output. Data are recorded as National Grid co-ordinates to centimetre accuracy.

Grid co-ordinates of the data points can be verified as correct by overlaying them onto the OS-derived site plan. Sometimes there is a consistent shift throughout the data set as a result of differences in projection between the satellite set-up and the base map. The magnitude of any mismatch can be calculated by obtaining a GPS fix at a point on the ground whose co-ordinates are known. If no such points are available the shift can be scaled from the base map. Data can then be corrected by a global arithmetic adjustment to the co-ordinates. Having done this, the plotted data points should fit the base map across the full survey area with no distortions. This can be checked on site at the end of each day's work. Any discrepancy in the spatial data will show up as a differential mismatch over the surveyed area between the data points and the base map.

Checking Survey Coverage

By examining the displayed survey output during or at the end of each day's work, field operators can monitor the extent of their coverage and check for any gaps due to having travelled too fast or strayed off line. Any gaps can then be filled in the following day. If a gap is caused by an area being inaccessible to the trailer-mounted equipment, or the GPS signal being obscured (e.g. by trees) the fill-in is completed using non-GPS equipment with the

readings recorded manually. Figure 2 shows the coverage at Daedalus, with each data point being graphically representative of the instrument's range of sensitivity plotted to scale.

Activity Measurements

Detector output is recorded as counts per second. The accuracy of these readings in relation to gross gamma radiation is verified by the instrument calibration, which is carried out annually. Calibration is carried out on all Entec instruments by the Health Protection Agency (ex-National Radiation Protection Board). All radiological monitoring instruments used on site are covered by valid calibration certificates, which are included in Annex B.

Calibration is confirmed on site by taking readings of a check source of known activity. Readings should not vary significantly from day to day. Where two or more instruments are employed, both should read approximately the same, and should also give a similar response to any sources discovered.

4. Ground Conditions

4.1 Overview

4.1.1 Soil Conditions

Made Ground encountered in trial pits comprised mainly topsoil and reworked natural material, described in the main as clayey sand and gravel, with variable amounts of ash, clinker, brick, concrete and miscellaneous other materials.

The natural ground is generally described as firm, grey-brown clay with flint gravel.

Spectrographic results from the Radsurvey probes indicated radium-226 and its decay products to be the sole contaminating isotopes. One soil sample from Location 5 was sent to DSTL laboratories in Gosport for radiochemical analysis. The results, presented in Annex B, confirm that radium-226 is the source of radioactive contamination. Ra-226 is considered to be present in secular equilibrium with its decay products.

4.1.2 Radioactivity Threshold Levels

Thresholds Under Radioactive Substances Act

The Radioactive Substances Act 1993 (RSA) defines whether or not a substance is radioactive in terms of its 'activity concentration', measured in becquerels per gram (Bq/g) or equivalent units. In the case of Ra-226, any material having more than 0.37 Bq/g is defined as radioactive material under this Act. Further explanation of the RSA is given in Section 5.2.1.

The disposal criteria for radium contamination with reference to the RSA are as follows (Table 4.1):

Table 4.1 Criteria for Radium Disposal

Activity Concentration	Description	Classification
<0.37 Bq/g	Under 'The Radioactive Substances Act 1993' such material is not regarded as radioactive for the purposes of statutory control.	Radiologically clean
>0.37 <4.9 Bq/g	Contaminated soil in this range is exempt from the controls in RSA93 by virtue of 'The Radioactive Substances (Phosphatic Substances, Rare Earths etc) Exemption Order 1962'. Such material is generally disposed of to landfill under normal duty of care arrangements. (Note: whilst some volume averaging may be acceptable in this category disposal of discrete sources would generally have to be isolated and removed).	Exempt waste
>4.9 Bq/g	Material above this concentration is regarded as Low Level Radioactive Waste (LLW). Such material is normally dispatched to BNFL Drigg in Cumbria for disposal under an authorisation issued by the Environment Agency. The upper activity concentrations for such disposals is 4000 Bq/g for alpha activity and 12 000 Bq/g for beta/gamma activity. For radium and daughters in equilibrium this would equate to a radium-226 concentration of 2000 Bq/g.	Low Level waste (LLW)

Risk-based Threshold

The human health hazard from radioactivity is based on exposure to ionising radiation, expressed as a dose. A dose rate of 0.3 millisieverts per year (mSv/yr) has been derived by the then National Radiation Protection Board (NRPB), now part of the Health Protection Agency (HPA) as the radiation exposure level below which there is no detectable human health risk (This level may still present a risk to human health, but any negative effect cannot be distinguished from health effects caused by other sources of radiation or environmental factors). This dose rate has been calculated by NRPB to correspond to a radium-226 activity concentration of 0.34 Bq/g above background (assuming a homogeneous source), hence this is the level below which remedial action to mitigate health risks is not considered necessary. This standard is based on the most sensitive exposure scenario, i.e. domestic housing. Further details of the risk assessment are given in Section 5.2.2.

The risk-based clean-up standard of 0.34 Bq/g, as described above, is more stringent than the statutory level of 0.37 Bq/g under RSA, therefore the use of the former would automatically satisfy the statutory requirement. The clean-up standard to be proposed for Daedalus is therefore likely to be 0.34 Bq/g Ra-226, subject to the agreement of the regulatory authorities.

4.1.3 Relationship Between Activity Concentration and Probe Readings

The instruments are calibrated such that their response in counts per second (cps) is related to the activity concentration of a nominally homogeneous radium source in the ground. For the 3-inch probes, 1000 cps above background is approximately equivalent to an activity concentration of 1 Bq/g radium-226. Using the 2-inch probes, the calibration is 500 cps to 1 Bq/g. This relationship was derived by the NRPB (HPA).

Background radioactivity arising from naturally occurring radioisotopes, cosmic rays, etc. is ubiquitous, and needs to be considered separately from 'contaminating' radioactivity at Daedalus due to radium. The background level across the Daedalus site was measured using the mean of many thousands of readings. The background count rate has been deducted from the probe readings to calculate the net activity concentration due to radium-226.

4.2 Results of Walkover Survey

4.2.1 Overview of Findings

The majority of the site area was found to be free from radioactivity above background levels. However, a number of radioactive anomalies were discovered, including confirmation of those already noted from the 2003 survey as well as several new sources.

Figure 2 shows the whole area of walkover coverage and Figure 3 shows the areas where above-background levels of radiation (radioactive anomalies) were recorded.

Areas shown green on Figure 2 are those covered using the GPS-linked equipment. Areas covered using the Ludlum or G2 probes are shown in a maroon colour. Areas shown grey were not covered, for a variety of reasons relating to the practicability of carrying out the survey. Non-coverage was discussed and agreed with DE on site and justified on the grounds of minimal risk, i.e. site history indicates that these areas were never used for any contaminative activity. In particular this included a ploughed field in the north east of the site, whose history was of exclusively agricultural use.

The anomalies on Figure 3 are colour coded thus:

- Yellow:- indicates the possibility of some contamination being present, but likely to be below the 0.34 Bq/g threshold level for remedial action (subject to confirmation by intrusive investigation);
- Blue:- indicates the presence of contamination above 0.34 Bq/g, and hence a potential requirement for remedial action. These anomalies tended to be point sources and are represented on the drawing as stars.

Of the sources greater than 0.34 Bq/g, which are individually quite small in extent, numbers 1 to 6 were found within the Technical Area, in the vicinity of former workshops and hangars. Most of these were already known from the 2003 survey. Numbers 7 to 11 were near to the buildings on the western fringe of the airfield. These were new finds, in an area not previously surveyed. Numbers 12, 13 and 14 are previously-known sources in the vicinity of hangars in the east of the airfield.

It should be noted that the anomalies shown on Figure 3 are based on the walkover survey. Further intrusive investigation was undertaken to confirm the nature of the contamination (artefacts or ash) and its spatial extent.

4.2.2 Detail of Walkover Findings

Figure 3 shows 24 zones of yellow, denoted alphabetically A-X, and 14 individual hot-spots of blue (shown as stars) numbered 1-14. Each star may represent a potential single point source or a cluster of sources in close proximity. The yellow areas all represent activity concentrations below 0.34 Bq/g, according to surface probe measurements, with the potential for point sources or areas of diffuse radiological contamination to be present at depth.

The maximum activity concentrations at each of the blue star locations, being the principal anomalies of concern, are given in Table 4.2.

Table 4.2 Results of Radiological Anomalies

Point No	Location	Maximum Activity Concentration Above Background Bq/g	Equivalent Maximum Dose Rate at Ground Level µSv/hr
1[a]	North of technical area	0.37	0.2
2*	Grassed area near Building 134	1.81	0.7
3		3.98	1.3
4*		1.07	0.5
5*	Small oval area near Building 73	1.09	0.5
6	In grass near fuel bunker	0.39	0.2
7	Grassed area south of hangars in west of site	0.86	0.4
8		0.41	0.2
9		1.51	0.6
10		1.02	0.4

Table 4.2 (continued) Results of Radiological Anomalies

Point No	Location	Maximum Activity Concentration Above Background Bq/g	Equivalent Maximum Dose Rate at Ground Level µSv/hr
11	North of hangars in west of site	0.66	0.3
12*	Near Building 296	0.56	0.3
13*	Former burning ground	0.63	0.3
14*	Former burning ground	2.37	0.9

Note: [a] Potential hot-spot 1 was not re-locatable by the survey team during the walkover survey.

Many of the radioactive sources shown in the technical area and around the eastern hangars were already known from the 2003 survey. They are denoted by an asterisk in Table 4.2. Those elsewhere on the site are new finds. All of the sources detected in 2003 were found independently in the more recent survey.

4.3 Results of Intrusive Investigation

4.3.1 Extent of Intrusive Investigation

Figure 4 shows the locations of the 69 trial pits that were dug. The maximum depth was 1.6 m, but most pits were less than 1 m deep, as radioactive contamination did not extend into natural ground. Figure 5 shows the locations where activity concentration above the proposed remedial action threshold of 0.34 Bq/g was confirmed. Activity concentrations at the other locations investigated were found to be below this threshold. The radiological findings from the hot-spots are detailed in Table 4.3.

No above-background activity was detectable the vicinity of previously numbered hotspots 1 and 13. Trial pits were therefore not dug in these locations.

4.3.2 Waste Volume Calculations From Intrusive Investigation Findings

A total of 29 trial pits and shallow excavations were undertaken to investigate the fourteen numbered hot-spots identified during the walkover survey. Table 4.3 summarises the results in terms of probe readings and estimated volumes of exempt waste and LLW.

Table 4.3 Results of Intrusive Investigation of Radiological Anomalies

Point No	Location	Maximum In-situ Count Rate (cps)	Maximum Count Rate of Excavated Material (cps) (of identifiable artefacts/strata)	Estimated Volume of Exempt Waste (m^3)	Estimated Volume of LLW (m^3)
2	Grassed area near Building 134	735	1720	0.4	-
3		1362	2260 (6687)	0.6	0.001
4		11304	1411 (6600)	1.0	0.01
5	Small oval area near Building 73	3250	1556 (4276)	0.2	-
6	In grass near fuel bunker	1555	570 (1353)	0.2	-
7	Grassed area south of hangars in west of site	565	450 (814)	0.01	-
8		345	232	-	-
9		505	1122 (728)	0.2	-
10		516	140	-	-
11	North of hangars in west of site	175	93	-	-
12	Near Building 296 (seven trial pits)	5380	1640	2.0 (Notional)	0.2 (Notional)
14	Former burning ground	171	95	-	-
			Total	**4.61**	**0.211**

Note: Between conducting the walkover survey and the intrusive investigation, strip foundations constructed in the vicinity of Point 13 may have eliminated the source. It could not be relocated.

A further 40 excavations were undertaken to investigate the 24 alphabetically denoted zones shown on Figure 3, together with 15 additional minor anomalies (denoted AN01-AN16) and the off site-field anomaly. Table 4.4 summarises additional radiological contamination, based upon excavated averaging volumes. No material determined as LLW was found in any of these trial pits.

Hand dug pits (HDP) were excavated in locations D, K, Q and T1, as the radiological anomalies identified in these locations during the walkover survey were inaccessible to excavation plant.

Areas G, H, R, S, T2 (scheduled for the north of area T) and AN15 were also deemed inaccessible to plant. However, as no surface activity indicating anomalies >0.34 Bq/g could be detected here, intrusive works were not undertaken.

Table 4.4 Additional Radiological Contamination

Point No	Location	Max In-situ Count Rate (cps)	Max Excavated Count Rate (cps) (of identifiable artefacts/ strata)	Estimated Volume of Exempt Waste (m^3)	Estimated Volume of LLW (m^3)
TPAN2	Area A	1119	512	1.0	-
TPAN05		1650	392	0.2	-
TPAN07		635	380	1.5	-
			Total	**2.7**	**0**

Note on Discrepancy Between In-situ and Bucket Probe Readings

The in-situ monitoring is carried out to assist the environmental engineer ascertain if significant potential sources are still in the ground, or, following the identification of contamination, to assist in confirming its lateral or vertical extent. However, readings taken in a trial pit are often higher than those on the same material in a digger bucket, because of the geometry of the source in relation to the position of the detector.

Positioning the probe within an excavation tends to increase the detector response due to the influence of sources above and around the sides of the probe. For this reason, probe readings taken in the open (either in the excavator bucket or in the arisings stockpile) are considered to be more accurately representative of activity concentration in relation to the calibration factor derived by NRPB.

4.3.3 Summary of Intrusive Investigation Findings

Made Ground, including metal artefacts, ash or clinker, was detected in the majority of the excavations. A small volume of LLW was confirmed in relation to three of the original fourteen hot-spots. Exempt waste materials were confirmed in eight of the hot-spots, together with three of the minor surface anomalies targeted.

An estimated volume of 0.21 m^3 of LLW was identified. For the purpose of making provision for remediation, it would be prudent to allow an approximate 100% contingency. Hence a volume of 0.4 m^3 should be allowed for. This is equivalent to two 200-litre drums for Drigg disposal.

An estimated volume of 7.3 m^3 of radiological exempt waste is likely to require off site disposal. Again, allowing a 100% contingency, a volume of 15 m^3 for landfill disposal should be anticipated.

Figures 5a, 5b, 5c and 5d show detail of the identified locations of the LLW and exempt waste requiring excavation and off-site disposal.

5. Environmental Risk Assessment

5.1 Introduction

This environmental risk assessment considers the question of radioactive contamination only. Risks arising from non-radioactive contaminants are considered in a separate report.

The risk assessment is based on radiological walkover and intrusive findings.

An environmental risk assessment has been carried out within the statutory framework of Part IIA of the Environmental Protection Act 1990. Consideration is also given to the Radioactive Substances Act 1993, a further legislative instrument by which radioactive contamination is controlled.

Furthermore, as the future of the Daedalus site is likely to be redevelopment (at least in part) for housing, control of contamination risk will be enforced through the planning process. This is in accordance with Annex 2 of Planning Policy Statement 23 (PPS23) issued by the Office of the Deputy Prime Minister.

5.2 Assessment Framework

5.2.1 Legislation Related to Radioactivity

Part IIA, 1990

The principal legislation governing the identification and remediation of contaminated land is Part IIA of the Environmental Protection Act (EPA) 1990 which was implemented in April 2000. The legislation is supported by the Contaminated Land (England) Regulations (2000) and Statutory Guidance (DETR Circular 02/2000 superseded by Defra Circular 01/2006) which together define the regulatory regime governing the nature of liabilities that can be incurred by owners of contaminated land and groundwater. With the introduction of new legislation in 2006, the regime was extended to include radioactivity.

The threshold criterion for a formal determination under Part IIA, in cases of harm from radioactivity relating to lasting exposure, has been set at an individual effective dose of 3 millisieverts/year above local natural background. On this basis, using the Radioactively Contaminated Land Exposure Assessment (RCLEA) methodology proposed by Defra, a range of threshold activity concentrations of radium-226 contamination can be derived, according to end-use criteria. Assuming the most sensitive end-use scenario, and assuming a homogeneous source concentration in the ground to a depth of 1 m, the threshold activity concentration for Ra-226 is 1.1 Bq/g.

Although the vast majority of the HMS Daedalus site is well below this level, there are certain isolated locations where it is exceeded. RCLEA is specifically not designed to evaluate sites containing isolated hotspots of radioactivity; nevertheless, the presence of such hotspots could attract the attention of the Local Authority in pursuance of its duty to inspect potentially contaminated sites under Part IIA. Whether or not it was finally determined as 'radioactively

contaminated' would depend upon the selection and sizing of averaging areas within the overall site. An approved methodology for averaging is notably absent from published guidance.

However, in cases where 'voluntary' remediation is being proposed, Part IIA action will not generally be pursued by the Local Authority. The clean-up threshold for remediation at Daedalus, as described in Section 5.2.2 below, is significantly lower than the lowest RCLEA threshold of 1.1 Bq/g, even without averaging. Therefore the HMS Daedalus site, post-remediation, will not be at risk of determination as radioactively contaminated land.

Radioactive Substances Act, 1993

The Radioactive Substance Act (RSA) 1993 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 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' applies. Under the terms of this exemption, materials having a Ra-226 activity concentration between 0.37 and 4.9 Bq/g are 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.

5.2.2 Risk-based Criteria

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**. This is more stringent than the RSA level of 0.37 Bq/g, and would therefore, if adopted, automatically satisfy the statutory requirement.

5.3 Assessment Guidelines

5.3.1 The Risk Assessment Framework

A radiological risk assessment can follow the same established principles of the 'contaminant-pathway-receptor' relationship, or pollutant linkage as is applied under Part IIA Contaminated Land legislation, where:

A **contaminant** is a substance which is in, on or under the land and which has the potential to cause harm or cause pollution of controlled waters.

A **receptor** is either (a) a living organism, a group of living organisms, an ecological system or a piece of property that is in a category listed in Table A of Chapter A and is being or could be harmed by the contaminant or (b) controlled waters which are being or could be polluted by a contaminant.

A **pathway** is one or more routes or means by or through which a receptor is (a) being exposed to or affected by a contaminant or (b) could be so exposed or affected.

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 species of 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.

Categories of receptor and types of significant harm are detailed in Table A of Chapter A of the Part IIA Statutory Guidance. The Statutory Guidance also contains a number of other specific requirements on the conduct of risk assessments, and the manner in which determinations are to be made with respect to each of the four grounds.

Entec's approach to undertaking a risk assessment in line with the Part IIA 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 calculations 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 Tier 1 assessment. A conceptual model has been developed on this basis.

5.4 Conceptual Model

5.4.1 Source

The Phase 2 LQA produced by Entec in 2003 concluded that there was a potential pollutant linkage at the site, resulting from historic contamination, which posed a potential moderate to high risk in the current site use.

The presence of radioactive contamination sources was confirmed by the 2004/5 site walkover, and further sources were found in areas of the site that had not previously been surveyed. All of the sources detected were considered to lie within 0.3 m of the ground surface. It was possible that other sources may be present at deeper levels in Made Ground; however, it was unlikely that the natural strata would be contaminated.

The contaminating isotope is radium-226, which together with its decay products is an emitter of gamma radiation.

5.4.2 Receptor

Gamma radiation can cause health effects, including cancer, in humans. The severity of the effect depends on the level of exposure.

Three classes of human receptor have been identified, namely existing site users, workers involved in ground disturbance activities, and future site users post-redevelopment (possibly residents).

Ionising radiation at the levels present at this site are not considered to pose a significant risk that requires management to any other receptor.

5.4.3 Pathway

The pathway for exposure of humans is threefold; external irradiation by proximity to sources in the ground, internal irradiation from ingestion of sources, and internal irradiation from inhalation of sources. Site users may be exposed to a significant dose of external radiation if they spend sufficient time in physical contact with contaminated ground. They may be subjected to internal exposure if they ingest or inhale particles of contaminated soil or artefacts that may be liberated when the ground is disturbed.

5.5 Assessment

Current Site Users

Although HMS Daedalus remains under MOD ownership, the site relinquished its 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 hangars are used to house private light aircraft and gliders. A variety of commercial tenants use the facilities in the technical area.

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 on the ground in an area of known dose rate of 1.3 μSv/hr for 10 hours per week would result in an

annual dose through external radiation of 0.68 mSv. This simple assessment illustrates that the possibility of an individual receiving an external radiation dose exceeding the conservative 0.3 mSv/yr threshold is theoretically possible, though rather unlikely to occur in practice. On this basis the risk is assessed as low.

Internal 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. In the case of site users merely walking over or resting on the ground surface, the likelihood of such an occurrence is very low and overall the risk is assessed as low.

Although overall the risks are low, there are very localised zones where the dose rate for intervention proposed by NRPB is exceeded and where the risk of ingestion is higher. So although the likelihood of adverse health impact is low, intervention to reduce potential exposure dose rates below 0.3 mSv/yr would be beneficial in removing those risks, thereby enhancing public confidence in the safety of the site.

Site Construction Workers (Involved in Ground Disturbance)

Construction workers involved in ground disturbance have a greater risk of contact with radioactively contaminated material. However, because exposure is transient, the long term external dose would be small and the risk is therefore low. Risks of ingestion and inhalation are higher, and on this basis internal exposure is assessed as a moderate risk. This can be effectively managed by use of appropriate personal protective equipment (PPE), but a worst case risk assessment must assume this is not done.

Future Site Users

The redevelopment of HMS Daedalus presents a variety of possible 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 potentially be incorporated into a domestic garden. If the site were not remediated, the scenario of greatest concern is that of children playing in such a garden and ingesting contaminated soil. The radiation dose effect on children is considered more severe than a similar dose received by an adult.

Additionally, there is a possibility of uptake of radioisotopes into vegetables grown in the garden, though this is very unlikely.

Risks to future site users are assessed as moderate. On a risk basis, remediation is recommended to reduce potential dose to less than 0.3 mSv/yr. This can be achieved by removing all material having an activity concentration greater than 0.34 Bq/g above background.

Table 5.2 below explains the risk classification rationale.

Table 5.2 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.

5.6 Summary

Table 5.3 summarises the outcome of the risk assessment.

Table 5.3 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 (from radium-226) associated with Made Ground	Humans (Site Users)	External radiation	Health Impact (Cancer)	Severe	Unlikely	Low
			Ingestion		Severe	Unlikely	Low
			Inhalation		Severe	Very unlikely	Negligible
		Humans (Redevelopment/ Maintenance Workers)	External radiation	Health Impact (Cancer)	Severe	Unlikely	Low
			Ingestion		Severe	Possible	Moderate*
			Inhalation		Severe	Possible	Moderate*
		Humans (Future Users)	External radiation	Health Impact (Cancer)	Severe	Possible	Moderate
			Ingestion		Severe	Possible	Moderate
			Inhalation		Severe	Possible	Moderate

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

6. Overall Land Quality and Suitability for Redevelopment

6.1 Overall Site Sensitivity

Overall, in terms of the environmental and ecological aspects of the site, it is of low sensitivity in respect of vulnerability to radioactive contamination. The principal concern of radioactive contamination is adverse impact on human health, via ionising radiation.

6.2 Overall Land Quality

The greater part of the site is unaffected by radioactive contamination. However, several small clusters and isolated hot-spots of radioactive contamination have been identified by surface probe measurements, and the presence of a number of sources has been confirmed by intrusive investigation.

Surface probe readings indicate that although radiation is present in some areas slightly above the NRPB recommended level for intervention, the exposure scenario in respect of current site use is not such as to require any immediate protective action. However, if any work involving ground disturbance is contemplated in affected areas, it is recommended that appropriate health and safety precautions are taken to protect the workforce. There may also be issues around disposal of any spoil arising from such works. It is recommended that no excavations should take place in affected areas without specialist advice being sought.

Remedial work is not essential in the context of continuing present use, but is recommended in order to remove the liability.

6.3 Future Development

A change of use of the site could result in the creation of new exposure pathways with increased risk, especially to children. Remediation of identified hot-spots is required for future development for residential use.

7. References

- Radioactive Substances Act 1993;
- Ionising Radiation Regulations 1999;
- DETR 1990; 'Criteria for the Designation of Radioactively Contaminated Land';
- Part 2A, Environmental Protection Act, 1990;
- DEFRA September 2006, Circular 01/2006, Contaminated Land;
- Entec 2003; Phase 2 LQA Report ref: 03385rr056i1.

8. Annexes

Annex A: Trial Pit Logs

Annex B: Radiochemical Analysis

Annex A
Trial Pit Logs

76 Pages

Entec

RADIOLOGICAL TRIAL PIT LOG

Entec

Status:- Draft

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Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP01**
Client: **Defence Estates**	Site Area: **Hot-spot No.1**		
Method & Equipment:	Ground Level (mAOD):	Date:	Sheet **1 of 1**

TRIAL PIT ADDITIONAL INFORMATION

NOT EXCAVATED

Elevated activity could not be relocated during the original walkover survey, result however recorded as an anomaly by site staff.

No elevated surface activity could be detected during the intrusive investigation.

RADIOLOGICAL TRIAL PIT LOG

Entec

Status:- Draft

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Project: **HMS Daedalus Radiological Site Investigation** Contract No. 03385			TRIAL PIT NO **TP2**
Client: **Defence Estates**	Site Area: **Hot-spot No.2**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 27/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Turf	180		
	Ground	430		
0.0 – 0.1	Bucket	169 – 210		MG – brown sandy clay with rusty red pockets of sand, coke, concrete and fragments of metal with pocket of blue green sand* @ 0.3m.
	Excavation	170 – 735		
0.1 – 0.2	Bucket	1230 – 1720		
	Excavation	220 – 230		
0.2 – 0.3	Bucket	105 – 108		
	Excavation	151 – 171	0.5	
0.3 – 0.4	Bucket	95 – 108		Soft brown sandy CLAY.
	Excavation	167 – 169		
0.4 – 0.5	Bucket	107 – 108		
	Excavation	158 – 174		
				E.O.H @ 0.5m

TRIAL PIT ADDITIONAL INFORMATION

- *when spread out pockets of blue green sand (attached to fibre) gave count rates upto 1720cps.
- Trial pit extended 0.5m south
- Northern, southern, eastern and western extremities of Trial pit all recorded activity <170cps.
- Photo #1 & #2

- **Exempt waste estimate: 0.4m^3**
- **LLW estimate: N/A**

All dimensions in metres

Co-ordinates: E: 56108 N: 01472	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 2 x 1 x 0.5 Orientated east/west adjacent to path		Drafted by: MR	Checked By:	Logged By: SP

RADIOLOGICAL TRIAL PIT LOG

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Status:-Draft

Date:- 13/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP3**
Client: **Defence Estates**	Site Area: **Hot-spot No.3**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 28/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Turf	103 - 121		
	Ground	956 – 958		
0.0 – 0.1	Bucket	462 – 465		MG – loose gravely SAND. Gravel is f-c angular and sub-angular with much slate.
	Excavation	1253 – 1362		Occasional metal (?) fragments*
0.1 – 0.2	Bucket	2256 – 2260		Some chalk in north of excavation
	Excavation	142 – 145		... . becoming more clayey with depth
0.2 – 0.4	Bucket	107 – 109		
	Excavation	148 – 149		
0.4 – 0.6	Bucket	88 – 89	0.4	Brown clayey SAND with occasional gravel of f-m subrounded and rounded flint.
	Excavation	170 – 174		E.O.H @ 0.6m

TRIAL PIT ADDITIONAL INFORMATION

- cps of metal fragment = 6684 – 6687.
- Metal lumps dispersed – 2 or 3 observed (photo 5) – following removal of objects activity dropped dramatically.
- **Exempt waste estimate: 0.6 m^3**
- **LLW estimate: 0.001 m^3 (nominal volume)**

All dimensions in metres

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y	
Dimensions: 2 x 1.5 x 0.6 Location 3.4m north of building from red mark approx 0.5m to east of boarded up door. All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

RADIOLOGICAL TRIAL PIT LOG

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Status:-Draft

Date:- 13/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP4**
Client: **Defence Estates**	Site Area: **Hot-spot No.4**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 27/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	656 – 664		
	Turf	108 – 121		
0.05	Excavation	1117 – 11304		
0.1 – 0.2	Bucket	93 – 105		MG – dark brown soft sandy gravely CLAY. Gravel is m-c of flint and rounded to sub-rounded.
	Excavation	3512 – 4782		
0.2 – 0.3	Bucket	451 – 671	0.2	... .@ 0.2 white plate/tiling and powder *
	Excavation	4320 – 5500		
0.3 – 0.4	Bucket	1300 – 1312		MG – loose sandy rubble with much metal and much blue green sand, much brick etc and metal
	Excavation	2700 – 2716		
0.4 – 0.6	Bucket	1406 – 1411		Brown clayey SAND with occasional gravel of f-m subrounded and rounded flint
	Excavation	3251 –4 151		Blue green metal piping = 6600cps
			0.6	Natural clayey sand
				E. O H @ 0.6m

TRIAL PIT ADDITIONAL INFORMATION

Additional pits

- 1m north TP 113cps @ 0.4m bgl
- 1m east TP 134cps @ 0.4m bgl
- 0.5m south TP 211cps @ 0.4m bgl
- 1.5m west TP 109cps @ 0.4m bgl

Photo 3 & 4

- **Exempt waste estimate: 1 m^3**
- **LLW estimate: 0.01 m^3**

All dimensions in metres

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y	
Dimensions: 2 x 1.5 x 0.6 Location 3.4m north of building from red mark approx 0.5m to east of boarded up door. All dimensions in metres	Drafted by: MR	Checked By:	Logged By: SP

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Status:- Draft

Date:- 27/09/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP05**
Client: **Defence Estates**	Site Area: **Hot-spot No.5**		
Method & Equipment:	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground	1113		
0.00 – 0.10	Bucket	248 – 254	0.00 - 0.20	MG: Light brown silty sand/clay
	Excavation	2918 – 2948		
0.10 – 0.20	Bucket	1350 – 1556	0.20 – 0.60	MG: Dark brown / black gravelly sand. Gravel is fine to coarse subangukar to subrounded consisting of some white fragments and metal wire fragments *
	Excavation	2989 – 3250		
0.20 – 0.30	Bucket	420 – 454		.... @ 0.5 m sand lense
	Excavation	920 – 1327		
0.30 – 0.40	Bucket	213 – 215	0.60	Soft brown sandy CLAY
	Excavation	560 – 563		
0.40 – 0.50	Bucket	163 – 206		
	Excavation	245 - 296		

TRIAL PIT ADDITIONAL INFORMATION

*** metal wire fragments = 4276 cps**
Pit dimensions: 2.00 x 1.00 x 0.60

TP5A: (1.0 m E) 0.0 – 0.2 m Bucket: 95 – 107 Excavation: 127 – 138
0.2 – 0.4 m Bucket: 112 – 114 Excavation: 162 - 167
TP5B: (2.0 m N) 0.0 – 0.2 m Bucket: 110 – 113 Excavation: 160 – 164 (TP5B opened further away due to cable)
0.2 – 0.4 m Bucket: 87 – 95 Excavation: 120 - 124
TP5C: (1.0 m W) 0.0 – 0.2 m Bucket: 113 – 117 Excavation: 164 – 168
0.2 – 0.4 m Bucket: 112 – 113 Excavation: 161 - 164

- **Exempt waste estimate: 0.2 m^3**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1 x 0.5 x 0.6 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

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Status:- Draft

Date:- 28/09/2005

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP06**
Client: **Defence Estates**	Site Area: **Hot-spot No.6**		
Method & Equipment: **Ludlum 2241 Meter**	Ground Level (mAOD):	Date: **28/09/05**	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground level (grass)	525	0.00 – 0.30	MADE GROUND: loose brown silty sand with occasional gravel consisting of brick and occasional pockets of red sand, silvery sand and blue sand
0.00 - 0.10	Bucket	450 – 455		
0.00 - 0.10	Trial Pit	1527 – 1555		
0.10 – 0.20	Bucket	560 – 570 *		
0.10 – 0.20	Trial Pit	309 – 312		
0.20 – 0.30	Bucket	173 – 192		
0.20 – 0.30	Trial Pit	234 – 236		Soft brown sandy CLAY
0.30 – 0.40	Bucket	113 – 117		
0.30 – 0.40	Trial Pit	173 – 201		End of monitoring at 0.40 m bgl

TRIAL PIT ADDITIONAL INFORMATION

- **cps ranged from 560 – 570, apart from in pockets of silvery sand encountered where counts ranged from 1352 – 1353**

Addition al Trial Pits excavated in the area to identify the extent of the contamination detected in TP F6:

- **TP6A: 0.00 – 0.20 Bucket count = 114 – 116, Trial Pit count = 195 – 203**
- **TP6B: 0.00 – 0.20 Bucket count = 97 – 98, Trial Pit count = 103 – 111**
- **TP6C: 0.00 – 0.20 Bucket count = 97.3 – 98, Trial Pit count = 101 – 113**
- **TP6D: 0.00 – 0.20 Bucket count = 89 – 90, Trial Pit count = 113 – 115**
- **TP6E: 0.00 – 0.20 Bucket count = 114 – 116, Trial Pit count = 191 – 195**
- **TP6F: 0.00 – 0.20 Bucket count = 93 – 95, Trial Pit count = 112 – 117**

- **Exempt waste estimate: 0.2 m^3**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability:	Sides: Y Base: Y	
Dimensions: 1.0 x 1.0 x 0.4 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: LCAM

RADIOLOGICAL TRIAL PIT LOG

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Status:- Draft

Date:- 14/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP07**
Client: **Defence Estates**	Site Area: **Hot-spot No.7**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 26/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground level	273 – 294		
	Turf	124		
0.0 – 0.2	Bucket	121 – 128		Soft brown sandy CLAY with occasional flint gravel.
	Excavation	450 – 565		
0.2 – 0.3	Bucket	252 – 450		. ...@ 0.3m round metal disc with pieces of glass (814cps)
	Excavation	350 – 447		
0.3 – 0.4	Bucket	110 – 134		
	Excavation	170 – 213		
0.4 – 0.5	Bucket	113 – 122	0.5	Light brown soft sandy CLAY
	Excavation	176 – 245		
				E.O.H @ 0.55m

TRIAL PIT ADDITIONAL INFORMATION

Round metal disc @ 0.3m, possibly old aircraft dial? Glass observed in same bucket. Maximum activity 814cps.

- **Exempt waste estimate: 0.01 m^3**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y	
Dimensions: 2 x 0.5 x 0.5 All dimensions in metres		Drafted by: MR	Checked By: / Logged By:

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Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP08**
Client: **Defence Estates**	Site Area: **Hot-spot No.8**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 29/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground level	285		
	Turf	195 – 210		
0.0 – 0.25	Bucket	159 – 212		Soft brown sandy CLAY
	Excavation	210 – 345		
0.25 – 0.45	Bucket	121 – 167		
	Excavation	267 – 274		
0.45 – 0.65	Bucket	108 – 151		....@ 0.65 increasing ferrous iron discolouration.
	Excavation	265 – 268		
0.65 – 0.85	Bucket	170 – 232		
	Excavation	212 – 235		
1.15 – 1.25	Bucket	110 – 151	1.0	Dense brown sandy fine to coarse GRAVEL, rounded and sub-rounded of flint.
	Excavation	161 – 181		
				E.O.H @ 01.25m

TRIAL PIT ADDITIONAL INFORMATION

- No visible evidence of MG although distinct point source.
- No activity <170cps 1m around the TP

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 1.25 All dimensions in metres		Drafted by: MR	Checked By:	Logged By:

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP09**
Client: **Defence Estates**	Site Area: **Hot-spot No.9**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 26/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground level	160 – 505		
	Turf	256		
0.0 – 0.2	Bucket	365 – 1122		MG – Loose brown sandy CLAY with occasional fragments of brick and chalk
	Excavation	242 – 350		
0.2 – 0.4	Bucket	112 – 150		.....@ 0.25 three round discs observed*.
	Excavation	212 – 216		
0.4 – 0.6	Bucket	132 – 147		
	Excavation	223 – 252		
0.6 – 0.7	Bucket	109 – 112	0.6	Dense fine to coarse sandy GRAVEL, sub-rounded and rounded of flint.
	Excavation	169 – 172		
				E.O.H @ 0.7m

TRIAL PIT ADDITIONAL INFORMATION

- three discs were flat metal/fine? And are a pale bright green with a maximum activity 728cps.
- Elevated activity presumed to point source relating to discs, no activity >170cps within the near vicinity.

- **Exempt waste estimate: 0.2 m^3**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 2 x 0.5 x 0.7 All dimensions in metres		Drafted by: MR	Checked By:	Logged By:

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP10**
Client: **Defence Estates**	Site Area: **Hot-spot No.10**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 26/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground level	285 – 411		
	Turf	120		
0.0 – 0.1	Bucket	120 – 126		MG – light brown sandy CLAY.
	Excavation	311 – 516		
0.1 – 0.3	Bucket	112 – 140	0.1	MG – Compacted sandy GRAVEL. Gravel is fine to coarse of brick, concrete with pockets of ashy black sand.
	Excavation	147 – 160		
0.3 – 0.5	Bucket	97 – 103	0.3	Soft brown sandy CLAY
	Excavation	114 – 156		
				E.O.H @ 0.5m

TRIAL PIT ADDITIONAL INFORMATION

Extent of black ashy/brick layer chased out 2m north and 11m south of the trial pit respectively.

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1 x 0.5 x 0.5 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

RADIOLOGICAL TRIAL PIT LOG

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Date:- 14/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP 11**
Client: **Defence Estates**	Site Area: **Hot-spot No.11**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 26/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground level	175		
	Turf	101 – 105		
0.05	Excavation	157 – 163		MG – Loose brown silty sand with much gravel of bricks, coke and concrete.
0.1 – 0.2	Bucket	87 – 93		
	Excavation	156 – 170		
				E.O.H. @ 0.2m

TRIAL PIT ADDITIONAL INFORMATION

Activity >170cps is more underneath the concrete to the east of the pit.

Excavation terminated @ 2.0m due to hitting foundation of peripheral runway.

- **Exempt waste estimate:** N/A
- **LLW estimate:** N/A

All dimensions in metres

Co-ordinates:	E: N:	Groundwater: NO
Stability:	Sides: Y Base: Y	Remarks

Dimensions: 1.5 x 0.5 x 0.4 Trial pit orientated north/south	Drafted by: MR	Checked By:	Logged By:	Contract No. 03385

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Status:- Draft

Date:- 29/09/2005

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP12**
Client: **Defence Estates**	Site Area: **Hot-spot No.12**		
Method & Equipment: **Ludlum 2241 Meter**	Ground Level (mAOD):	Date: **21/09/05**	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground level (grass)	162 – 318	0.00 – 0.20	MADE GROUND: Brown clayey slightly silty sand with some angular fine to coarse gravel. With occasional metal fragments.
0.05	Trial Pit	246 – 418		
0.05 – 0.10	Bucket	131 – 178		
0.10	Trial Pit	319 – 675		
0.15 – 0.20	Bucket	157 – 272		From 1.50m Occasional white and blue ashy friable material.
0.20	Trial Pit	589 – 751		
0.30	Trial Pit	Up to 3110	0.20 – 0.90	MADE GROUND: Light brown clayey slightly silty sand with some angular fine to coarse gravel. With occasional ash, concrete, metal pieces (springs, bars, possible dials), white chalky material, fragmented brick, possible asbestos-cement boarding.
0.35 – 0.45	Bucket	490 – 600		
0.45	Trial Pit	Up to 5340		
0.55 – 0.70	Bucket	790 – 1640		
0.70	Trial Pit	4490 – 5380		From 0.70m Becoming more clayey.
0.90 – 1.00	Bucket	268 – 318	0.90 – 1.10	Stiff to very stiff orange-brown mottled grey slightly sandy slightly silty CLAY with a little angular fine to coarse gravel.
1.00	Trial Pit	1070 – 1120		

TRIAL PIT ADDITIONAL INFORMATION

Counts at ground level only significantly elevated above background levels.
Counts significantly increased from 0.30 m bgl.
Made Ground from 0.30 m bgl includes possible dials and possible fragments of asbestos-cement products.

- **Exempt waste estimate: 2m^3**
- **LLW estimate: 0.2m^3 (provision?)**

PLAN	Groundwater None
Bearing	Remarks Unstable sides of trial pit from 0.00 – 0.90 m bgl

All dimensions in metres		Checked By:	Logged By: LCAM	Contract No. 03385

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Date:- 21/10/2005

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP12ii**
Client: **Defence Estates**	Site Area: **Hot-spot No.12**		
Method & Equipment: **Ludlum 2241 Meter**	Ground Level (mAOD):	Date: **22/09/05**	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground level (grass)	105 – 135		
0.05	Trial pit (under turf)	108 - 143		MADE GROUND: Brown clayey slightly silty sand with some angular fine to coarse gravel.
0.1	Trial Pit	105 - 140		Light brown clayey slightly silty sand with many angular fine to coarse gravel of demolition rubble including suspected asbestos cement fragments.
0.2 – 0.3	Trial Pit	110 – 140		
	Bucket	70 – 100		...@ 0.3m black ashy material encountered with fragments and whole bricks.
0.3 – 0.4	Trial Pit	140 – 160		
	Bucket	110 – 130		.....@ 0.4m ashy material bottomed out, demolition rubble still present.
0.5	Trial Pit	130 – 185	0.7	From 0.8m Becoming more clayey.
0.7	Trial Pit	130 – 158		Stiff to very stiff orange-brown mottled grey sandy slightly CLAY with a little angular fine to coarse gravels including flint.
	Bucket	85 – 118		
0.8	Trial Pit	120 – 166	0.5	.. flint gravels and cobbles increasing with depth.
	Bucket	96 – 115		
1.0	Trial Pit	160 – 188		
	Bucket	90 – 100		
1.2	Trial Pit	160		
	Bucket	110		
				Trial pit terminated @ 1.2m

TRIAL PIT ADDITIONAL INFORMATION

Photo 1030

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 1.2 Orientated east/west parallel to road approx. 5m NW from TP12 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: MR

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Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP12iii**
Client: **Defence Estates**	Site Area: **Hot-spot No.12**		
Method & Equipment: **Ludlum 2241 Meter**	Ground Level (mAOD):	Date: **22/09/05**	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground level (grass)	110 – 143		
0.0 – 0.15	Trial Pit	96 – 120		MADE GROUND: Brown clayey slightly silty sand with occasional angular fine to coarse gravel.
	Bucket	74 – 90		... @ 0.15 gravels inc. metal fragments and angular cobbles and gravels of brick, concrete and flint. Also dark/black granular material.
0.15 – 0.2	Trial Pit	103 – 131		
	Bucket	90 – 112		... @ 0.3 east of pit becoming light brown sandier clay with increasing sub-rounded to angular gravels of flint
0.2 – 0.3	Trial Pit	112 – 144		
	Bucket	89 – 98		.... @ 0.45 brown sandy clay occasional gravels.
0.3 – 0.45	Trial Pit	315 – 370*	0.8	
	Bucket	220 – 240*		
0.5 – 0.6	Trial Pit	280 – 370*		
	Bucket	240 – 270*		
0.6 – 0.8	Trial Pit	320 – 380*		
	Bucket	220 – 260*		
0.8 – 1.4	Trial Pit	380 – 455*		Firm to stiff orange-brown mottled grey sandy slightly CLAY with a occasional angular fine to coarse gravels including flint.
	Bucket	250 – 270*		
1.6	Bucket	230 – 250*		
				Trial pit terminated @ 1.6m

TRIAL PIT ADDITIONAL INFORMATION

Note: Ludlum monitor failure @ 0.45m. All activity marked with asterisk (*) using Arrdvark system calibration and correspondence activity interpretation differs – please refer to text.

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 1.6 Located to approx. 2.5m SW of TP12		Drafted by: MR	Checked By:	Logged By: MR

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Date:- 21/10/2005

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP12iv**
Client: **Defence Estates**	Site Area: **Hot-spot No.12**		
Method & Equipment: **Electra (0.0 – 0.5) and Arrdvark* (0.15 – 0.5)**	Ground Level (mAOD):	Date: **22/09/05**	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground level (grass)	92 – 105		
0.0 – 0.5	Trial Pit	98 – 112		MADE GROUND: Brown sandy clay fine to coarse gravels including brick and occasional black granular pockets.
	Bucket	89 – 146		...@ 0.2 increasing brick fragments, flint and granular material
0.15 – 0.2	Trial Pit	350 – 400*		
	Bucket	270 – 300*		
0.3 – 0.5	Trial Pit	340 – 400*		
	Bucket	270 – 320*		
				Trial pit terminated @ 0.5 following exposure of yellow warning tape above electric cable.

TRIAL PIT ADDITIONAL INFORMATION

Photo 1033

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 0.5 Located to approx. ##m east of TP12		Drafted by: MR	Checked By:	Logged By: MR

RADIOLOGICAL TRIAL PIT LOG

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Status:-Draft

Date:- 21/10/2005

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP12v**
Client: **Defence Estates**	Site Area: **Hot-spot No.12**		
Method & Equipment: Arrdvark	Ground Level (mAOD):	Date: **22/09/05**	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground level (grass)	260 – 320		
0.0 – 0.10	Trial Pit	297 – 380		MADE GROUND: Brown sandy silty clayey.
	Bucket	240 – 260		... @ 0.1 angular gravels of orange brick
0.10 – 0.25	Trial Pit	370 – 501		.. @ 0.25 increasing medium to course gravels of brick and soft white stone (chalk), with occasional pockets of fine black gravels or ash.
	Bucket	360 – 370		
0.4 – 0.5	Trial Pit	404 – 916*		.@ 0.4 lighter sandy brown clay, gravels of brick and burnt black fragments. Increasing subrounded to angular granular material including clinker and porcelain.
	Bucket	300 -360		
				Additional rubble observed in the northern end of excavation, including metal fragments and numerous green/blue flecks/mottle within clay. *Increasing activity in northern end of excavation.
0.5 – 0.6	Trial Pit	600 - 1010		
0.65	Trial Pit	470 – 1274		Firm dark brown clay, except within northern end of pit with rubble and man-made debris is northern. Elevated activity associate with northern end of excavation.
	Bucket	492 – 530		
Pit extended north.				
0.2	Trial Pit	400 – 410		
0.25	Trial Pit	550 – 619		Start of demolition rubble
0.25 – 0.4	Bucket	270 – 280		Metal debris, including distinct artefacts
0.4	Bucket	302 – 390		Asbestos cement, sink fragments, metal, gaskets, electrical junction box
	Trial Pit	860 – 916		
0.55	Trial pit	870 – 1027		Twisted metal and rubble
0.75	Trial Pit	830 – 1003		Darker possibly damp sandy clay with additional metal fragments
0.85	Bucket	400 – 425		Material appears to extend to the east.
	Trial Pit	810 – 942		

0.9	Bucket Trial Pit	335 – 350 520 - 550		Soft yellow clay in north of pit. Trial pit terminated @ 1.5m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 2 x 0.6 x 1.5 Orientated north/south Located between TP12 and TP12iv?		Drafted by: MR	Checked By:	Logged By: MR

RADIOLOGICAL TRIAL PIT LOG

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Status:-Draft

Date:- 21/10/2005

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Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP12vi**
Client: **Defence Estates**	Site Area: **Hot-spot No.12**		
Method & Equipment: Arrdvark	Ground Level (mAOD):	Date: **22/09/05**	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground level (grass)	255 – 307		
0.0 – 0.15	Trial Pit	230 – 270		MADE GROUND: Brown sandy clay some angular fine to coarse gravels including orange brick
	Bucket	170 – 190		
0.15 – 0.3	Trial Pit	288 – 321		MG – lighter brown sandy gravely clay with increasing brick, white & black pockets of granular material/gravel.
	Bucket	225 – 250		
0.4 – 0.85	Trial Pit	395 – 448.		Darker brown sandy very gravely clay
	Bucket	220 – 240		
0.85 – 1.0	Trial Pit	360 -380		Grey and black mottle clay
	Bucket	235 – 248		Soft grey/yellow sandy clay with few gravels
1.0 – 150	Trial Pit	397 – 435		
1.5	Trial Pit	483 – 518		Grey clay with brown mottle
	Bucket	280 – 290		
1.6	Trial Pit	510 – 538.		
	Bucket	260 – 280		
2.10	Bucket	287 – 330		
				Trial pit terminated @ 2.1m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.6 x 1.5 Orientated north/south Located west of TP12		Drafted by: MR	Checked By:	Logged By: MR

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Status:- Draft

Date:-

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP13**
Client: **Defence Estates**	Site Area: **Hot-spot No.13**		
Method & Equipment:	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION

TRIAL PIT ADDITIONAL INFORMATION

Previous anomaly hot-spot could not be relocated. New strip foundations were noted in the area.

All dimensions in metres

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Status:- Draft

Date:- 14/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP14**
Client: **Defence Estates**	Site Area: **Hot-spot No.14**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 27/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	101		
0.0 – 0.2	Bucket	88		MG – Loose black ashy SAND with much fine to medium gravel of brick and concrete
	Excavation	120		....@ 0.2m layer of bricks
0.2 – 0.4	Bucket	89 – 94	0.3	Soft brown sandy CLAY with occasional gravel of flint and chalk.
	Excavation	140 – 145		
0.4 – 0.6	Bucket	80 – 95		
	Excavation	151 – 171		
0.6 – 0.8	Bucket	79 – 83		
	Excavation	143 – 169		
0.8 – 1.0	Bucket	75 – 78	0.8	Dense medium to coarse rounded and sub-rounded gravel of flint.
	Excavation	138 – 151		
				E.O.H. @ 1.0m

TRIAL PIT ADDITIONAL INFORMATION

TP <170cps not located therefore TP excavated @ point nearest to GPS co-ordinates (accounting for drift)

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 2 x 0.5 x 1		Drafted by: MR	Checked By:	Logged By:

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Date:-

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPA1**
Client: **Defence Estates**	Site Area: **Anomaly Area A**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 27/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Turf	102 – 109		MG – brown loose clayey sand with some brick and concrete fine – medium angular gravel.
0.05	Ground	193 – 242		
0.1 – 0.2	Bucket	130 – 138		
	Excavation	660 – 1137		
0.2 – 0.4	Bucket	168 – 174		... @ 0.3 large pocket of blue green sand
	Excavation	468 – 512		
0.4 – 0.6	Bucket	106 – 113		
	Excavation	260 – 281	0.5	Soft brown clayey SAND
				E.O.H @ 0.6m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 0.6 Orientated east/west adjacent to path		Drafted by: MR	Checked By:	Logged By: SP

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Date:- 13/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPA2**
Client: **Defence Estates**	Site Area: **Anomaly Area A**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 27/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Turf	108		
	Ground	193 – 243		
0.0 – 0.1	Excavation	158 – 438		MG – light brown sandy CLAY with fragments of concrete, brick and occasional metal.
0.1 – 0.2	Bucket	138 – 142		
	Excavation	185 – 719		
0.2 – 0.3	Excavation	621 – 1119*	0.25	MG dark brown/black sandy ashy GRAVEL of coke with large pockets of blue green sand,
0.3 – 0.4	Bucket	456 – 512 *		
	Excavation	145 – 156		
0.4 – 0.5	Bucket	108 – 110	0.4	Soft brown sandy CLAY.
	Excavation	140 – 163		
				E.O.H @ 0.5m

TRIAL PIT ADDITIONAL INFORMATION

- *pockets of blue green sand
- extended 3 x 2 x 0.5m, additional blue powder encountered 158 – 193cps

- **Exempt waste estimate: 1.0 m^3**
- **LLW estimate: N/A**

All dimensions in metres

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 3 x 2 x 0.5		Drafted by: MR	Checked By:	Logged By: SP

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Date:- 13/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPA3**
Client: **Defence Estates**	Site Area: **Anomaly Area A**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 27/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Turf	105 – 145		
	Ground	187 – 213		
0.0 – 0.05	Excavation	171 – 245		MG – loose brown sandy subsoil
0.1 – 0.2	Bucket	103 – 138		... .@ 0.2 large metal fragment
	Excavation	202 – 243		
0.2 – 0.3	Excavation		0.3	Light brown clayey fine SAND
0.3 – 0.4	Bucket	101 – 138		... ...becoming more clayey with depth
	Excavation	201 – 222		
			1.2	Light brown f-c roundd and subrounded GRAVEL of flint with some clay.
				E.O.H @ 1.2m

TRIAL PIT ADDITIONAL INFORMATION

Source = possibly the metal fragment 243cps, no other visible potential source and activity decreased in the near vicinity.

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

All dimensions in metres

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 1.2		Drafted by: MR	Checked By:	Logged By: SP

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Status:- Draft

Date:- 27/08/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPB**
Client: **Defence Estates**	Site Area: **Anomaly Area B**		
Method & Equipment:	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	163		
0.00 – 0.10	Bucket	97.5 – 101	0.1	MG – Soft brown sandy clay with fine to medium, angular to subangular gravel. Gravel consisting of brick, concrete and charcoal.
	Excavation	112 – 114		
0.10 – 0.30	Bucket	101 – 104	0.3	Dense brown clayey SAND
	Excavation			
				E. O. H @ 0.3 m

TRIAL PIT ADDITIONAL INFORMATION

Counts > 170 cps could not be located, therefore trial pit excavated at GPS coordinates.

Pit dimensions: 1.30 x 0.50 x 0.30

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y	
Dimensions:		Drafted by: MR	Checked By: / Logged By: SP

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Status:- Draft

Date:- 28/08/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPC**
Client: **Defence Estates**	Site Area: **Anomaly Area C**		
Method & Equipment:	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	165		
0.00 – 0.30	Bucket	130 – 105	0.30	MG – Dense brown sandy clay with occasional gravel of charcoal, wood, brick and flint
	Excavation	155 – 162		
0.30	Bucket	114 – 117		Dense brown sandy CLAY
	Excavation	165 - 174		

TRIAL PIT ADDITIONAL INFORMATION

Searched for > 400 cps, could not locate therefore the highest reading was taken

Pit dimensions : 0.50 x 0.50 x 0.50

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability:	Sides: Y Base: Y	
Dimensions:		Drafted by: MR	Checked By:	Logged By: SP

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Status:- Draft

Date:- 28/09/2005

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **HDP D**
Client: **Defence Estates**	Site Area: **Anomaly Area D**		
Method & Equipment: **Ludlum 2241 Meter**	Ground Level (mAOD):	Date: **28/09/05**	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground level (grass)	178 – 191	0.00 – 0.20	MADE GROUND: Soft brown clayey sandy silt with frequent cobbles of brick and concrete.
0.00 -0.20	Bucket	198 – 211		
	Excavation	105 – 168		End of monitoring at 0.2 m bgl due to lack of penetration

TRIAL PIT ADDITIONAL INFORMATION

Elevated count due to brick material at the base of the pit.

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 0.3 x 0.3x 0.2		Drafted by: MR	Checked By:	Logged By: LCAM

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Status:- Draft

Date:-

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPE**
Client: **Defence Estates**	Site Area: **Anomaly Area E**		
Method & Equipment:	Ground Level (mAOD):	Date: 28/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	169		
0.00 – 0.20	Bucket	103 – 108	0.4	MG: Soft brown clayey sand with some fine to coarse gravel of brick and coal.
	Excavation	142 – 152		
0.20 - 0.40	Bucket	113 – 156		Dense brown clayey SAND
	Excavation	116 - 117		
0.60				... ... becoming gravelly at 0.60 m bgl
				E. O. H @ 0.60 m bgl

TRIAL PIT ADDITIONAL INFORMATION

No sign of > 2170 cps therefore anomaly, machine related?

- **Exempt waste estimate:N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: **1.50 x 0.50 x 0.60**		Drafted by: MR	Checked By:	Logged By: SP

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Status:- Draft

Date:- 28/09/2005

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPF**
Client: **Defence Estates**	Site Area: **Anomaly Area F**		
Method & Equipment: **Ludlum 2241 Meter**	Ground Level (mAOD):	Date: **28/09/05**	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground level (grass)	189 – 193	0.00 – 0.40	MADE GROUND: loose brown silty sand with frequent medium to coarse brick rubble.
0.00 - 0.10	Bucket	105 – 105		Black ashy layer with frequent medium to coarse brick rubble present at 0.2 m bgl.
0.00 - 0.10	Trial Pit	165 – 167		
0.10 – 0.20	Bucket	111 – 113		
0.10 – 0.20	Trial Pit	193 – 202		
0.20 – 0.30	Bucket	153 – 156		
0.20 – 0.30	Trial Pit	173 – 175		Brown clayey SAND
0.30 – 0.40	Bucket	103 – 104		
0.30 – 0.40	Trial Pit	179 – 181		End of monitoring at 0.45 m bgl due to lack of penetration

TRIAL PIT ADDITIONAL INFORMATION

No sign of any particular source. Brick rubble thought to be acting as a source

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.0 x 1.0 x 0.4		Drafted by: MR	Checked By:	Logged By: LCAM

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Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPG**
Client: **Defence Estates**	Site Area: **Anomaly Area G**		
Method & Equipment:	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION

TRIAL PIT ADDITIONAL INFORMATION

Location not accessible to plant – elevated surface activity could not be located therefore no hand dug pit excavated.

All dimensions in metres

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions:		Drafted by: MR	Checked By:	Logged By: SP

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Status:- Draft

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPH**
Client: **Defence Estates**	Site Area: **Anomaly Area H**		
Method & Equipment:	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION

TRIAL PIT ADDITIONAL INFORMATION

Elevated surface activity could not be located – no HDP

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions:		Drafted by: MR	Checked By:	Logged By: SP

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Status:- Draft

Date:- 14/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP1**
Client: **Defence Estates**	Site Area: **Anomaly Area I**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 26/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground level	310 - 317		
0.0 – 0.25	Bucket	120 – 146		Brown sandy silt with occasional brick fragments and glass
	Excavation	500 – 588		
0.25 – 0.45	Bucket	128 – 130	0.3	Soft brown sandy CLAY
	Excavation	158 – 167		
0.45 – 0.55	Bucket	116 – 134		
	Excavation	168 – 172		
0.55 – 0.65	Bucket	112 – 120		
	Excavation	170 – 172		
				E.O.H @ 0.65m

TRIAL PIT ADDITIONAL INFORMATION

CPS reduced at depth. Distinct point source – no evidence of MG or MG object - Soil presumed natural @0.3m

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 0.65		Drafted by: MR	Checked By:	Logged By:

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Status:- Draft

Date:- 14/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPJ**
Client: **Defence Estates**	Site Area: **Anomaly Area J**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 26/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground level	150 – 170		
0.0 – 0.2	Bucket	88 – 103		MG – Loose dark brown black ashy sand with some fine to medium gravel of coal, brick and concrete.
	Excavation	184 – 114		
0.2 – 0.4	Bucket	74 – 85		..... becoming darker and more compacted with depth.
	Excavation	219 – 225		
			0.4	Solid brick foundations – no further penetration possible.
				E.O.H. @ 0.4m

TRIAL PIT ADDITIONAL INFORMATION

Brick foundations @ 0.4m activity recorded as 222 – 233cps.

Elevated activity may be due to brick foundations. No extension or area definition possible due to vehicles and dense vegetation cover.

- **Exempt waste estimate:N/A**
- **LLW estimate: N/A**

All dimensions in metres

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 0.4		Drafted by: MR	Checked By:	Logged By:

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Date:- 14/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **HDP K**
Client: **Defence Estates**	Site Area: **Anomaly Area K**		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 30/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.0 – 0.2	Ground Bucket Excavation	176 – 183 132 – 147 161 – 168	0.2	MG – Medium dense brown clayey SAND with occasional fine to coarse gravel of brick and concrete. Medium dense brown clayey SAND. E.O.H. @ 0.3m

TRIAL PIT ADDITIONAL INFORMATION

Hole dug in vegetation patch. There were no obvious elevated readings despite walking over the whole area.

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 0.3 x 0.3 x 0.3		Drafted by: MR	Checked By:	Logged By: SP

RADIOLOGICAL TRIAL PIT LOG

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Status:- Draft

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP L01**
Client: **Defence Estates**	Site Area: **Anomaly Area L**		
Method & Equipment: Ludlum 2241 Meter	Ground Level (mAOD):	Date: 20/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.05	Bucket	132 – 161	0.00 – 0.10	MG: Dark brown , grey and black ashy silty fine to coarse sand with a little angular fine to coarse gravel with occasional clinker.
	Excavation	158 – 199		
0.10	Bucket	127 – 158	0.10 – 0.20	MG: Light grey ashy silty fine to coarse sand with a little to some angular fine to coarse gravel of clinker.
	Excavation	156 – 178		
0.20	Bucket	108 – 138	0.20 – 0.30	MG: Black tarmacadam recovered as angular fine to coarse gravel sized fragments of tarmac
	Excavation	129 – 151		
0.30	Bucket	80 – 98	0.30 – 0.45	MG: Light brown and grey slightly clayey fine to coarse sand and angular fine to coarse gravel with occasional fragmented red brick.
	Excavation	115 – 156		
0.35	Bucket	88 – 101	0.45 – 1.50	Light brown clayey slightly silty SAND with a little angular to subrounded gravel.
	Excavation	142 – 165		
0.60	Excavation	208 – 245		
1.00	Bucket	101 – 142		
	Excavation	284 – 312		
1.20	Bucket	124 - 149		
	Excavation	274 – 309		
1.40	Excavation	272 - 311		
				TPL 01 completed at 1.50 m

TRIAL PIT ADDITIONAL INFORMATION

Excavation dimensions = 1.10 x 0.65

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.6 x 1.5m		Drafted by: MR	Checked By:	Logged By: LCAM

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Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP L02**
Client: **Defence Estates**	Site Area: **Anomaly Area L**		
Method & Equipment: Ludlum 2241 Meter	Ground Level (mAOD):	Date: 20/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground	158 – 210	0.00 – 0.20	MG: Dark brown and dark grey ashy silty fine to coarse sand with a little to some angular fine to coarse gravel with occasional clinker.
0.05	Bucket	154 – 168		
	Excavation	171 – 194		
0.10	Bucket	143 – 156		
	Excavation	132 – 170		
0.20	Bucket	88 – 116	0.20 – 0.40	MG: Light brown and black slightly clayey silty fine to coarse sand with some angular fine to coarse gravel with occasional fragmented brick
	Excavation	163 – 182		From 0.30 m predominantly red brick.
0.35	Bucket	112 – 143	0.40 – 1.20	Light brown silty sandy fine to medium CLAY with occasional red staining and occasional angular to subrounded gravel.
	Excavation	180 – 205		
0.60	Bucket	134 – 154		
	Excavation	202 – 252		
0.95	Bucket	106 – 149	1.20 – 1.60	Very stiff light brown – orange slightly sandy slightly silty CLAY with some angular – subrounded fine to coarse gravel, with occasional pockets of grey sandy cay with some angular and subangular gravel.
	Excavation	243 - 309		
1.40	Bucket	111 – 139		
	Excavation	244 - 288		
				TPL 02 completed at 1.60 m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate:N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.80 x 0.65 x 1.6 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: LCAM

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Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP L03**
Client: **Defence Estates**	Site Area: **Anomaly Area L**		
Method & Equipment: Ludlum 2241 Meter	Ground Level (mAOD):	Date: 20/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground	166 – 203	0.00 – 0.20	MG: Black and dark brown ashy slightly silty fine to coarse sand and angular fine to medium gravel predominantly of clinker.
0.05	Bucket	137 – 181		
	Excavation	173 – 207		
0.20	Bucket	119 – 131	0.20 – 0.60	Light brown slightly silty sandy CLAY with a littlel angular to subrounded fine to coarse gravel.
	Excavation	163 – 213		
0.35	Bucket	108 – 141		
	Excavation	202 – 233		
0.55	Bucket	115 – 153		
	Excavation	212– 270		
				TPL 03 completed at 0.60 m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.90 x 0.65 x 0.6 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: LCAM

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Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP L04**
Client: **Defence Estates**	Site Area: **Anomaly Area L**		
Method & Equipment: Ludlum 2241 Meter	Ground Level (mAOD):	Date: 20/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground	168 – 186	0.00 – 0.10	MG: Black and dark brown ashy silty fine to coarse sand with a little angular fine to coarse gravel predominantly of clinker.
0.05	Bucket	120 – 152		
	Excavation	173 – 198		
0.10	Bucket	99 – 140	0.10 – 0.25	MG: Black and white compacted layer of tarmacadam and chalk.
	Excavation	173 – 185		
0.20	Bucket	118 – 139	0.25 – 0.50	MG: Dark brown and white slightly clayey fine to coarse sand and angular fine to coarse gravel with much whole and fragmented brick.
	Excavation	184 – 223		
0.40	Bucket	144 – 180	0.50 – 0.85	Firm slightly silty sandy CLAY with a little angular to subrounded fine to medium gravel.
	Excavation	228– 261		
0.60	Bucket	115 – 136		
	Excavation	252 – 288		
0.85	Bucket	126 – 142		
	Excavation	279 - 322		
				TPL 04 completed at 0.85 m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.90 x 0.65 x 8.5 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: LCAM

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Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP L05**
Client: **Defence Estates**	Site Area: **Anomaly Area L**		
Method & Equipment: Ludlum 2241 Meter	Ground Level (mAOD):	Date: 20/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground	151 – 192	0.00 – 0.10	MG: Black and dark brown ashy slightly silty fine to coarse sand with some angular fine to coarse gravel of clinker.
0.05	Bucket	159 – 167	0.10 - 0.20	MG: Black and white compacted layer of tarmacadam and chalk.
	Excavation	141 – 191		
0.15	Bucket	122 – 150	0.20 – 0.45	MG: Whole and fragmented red brick with a matrix of brown clayey fine to coarse sand with some fine to coarse gravel.
	Excavation	178 – 199		
0.35	Bucket	117 – 136	0.45 – 0.90	Light grey mottled brown clayey slightly silty fine to medium SAND with a little angular to subangular gravel.
	Excavation	216 – 249		From 0.65 becoming light brown in colour with a little grey mottling.
0.60	Bucket	117 – 147		
	Excavation	242– 283		
0.90	Bucket	141 – 161		
	Excavation	255 – 297		TPL 05 completed at 0.60 m

TRIAL PIT ADDITIONAL INFORMATION

Excavation dimensions = 2.10 x 0.65

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 2.10 x 0.65 x 0.6 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: LCAM

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Date:- 14/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPM**
Client: **Defence Estates**	Site Area: **Anomaly Area M**		
Method & Equipment: Aadvarc	Ground Level (mAOD):	Date: 27/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.05	Excavation	430 – 540		Light brown very sandy slightly silty clay with rare gravels.
0.05 – 0.3	Bucket	330 – 375		Occasional fragments/gravels of clinker
	Excavation	480 – 530		
0.3 – 0.6	Bucket	290 – 360		
	Excavation	460 – 540		
0.8	Bucket	325 – 365		Darker brown sandy clay rare sub-rounded to angular cobbles of flint and brick. Higher readings towards the building.
	Excavation	520 – 560		
0.9 – 1.4	Bucket	320 – 380		Firm orange brown very sandy clay, occasional fine to coarse gravels.
	Excavation	570 – 620		
1.6	Excavation	540 – 570		TP Terminated @ 1.6m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate:N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.6 x 1.6 All dimensions in metres		Drafted by: MR	Checked By:	Logged By:

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Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPN**
Client: **Defence Estates**	Site Area: **Anomaly Area N**		
Method & Equipment: Electra	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.1	Trial Pit	115 – 157		MG: Sandy brown soil frequent gravels
0.4	Trial Pit	143 – 150		.... @ 0.4m fragments of brick
	Bucket	110 – 120		
0.6	Trial Pit	120 – 140		Gravels include clinker, occasional white (chalk) cobbles, half/whole bricks, clinker and wood
	Bucket	90 – 100		
0.8	Trial Pit	148 – 160		Non-cohesive very sandy gravely clay
1.0	Trial Pit	165 –169		Concrete and whole bricks, metal fragments and possibly asbestos cement
	Bucket	90 – 100		
1.2	Trial Pit	160 – 170		
1.3	Bucket	50 – 90		Firm – stiff grey slightly sandy clay
				TP terminated @ 1.4m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.6 x 1.4 All dimensions in metres		Drafted by: MR	Checked By:	Logged By:

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Status:- Draft

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPO**
Client: **Defence Estates**	Site Area: **Anomaly Area O**		
Method & Equipment: Electra	Ground Level (mAOD):	Date: 28/9/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	181 – 195		
0.0 – 0.2	Bucket	104 – 110		MG – soft brown sandy CLAY, with some bricks and concrete
	Excavation	171 – 184		
0.2 – 0.4	Bucket	124 – 156		Soft brown sandy CLAY becoming lighter with depth.
	Excavation	181 – 189		
				E.O.H @ 0.8m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 0.8 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

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Date:- 13/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPP1**
Client: **Defence Estates**	Site Area: **Anomaly Area P**		
Method & Equipment:	Ground Level (mAOD):	Date: 28/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Turf	158		
	Ground	184		
0.0 – 0.2	Bucket	110 - 118		Made Ground – Dense clayey sandy GRAVEL with ashy component with coal/charcoal remains. Gravel is f-m of brick, flint, coal and concrete.
	Excavation	172 - 184		
0.2 – 0.4	Bucket	103 – 117		.... @ 0.25m brick foundation
	Excavation	152 - 167		. . . @ 0.38 layer of orange sandy
0.4 – 0.5				Soft brown sandy CLAY
				E.O.H @ 5m

TRIAL PIT ADDITIONAL INFORMATION

- Electric cable orientated NE/SW Crossing northern end of TP (Dead? no detection by CAT?)
- TP extended to the south.
- TPP1a and TPP1b excavated 1m east and west respectively of TPP1. (ref: original log sketch)

TPP1a 0.0 – 0.2m Bucket = 157 – 142 cps, Excavation 227 – 251 cps
0.2 – 0.4m Bucket = 107 – 119 cps, Excavation 203 – 227 cps (CLAY @ 0.4m)

TPP1b 0.0 – 0.2m Bucket = 103 – 117 cps, Excavation 167 – 170 cps
0.2 – 0.4m Bucket = 110 – 119 cps, Excavation 174 – 183 cps

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 3 x 0.5 x 0.5 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

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Date:- 13/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPP2**
Client: **Defence Estates**	Site Area: **Anomaly Area P**		
Method & Equipment: Electra No. 5	Ground Level (mAOD):	Date: 28/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	168 – 179		
0.0 – 0.2	Bucket	124 - 127		Made Ground – dark brown clayey/silty sand with some gravel of brick, charcoal, concrete and occasional pockets of black sandy ash, with some glass.
	Excavation	185 - 188		
0.2 – 0.4	Bucket	158 – 164		Dense brown clayey SAND becoming more clayey with depth with some grey mottling.
	Excavation	212 - 234		
				E.O.H @ 0.6m

TRIAL PIT ADDITIONAL INFORMATION

- TPP2a and TPP2b excavated north and south respectively of TPP2. (ref: original log sketch)

TPP2a Ground = 168 – 172cps, 0.0 – 0.2m Bucket = 112 – 123cps, Excavation 166 - 179cps. Natural @ 0.2m.

TPP2b Ground = 145 - 163cps, 0.0 – 0.2m Bucket = 113 – 134cps, Excavation 156 - 168cps. Natural @ 0.2m.

- Pipe/cable noted in vicinity of TPP2b between buildings.

- **Exempt waste estimate:** N/A
- **LLW estimate:** N/A

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 0.6 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

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Date:- 13/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPP3**
Client: **Defence Estates**	Site Area: **Anomaly Area P**		
Method & Equipment: Electra No. 5	Ground Level (mAOD):	Date: 28/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	161 – 172		
0.0 – 0.1	Bucket	103 - 117		Made Ground – brown sandy caly with some f-c angularand rounded gravel of flint, brick and concrete with pockets of black/ashy sand in east of pit.
	Excavation	141 - 148		
0.1 – 0.2	Bucket	113 – 145	0.2	Medium dense brown clayey SAND
	Excavation	171 - 175		....@0.35m large band of flint cobbles in north of pit.
				E.O.H @ 0.4m

TRIAL PIT ADDITIONAL INFORMATION

- Cable noted in approximately 1m west of TPP3 orientated north/south parallel to building.
- TPP3a excavated 1m east of TPP2. (ref: original log sketch)

TPP3a 0.0 – 0.2m Bucket = 87.5 – 93cps, Excavation 138 - 153cps.

- Pocket of black ashy sand in east of pit chased to east.

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 2 x 0.6 x 0.4 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

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Date:- 13/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPP4**
Client: **Defence Estates**	Site Area: **Anomaly Area P**		
Method & Equipment: Electra No. 5	Ground Level (mAOD):	Date: 28/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	156 – 164		
0.0 – 0.2	Bucket	113 - 132		Made Ground – dark clayey SAND with some f-c angular/subangular gravel of brick, coal and glass.
	Excavation	143 - 156		
0.2 – 0.4	Bucket	123 – 137		....@ 0.3m lense of black ashy sand in east of pit.
	Excavation	154 – 163		
0.4 – 0.5	Bucket	108 – 119		Medium dense brown clayey SAND.
	Excavation	208 – 221		
				E.O.H @ 0.5m

TRIAL PIT ADDITIONAL INFORMATION

- Pit located approx. 0.8m east from wall, north of lamp post and north west of tree. Electric cable noted to east of TPP4

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 0.6 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

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Date:- 13/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPP5**
Client: **Defence Estates**	Site Area: **Anomaly Area P**		
Method & Equipment: Electra No. 5	Ground Level (mAOD):	Date: 29/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	158 – 164		
0.0 – 0.2	Bucket	132 - 147		Made Ground – soft brown clayey SAND with much f-c, angular and rounded gravel of brick, concrete, slate, coal and flint.
	Excavation	151 - 158		
0.2 – 0.3	Bucket	134 – 141		
	Excavation	161 – 168		
0.3 – 0.4	Bucket	112 – 115		Soft brown sandy CLAY with occasional f-m gravel of flint.
	Excavation	181 – 212		
				E.O.H @ 0.4m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability:	Sides: Y Base: Y	
Dimensions: 1.5 x 0.6 x 0.4 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

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Status:- Draft

Date:- 13/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPP6**
Client: **Defence Estates**	Site Area: **Anomaly Area P**		
Method & Equipment: Electra No. 5	Ground Level (mAOD):	Date: 29/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	168 – 172		
0.0 – 0.2	Bucket	148 - 150		Made Ground – light/dark brown f-m sand with much f-c gravel rounded to subrounded of flint, chalk, brick and concrete with occasional metal fragments inc.
	Excavation	158 - 160		
0.2 – 0.4	Bucket	131 – 140		Dense brown clayey SAND with some f-c gravel, rounded to sub-rounded, of flint and occasional large flint cobble
	Excavation	178 – 184		
				E.O.H @ 0.4m

TRIAL PIT ADDITIONAL INFORMATION

TP located approx. 1.5m south of building.

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 0.6 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

RADIOLOGICAL TRIAL PIT LOG

Entec

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Status:- Draft

Date:- 13/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPP7**
Client: **Defence Estates**	Site Area: **Anomaly Area P**		
Method & Equipment: Electra No. 5	Ground Level (mAOD):	Date: 28/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	179 – 181		
0.0 – 0.2	Bucket	115 - 128		Made Ground – soft brown silty clayey SAND with much f-c angular and rounded gravel of flint, brick and concrete with pockets of ashy coal in centre of trial pit.
	Excavation	191 – 212		
0.2 – 0.4	Bucket	134 – 145	0.2	Dense brown clayey SAND
	Excavation	198 – 201		
				E.O.H @ 0.4m

TRIAL PIT ADDITIONAL INFORMATION

- TPP7a excavated 0.7m north of TPP7 (ref: original log sketch)
  TPP7a 0.0 – 0.2m Bucket = 138 – 141cps, Excavation 167 - 169cps.
- TPP7b excavated 1m south of TPP7
  TPP7b 0.0 – 0.2m Bucket = 128 – 152cps, Excavation 174 - 181cps.
- TPP7c excavated east of TPP7 between TPP7 and path
  TPP7c 0.0 – 0.2m Bucket = 101 – 113cps, Excavation 152 - 159cps.
- TPP7d excavated 1m north of TPP7
  TPP7d 0.0 – 0.2m Bucket = 107 – 109cps, Excavation 152 - 156cps.

Black ashy coaly layer noted in TPP7a, TPP7d and west of TPP7b. Natural soil in TPP7c.

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 0.4 Orientated east/west 0.5m from building. All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

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Status:- Draft

Date:- 13/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPP8**
Client: **Defence Estates**	Site Area: **Anomaly Area P**		
Method & Equipment: Electra No. 5	Ground Level (mAOD):	Date: 29/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	168 – 171		
0.0 – 0.2	Bucket	103 - 118		Made Ground – light brown medium dense clayey sand with much f-c angular and subangular gravel of flint, concrete, coke/charcoal fragments.
	Excavation	161 – 169		
		(162)		.....@ 0.15 lense of black coal dust
0.2 – 0.4	Bucket	123 – 134		Made Ground brown sandy CLAY with some orange/grey mottling.
	Excavation	198 – 214		
				E.O.H @ 0.6m

TRIAL PIT ADDITIONAL INFORMATION

Pipe in east of pit

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 0.6 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

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Status:- Draft

Date:-

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **HDP Q**
Client: **Defence Estates**	Site Area: **Anomaly Area Q**		
Method & Equipment:	Ground Level (mAOD):	Date: 29/9/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.0 – 0.2	Ground Spoil Excavation	191 - 196 159 – 161 191 – 203	0.2	MG – Clayey SAND with some fine-medium gravel of brick and concrete. ... @ 0.15m lense of black ashy sand. Brown medium dense clayey sand. E.O.H @ 0.3m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: Orientated west/east, approx 2m from building All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

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Status:- Draft

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPR**
Client: **Defence Estates**	Site Area: **Anomaly Area R**		
Method & Equipment:	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION

TRIAL PIT ADDITIONAL INFORMATION

Not accessible to plant, no HDP as no elevated surface readings could be detected.

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

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Status:- Draft

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPS**
Client: **Defence Estates**	Site Area: **Anomaly Area S**		
Method & Equipment:	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION

TRIAL PIT ADDITIONAL INFORMATION

Not accessible to plant, no HDP as no elevated surface readings could be detected

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

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Status:- Draft

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **HDP T1**
Client: **Defence Estates**	Site Area: **Anomaly Area T**		
Method & Equipment: Electra No.5	Ground Level (mAOD):	Date: 29/9/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.0 – 0.2	Ground Spoil Excavation	171 -211 132 – 143 156 – 162	0.2	MG – Medium dense brown clayey SAND with some f-c gravels of brick, concrete, coke and wood. Brown medium dense clayey SAND. E.O.H @ 0.3m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

HDP T2 scheduled for the north of the area was not excavated as no elevated surface activity could be detected.

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

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Status:- Draft

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPU**
Client: **Defence Estates**	Site Area: **Anomaly Area U**		
Method & Equipment: Electra	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.0	Surface	140 – 206		
0.05	Trial Pit	165 – 202		Light brown sandy 'soil' under grass.
0.1	Trial Pit	165 – 170		Extensive brick, half and whole, and clinker
0.2	Trial Pit	160 – 185		
	Bucket	155 – 174		
0.3	Trial Pit	238 – 250		Light brown very sandy friable clay with frequent fine to coarse gravels.
		123 – 158		
0.6	Trial Pit	227 – 247		Orange brown firm to stiff clay when not friable, with occasional grey mottle.
1.0	Trial Pit	255 – 260		
	Bucket	160 – 180		
1.2	Trial Pit	255 – 265		
				Excavation terminated @ 1.2m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.6 x 1.2 Orientated north/south All dimensions in metres		Drafted by: MR	Checked By:	Logged By: MR

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Status:- Draft

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPV1**
Client: **Defence Estates**	Site Area: **Anomaly Area V**		
Method & Equipment: Ludlum	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Surface	198 – 218		
0.0 – 0.05	Excavation	210 – 229	0.0 - 0.1	MG – Dark brown medium dense gravely/granular SAND with clinker.
0.15 – 0.25	Bucket	165 – 170	0.1 – 0.3	....gravels inc small brick fragments, clinker and ash.
	Excavation	207 – 216		
0.3	Bucket	140 – 165	0.3 – 1.2	Grey brown orange mottled CLAY
	Excavation	208 – 218		
0.4	Excavation	218 - 238		
0.7	Bucket	140 – 158		Firm grey mottled CLAY, few gravels
	Excavation	249 – 257		
0.8	Bucket	132 – 153		
	Excavation	235 – 247		
0.9	Excavation	268 – 280		
1.2	Bucket	132 – 150		.....increasing gravels of flint angular to sub-angular
				TP Terminated @ 1.2m

TRIAL PIT ADDITIONAL INFORMATION

Photograph # & ## taken at 0.2 & 0.35m respectively

Additional shallow TP excavated 4m to the north parallel to TPV1

- **Granular as/clinker soil under grass approx. 0.15 m thick, below which clay with brick gravels/cobbles (160 – 176 cps in excavation) @ 0.3m orange brown sandy clay (160 – 180cps).**

Additional shallow TP excavated 2m to the south of TPV1, orientated north/south (perpendicular to TPV1)

- **Similar made ground only observed in north of pit (160 cps) . ... @ 0.4 change to light yellow orange brown clay (160 – 210 cps in excavation). Terminated @ 0.6m 120 – 160cps in bucket.**

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.6 x 1.2 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: MR

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Status:- Draft

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPV2**
Client: **Defence Estates**	Site Area: **Anomaly Area V**		
Method & Equipment: Ludlum	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Surface	190 – 218		
0.0 – 0.05	Excavation	193 – 210		MG – brown sandy 'soil' under grass frequent gravels including some clinker
0.15 – 0.25	Bucket	118 – 134		Brown sandy gravely clay. Gravels and cobbles include slate, concrete fragments, whole and half bricks
	Excavation	160 – 230		
0.5	Bucket	195 – 205		... ... rare demolition rubble
	Excavation	122 – 142		
0.7	Excavation	196 – 200		Large concrete section within TP > 0.5 m
1.0	Excavation	210 – 245		Firm to stiff brown sandy clay in west of pit, possibly foundations/buried rubble in east.
1.2	Excavation	200 – 250		Orange brown clay with occasional grey mottle.
1.5 – 1.7	Excavation	220 – 275		.... Increasing angular to sub-angular gravels and cobbles of flint
2.1	Bucket	110 – 140		Grey mottled brown orange clay
				TP Terminated @ 2.1m

TRIAL PIT ADDITIONAL INFORMATION

Photograph 1065 taken at 1.0m

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.6 x 2.1 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: MR

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Status:- Draft

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPW**
Client: **Defence Estates**	Site Area: **Anomaly Area W**		
Method & Equipment: Electra	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.0	Surface	140 – 182		Overgrown vegetation on path between brambles
0.0 – 0.05	Bucket	160 – 180		MG. Black granular fine to coarse sandy ashy with some clinker
	Ground	242 – 356		
0.05 – 0.15	Bucket	130 – 143		Concrete, brick and clinker
	Ground	148 – 210		
0.15 – 0.5	Bucket	98 – 125		Black granular material below grass 0.2 to 0.3m thick, large cobbles of clinker, whole and half bricks, occasional metal and broken crockery fragments ..... then brown grey orange clay with bricks and clinker .....@ 0.5m a 0.1m band of clinker and bricks
	Ground	146 – 190		
0.6 – 1.0	Bucket	130 – 153		Increasing content of firm to stiff light brown sandy clay, with fine to coarse gravels
	Ground	92 – 114		
1.0	Bucket	82 – 120	1.0 – 1.6	Still evidence of red/orange bricks, gravels and cobbles of flint also present.
	Ground	136 – 146		
1.4	Bucket	82 – 100		
	Ground	174 – 208		
1.6	Bucket	92 – 98		Approx. base of brick
1.7				Firm to stiff light brown sandy clay becoming grey mottled at approx. 1.8m
				TP terminated @ 2.3m

TRIAL PIT ADDITIONAL INFORMATION

Photo 1058, 1059.....

Overgrown vegetation in immediate surrounding area cleared – surface monitoring 82 – 106cps. Surface scrape 4m south of TPW revealed bricks, clinker @ 0.1m (80 – 98 cps) – Therefore ash not chased out.

- **Exempt waste estimate: N\A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: All dimensions in metres		Drafted by: MR	Checked By:	Logged By:

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Status:- Draft

Date:- 21/09/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP X01**
Client: **Defence Estates**	Site Area: **Anomaly Area X**		
Method & Equipment: Ludlum 2241 Meter	Ground Level (mAOD):	Date: 21/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	156 – 215		
0.10	Bucket	127 – 154	0.00 – 0.25	MG: Dark brown silty fine to coarse sand with some angular fine to coarse gravel including occasional to some clinker.
	Excavation	181 – 214		
0.20	Bucket	148 – 168	0.25 – 0.50	MG: Brown and black ashy silty fine to coarse sand with some angular fine to coarse gravel predominantly of clinker.
	Excavation	185 – 221		
0.30	Bucket	117 – 140	0.25 – 0.50	Firm brown slightly sandy silty clay with a little angular and sub angular fine to coarse gravel
	Excavation	160 – 190		
0.40	Bucket	110 – 127		From 0.5 m becoming mottled grey
	Excavation	184 – 223		
0.60	Bucket	108 - 140		
	Excavation	180 – 215		
0.80	Bucket	101 – 124		
	Excavation	159 - 188		
				TPX01 completed at 0.80m bgl

TRIAL PIT ADDITIONAL INFORMATION

Pit dimensions: 2.10 x 0.60
Counts generally lower in the natural clay
Greatest count at 0.40m within MG – However, count in bucket greatest in MG above 0.20 m

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.6 x 0.8 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: LCAM

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Status:- Draft

Date:- 21/09/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP X09**
Client: **Defence Estates**	Site Area: **Anomaly Area X**		
Method & Equipment:	Ground Level (mAOD):	Date: 21/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground	167 – 210		
0.05	Bucket	136 – 162	0.0 – 0.25	MG: Dark brown black silty fine to coarse sand with some fine to coarse gravel including occasional to some clinker.
	Excavation	206 – 263		
0.20	Bucket	142 – 168	0.25 – 0.50	MG: Brown sandy slightly silty clay with little angular fine to coarse gravel
	Excavation	238 – 290		
0.35	Bucket	92 – 124		
	Excavation	229 – 254		
0.5	Bucket	100 – 115	0.50 – 0.80	Stiff orange – brown mottled grey slightly sandy CLAY with a little angular to subrounded fine to coarse gravel, predominantly of flint.
	Excavation	231 – 266		
				TPX09 completed at 0.50m bgl

TRIAL PIT ADDITIONAL INFORMATION

Pit dimensions: 1.80 x 0.60

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

All dimensions in metres

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y	
Dimensions: All dimensions in metres	Drafted by: MR	Checked By:	Logged By: LCAM

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Status:- Draft

Date:- 20/09/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP an01**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Ludlam 2241 Meter	Ground Level (mAOD):	Date: 20/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground	153 – 172		
0.05	Bucket	124 – 140	0.00 – 0.10	MG: Light brown slightly clayey silty fine to medium sand with little angular gravel.
	Excavation	152 – 187		
0.20	Bucket	130 – 143	0.10 – 0.25	MG: Light brown slightly clayey silty fine to medium sand with occasional angular gravel consisting of black clinker.
	Excavation	169 – 210		
0.40	Bucket	117 – 165	0.25 – 0.60	Light brown slightly clayey silty fine to medium SAND with a little angular to subrounded fine to coarse gravel.
	Excavation	177 – 237		
0.60	Bucket	122 – 148		
	Excavation	219 - 249		
				TPAN 01 completed at 0.60 m bgl

TRIAL PIT ADDITIONAL INFORMATION

Counts generally increase with depth into the natural ground

- **Exempt waste estimate:N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y	
Dimensions: **2.30 x 0.60 x 0.6** All dimensions in metres	Drafted by: MR	Checked By:	Logged By: LCAM

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Status:- Draft

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP an02**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Ludlam 2241 Meter	Ground Level (mAOD):	Date: 20/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground	136 – 167	0.00 – 0.70	Light brown slightly clayey silty fine to coarse SAND with a little angular to subangular fine to medium gravel
0.10	Bucket	98 – 140		... becoming brown in colour from 0.30 m
	Excavation	153 – 180		
0.30	Bucket	114 – 155		
	Excavation	184 – 218		
0.45	Bucket	102 – 129		
	Excavation	201 – 255		
0.65	Bucket	112 – 137		
	Excavation	211 - 273		
				TPAN 02 completed a 0.70m bgl

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N\A**
- **LLW estimate: N/A**

Counts increasing with depth greater in ground than in the JCB bucket

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: **2.10 x 0.60 x 0.7** All dimensions in metres		Drafted by: MR	Checked By:	Logged By: LCAM

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Status:- Draft

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP an03**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Ludlam 2241 Meter	Ground Level (mAOD):	Date: 20/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground	149 - 177	0.00 - 0.70	Light brown slightly clayey silty fine to medium SAND with a little angular to subrounded fine to medium gravel
0.05	Bucket	109 – 142		
	Excavation	140 – 180		
0.20	Bucket	105 – 142		
	Excavation	167 – 196		
0.40	Bucket	112 – 140		
	Excavation	20 – 254		
0.70	Bucket	124 – 141		
	Excavation	262 - 278		
				Tpan 03 completed at 0.70 m bgl

TRIAL PIT ADDITIONAL INFORMATION

As before, concentration increases with depth.
Counts consistently less in bucket

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: **2.00 x 0.60 x 0.7** All dimensions in metres		Drafted by: MR	Checked By:	Logged By: LCAM

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Status:- Draft

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP an04**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Ludlam 2241 Meter	Ground Level (mAOD):	Date: 20/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground	146 – 166	0.00 – 0.65	Light brown slightly clayey silty fine to medium SAND ith a little angular to subrounded fine to coarse gravel becoming clayey from 0.5m
0.05	Bucket	119 – 142		
	Excavation	155 – 196		
0.20	Bucket	105 – 133		
	Excavation	191 – 215		
0.40	Bucket	119 – 147		
	Excavation	204 – 252		
0.60	Bucket	94 – 133		
	Excavation	261 – 283		
				TPAN 04 completed at 0.65 m

TRIAL PIT ADDITIONAL INFORMATION

As before, concentration increases with depth.
Counts consistently less in bucket

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: **2.00 x 0.60 x 0.65** All dimensions in metres		Drafted by: MR	Checked By:	Logged By: LCAM

RADIOLOGICAL TRIAL PIT LOG

Entec

ENTEC UK LTD
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Status:- Draft

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP an05**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Ludlam 2241 Meter	Ground Level (mAOD):	Date: 21/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.00	Ground	154 - 217	0.00 – 0.25	MG: Light brown clayey silty fine to coarse SAND with a little angular fine to coarse gravel
0.05	Bucket	112 – 139		
	Excavation	896 to the south of the pit		
0.15	Bucket	121 – 148		
	Excavation	1.65 kcps		
0.25	Bucket	159 – 392		
	Excavation	176 - 227		
				TPAN 05 completed at 0.25 m

TRIAL PIT ADDITIONAL INFORMATION

Elevated reading within excavator bucket from 0.15 – 0.25 – material returned to hole in same order and location marked.

- **Exempt waste estimate: 0.2 m^3**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: **1.00 x 0.90 x 0.25** All dimensions in metres		Drafted by: MR	Checked By:	Logged By: LCAM

RADIOLOGICAL TRIAL PIT LOG

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Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP an06**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Aardvarc	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
				Brown sandy 'soil' under grass
0.1	Trial Pit	400 – 605		Gravels of brick and clinker
0.2	Trial Pit	300 – 415		Piece of metal sheeting (activity below background)
0.4	Trial Pit	364 – 485		
	Bucket	260 – 274		
0.6	Trial Pit	430 – 490		Broken glass and tile or roofing slate fragments
	Bucket	253 – 290		
0.8	Trial Pit	440 – 470		Gravels include subrounded to subangular flint
0.9	Trial Pit	445 – 475		
1.0	Trial Pit	400 – 460		Firm – stiff orange brown clay
1.1	Trial Pit	322 – 370		Very gravely sandy grey clay with orange and brown mottle
	Bucket	290 – 310		
1.4	Bucket	170 – 190		
				TP terminated @ 1.4m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: Orientated west/east All dimensions in metres		Drafted by: MR	Checked By:	Logged By:

RADIOLOGICAL TRIAL PIT LOG

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Status:- Draft

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Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP an07**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Aardvarc	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.0	Surface	311 – 403		Long grass
0.05	Bucket	337 – 365		Light brown sandy clay under grass, gravels fine to medium
	Trial Pit	380 – 440		
0.15	Bucket	266 – 340		.... @ 0.15 Fragments of brick in west of pit
	Trial Pit	460 – 507		
0.3	Bucket	340 – 380		... increasing gravels, fine to coarse subrounded to angular including flint
	Trial Pit	518 – 604		
0.5	Bucket	330 – 370		
	Trial Pit	580 – 635		
0.8	Bucket	290 – 370		
	Trial Pit	570 – 620		
1.0	Bucket	320 – 340		Firm grey orange mottled sandy very gravely clay with frequent cobbles angular to subrounded.
	Trial Pit	590 – 611		
1.6	Bucket	320 – 340		
				TP terminated @ 1.6m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: 1.5m^3**
- **LLW estimate: N/A**

Co-ordinates: E: 56601 N: 02603	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.6 x 1.6 All dimensions in metres		Drafted by: MR	Checked By:	Logged By:

RADIOLOGICAL TRIAL PIT LOG

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Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP an08**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Electra	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.0	Surface	130 – 170		Grass
0.05	Bucket	123 – 136		Light brown sandy 'soil'
	Trial Pit	140 – 165		...@ 0.15 rare ash clinker and gravels of brick
0.2	Trial Pit	222 – 238		Friable sandy clay
0.5	Bucket	119 – 128		Firm to stiff orange/brown sandy clay
	Trial Pit	218 – 232		
1.0	Bucket	130 – 155		Firm grey brown orange mottled clay with gravels and cobbles of flint
	Trial Pit	190 – 245		
1.2	Bucket	108 – 130		.... Frequent angular to subrounded cobbles and medium to fine gravels of flint
	Trial Pit	225 – 237		
				TP terminated @ 1.3m

TRIAL PIT ADDITIONAL INFORMATION

Photo 1053?

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: All dimensions in metres		Drafted by: MR	Checked By:	Logged By:

RADIOLOGICAL TRIAL PIT LOG

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Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP an09**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Electra	Ground Level (mAOD):	Date:	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
0.0	Surface			Grass
0.1	Trial Pit	159 – 171		Brick fragments, ash and concrete
0.3				Friable light brown orange sandy clay
0.5	Trial Pit	198 – 209		Increasing fine to coarse gravels
	Bucket	115 – 135		
0.8	Trial Pit	237 – 245		
1.1	Trial Pit	209 – 217		Firm orange brown clay with gravels and cobbles of flint
				TP terminated@ 1.2m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.6 x 1.2 All dimensions in metres		Drafted by: MR	Checked By:	Logged By:

RADIOLOGICAL TRIAL PIT LOG

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Status:- Draft

Date:- 14/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TPan 10**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 26/09/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground level	140 – 150		
0.0 – 0.2	Bucket	87 – 92		MG – Soft brown sandy clay with occasional gravel of brick and glass.
	Excavation	150 – 160		
0.2 – 0.4	Bucket	103 – 109		
	Excavation	176 – 194		
0.4 – 0.6	Bucket	87 – 120		
	Excavation	212 – 223		
0.6 – 0.8	Bucket	108 – 113		
	Excavation	210 – 227		
0.8 – 1.1	Bucket	117 – 129		
	Excavation	220 – 231		
				E.O.H. @ 1.1m

TRIAL PIT ADDITIONAL INFORMATION

Elevated activity may be due to natural materials/background levels.
No visual signs of any contamination or non-natural materials (e.g. MG) @ depth. Possible effects of proximity to building 360?

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 1.1 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

RADIOLOGICAL TRIAL PIT LOG

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Status:- Draft

Date:- 14/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP An11**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 26/9/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground level	134 – 146		
	Turf	136 - 143		
0.0 – 0.2	Bucket	87 – 93		MG – soft brown sandy CLAY with occasional gravel of flint and brick
	Excavation	134 – 138		... ... @ 0.15m metal plate in south of pit.
0.2 – 0.4	Bucket	95 – 103		...@ 0.5m electricity cable protection tiles.
	Excavation	143 – 192		
				TP Terminated @ 0.5m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate:N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1 x 0.5 x 0.5 TP orientated west/east, adjacent south east corner of building 380 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

RADIOLOGICAL TRIAL PIT LOG

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Status:- Draft

Date:- 14/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP An12**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 26/9/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground level	228 - 232		
	Turf	119 – 122		
0.0 – 0.1	Bucket	92 – 98		Loose sandy silty Clay with some black coal fragments and brick, occasional flint, plus one small pocket of green sand
	Excavation	246 – 417		
0.1 – 0.3	Bucket	98 – 105		
	Excavation	210 – 493		
0.3 – 0.4	Bucket	147 – 156		
	Excavation	167 – 175		
0.4 – 0.5	Bucket	97 – 150		
	Excavation	175 – 191		
0.5 – 0.6	Bucket	96 – 112	0.55	Loose medium dense fine to coarse gravel of flint and chalk
	Excavation	165 – 167		
				E.O.H @ 0.6m

TRIAL PIT ADDITIONAL INFORMATION

Extended 0.5m north – potential point source with no significant activity around the extended location.

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 2 x 0.5 x 0.6 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

RADIOLOGICAL TRIAL PIT LOG

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Status:- Draft

Date:- 14/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP An13**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 26/9/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground level	150 – 214		
	Turf	140 – 167		
0.0 – 0.25	Bucket	160 – 168		MG – loose dark brown/black sandy ashy gravel. Gravel is ashy fragments coal/coke with black ash and many whole and half bricks
	Excavation	185 – 190		
0.25 – 0.35	Bucket	103 – 118	0.25	Soft brow sandy CLAY
	Excavation	169 – 181		
0.55 – 0.65	Bucket	120 – 123		... ... becoming slightly gravely @ 0.65
	Excavation	201 – 210		(count rate possibly associated with brick/ash from sides)
0.75 – 0.85	Bucket	108 – 114		
	Excavation	160 – 170		
				E.O.H @ 0.9m

TRIAL PIT ADDITIONAL INFORMATION

Extent of ashy fill noted 4m north, 15m east, 1.5m south and 13.5m west of the original trial pit. Activity, CPS, increase where bricks are present up to 210cps.
Asbestos noted in fill south of original trial pit.

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 2 x 0.5 x 0.9 TP orientated west/east All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

RADIOLOGICAL TRIAL PIT LOG

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Status:- Draft

Date:- 13/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP An14**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Electra No.5	Ground Level (mAOD):	Date: 28/9/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
Ground level	-	252 – 258	-	
0.0 – 0.05	Bucket	170 – 176*		Made Ground – loose light brown clayey sand with occasional gravel of brick.
	Excavation	142 – 153		@0.05m 2cm radius metal disc, below which small patch of blue green sand.
				Becoming more clayey with depth
0.05 – 0.25	Bucket	91 – 103		
	Excavation	148 – 149		E.O.H@0.3m

TRIAL PIT ADDITIONAL INFORMATION

- **metal disc = 342cps**
- **Photo # 10 & 11**

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 0.3 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

RADIOLOGICAL TRIAL PIT LOG

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Status:- Draft

Date:- 13/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **TP An16**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Electra No.5	Ground Level (mAOD):	Date: 29/9/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
Ground level	-	142 – 163	-	
0.0 – 0.2	Bucket	101 – 126		Medium dense brown sandy CLAY
	Excavation	156 – 169		
0.2 – 0.4	Bucket	127 – 163		
	Excavation	211 - 224		
				E.O.H@0.4m

TRIAL PIT ADDITIONAL INFORMATION

TP excavated @ GPS coordinates (with drift compensation) after no activity >170cps detected within immediate area.

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1.5 x 0.5 x 0.4 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

RADIOLOGICAL TRIAL PIT LOG

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Status:- Draft

Date:- 14/10/05

Project: **HMS Daedalus Radiological Site Investigation**			TRIAL PIT NO **Off Site Field**
Client: **Defence Estates**	Site Area:		
Method & Equipment: Electra 5	Ground Level (mAOD):	Date: 29/9/05	Sheet **1 of 1**

SAMPLES & TESTS			STRATA	
Monitoring Depth (m bgl)	JCB bucket / trial pit monitoring	Probe reading (cps)	Depth (thickness)	DESCRIPTION
	Ground level	284		
0.0 – 0.2	Bucket	103 – 114		Soft brown clayey SAND with some fine to medium subangular and rounded gravel of flint.
	Excavation	153 – 156		
0.2 – 0.4	Bucket	109 – 112		
	Excavation	163 – 165		
				TP Terminated @ 0.6m

TRIAL PIT ADDITIONAL INFORMATION

- **Exempt waste estimate: N/A**
- **LLW estimate: N/A**

Co-ordinates: E: N:	Groundwater: NO	Stability: Sides: Y Base: Y		
Dimensions: 1 x 0.5 x 0.6 All dimensions in metres		Drafted by: MR	Checked By:	Logged By: SP

Annex B
Radiochemical Analysis

2 Pages

Entec

UKAS TESTING
1305

[ ] Certificate of Testing

of radiological samples issued by
Dstl Environmental Sciences Department
for Job Number : 525/05

[dstl]

Administration

Laboratory Address	**Dstl Environmental Sciences Department** **Radiochemistry Laboratory** Institute of Naval Medicine Crescent Road, Alverstoke Gosport, Hants, PO12 2DL Tel 023 92768164 Fax 023 92768150	Customer Name: Customer Address:	ENTEC UK For HMS Daedlus
Date of Receipt:	11.11.05	Date of Testing:	14.11.05

Analysis and Reporting

Analysis Type and Technical Comments: These soil samples have been analysed by Gamma Spectrometry. The result quoted for ^{226}Ra is only an estimate and not covered by the UKAS accreditation.

Reporter: [redacted] Role: Technician Signature: Date: 15.11.05

Countersigner: Role: Signature: Date:

Information

The reported uncertainty is calculated from both the counting and preparation. The confidence level is 95% (k factor = 1.96). The certificate is issued in accordance with the requirements of the United Kingdom Accreditation Service as specified in the UKAS Accredited Standard and UKAS regulations. It provides traceability of measurement to recognised national standards and to the units realised by the National Physical Laboratory or other recognised National Standards Laboratory. This certificate may not be reproduced other than in full, except with the prior approval of the issuing laboratory. The * denotes the ^{226}Ra result is only an estimate based on the activity of the daughter products and the deconvolution of the spectral peaks and therefore not covered by the UKAS accreditation.

[redacted] [redacted] [redacted] [redacted]

UKAS TESTING
1305

Certificate of Testing

of radiological samples issued by
Dstl Environmental Sciences Department
for Job Number : 525/05

[dstl]

Sample Analysis Reference No.	Customer's Reference	^{147}Pm	^{40}K	^{60}Co	^{137}Cs	^{208}TL	^{212}Pb	^{214}Pb	^{214}Bi	$^{226}Ra^*$	^{228}Ac	^{234}Th	^{235}U	^{241}Am
		Reporting Units Bqkg^{-1}												
5C525001	HDP 1B 0.25m	<189790	336.2±81.1	<4.5	<5.4	10.2±3.9	32.2±8.7	3287.9±223.4	3086.4±211.6	3726.7±381.4	<19.6	<680.0	<16.3	<68.3
Sample Analysis Reference No.	Customer's Reference	^{147}Pm	^{40}K	^{60}Co	^{137}Cs	^{208}TL	^{212}Pb	^{214}Pb	^{214}Bi	$^{226}Ra^*$	^{228}Ac	^{234}Th	^{235}U	^{241}Am

Analysed by [redacted] Date: 15.11.05

Countersigned by: Date:

9. Figures

Prepared for the Ministry of Defence, Defence Estates, contract DE11/447

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Delivering Estate Solutions to Defence Needs

HMS Daedalus, Lee-on-Solent
Radiological Survey

Figure 1
Site Location

March 2006
03385-S33.cdr parkj

Entec

N

Key:

- Site boundary
- Surveyed areas
- Surveyed areas (non GPS)
- Excluded areas
- Overgrown area

0m 200m

Scale 1:4,000 @ A1

Prepared for the Ministry of Defence, Defence Estates, contract DE114471

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HMS Daedalus, Lee-on-Solent
Radiological Survey

Figure 2
Site Layout Showing Radiological Survey Coverage

March 2006
03385-R05a.wor reynm

Ente

Key

Site Boundary

Elevated Radiological Activity Results

>1.5 Background <0.34 Bq/g (Areas A - X)

>0.34 Bq/g <4.90 Bq/g (Areas 1 - 14)

0 m 300 m

Scale 1:4,000 @ A1

Prepared for the Ministry of Defence, Defence Estates, contract DE11/4471

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HMS Daedalus, Lee-on-Solent
Radiological Survey

Figure 3
Site Layout Showing Locations of Radiological Anomalies

March 2006
03385-R06a.wor renfm

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N

455500E

456000E

456500E

457000E

102500N

102000N

101500N

101000N

Key

Site boundary

Internal boundary

Proposed Trial Pit Investigation of Radiological Anomalies

Radiological investigation trial pit

Scale 1:1000 @ A1

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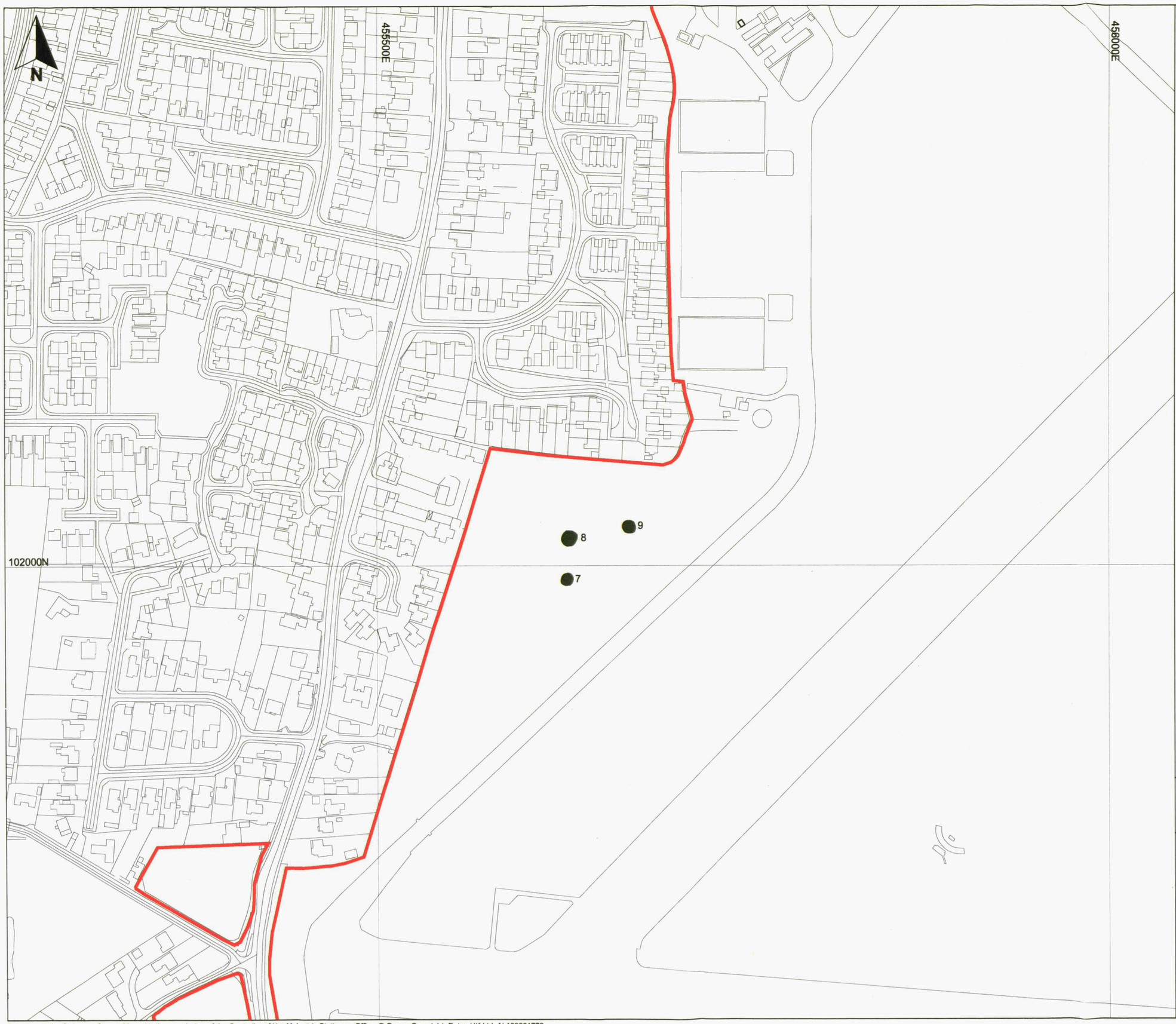
HMS Daedalus, Lee-on-Solent
Radiological Survey

Figure 4
Locations of Trial Pits

March 2006
03385-S37.dwg caryg

Entec



Key

Site boundary

Areas of exempt waste

Trial Pit Identification Numbers

Estimated Waste Volumes m		
TP No.	Exempt	LLW
7	0.01	-
8	-	-
9	0.2	-

0 m — 150 m

Scale 1:2500 @ A3

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HMS Daedalus, Lee-on-Solent
Radiological Survey

Figure 5a
Areas Requiring Remediation

March 2006
03385-S38.dwg caryg

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N

456500E

457000E

102000N

12

Key

Site boundary

Areas of low level waste

Trial Pit Identification Numbers

Estimated Waste Volumes m		
TP No.	Exempt	LLW
12	2.0	0.2

0 m 150 m

Scale 1:2500 @ A3

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HMS Daedalus, Lee-on-Solent
Radiological Survey

Figure 5b
Areas Requiring Remediation

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03385-S39.dwg caryg

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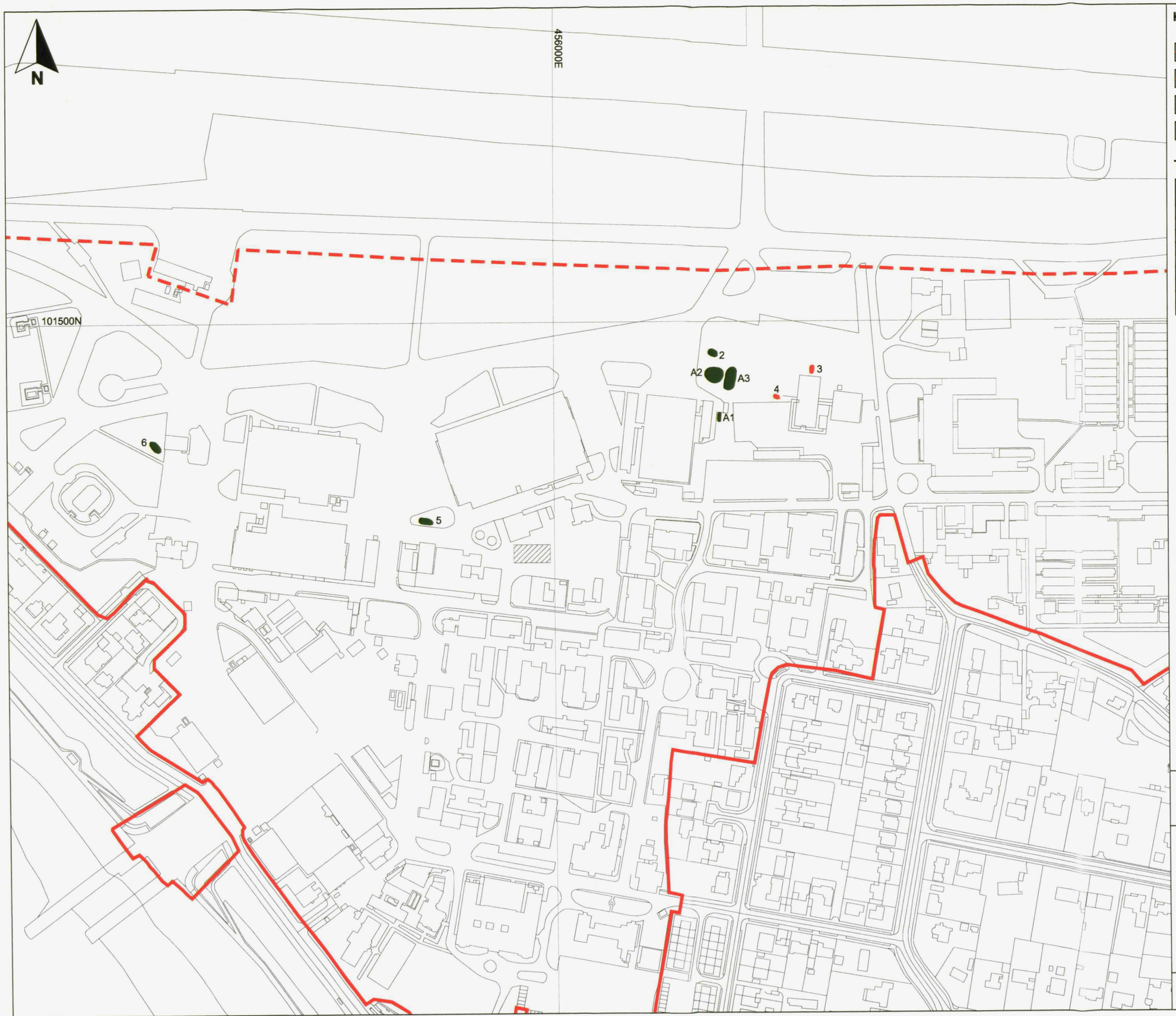

Key

- Site boundary
- Internal boundary
- Areas of exempt waste
- Areas of low level waste

Trial Pit Identification Numbers

Estimated Waste Volumes m		
TP No.	Exempt	LLW
A1	-	-
A2	1.0	-
A3	-	-
2	0.4	-
3	0.6	0.001
4	1.0	0.01
5	0.2	-
6	0.2	-

0 m — 150 m

Scale 1:2500 @ A3

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Figure 5c
Areas Requiring Remediation

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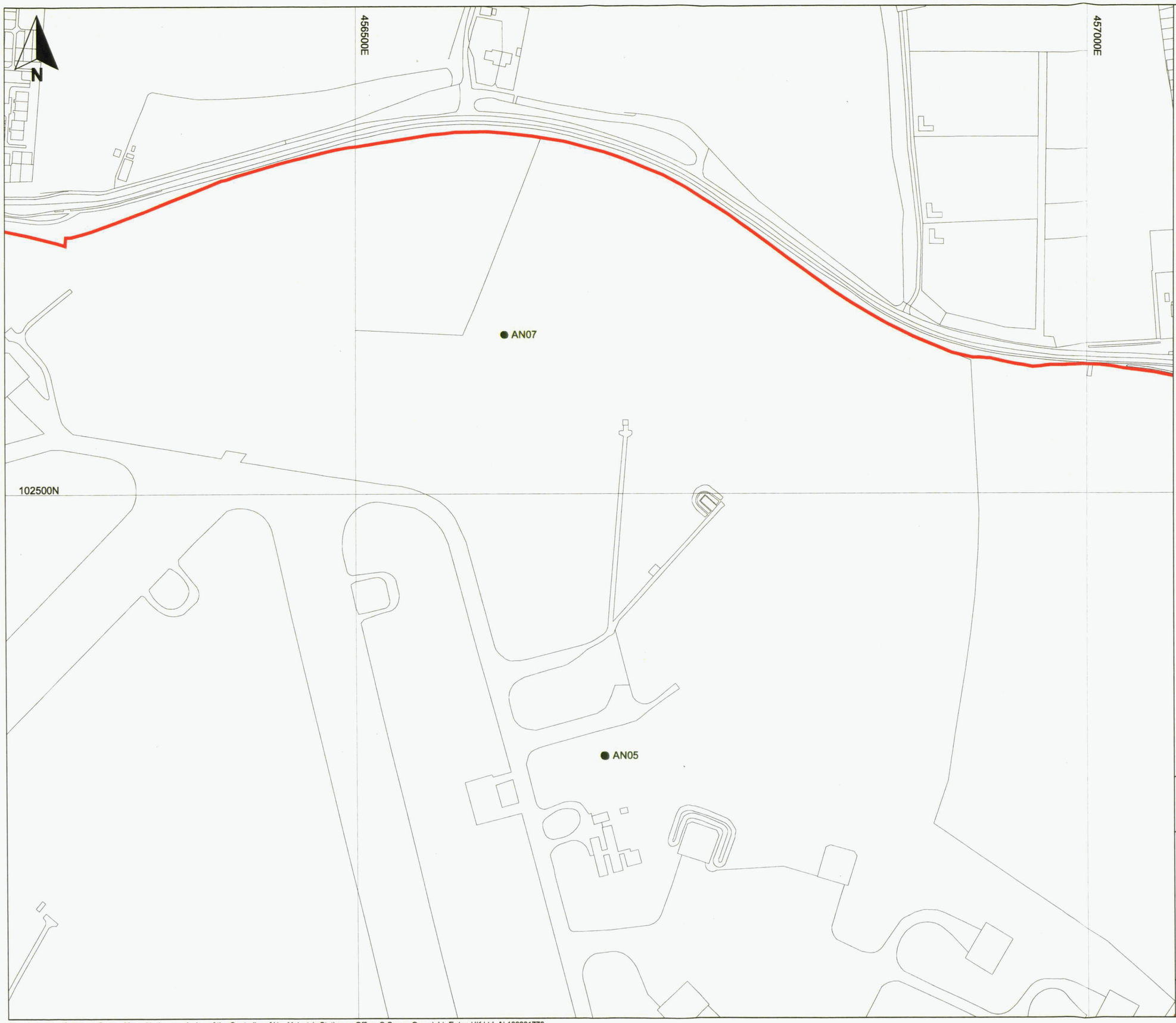

Key

- Site boundary
- Areas of exempt waste

0 m — 150 m

Scale 1:2500 @ A3

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Figure 5d
Areas Requiring Remediation

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