1. Introduction

1.1 Context

This Technical Appendix comprises a Phase 1 and Phase 2 Environmental Site Assessment (ESA) associated with the Proposed Development at Springs Road, Misson, Nottinghamshire.

Please note, this Technical Appendix must be read in conjunction with the planning application which contains:

- Figures showing the development (Volume 1);
- a detailed description of the Proposed Development in the Environmental Statement (ES) (Volume 3) ;
- a summary of other assessments undertaken in relation to the Proposed Development which may be relevant contained in the Environmental Statement (Volume 3).

A full description of the Proposed Development is given in Chapter 4 of the ES in Volume 3

The Phase 1 ESA (Sections 2 to 4) aims to assess the ground conditions at the Site including a review of:

- geological conditions;
- hydrology and hydrogeology;
- potential sources of land contamination based on a desk based review.

The Phase 2 ESA (Sections 5 to 10) updates this review based on the results of a ground investigation and provides a conceptual site model and environmental risk assessment.

1.2 Information Sources

The following information sources have been used to undertake this assessment:

- Envirocheck® report 66955963_1_1, including historical ordnance survey (OS) mapping (Annex H2);
- British Geological Survey (BGS) Geology of Britain viewer and Geoindex tool (http://www.bgs.ac.uk/geoindex/);
- Environment Agency (EA) website (http://maps.environment agency.gov.uk/wiyby/wiybyController);
- Coal Authority report 51000864621001 (Annex H3);
- Preliminary Unexploded Ordnance Risk Assessment ref. 500852 (Annex H4); and
- BGS Geological Map for Doncaster (1:50,000 scale, sheet 88).

2 Environmental Setting

2.1 Site Walkover

A walkover inspection of the proposed development site was undertaken by an AECOM Field Engineer on 6th May 2015. Photographs are presented in Annex H1.

The eastern and main portion of the Site comprises a large, flat area occupied by a network of 16 concrete former missile launch pads connected by a roadway (see photograph 1). The concrete is in a moderate to poor condition, with numerous cracks observed and potential staining in many of the launch pad areas (see photograph 2). Subsurface ducts run from the outer edge to the centre of each pad, some of which are damaged (see photograph 3) or have been infilled with concrete. Disused ex-military vehicles are stored on a number of the concrete slabs. The centre of the area is compacted hardcore and gravel. Outside of the former missile launch pad concrete slabs, the surface is covered in long grass. The eastern portion of the Site is bound by trees and dense hedgerows on the northern, eastern and part of the western sides. In the west, a vegetated soil berm, up to approximately 1 m in height, runs along the Site boundary (see photograph 4). No visible boundary marks the southern extent of the Site.

The western portion of the Site comprises two grassy areas separated by a hedge. The northern area (see photograph 5) is well-maintained with trees lining a concrete driveway. Two small brick buildings, a former security cabin and former bomb shelter, are present in the north-western corner. The southern area comprises rough, long grass and other vegetation (see photograph 6). Misson Springs Cottage is present to the south of the existing access road from Springs Road. A concrete floor slab of a former structure is present in the north-eastern corner.

The eastern and western portions of the Site are linked by a corridor comprising a concrete roadway and a gravel area where ex-military vehicles are currently stored (see photograph 7). The concrete is in a moderate to poor condition, with numerous cracks observed. A concrete floor slab of a former structure is present in the centre (see photograph 8). Warehouses are present to the north and south of this part of the Site. A shallow open drain, approximately 0.5 m in depth, runs south from this part of the Site.

Two small (25 L) waste drums, possibly formerly containing Bis (2-ethylhexyl) tetrabromophthalate (a fire retardant), were identified in the grass towards the north-eastern corner of the Site (see photograph 9). A pile of cement pipes were identified towards the western side of the eastern portion of the Site. White ‘fibres’ were visible in the broken end of the pipes, considered to potentially be asbestos-containing material (see photograph 10). No further evidence of potential sources of ground contamination (e.g. fly-tipping, fires, stained soil or poor vegetation growth) was observed.

2.2 Geology

Geological information about the Site was sourced from the Envirocheck Report (66955963_1_1) and BGS geological maps and is summarised in the following sections.

2.2.1 Made Ground

The geological map records no Made Ground beneath the Site. Based on BGS borehole logs SK79NW48 and SK79NW60, located within approximately 100 m of the western boundary of the Site, there is inferred to be up to approximately 0.6 m of cultivated topsoil beneath grassed parts of the Site.

2.2.2 Superficial Deposits

The geological map shows no superficial deposits beneath the Site. However, undifferentiated River Terrace Deposits, which may comprise both clay and sand/gravel, are identified on the geological map beneath the western portion of the Site. BGS borehole logs SK79NW30 and SK79NW60 to the west of Springs Road record up to at least 5.5 m of sand and gravel (River Terrace Deposits) underlying the topsoil (the base of the River Terrace Deposits was not proven in these boreholes). No superficial deposits are recorded beneath the eastern portion of the Site.

Localised deposits of peat are identified on the geological map approximately 160 m to the east of the Site.

2.2.3 Bedrock Geology

The geological map indicates that the Site is underlain by mudstone of the Triassic Mercia Mudstone Group. BGS borehole SK79NW15, located approximately 650 m east of the Site records clay bedrock, inferred to be Mercia Mudstone, at a depth of 4.4 m with thickness unproven. Approximately 120 m to the west of the Site, the geological map identifies Triassic Nottingham Castle Sandstone Formation, part of the Sherwood Sandstone Group, dipping gently to the east. The boundary between the sandstone and mudstone bedrock is conformable and the outcrop trace runs approximately north-south. As the Triassic strata dip gently to the east, the Nottingham Castle Sandstone underlies the Mercia Mudstone at a relatively shallow depth beneath the Site. BGS borehole SK39NW30, located approximately 400 m to the south of the Site records red sandstone and marl of the Sherwood Sandstone Group at a depth of approximately 17 m, immediately underlying superficial sand and clay deposits where the latter may be weathered Mercia Mudstone.

2.2.4 Geological Faults

No geological faults are identified in the vicinity of the Site.

2.2.5 Potential for Natural Ground Hazards

The following Natural Ground Hazards are classified by the BGS as having 'no hazard' potential at the Site;

- Potential for Compressible Ground Stability Hazards;
- Potential for Shrinking or Swelling Clay Ground Stability Hazards (western part of the Site);
- Potential for Ground Dissolution Stability Hazards; and
- Potential for Running Sand Ground Stability Hazards (eastern part of the Site)

The following Natural Ground Hazards are classified by the BGS as having 'very low' potential at the Site;

- Potential for Collapsible Ground Stability Hazards;
- Potential for Landslide Ground Stability Hazards;
- Potential for Running Sand Ground Stability Hazards (western part of the Site); and
- Potential for Shrinking or Swelling Clay Ground Stability Hazards (eastern part of the Site).

2.2.6 Mining

The Site is located in an area identified by the Coal Authority as an area where a coal mining assessment is required.

However, Coal Authority report 51000864621001, obtained for the Site (see Annex H3), indicates the following:

- the Site is not located within an area which has been influenced by past or present underground mine workings;
- the Site is not located within an area for which a licence to remove coal has been granted or is in the process of determination;
- no mines have been identified at, or within 20 m of, the Site; and
- the Site (including the possible sub-surface trajectory of the horizontal well) is not within a boundary of a historical open cast coal site, within 200 m of a current opencast mine or within 800 m of the boundary of an opencast site for which a licence to remove coal has been granted or is in the process of determination.

2.3 Hydrogeology

The hydrogeology of the Site and the surrounding area are assessed in detail in Technical Appendix F.

In summary, the superficial deposits (River Terrace Deposits) underlying the western part of the Site are classified by the EA as a Secondary A Aquifer; the Mercia Mudstone bedrock is classified as a Secondary B Aquifer; and the Nottingham Castle Sandstone Formation is classified as a Principal Aquifer.

A Source Protection Zone 3 (Total Catchment) is located approximately 90 m to the west of the wellsite, relating to groundwater abstractions located approximately 3.5 km to 4.3 km to the west.

2.4 Hydrology

The Hydrology of the Site and the surrounding area is discussed in Technical Appendix G.

3 Summary of Environmental Information

3.1 Water Abstractions

The Envirocheck report indicates that there are no licensed groundwater or surface water abstractions at the Site.

An active surface water abstraction from an unnamed surface drain is recorded approximately 560 m south of the Site for irrigation purposes. A further twenty surface water abstractions and three groundwater abstractions are recorded within distances of between 1 km and 2 km of the Site for general agricultural applications and irrigation.

3.2 Discharge Consents

The Envirocheck report records one discharge consent within 1 km of the Site, issued for the discharge of treated effluent to Snow Sewer approximately 130 m north of the Site.

3.3 Pollution Incidents to Controlled Waters

Two pollution incidents to Controlled Waters (surface water) are recorded within a 1 km radius of the Site:

- a Category 3 (minor incident), release of an unknown pollutant to an unnamed stream approximately 550 m southeast of the proposed development site in December 1993; and
- a Category 3 (minor incident), release of waste oil to a tributary of the Coulson Road drain, approximately 550 m south of the proposed development site in April 1994. The release was attributed to poor operational practice.

3.4 Local Authority Pollution Prevention and Controls

No Integrated Pollution Controls, Integrated Pollution Prevention and Controls or Local Authority Integrated Pollution Prevention and Control facilities are identified within 1 km of the Site.

3.5 Environmental Prosecutions

No prosecutions relating to Authorised Processes are identified within 1 km of the Site.

3.6 Potentially Hazardous Sites

No Control of Major Accident Hazards Sites (COMAH), Explosive Sites, Notification of Installations Handling Hazardous Substances (NIHHS), Planning Hazardous Substance Consents or Planning Hazardous Substance Enforcement sites are identified within1 km of the Site.

3.7 Contemporary Trade Land Use

Two Contemporary Trade Directory Entries are recorded within 1 km of the Site, as summarised below:

- bottling machinery and equipment (Advance Bottling UK Ltd), approximately 580 m north; and
- garage services (Springs Auto Service), approximately 920 m southwest.

Both are listed as inactive in the Envirocheck report.

3.8 Registered Landfill and Waste Management Facilities

No registered landfill sites, historic landfill sites, permitted waste management facilities, local authority recorded landfill sites or registered waste treatment or disposal sites are identified within 1km of the Site.

3.9 Radon

The Envirocheck report indicates that the Site is in a lower probability radon area, as less than 1% of homes are above the action level. No radon protection measures are likely to be necessary in the construction of new buildings.

3.10 Sensitive Land Uses

Misson Training Area Site of Special Scientific Interest (SSSI) is located approximately 120 m to the east of the Site boundary.

The Site is located within a nitrate vulnerable zone.

4 Site History

4.1 Review of Historical Ordnance Survey Maps

A summary of historical land uses for the Site is presented in Table 4.1. The table describes significant changes in industry and land development within the Site boundary from 1885 to present day, and significant developments within 1 km of the Site boundary. This discussion of historical land use is focused primarily on contaminative land use.

Where dates are given, these refer to dates of maps on which the features appear, and do not necessarily refer to the exact date of operation of any particular facility.

Table 4.1: Review of Historical Ordnance Survey (OS) Maps

Date1	Scale	Within Proposed Development Site Boundary	Outside Proposed Development Site Boundary
1885 - 1956	1:2,500 1:10,000 1:10,560	The Site is agricultural land.	Misson Springs Cottage is present to the south of the existing access from Springs Road. The surrounding land use is primarily agricultural. Numerous farms are present within 1 km of the Site. Snow Sewer (drain) has been constructed.
1979	1:2,500 1:10,000	Two small buildings are present; one on the western part of the Site approximately 200 m east of Misson Springs Cottage and the other in the central part of the Site. The eastern portion of the Site is in its current layout, with missile launch pads present.	A small building is present immediately to the north of the central part of the Site. A further five buildings are present 50 m from the south of the central part of the site. All six buildings are thought to be related to the missile facility in the early 1960s. A cluster of larger buildings is present approximately 400 m to the south, again inferred to be related to the missile facility.
1990	1:2,500 1:10,000	No significant change	Sand and gravel pits are shown, approximately 400 m to the west of the Site.
2006	1:10,000	No significant change	Three warehouse buildings have been constructed immediately to the north (one) and south (two) of the Site and replacing three of the six small buildings identified in 1979. The sand and gravel pits approximately 400 m to the west are no longer present.
2015	1:10,000	The small building located approximately 200 m east of Misson Springs Cottage is no longer shown.	An additional two warehouse buildings are present to the south of the central part of the Site. Two small buildings are present immediately to the north of the eastern part of the Site.

4.2 Preliminary Unexploded Ordnance Assessment

Although not evident from any of the historical OS maps reviewed, it is understood that the Site formed part of RAF Misson, a training area and bombing range (see Technical Appendix J, Cultural Heritage).

Therefore, due to its potential historical use as part of RAF Misson, a preliminary Unexploded Ordnance (UXO) survey has been conducted at the Site (see Annex H4) in accordance with CIRIA C681 *"Unexploded Ordnance (UXO) – A guide for the Construction Industry"* Risk Management Framework. The Preliminary Unexploded Ordnance Risk Assessment Report, prepared by BACTEC International Limited, is provided at Annex H4.

1 Historical OS maps dating from 1885, 1886, 1893, 1899, 1900, 1903-1905, 1921, 1922, 1948, 1956, 1959, 1963, 1963-1974, 1964, 1979, 1979-1990, 1983-1985, 1987, 1990, 1992,1993-1994, 2006 and 2015 were reviewed; and

The key findings of the assessment are as follows:

- 7 no. military airfield sites, 4 no. bombing decoy sites, 2 no. World War II defence-related positions, 2 no. heavy anti-aircraft batteries and one abandoned bomb are recorded within 10 km of the Site; and
- of most significance is RAF Misson, the centre of which reported in the BACTEC assessment as being 0.1 km from the Site.

The location of the Site close to a bombing range increases the risk of unexploded ordnance to be present. Following the sale of land formerly used by the RAF for weapons training, explosive ordnance clearance tasks are routinely undertaken by the RAF as standard procedure. Consequently RAF personnel are highly likely to have carried out such clearance in the vicinity of the Site. The UXO risk assessment conservatively concluded that there is a medium risk of unexploded ordnance to be present at the Site.

4.3 Other Historical Information

A letter response by the Ministry of Defence to a request under the Freedom of Information Act (ref. FOI-2015-02193, dated 25th March 2015), and publicly available online, indicates the following:

- the RAF bombing range at Misson was used between 1934 and 1958 The volume of explosives dropped on the bombing range during this time is unknown; and
- between 1959 and 1979, the RAF Bomb Disposal team recovered over 4,600 unexploded bombs and over 44,000 items of land service ammunition, including mortars and grenades, from the wider RAF Misson site. The letter notes that these quantities are significantly lower than the actual number of explosives dropped on RAF Misson as devices which functioned successfully would not be able to be recovered.

Between October 1960 and June 1963, the eastern part of the Site is understood to have been used as a surface to air missile (Bristol Bloodhound) facility[2].

2 Jefford, C.G., 1988, *RAF Squadrons: A Comprehensive Record of the Movement and Equipment of all RAF Squadrons and their Antecedents since 1912*. Airlife Publishing, ISBN 1-84037-141-2.

5 Fieldwork

5.1 Introduction

An intrusive investigation was undertaken at the Site on 7th May 2015. The fieldwork was directed by R. Elliott Associates Limited (REA). An AECOM engineer was also in attendance to log trial pits and obtain soils samples for subsequent laboratory chemical analysis. The intrusive investigation locations and Trial Pit logs are presented in Annex H5.

5.2 Unexploded Ordnance Clearance

A specialist Unexploded Ordnance (UXO) clearance surveyor from BACTEC was present for the duration of the fieldwork. The BACTEC surveyor scanned each investigation for the presence of potential UXO location prior to breaking ground using an electromagnetic scanning technique. The trial pits were subsequently scanned at 1 m intervals using a down-hole electromagnetic scanner. During the advancement of the trial pits no UXO was encountered or detected.

5.3 Underground Service Clearance

REA was responsible for review of underground utility plans prior to commencing Site investigation works.

Trial pit locations were positioned in locations where no underground services were anticipated. It is understood that the Site owner indicated that no live services existed in the investigation area. In addition, the use of the electromagnetic scanner for the UXO clearance would detect metal service cables in the subsurface.

No underground services were identified in any of the trial pits excavated as part of this investigation.

5.4 Trial Pits

A total of ten trial pits (TP-E1 to E9 and REA1) were excavated on 7th May 2015 using a tracked JCB-3CX mechanical backhoe excavator. Given the lack potential point sources of contamination to be targeted, the Trial Pits were evenly distributed over the proposed development area. Trial pit locations are shown on Figure H1.

In accordance with best practice in areas of potential UXO risk, a smooth-edged bucket was used where possible to reduce the risk of disturbance of unforeseen buried UXO.

Trial pits were excavated to a maximum depth of 4 m below ground level (bgl). Six pits were terminated above the target depth due to instability and/or water ingress. Arisings were logged by the AECOM Engineer in general accordance with BS5930:1999 (A2), as amended in 2007. Trial pit logs are presented in Annex H5.

On completion, trial pits were backfilled with arisings in the reverse order in which they were excavated and compacted in layers to reduce the potential for settlement.

5.5 Soil Sampling and Field Screening

Soils were screened in the field for the potential presence of total Volatile Organic Compounds (VOCs) by headspace analysis using a photo-ionization detector (PID). Soil samples were placed into sealed containers for approximately 10 to 15 minutes to equilibrate. The headspace above the soil in each container was then tested for the potential presence of VOC using a MiniRae 3000 PID fitted with a 10.6 eV lamp. The PID was calibrated to 100 ppm isobutylene and fresh air at the start of the shift. The PID headspace results are recorded on the trial pit logs (see Annex H5).

Based on the results of field screening and visual or olfactory evidence of contamination (see Section 4.3, below), soil samples were selected at the discretion of the AECOM Field Engineer. Samples were placed into laboratory-supplied sample ware using clean and dedicated gloves for each sample location. Samples were transferred into chilled cool boxes and shipped to Jones Environmental Laboratory (Jones) for chemical analysis.

5.6 Environmental Laboratory Analysis

The analytical schedule for the soil samples is presented in Annex H6, appended, and summarised below.

A total of fifteen soil samples were submitted for analysis for the following analytical suites, selected based on the findings of the Phase 1 ESA:

- Volatile Organic Compounds (VOCs);
- Semi-Volatile Organic Compounds (SVOCs);
- Total Petroleum Hydrocarbons Criteria Working Group (TPH-CWG);
- explosives suite (thirteen specific compounds);
- a suite of eleven heavy metals;
- pH;
- sulphide and elemental sulphur;
- cyanide;
- organic matter; and
- asbestos screening.

All analyses were undertaken at Jones, with the exception of the explosive suite, which were outsourced to BAE Systems, a specialist laboratory.

6 Site Investigation Findings

6.1 Introduction

This section describes the geology, hydrogeology and observations of potential contamination encountered during the Site investigation. Geological observations, groundwater depths and field indicators of potential contamination including photo-ionization detector (PID) headspace results are presented in the trial pit logs in Annex H5. Trial pit locations are presented on Figure H1.

6.2 Geology

6.2.1 Topsoil / Made Ground

Topsoil was encountered at five trial pit locations (TP-E1, TP-E3, TP-E4, TP-E8 and TP-E9), all located in unsurfaced areas where grass was present at the surface. The topsoil typically comprised dark brown, slightly gravelly sand and ranged in thickness between 0.4 m (TP-E1 and E4) and 0.7 m (TP-E9).

At TP-E5 to E7 and REA1 Made Ground was identified comprising brown, sandy gravelly cobbles (compacted hardcore). These trial pits were located inside the concrete slab pads and connecting roadways of the historical missile launch pads in the central part of the eastern portion of the Site. The Made Ground ranged in thickness between 0.3 m (REA-1) and 0.5 m (TP-E5 to E7). At TP-E2, located in a grassy area in the middle of the Site to the west of the missile pads, dark brown to black, ashy sand was encountered to a depth of 0.6 m bgl.

Potential former topsoil, comprising dark brown, sandy clay, was encountered beneath the Made Ground at TP-E5 between 0.5 and 0.8 m bgl.

6.2.2 Superficial Deposits

Superficial deposits, typically comprising orange-brown and grey mottled, sandy, slightly gravelly clay, were encountered beneath the topsoil/Made Ground in all trial pits except for TP-E9, located in the far south-east of the Site. Orange brown, gravelly slightly clayey sand was identified underlying topsoil and overlying weathered Mercia Mudstone in TP-E3. The superficial deposits were observed to range between 0.8 m and 2.7 m in thickness and are presumed to represent River Terrace Deposits.

6.2.3 Bedrock

Fully weathered Mercia Mudstone bedrock was identified in seven trial pit locations (TP-E1 to E3, TP-E5 and TP-E7 to E9) as stiff to very stiff, red-brown and grey mottled, slightly sandy clay. The bedrock was overlain by superficial deposits at all locations except TP-E9, located in the south-east of the Site, where fully weathered mudstone was encountered immediately underlying the topsoil at a depth of 0.7 m bgl. Elsewhere, depth to bedrock ranged between 1.3 m and 3.2 m bgl. At TP-E9, the clay was observed to become friable with cobbles of mudstone below approximately 2.8 m bgl (i.e. partially weathered Mercia Mudstone).

In TP-E3 and TP-E5, orange medium to coarse sand was encountered in one wall of the trial pits at depths of 0.8 m to 0.9 m below the upper surface of the weathered Mercia Mudstone bedrock. A similar sand deposit was recorded in TPE8 above the fully weathered worked Mercia Mudstone. It is considered that these sand deposits are likely to represent fully weathered sandstone bands within the Mercia Mudstone. Table 6.1, below, summarises the geological sequence encountered at the Site.

Table 6.1. Summary of Strata Encountered during Trial Pitting Investigation

Strata	Depth to Top of Strata (m bgl)	Thickness of Strata (m)	Description	Locations Encountered
Topsoil	0	0.4 – 0.7	Dark brown, slightly gravelly sand.	TP-E1, TP-E3, TP-E4, TP-E8 and TP-E9 only. Potential former topsoil identified in TP-E5, underlying the Made Ground, between 0.5 m and 0.8 m bgl.
Made Ground	0	0.3 – 0.6	Brown, sandy gravelly cobbles.	TP-E5 to E7 and REA1 only.
River Terrace Deposits	0.3 – 0.8	0.8 – 2.7	Orange-brown and grey mottled, sandy, slightly gravelly clay; and occasionally orange brown gravelly slightly clayey sand.	All locations except TP-E9.
Mercia Mudstone bedrock	0.7 – 3.2	Unproven	Stiff to very stiff, red-brown and grey mottled, slightly sandy clay with bands of orange brown sand (fully weathered mudstone with sandstone bands)	TP-E1 to E3, TP-E5 and TP-E7 to E9.

6.3 Groundwater

Groundwater was encountered in seven of the trial pits, as follows:

- Perched groundwater at the base of the Made Ground in TP-E6 (0.5 m bgl) and REA1 (0.3 m bgl) on top of the underlying, lower permeability clay (superficial deposits);
- Slow groundwater seeps within the natural ground, often on the boundary between the superficial deposits and underlying bedrock, at TP-E2 (2.9 m bgl), TP-E4 (2.0 m bgl), TP-E5 (1.6m bgl) and TP-E7 (1.8 m bgl); and
- Saturated, running sands associated with the orange sands within the Mercia Mudstone encountered in TP-E3 (2.2 m bgl), TP-E5 and TP-E8 (2.4 m bgl).

Based on the geological sequence, and the difference in relative permeabilities between the Made Ground and the underlying River Terrace deposits and weathered Mercia Mudstone, shallow groundwater is considered likely to be present as perched discontinuous lenses at the base of the Made Ground and in discontinuous sand beds within the Mercia Mudstone).

6.4 Field Observations of Potential Contamination

With the exception of ashy Made Ground encountered at TP-E2, no visual or olfactory evidence of contamination was recorded during the trial pit investigation.

No elevated VOC readings were identified on the PID (a maximum of 0.5 ppm was recorded in the potential former topsoil in TP-E5).

7 Laboratory Analytical Results and Risk Screening (Human Health)

7.1 Introduction

7.1.1 Human Health

In order to assess the significance of the analytical results and in accordance with the methodology defined in the Environment Agency's CLR11 guidance, soil analytical data have been screened against Stage 2 Generic Assessment Criteria (GAC) as part of a Generic Quantitative Risk Assessment (GQRA) in order to identify contaminants that may be of concern and may pose a risk to human health. Stage 2 GAC for the protection of Human Health are selected according to a hierarchy of published sources, as follows:

- Land Quality Management (LQM) / Chartered Institute of Environmental Health (CIEH) S4UL;
- Environmental Industries Commission (EIC) GAC;
- AECOM derived GAC;
- Department for the Environment, Food and Rural Affairs (Defra) C4SL;
- Dutch Intervention Values (IV) and Serious Risk Concentrations (SRC); and
- United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSL).

The Stage 2 GQRA with respect to Human Health has been undertaken using GAC assuming a commercial/industrial land use.

7.1.2 Controlled Waters

Based on the results of the Phase 1 risk evaluation of potential pollutant linkages, groundwater in the superficial deposits Secondary A Aquifer is considered likely to be the most at-risk Controlled Waters (CW) receptor. Therefore, Stage 2 GAC based on Environmental Quality Standards (EQS) for freshwater have been selected for the Stage 2 GQRA with respect to Controlled Waters. Groundwater samples have not been collected as part of this investigation, and consequently the soil results have been compared to the GAC for the protection of Controlled Waters which are back-calculated from soil pore water concentrations using standard soil-water partition algorithms. CW GAC are selected according to the following hierarchy:

- Water Framework Directive (England and Wales) (WFD);
- Scottish Environment Protection Agency (SEPA);
- Predicted No Effect Concentration (PNEC) values derived for EU REACH registration dossiers; and
- AECOM derived PNEC.

Based on the soil types encountered at the Site, concentrations have initially been conservatively screened against Stage 2 CW GAC assuming sandy soil and TOC concentration of 0.2%. Where concentrations exceed this initial CW GAC, concentrations have also been compared to CW GAC assuming silty clay soil and 1% TOC, which is considered to be representative of the majority of soil encountered during the trial pitting investigations. Where no EQS criteria are available, analytical results have been compared to Stage 2 GAC based on UK Drinking Water Standards (DWS). It is considered that, in the absence of shallow groundwater results, the screening of soil data for risks to controlled water against the Stage 2 GAC provides a conservative assessment of potential risk.

An exceedance of Stage 2 GAC does not automatically imply that the concentrations represent a significant risk, as defined under relevant UK legislative, regulatory and technical guidance. It is however assumed that for these potential contaminants, a significant risk to the identified HH and/or CW receptors has the potential to occur if one or more plausible exposure and/or migration pathways can be demonstrated. In this case further site specific assessment, (typically a Stage 3 Detailed Quantitative Risk Assessment (DQRA) or additional investigation may be required.

Laboratory results are presented in Annex H6 appended, and summarised below. Laboratory results certificates for both Jones and BEA Systems are provided in Annex H7.

7.2 Soil Analytical Results

7.2.1 Volatile Organic Compounds (VOC)

Seven soil samples were scheduled for VOC analysis. Laboratory results are presented in Annex H6. All reported concentrations of VOCs were below the laboratory Method Reporting Limit (MRL). As such the potential risks to human health and controlled waters are considered to be negligible.

7.2.2 Semi-Volatile Organic Compounds (SVOC)

Seven soil samples were scheduled for SVOC analysis. Laboratory results are presented in Annex H6 Table 3. Concentrations of SVOCs were reported above the MRL in four of the seven samples analysed (TP-E2 0.3m, TP-E3 0.2 m, TP-E5 0.3 m and TP-E6 0.4 m).

No reported concentrations of SVOC exceed the Stage 2 GAC for the protection of Human Health.

One or more Polycyclic Aromatic Hydrocarbons (PAH) were identified in four soil samples (TP-E2 0.3 m, TP-E3 0.2 m, TP-E5 0.3 m and TP-E6 0.4 m) at concentrations above the Stage 2 CW GAC. Only three of the samples (TP-E2 0.3 m, TP-E3 0.2 m and TP-E5 0.2 m) exceeded the Stage 2 CW GAC based on 1% TOC. Exceedances were typically minor, with the exception of TP-E2 (total PAH 2.1 mg/kg), where ash was observed in the Made Ground, and TP-E5 (total PAH 10.5 mg/kg), where exceedances were up to two orders of magnitude above the Stage 2 CW GAC. No exceedances were reported in the superficial deposits. Furthermore, a number of the Stage 2 CW GAC for PAH are based on DWS (i.e. no EQS are available) which are often more conservative than the EQS.

SVOC concentrations in soil in most parts of the Site are therefore considered unlikely to present a significant risk to Controlled Waters.

7.2.3 Total Petroleum Hydrocarbons (TPH)

Eight soil samples were scheduled for TPH analysis. Laboratory results are presented in Annex H6 Table 4. Concentrations of TPH were reported above the MRL in only one of the eight samples analysed (TP-E5 0.3 m).

No reported concentrations of TPH exceeded the Stage 2 GAC for the protection of Human Health.

Concentrations of aromatic TPH fractions EC_{16}-EC_{21} (17 mg/kg) and EC_{21}-EC_{35} (168 mg/kg) in TP-E5 0.3 m slightly exceeded the relevant Stage 2 CW GAC. However, the exceedances were relatively minor and relate to the less mobile medium to long chain aromatic hydrocarbon bands and are therefore not considered likely to present a significant risk to Controlled Waters. Furthermore, the reported exceedances are only marginal with respect to the Stage 2 CW GAC based on 1% TOC.

7.2.4 Explosives

Seven soil samples were scheduled for analysis of various explosive compounds (explosives). Laboratory results are presented in Annex H6 Table 5. All reported concentrations of the explosive compounds were below the laboratory Method Reporting Limit (MRL).

7.2.5 Metals and Inorganics

Fifteen soil samples were scheduled for analysis of heavy metals and inorganic compounds. Laboratory results are presented in Annex H6 Table 6.

Reported concentrations of total phosphorus in all fifteen soil samples (97 mg/kg to 530 mg/kg) exceeded the Stage 2 HH GAC of 23 mg/kg. Although phosphorus may be present in some explosive compounds, and in some fertilisers used for agricultural purposes, the elevated concentrations amongst all soil types and all depths sampled suggest that it is not attributable to an introduced contaminant in this case. It is considered more likely that the elevated phosphorus concentrations are naturally occurring, and likely associated with dissolution of evaporite beds within the Mercia Mudstone. According to the UK Soil Observatory's online mapping tool, typical total phosphorus concentrations in topsoil in the vicinity of the proposed development site are up to 800 mg/kg. Furthermore, the Stage 2 HH GAC is for elemental phosphorus (not total phosphorus). No Stage 2 GAC is available for total phosphorus.

In addition, a number of exceedances of Stage 2 CW GAC were reported, as follows:

- exceedances of the Stage 2 CW GAC for total chromium in shallow soils at all locations except for TP-E1 and TP-E4. Exceedances are generally minor, with the exception of TP-E5 0.3 m (217 mg/kg, compared to the Stage 2 CW GAC of 60 mg/kg);
- an exceedance of the Stage 2 CW GAC for nickel (42 mg/kg) in Made Ground at TP-E5 0.3 m (125 mg/kg). Three samples of natural ground (TP-E2, TP-E4 and TP-E8, maximum reported concentration 54 mg/kg) also slightly exceeded the Stage 2 CW GAC for nickel, however these are considered likely to be within the 'natural background' range of nickel concentrations in soil at the Site;
- isolated exceedances of copper (382 mg/kg compared to the Stage 2 CW GAC of 62 mg/kg) and zinc (405 mg/kg compared to the Stage 2 GAC of 224 mg/kg) in Made Ground at TP-E5 (0.3 m);
- marginal exceedances of the Stage 2 CW GAC for cadmium of 1mg/kg in Made Ground at TP-E5 (1.6 mg/kg) and TP-E6 (1.7 mg/kg); and
- marginal exceedances of the Stage 2 CW GAC for selenium in samples of natural ground at TP-E2, TP-E4, TP-E6 and TP-E8. The reported concentrations are considered likely to be representative of 'natural background' selenium concentrations at the Site.

Trace levels of total cyanide were reported in TP-E1 0.3 m and TP-E2 0.3 m. The reported concentrations are significantly below the Stage 2 HH GAC. No Stage 2 CW GAC are available.

The reported pH of the soil samples analysed was typically in the range 6.7 to 8.0.However pH was slightly more alkaline (up to pH9.3) at TP-E5, TP-E6 and TP-E7 located inside the concrete slab network in the central part of the eastern portion of the Site.

7.2.6 Asbestos

Nine shallow soil samples were scheduled for asbestos screening. Laboratory results are presented in Annex H6 Table 6. Asbestos was detected in one sample (TP-E5 0.3 m) as fibre bundles of chrysotile (white asbestos).

7.3 Discussion of Results

A small number of exceedances of Stage 2 GAC were reported in the laboratory analytical results.

7.3.1 Human Health

Phosphorus concentrations were reported to exceed the Stage 2 GAC for Human Health, assuming a commercial/industrial land use, in all samples analysed. However, the reported concentrations are considered to be naturally-occurring and are therefore not considered to present a risk to future Site users.

Asbestos was identified in the Made Ground at TP-E5 as bundles of chrysotile (white asbestos) fibres. The concentration of asbestos in soil at this location is unknown. No asbestos was identified in samples from TP-E6 and TP-E7 where similar Made Ground was encountered, suggesting that the distribution of asbestos is unlikely to be widespread. Further assessment of asbestos in the Made Ground will be undertaken prior to the commencement excavation of the well cellar. The presence of asbestos requires future works at the Site to adhere to the procedures set out in the Control of Asbestos Regulations (CAR) 2012.

7.3.2 Controlled Waters

Exceedences of Stage 2 CW GAC for PAH, TPH and metals were reported in the laboratory data. In general, exceedences were minor, with the exception of the Made Ground at TP-E5 (0.3 m), located inside the network of concrete slabs for historical launch pads in the eastern part of the Site. Based on observations during the trial pitting investigation, shallow groundwater is present as slow seepages on top of the Mercia Mudstone bedrock, or as perched lenses at the base of the Made Ground, and in isolated pockets of running sands within the Mercia Mudstone. It is therefore considered unlikely that the reported contaminant concentrations at TP-E5, or elsewhere, would present a significant risk to Controlled Waters given the current layout. More significant groundwater strikes were observed where orange sand was encountered (TP-E3 and TP-E5). However, these deposits are isolated pockets within the reworked Mercia Mudstone, which are not considered to be in hydraulic continuity with the underlying Sherwood Sandstone.

Whilst further characterisation of the background shallow groundwater conditions will be undertaken as part of a separate baseline groundwater monitoring exercise for the Proposed Development (see Chapter 3 of the ES) no mitigation measures are required.

8 Conceptual Site Model

8.1 Introduction

Current best practice recommends that the determination of health hazards due to contaminated land is based on the principle of risk assessment, as outlined in Part 2A of the Environmental Protection Act 1990.

The risk assessment process for the environmental contaminants is based on a source-pathway-receptor analysis. These terms can be defined as follows:

- **Source:** Hazardous substance that has the potential to cause adverse impacts;
- **Pathway:** Route whereby a hazardous substance may come into contact with the receptor: examples include ingestion of contaminated soil and leaching of contaminants from soil into watercourses; and
- **Receptor:** Target that may be affected by contamination: examples include human occupants/users of site, water resources (surface waters or groundwater), or structures.

For a risk to be present, there must be a viable pollutant linkage; i.e. a mechanism whereby a source impacts on a sensitive receptor via a pathway.

The following sections detail the Conceptual Site Model based on the findings of the Phase 1 and Phase 2 ESA with the view to assessing the potential risks during construction and operation of the Proposed Development. The potential sources of contamination, potential receptors and potential pollutant pathways are identified and are presented below.

8.2 Sources of Potential Contamination

Identified sources of contamination at the Site include:

- Made Ground – particularly in the vicinity of TP-E5, located inside the network of concrete slabs for the former missile launch pads, where elevated concentrations of PAH, TPH and metals have been identified above Stage 2 CW GAC. Ashy Made Ground at TP-E2 was also reported to contain elevated concentrations of PAH and metals; and
- Asbestos – identified as fibre bundles of chrysotile (white asbestos) in Made Ground at TP-E5.

8.3 Potential Pathways

Potential pathways with respect to Human Health and Controlled Waters receptors at the Site include:

8.3.1 Human Health

- ingestion/inhalation/dermal contact with particulates following disturbance of contaminated soil during phases 1 and 2; and
- inhalation of asbestos fibres should asbestos contaminated made ground be disturbed during phases 1 and 2.

8.3.2 Controlled Waters:

- surface run off into drains and migration into nearby surface water features including a waterbody to the south of the Site, and the River Idle;
- leaching of contaminants from soil in the unsaturated zone into the superficial deposits; and
- vertical migration of impacted groundwater within the superficial aquifer into the bedrock aquifer; and
- lateral migration of impacted groundwater into surface water.

8.4 Potential Receptors

Potential receptors at the Site include:

8.4.1 Human Health

- future on-site workers; and
- off-site workers on neighbouring sites.

8.4.2 Controlled Waters:

- groundwater – superficial deposits (Secondary A Aquifer);
- groundwater – sand horizons within the Mercia Mudstone bedrock (Secondary B Aquifer);
- groundwater – Nottingham Castle Sandstone (Principal Aquifer);
- surface water – waterbody;
- surface water – field drains; and
- surface water – River Idle.

8.5 Potential Pollutant Linkages

The potential pollutant linkages and associated risks identified for the Site are summarised in Table 8.1, below.

Table 8.1. Summary of Potential Pollutant Linkages

Source		Pathway		Receptor
Human Health				
Asbestos	→	Inhalation of fibres	→	On-site workers (during phase 1) and off-site workers on neighbouring sites.
Controlled Waters				
Made Ground (PAH, TPH, metals)	→	Leaching of contaminants from soil in the unsaturated zone into the superficial aquifer.	→	Groundwater (including superficial aquifer, mudstone bedrock aquifer and sandstone bedrock aquifer)
		Vertical migration of impacted groundwater within the superficial aquifer into the bedrock aquifers.		
	→	Surface run off (into drains and migration into the pond and River Idle)	→	Surface waters (including field drains, the pond and River Idle)
		Lateral migration of impacted groundwater into surface water.		

9 Environmental Risk Assessment

9.1 General

The Conceptual Site Model presented in Section 6, above, has been developed for the Site from information during the Phase 1 and Phase 2 ESAs for the Site. Based on the assessment of the pollutant linkages presented in Table 6.1, the various components of the model are discussed in the following sections, taking into account the Site in its current condition and proposed future use.

9.2 Risk Assessment Principles

Current best practice recommends that the determination of hazards due to contaminated land is based on the principle of risk assessment, as outlined in Part 2A of the Environmental Protection Act 1990.

Assessments of risks associated with each of the potential pollutant linkages identified in Section 6.4, above, are discussed in the following sections. Using criteria broadly based on those presented in Section 6.3 of the CIRIA Report "Contaminated Land Risk Assessment: A Guide to Good Practice" (CIRIA Report C552), the magnitude of the risk associated with potential contamination at the Site has been assessed. To do this an estimate is made of:

- the potential severity of the risk; and
- the likelihood of the risk occurring.

The severity of the risk is classified according to the criteria in Table 9.1.

Table 9.1. Severity of Risk

Severity	Description
Severe	• Acute risks to human health likely to result in "significant harm" (e.g. very high concentrations of contaminants / ground gases); or • Catastrophic damage to buildings/property (e.g. by explosion, sites with high gassing potential, extensive VOC contamination); or • Major pollution of controlled waters (e.g. surface watercourses or Principal aquifers/source protection zones); or • Short term risk to a particular ecosystem.
Medium	• Chronic (long-term) risk to human health likely to result in "significant harm" (e.g. elevated concentration of contaminants/ground gases); or • Pollution of sensitive controlled waters (e.g. surface watercourses or Principal / Secondary aquifers); or • Significant effects on sensitive ecosystems or species.
Mild	• Pollution of non-sensitive waters (e.g. smaller surface watercourses or Unproductive Strata); or • Significant damage to crops, buildings, structures or services (e.g. by explosion, sites with medium gassing potential, elevated concentrations of contaminants).
Minor	• Non-permanent human health effects (requirement for protective equipment during site works to mitigate health effects); or • Damage to non-sensitive ecosystems or species; or • Minor (easily repairable) damage to buildings, structures or services (e.g. by explosion, sites with low gassing potential).

The probability of the risk occurring is classified according to criteria in Table 9.2.

Table 9.2. Probability of Risk Occurring

Probability	Description
High likelihood	• Pollutant linkage may be present that appears very likely in the short-term and risk is almost certain to occur in the long term, or there is evidence of harm to the receptor.
Likely	• Pollutant linkage may be present, and it is probable that the risk will occur over the long term.
Low likelihood	• Pollutant linkage may be present and there is a possibility of the risk occurring, although there is no certainty that it will do so.
Unlikely	• Pollutant linkage may be present but the circumstances under which harm would occur even in the long-term are improbable.

An overall evaluation of the level of risk is gained from a comparison of the severity and probability, as shown in Table 9.3.

Table 9.3. Comparison of Severity and Probability

Probability	Severity				
		Severe	Medium	Mild	Minor
	High Likelihood	Very High	High	Moderate	Moderate/Low
	Likely	High	Moderate	Moderate/Low	Low
	Low Likelihood	Moderate	Moderate/Low	Low	Very Low
	Unlikely	Moderate/Low	Low	Very Low	Very Low

9.3 Evaluation of Risk

An evaluation of the potential risks associated with the identified sources at the Site to the various receptors is discussed and presented in the following section. The level of risk is determined based on the current condition of the Site (i.e. the effects of mitigation measures are not included) and takes into account the Proposed Development.

Table 9.4, below, presents an assessment of the significance of the identified potential pollutant linkages taking into account the results of the Phase 2 assessment.

Table 9.4. Risk Evaluation of Potential Pollutant Linkages

Source	Pathway	Receptor	Risk Evaluation		
			Severity	Probability	Risk
Human Health					
Asbestos in Made Ground	Inhalation of fibres	Future on-site workers, including construction workers and Off-site workers on neighbouring sites	Medium	Low	Moderate/ Low
Controlled Waters					
Made Ground (PAH, TPH, metals)	Leaching of contaminants from soil in the unsaturated zone into the superficial aquifer	Superficial Secondary A Aquifer	Medium	Low Likelihood	Moderate/Low
	Vertical migration of impacted groundwater within the superficial aquifer into the bedrock aquifers	Bedrock Secondary B Aquifer (Mercia Mudstone)	Minor	Low Likelihood	Very Low
		Bedrock Principal Aquifer (Nottingham Castle Sandstone)	Medium	Unlikely	Low
	Surface run off	Field drains	Minor	Likely	Low
	Lateral migration of impacted groundwater into surface water.	Pond & River Idle	Mild	Unlikely	Very Low

9.3.1 Risks to Human Health

Based on the presence of asbestos fibre bundles in the Made Ground at TP-E5 in the eastern portion of the Site, the risk to Human Health (including construction workers) from on-site sources of contamination is considered to be 'moderate/low'. However, the presence of asbestos is considered unlikely to impact significantly upon the Proposed Development as only limited subsurface works are proposed. However, there should be further investigation for the presence of asbestos in areas where excavation works are proposed (i.e. the well cellar and holding tank). Excavation works should be undertaken in accordance current Health and Safety guidance and legislation. There is no significant potential for off-site workers to be impacted (e.g. by generation of dust and migration downwind of the Site) provided standard dust control measures are employed during excavation works (see Technical Appendix C).

9.3.2 Risks to Controlled Waters

The risk to Controlled Waters is considered to be 'moderate/low' to 'very low'.

The most significant risk to Controlled Waters is considered to be the potential for adverse impact on the superficial aquifer as a result of leaching of contaminants from the unsaturated zone, particularly from Made Ground in the vicinity of TP-E5. Due to the nature of the superficial deposits encountered at the Site (relatively low permeability clays with sand bands of limited lateral persistence) the likelihood of the pathway being present is low, however the relative sensitivity of the Superficial deposits receptor (a Secondary A Aquifer), results in the 'moderate/low' risk rating.

Risk to Controlled Waters via other potential pathways is considered to be low to very low, based on the conservative nature of the screening assessment of soil results, the unlikely probability of complete pollutant linkages being present and/or the low sensitivity of the receptor. However, it is noted that a Principal Aquifer (Nottingham Castle Sandstone Formation) underlies the Site at relatively shallow depth. Any risk of creation of a potential pathway between shallow Made Ground and the deeper sand/sandstone during operations will be mitigated by installation and cementing a shallow conductor in place prior to drilling to prevent any risk to Controlled Waters (see Technical Appendix F).

10 Conclusions and Recommendations

10.1 Conclusions

The principal conclusions of this Phase 1 and 2 Environmental Site Assessment are as follows:

- the geological sequence beneath the Site comprises topsoil or Made Ground to a depth of between 0.3m and 0.7m, underlain by orange-brown, clayey superficial deposits to a maximum depth of between 1.3m and 2.7 m bgl, which are in turn underlain by fully weathered Mercia Mudstone bedrock;
- groundwater was encountered as perched isolated occurrences at the base of the Made Ground at locations inside the network of concrete slabs for the former missile launch pads, and as slow seepages at, or close to, the boundary between the superficial deposits and the Mercia Mudstone bedrock. In addition, superficial sand strata were encountered in TP-E3 only ;
- fifteen soil samples were collected and scheduled for a range of analyses based on the findings of the Phase 1 ESA. Only phosphorus was reported to exceed the Stage 2 GAC for Human Health, assuming a commercial/industrial land use. However, the reported concentrations are considered to be naturally-occurring and are therefore not considered to present a risk to future Site users;
- asbestos was identified in the Made Ground in a single location at TP-E5 as bundles of chrysotile (white asbestos) fibres. No asbestos was identified in samples analysed from TP-E6 and TP-E7 where similar Made Ground was encountered, suggesting that the distribution of asbestos is unlikely to be widespread;
- exceedences of Stage 2 CW GAC for PAH, TPH and metals were reported in many of the soil samples. In general, exceedences were minor, with the exception of the Made Ground at TP-E5 (0.3m) where a number of PAH and metals exceed the Stage 2 CW GAC by up to more than two orders of magnitude;
- based on the presence of asbestos fibre bundles identified in the Made Ground at TP-E5 in the eastern portion of the Site, the risk to Human Health (including construction workers) from on-site sources of contamination is considered to be ‘moderate/low’ as limited subsurface works are proposed during phase 1;
- the most significant risk to Controlled Waters is considered to be the potential for adverse impact on the superficial deposits (Secondary A Aquifer) as a result of leaching of contaminants from the unsaturated zone, particularly from Made Ground in the vicinity of TP-E5, albeit that the identified groundwater was limited and discontinuous. Due to the conservative nature of the assessment, the nature of the superficial deposits encountered at the Site (relatively low permeability clays with sand bands of limited lateral persistence) the likelihood of the pathway being present is low, however the relative sensitivity of the superficial deposits receptor (a Secondary A Aquifer), results in a ‘moderate/low’ risk rating; This risk will be reduced as a result of the Proposed Development due to the reduction in rainfall infiltration over the wellpad area (see Technical Appendix G);
- risk to Controlled Waters via other potential pathways is considered to be ‘low’ to ‘very low’, based on conservative nature of the assessment, the unlikely probability of complete pollutant linkages being present, the low sensitivity of the receptor and the use of the Environmental Design and Management measures described in Chapter 4 of the ES; and
- any risk of creation of a potential pathway between shallow Made Ground and the deeper sand/sandstone during operations will be mitigated by installation and cementing a shallow conductor in place prior to drilling to prevent any risk to Controlled Waters (as described in Chapter 4 of the ES).

10.2 Recommendations

Based on the conclusions above, the following recommendations are made:

- the presence of asbestos is considered unlikely to impact significantly upon the Proposed Development. However, there should be further investigation for the presence of asbestos in areas where excavation works are proposed (i.e. the well cellar and holding tank). Excavation works should be undertaken in accordance current Health and Safety guidance and legislation ; and
- the site of the well cellar should be cleared for the presence of UXO both prior to and during excavation works by a UXO specialist.

11 References

1. CIRIA (2009) Unexploded Ordnance (UXO): A Guide of the Construction Industry, CIRIA Report C681
2. CIRIA (2010) Environmental Good Practice on site. 3rd Edition, CIRIA Report C692
3. CIRIA (2001) Contaminated Land Risk Assessment: A Guide to Good Practice. CIRIA Report C552
4. Environment Agency (2004) Model Procedures for the Management of Land Contamination, CLR 11
5. Envirocheck® Report 65307237_1_1, including historical ordnance survey (OS) mapping
6. British Geological Survey (BGS) Geology of Britain viewer and Geoindex tool (http://www.bgs.ac.uk/geoindex/)
7. Environment Agency (EA) website (http://maps.environment agency.gov.uk/wiyby/wiybyController)
8. Non-Residential Coal Authority Mining Report ref. 51000799862001 (March 2015)
9. Unexploded Ordnance (UXO) Risk Assessment Report (BACTEC, ref. 500852)
10. BGS Geological Map for Doncaster (1:50,000 scale, sheet 88)

Annex H1: Site Walkover Photographs

Annex H2: Envirocheck Report

Annex H3: Coal Authority Report

Annex H4: Unexploded Ordnance Risk Assessment

Annex H5: Trial Pit Logs

Annex H6: Risk Screening

Annex H7: Laboratory Test Datasheets