

IRC CAMPSFIELD PHASE 1 PRELIMINARY RISK ASSESSMENT

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EXECUTIVE SUMMARY

Appointment	<p>Curtins were instructed by CTG Consultancy on behalf of the Home Office to undertake a Phase 1 Preliminary Risk Assessment (PRA) for the development area located at Campsfield, Langford Lane, Kidlington OX5 1RE. The site is centred on NGR 447370, 214620, and covers an area of approximately 7.7 Ha.</p> <p>It is understood that the development consists of eight new structures including a care and segregation unit (CASU), a new three-storey housing block, command centre, a Gate House, East Block, Visitors Reception, Escorts Rest, and a new hardstanding car park.</p>
Current Site Status	<p>The site topographically is recorded to be a slight valley with elevations of 73.00m AOD recorded in the northwest and southeast of the site and a topographic low of 70.00m AOD recorded in the central portion. The south of the site currently comprises Campsfield Immigration Removal Centre, consisting of a main multi-storey, multi-block structure with satellite structures including garages, a healthcare unit, a boiler house, workshops, offices, and tank rooms. The central portion consists of two large NTRG warehouses with a hardstanding car park surrounding. The northern and western portion of the site predominantly consists of soft landscaping with several mature trees.</p>
Site History	<p>From the earliest available mapping (1878), the subject site comprised of undeveloped agricultural land with a track running N-S through the centre of the site. By 1947, the central and southeastern portions of the site had been developed to incorporate 4 large structures and 5 smaller structures (later mapping details this area as a depot). The remainder of the site remained as undeveloped/agricultural land. In the 1950s, there was an expansion of the structure in the southeastern corner of the site to incorporate 4 wings and an annexe. In the central-western portion of the site, a small circular structure was constructed. Within the 1960's the multi-winged structure was used as H.M. Detention Centre Campsfield. The early 1970s saw major development of the site, to which by 1974, the site consisted of H.M Detention Centre Campsfield in the southeast, Sewage Works in the central-western portion, a depot with electrical substation and tank rooms in the central regions and the northern areas were predominantly residential housing with private gardens. Between the 1980s and 1990s, the residential housing within the northern areas was demolished. The sewage works were incorporated into the Detention Centre and subsequently closed and demolished. By 2006, development was confined to the south of the site with northern areas remaining untouched. The south saw the expansion of the Detention Centre with new wings within the main building and smaller surrounding structures constructed. In 2018, the detention centre was closed.</p> <p>The surrounding area predominately comprised agricultural land, Oxford (Kidlington) Aerodrome (a commercial and subsequent RAF flight training centre opened in 1938), associated residential and commercial units. A Gravel Pit was present circa 450m of the southern boundary and is surrounded by residential development, extending up Woodstock Road. The areas surrounding the site to the north and east were subject to industrial development and by 1981 incorporate a science/business park and industrial estates with works and depots. The Gravel Pit to the south was later infilled and residential housing developed on the land. Circa 2021, Oxford Technology Park began construction directly east of the subject site.</p>
Geology	<p>The British Geological Society records indicate that the site is predominantly underlain by the bedrock geology comprising Mudstone of the Kellaways Clay Member in the south of the site, Mudstone of the Forest Marble Formation in the east of the site and Limestone of the Cornbrash Formation is expected to comprise the remainder of the site in the north, west and central regions. Localised Superficial Deposits are recorded as Wolvercote Sand and Gravel Member and expected to be encountered within the far northwest of the site.</p>
Hydrogeology	<p>The bedrock geology of the Kellaways Clay is categorised as an Unproductive Aquifer, with remaining bedrock detailed as Secondary A Aquifer.</p> <p>The site is not recorded to be within an Environment Agency designated groundwater Source Protection Zone (SPZ). There are three records of licensed commercial groundwater abstraction boreholes within</p>

	<p>1km of the site boundary, located at Langford Lane, Kidlington – Well 'A' between 338m and 438m northeast whereby groundwater is abstracted for general use within dairy farms.</p>
<p>Hydrology</p>	<p>The closest surface water feature is a pond situated approximately 301m east of the site boundary, referring to two small ponds south of Oxford Motor Park. No pollution incidents have been recorded within 250m of the site. The closest was approximately 420m southeast of the site boundary in 1996 for a Category 3 – Minor incident relating to unknown sewage.</p> <p>There are no licensed surface water abstractions recorded within 1km of the site.</p>
<p>Landfill and Pollution</p>	<p>The BGS Geoindex and UK Radon Mapping confirms the site is situated in a intermediate probability radon area where 5 to 10% of homes are estimated to be at or above the action level. Therefore, radon protective measures are necessary in the construction of new dwellings or extensions. Where the new development incorporates a basement the advice of a specialist Radon assessor must be obtained.</p> <p>The Envirocheck Report records one historical landfill within 1km of the site. This was recorded 297m south of the site at Willow Way Landfill with deposited waste including inert, industrial, commercial, and household waste.</p>
<p>Unexploded Ordnance (UXO)</p>	<p>A review of the historical mapping did not identify 'ruins' or any clearance of the site post-WWII reflective of bomb damage or equally within the surrounding area (<100m). In addition, Zetica UXB Risk Maps did not record any strikes on-site or within the surrounding area (<100m). However, RAF Kidlington was located approximately 12m north of the site which is potentially a bombing target. It is understood that RAF Kidlington was attacked four times by the Luftwaffe and that 25 high-explosive bombs hit the airfield. A review of online Cherwell District (8) planning records (ref. 14/01778/F) has determined a previous Detailed Unexploded Ordnance Assessment for the site, which detailed a Medium risk of UXO.</p>
<p>Initial Ground Contamination Assessment</p>	<p>The qualitative risk assessment (QRA) determined an overall Moderate-Low level of risk to human health and Moderate risk to controlled waters associated with on-site sources of potential contamination. A Low risk from off-site sources of potential contamination was considered. A Moderate level of risk was identified for potential on-site and off-site sources of ground gases. The QRA concluded by recommending that generic quantitative risk assessments (GQRA) were conducted to confirm the assessment of risk ascribed to each of the respective potential pollutant linkages (PPLs).</p>
<p>Recommendations</p>	<p>In summary, the following recommendations are made:</p> <ul style="list-style-type: none"> • Undertake an intrusive ground investigation to support civil and structural design. • Undertake a GQRA for human health and controlled waters as part of ground investigation. • Undertake ground gas monitoring as part of GQRA. <p>It is further recommended that this work is completed in advance of any development works taking place.</p>

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1 INTRODUCTION

1.1 Project Background

Curtins were instructed by CTG Consultancy on behalf of Home Office to undertake a Phase 1 Preliminary Risk Assessment (PRA) for the site located at Campsfield, Langford Lane, Kidlington, OX5 1RE.

It is understood that the development consists of eight new structures including a care and segregation unit (CASU), a new three-storey housing block, command centre, a Gate House, East Block, Visitors Reception, Escorts Rest, and a new hardstanding car park. The proposed development plans at the time of writing are presented in Appendix A.

1.2 Scope of Services

The Phase 1 PRA is intended to provide an overview of the geo-environmental and geotechnical setting of the site for development. These works are undertaken in general accordance with the LCRM: Stage 1 risk assessment (1).

Through this overview the Phase 1 aims to develop both a working conceptual and ground model for the site, as well as present an initial assessment of any risks that could be presented to the development including its intended end users and the wider environment.

Specifically, the Phase 1 provides an initial assessment of the site with regard to:

- a) Potential contamination of the site strata by historical and or current use;
- b) The potential impact on the wider environment by historical and or current use of the site of interest;
- c) The potential impact from surrounding land uses and other environmental factors;
- d) Potential problems associated with geological features such as faulting, mineral extraction, mining, and land instability;
- e) The location of apparent sub-surface structures that may affect the proposed redevelopment; and
- f) The location of above-surface features that may affect the proposed redevelopment.

The PRA is a desk-based exercise written using information provided from a desk based environmental study and any information made available to Curtins from the Client. The PRA can be utilised to inform the requirement for, and extent of, any future intrusive investigation work.

Consideration of detailed flood risk, ecology and archaeological issues are outside of the scope of this report.

2 DESK STUDY

This desk study has been undertaken using the following data sources and publicly available information.

- Envirocheck Report (2)
- British Geological Survey Records (3) (5)
- Environmental Agency Data (6)
- Historical Landfill Data (7)
- UK Radon Maps (8)
- Cherwell District Council Planning Portal (9)
- Zetica UXO Maps (10)

Copies of reports and any other supporting information are presented in Appendix B.

2.1 Site Location and Current Details

A site walkover has not been undertaken by Curtins to date for the purpose of this Phase 1 report. However, pertinent details for the site have been able to be obtained from satellite imagery have been used to assess the current site conditions; these are detailed below.

Table 2.1 Site Details

Site Address	Campsfield, Langford Lane, Kidlington OX5 1RE.
NGR	447370, 214620
Area of Site	7.7 Ha
Current Site Use and Description	<p>The following pertinent details were recorded from satellite imagery, provided client information and readily available geodatabases:</p> <ul style="list-style-type: none"> • The site topographically is recorded to be a slight valley with elevations of 73.00m AOD recorded in the northwest and southeast of the site and a topographic low of 70.00m AOD recorded in the central portion. • The south of the site currently comprises Campsfield Immigration Removal Centre, consisting of a main multi-storey, multi-block structure with satellite structures including garages, a healthcare unit, a boiler house, workshops, offices, and tank rooms. • The central portion consists of two large NTRG warehouses with a hardstanding car park surrounding. • The northern and western portion of the site predominantly consists of soft landscaping with several mature trees.



Figure 2.1 Site Location Plan, site boundary shown in pink © Google Earth 2024.

2.2 Surrounding Area Details

The following information was also established through undertaking an environmental database search (Envirocheck report (3) included in Appendix B) and reviewing publicly available online information.

Table 2.2 Surrounding Area

Surrounding Area	N	Residential dwellings and London Oxford Airport.
	E	Commercial units within Oxford Technology Park
	S	Agricultural land.
	W	Agricultural land.

3 SITE HISTORY

A review of the available historical mapping and other available information for the site and surrounding area (<250m) as presented within the Envirocheck report (2) has been undertaken. The historical development of the site and surroundings are presented below in Table 3 below. Bold text indicates within the site boundary. In addition, a drawing presented within Appendix A highlights areas of historical use overlying aerial imagery.

Table 3.0 Previous Site and Surrounding Area Uses and Potential Sources of Contamination

Date	Description	Potential Sources of Contamination
1878 – 1947	<p>From the earliest available mapping (1878), the subject site comprised of undeveloped agricultural land with a track running N-S through the centre of the site.</p> <p>The initial surrounding area was recorded similarly as farmland. Langford Lane runs E-W adjacent to the north of the site. An old quarry is identified circa 400m east of the site. Further afield, circa 800m to the east, resides the small village of Woodstock which housed Kidlington Station (Formerly Woodstock Road Station) which was part of the Great Western Railway Line.</p>	<ul style="list-style-type: none"> • Potential use of Victorian fertilizers/pesticides comprising heavy metals during localised farming activities.
1947 – 1955	<p>By 1947, the central and southeastern portions of the site had been developed to incorporate 4 large structures and 5 smaller structures (later mapping details this area as a depot). The remainder of the site remained as undeveloped/agricultural land.</p> <p>Much of the initial surrounding land to the south, west and east remains as farmland, a notable exception is a sewage works located 500m southeast. 12m north of the site boundary development is present in the form of Oxford (Kidlington) Aerodrome, a commercial and subsequent RAF flight training centre opened in 1938. Associated residential and commercial units were constructed circa 150m to the northeast. A Gravel Pit is present circa 450m of the southern boundary and is surrounded by residential development, extending up Woodstock Road.</p>	<ul style="list-style-type: none"> • Uncontrolled deposition of Made Ground from construction-related activity. • Limited potential for contamination from off-site sources.
1955 – 1974	<p>In the 1950s, there was an expansion of the structure in the southeastern corner of the site to incorporate 4 wings and an annexe. In the central-western portion of the site, a small circular structure was constructed. Within the 1960's the multi-winged structure was used as H.M. Detention Centre Campsfield.</p> <p>No significant changes are noted within the surrounding area.</p>	<ul style="list-style-type: none"> • Uncontrolled deposition of Made Ground from construction and demolition-related activity. • Limited potential for contamination from off-site sources.
1974 – 1981	<p>The early 1970s saw major development of the site, to which by 1974, the site consisted of H.M Detention Centre Campsfield in the southeast, Sewage Works in the central-western portion, a depot with electrical substation and tank rooms in the central regions and the northern areas were predominantly residential housing with private gardens.</p> <p>The areas surrounding the site to the north and east are subject to industrial development and by 1981 incorporate a science/business park and industrial estates with works and depots. The Gravel Pit to the south has now been infilled and residential housing developed on the land.</p>	<ul style="list-style-type: none"> • Uncontrolled deposition of Made Ground from construction and demolition-related activity. • Potential deposition of inorganic (heavy metals)/organic putrescible material on-site associated with inadequate treatment and disposal of wastewater from Sewage Treatment Works. • Spillages and leakages of fuel and chemicals (VOCs) from electrical substation/tank rooms and depot. • Limited potential for contamination from off-site sources.
1981 - 1999	<p>Between the 1980s and 1990s, the residential housing within the northern areas was demolished. The sewage works were incorporated into the Detention Centre and subsequently closed and demolished.</p>	<ul style="list-style-type: none"> • Uncontrolled deposition of Made Ground from construction and demolition-related activity.

Date	Description	Potential Sources of Contamination
	By 1999 a rectangular-shaped building used as an ambulance station was constructed on the northeastern boundary of the site.	<ul style="list-style-type: none"> • Uncontrolled deposition of Made Ground from construction-related activity.
<p>1999 – 2024</p> <p>(Present Day)</p>	<p>By 2006, development was confined to the south of the site with northern areas remaining untouched. The south saw the expansion of the Detention Centre with new wings within the main building and smaller surrounding structures constructed. In 2018, the detention centre was closed.</p> <p>Circa 2021, Oxford Technology Park began construction directly east of the subject site. Numerous buildings have been constructed including offices and a premier inn.</p>	<ul style="list-style-type: none"> • Uncontrolled deposition of Made Ground from construction and demolition-related activity. • Limited potential for contamination from off-site sources.

Limited information is available relating to the site history before 1878 when the first ordnance survey maps were produced. Potential sources of on-site and off-site contamination are further discussed in Section 5.0.

3.1 Preliminary Unexploded Ordnance Risk Assessment

With reference to historical mapping, the development site pre WWII comprised undeveloped agricultural land prior to WW2 and is therefore unlikely to be an active bombing target.

A review of the historical mapping did not identify ‘ruins’ or any clearance of the site post-WWII reflective of bomb damage or equally within the surrounding area (<100m). In addition, Zetica UXB Risk Maps did not record any strikes on-site or within the surrounding area (<100m). However, RAF Kidlington was located approximately 12m north of the site which is potentially a bombing target. It is understood that RAF Kidlington was attacked four times by the Luftwaffe and that 25 high-explosive bombs hit the airfield. A review of online Cherwell District (8) planning records (ref. 14/01778/F) has determined a previous Detailed Unexploded Ordnance Assessment for the site, which detailed a Medium risk of UXO. This has been included in Appendix B.

The following risk mitigation measures were recommended in the previous detailed UXO risk assessment to support any proposed works:

All Works

- UXO Risk Management Plan; and,
- Site Specific UXO Awareness Briefings to all personnel conducting intrusive works.

Intrusive Works (i.e. boreholes, piling and foundations)

- On-site UXO Support and Magnetometer Survey

A copy of the Phase 1 reporting is recommended to be provided within the Health and Safety file for the development.

4 GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

4.1 Geology

A study of the Envirocheck records (3), British Geological Survey (BGS) 1:50,000 mapping records indicates the following geological and hydrogeological succession underlying the site:

Table 4.1a Geological / Hydrogeological Succession

Geology	Associated Hydrogeological Classification
A significant thickness of Made Ground is anticipated to be present on-site given the extensive historical development.	N/A
Localised Superficial Deposits are recorded as Wolvercote Sand and Gravel Member and expected to be encountered within the far northwest of the site.	Secondary A Aquifer ⁽¹⁾
Bedrock deposits comprising Mudstone of the Kellaways Clay Member is expected to be present in the south of the site, Mudstone of the Forest Marble Formation in the east of the site and Limestone of the Cornbrash Formation is expected to comprise the remainder of the site in the north, west and central regions.	Kellaways Clay Member – Unproductive Strata ⁽²⁾ Forest Marble Formation – Secondary A Aquifer ⁽¹⁾ Cornbrash Formation – Secondary A Aquifer ⁽¹⁾

Notes:

1. Secondary A aquifers comprise permeable layers that can support local water supplies, and may form an important source of base flow to rivers
2. Unproductive strata are largely unable to provide usable water supplies and are unlikely to have surface water and wetland ecosystems dependent on them.

A previous ground investigation was undertaken in February 2014 within the southwestern corner of the development site, encompassing 3 No. cable percussive boreholes. Details of the geological conditions encountered are found in Table 4.1b below.

Table 4.1b Historical Borehole Records

Record Number	Location	Details (Depth to base m bgl, Description and Thickness)
BH1	British National Grid: 447392, 214452	GL to 0.20m bgl, – MADE GROUND, soft dark brown slightly gravelly silty CLAY. Gravels of quartz and flint. (0.20m). 0.20m – 1.20m bgl – MADE GROUND, Firm brown and dark brown mottled slightly gravelly, silty CLAY with pockets of brown limestone gravel and a soft, grey, brown, silty clay with organic traces. Gravel of quartz, brick, and limestone. (1.00m) 1.20m – 2.10m bgl – WEATHERED KELLAWAYS CLAY, Soft, becoming firm, locally stiff, grey, and orange-brown mottled CLAY. (0.90m) 2.10m – 3.00m bgl – HIGHLY WEATHERED CORNBRAASH, Loose, orange-brown, clayey GRAVEL and COBBLES of angular, shelly limestone fragments. (0.90m)

Record Number	Location	Details (Depth to base m bgl, Description and Thickness)
		<p>3.00 – 5.50m bgl – CORNBRAASH FORMATION, Medium strong, very thinly to thinly bedded, light brown and grey hearted, shelly LIMESTONE with occasional thin beds of stiff or very stiff clay. (2.50m)</p> <p>*Borehole terminated at 5.50m</p>
BH2	447285, 214481	<p>GL – 0.50m bgl - MADE GROUND - Soft, dark brown and brown mottled, slightly gravelly, silty CLAY. Gravel of flint, limestone and brick. (0.50m)</p> <p>0.50 – 2.30m bgl – Head Deposit, Firm, locally stiff, orange brown and light grey mottled, slightly sandy, slightly gravelly CLAY. with occasional black carbonaceous traces. Gravel of angular to rounded flint and quartzite. (1.80m)</p> <p>2.30 – 3.00m bgl - WEATHERED CORNBRAASH, Orange brown, clayey GRAVEL and COBBLES of angular, shelly limestone fragments.(0.70m)</p> <p>3.00 – 3.30m bgl -CORNBRAASH FORMATION, Medium strong, very thinly and thinly bedded, light brown and light grey hearted, shelly LIMESTONE with 3.35-3.41 C 50* 3.20 occasional thin beds of stiff clay. (0.30m)</p> <p>*Borehole abandoned at 3.30m depth</p>
BH3	447353, 214503	<p>GL – 0.10 m bgl - MADE GROUND - Soft, dark brown, slightly gravelly, silty CLAY. Gravel of flint and brick.(0.10m)</p> <p>0.10 – 0.35m bgl - MADE GROUND - Brown, clayey GRAVEL and COBBLES of limestone, and occasional roadstone. (0.25m)</p> <p>0.35m – 1.90m bgl - Firm, orange-brown, brown and light grey mottled, slightly sandy, slightly gravelly CLAY with occasional black carbonaceous traces. Gravel of rounded flint and quartz. (1.55m)</p> <p>1.90m – 2.80m bgl – WEATHERED CORNBRAASH, Orange-brown, clayey GRAVEL and COBBLES of angular, shelly limestone fragments.</p> <p>2.80 – 3.00m bgl – CORNBRAASH FORMATION, Medium-strong, very thinly bedded, light brown and light grey hearted, shelly LIMESTONE. (0.20m).</p> <p>Borehole abandoned at 3.00m depth</p>

There are no geological fault lines within the site boundary or within 1km of the site boundary.

4.2 Hydrogeology

The site is not recorded to be within an Environment Agency designated groundwater Source Protection Zone (SPZ).

There are three records of licensed commercial groundwater abstraction boreholes within 1km of the site boundary, located at Langford Lane, Kidlington – Well ‘A’ between 338m and 438m northeast whereby groundwater is abstracted for general use within dairy farms.

4.3 Hydrology

The closest surface water feature is a pond situated approximately 301m east of the site boundary, referring to two small ponds south of Oxford Motor Park. No pollution incidents have been recorded within 250m of the site. The closest was approximately 420m southeast of the site boundary in 1996 for a Category 3 – Minor incident relating to unknown sewage.

There are no licensed surface water abstractions recorded within 1km of the site.

There are no records of a discharge consent within 250m of the site.

The site is not recorded to be within an area depicted on the EA Flood Zone maps to be at risk of flooding from rivers or the sea (very low risk). The site is recorded to be within an area depicted to be at very low risk from surface water flooding. The site is within an area of limited potential of groundwater flooding to occur.

4.4 Coal Mining or Mineral Extraction

The Envirocheck report (2) and The Coal Authority’s online interactive mapping confirm that the site is not situated within a coal mining reporting area.

There are four BGS-recorded mineral site within 1km of the site boundary. These are located between 747m and 926m east of the site boundary and pertain to opencast sand and gravel quarries extracting from the Summertown-Radley Sand and Gravel Member.

4.5 Natural Ground Subsidence and Ground Stability Issues

The Envirocheck Report provides information regarding the risk posed to the site by a range of ground hazards. A summary of these points is detailed below in Table 4.5. It should be noted that these ratings are based on generic classifications assigned to broad geologic strata by the BGS National Geoscience Information Service and do not necessarily reflect onsite conditions.

Table 4.5 Ground Stability Hazards for the site.

Ground Stability Hazard	Hazard Potential On-site
Collapsible Ground	Very Low
Compressible Ground	No Hazard
Ground Dissolution (Soluble Rocks)	Low
Landslide	Very Low
Running Sand	Very Low
Shrinking or Swelling Clay	Moderate

Given the information above, consideration should be given for shrinking or swelling clays on site with a reported Moderate risk. This risk is likely attributed to the presence of weathered Kellaways Clay and Forest Marble Formation.

Given the information above there is a need to address any of the ground stability hazards across the site as there is an identified potential for ground movement.

4.6 Radon Ground Gas

The BGS Geoindex (3) and UK Radon Mapping (8) confirms the site is situated in a intermediate probability radon area where 5 to 10% of homes are estimated to be at or above the action level. Therefore, radon protective measures are necessary in the construction of new dwellings or extensions. Where the new development incorporates a basement the advice of a specialist Radon assessor must be obtained.

4.7 Landfill and Pollution

The Envirocheck Report records one historical landfill within 1km of the site. This was recorded 297m south of the site at Willow Way Landfill with deposited waste including inert, industrial, commercial, and household waste.

There are no waste transfer sites and pollution prevention control permits within 500m of the site.

There are no records of potentially infilled land within 250m of the site.

4.8 Environmental Data

The site exists in a historically greenfield, more recently sub-urban setting. The Envirocheck Report details the below for the site and is presented in Appendix A2, and the data is summarised in Table 4.8 below.

Table 4.8 Summary of Environmental Data

Item	On the Site	In the Immediate Vicinity (<250m)
Environmentally Sensitive Sites ¹	Yes	Area of adopted green belt surrounds Oxford and extends to Kidlington.
Nitrate Vulnerable Zones	Yes	Yes
Potentially Contaminative Land Use	Yes – Sewage Works formally present onsite.	No
Historical Tanks, PFS, Garages, Energy Facilities	Yes – Electrical substation, tank rooms, garages, depot are all present onsite.	Numerous electrical substations, garages within Oxford Technology and Oxford Motor Park.
Potentially Infilled Land	None identified within the site boundary.	None recorded within 250m of the site.
Historic Landfill Sites	None identified within the site boundary.	None recorded within 250m of the site.
IPPC Authorisations	No data made available	No data made available
Discharge Consents	None identified within the site boundary.	None recorded within 250m of the site.
List 1 and 2 Dangerous Substances Sites	No data made available	No data made available

Item	On the Site	In the Immediate Vicinity (<250m)
Radioactive Substance Sites	None identified within the site boundary.	None recorded within 250m of the site.
Enforcements	None identified within the site boundary.	None recorded within 250m of the site.
Pollution Incidents	None identified within the site boundary.	None recorded within 250m of the site.
Waste Management Facilities	None identified within the site boundary.	None recorded within 250m of the site.
Current Industrial/Commercial Sites	None identified within the site boundary.	No data made available
Notes		
1. Sensitive land uses include Sites of Special Scientific Interest, Nature Reserves, National Parks, Special Areas of Conservation, Special Protection Areas, Ramsar sites, World Heritage sites, and Ancient Woodland.		

4.9 Contemporary Trade Directory Entries

There are no active contemporary trade directory entries for the site.

4.10 Planning Portal

A review of Cherwell District Council’s online planning register was undertaken to determine any potential environmentally pertinent information on-site or within the surrounding area, in relation to this assessment. However no environmentally pertinent information such as ground investigation data was identified.

However, as stated in section 4.1, a former ground investigation was undertaken on the southwestern corner of the site. The ground investigation comprised 3 No. boreholes to max depths of 5.50m bgl and 13 No. Trial Pits to max depths of 3.10m bgl.

The investigation identified that Made Ground contained occasional pieces of brick, ash, tile, plastic, concrete, slate, coal and glass and there was no olfactory or visual evidence of hydrocarbon contamination. No visual evidence of asbestos-containing material was observed within the exploratory holes.

The results of the environmental chemical testing analysis indicate that the Made Ground beneath the site contains elevated concentrations of arsenic and locally benzo[a]pyrene, which exceeded residential soil screening criteria. The recorded arsenic and benzo[a]pyrene concentrations did not exceed the screening values for a commercial/industrial end-use.

5 CONCEPTUAL SITE MODEL & QUALITATIVE RISK ASSESSMENT

The conceptual site model (CSM) and Qualitative Risk Assessment (QRA) are presented in the table presented in this section.

The CSM details the source-pathway-receptor linkages or potential pollutant linkages (PPL) that have been identified for the site. The QRA details the associated level of risk relating to these potential pollutant linkages.

The CSM and QRA concern risk to human health and water environment with additional, more specific risk assessment protocols contained within the main body of this reporting, as detailed in Section 5.1 below.

The QRA follows the framework outlined within CIRIA C552 which is summarised within *Appendix C*.

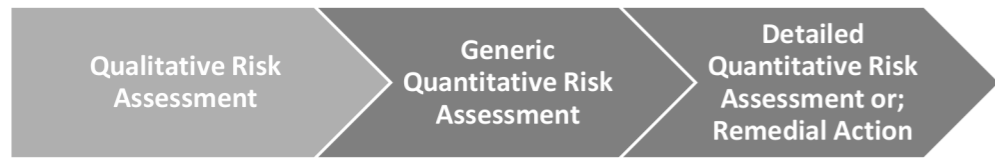
The 'risk rating' within the QRA refers to the risk that the source, pathway, receptor linkage or PPL is complete. Unless specifically stated it does not necessarily refer to an immediate risk and is intended to be used as a tool to assess the necessity for further assessment/investigation.

5.1 Additional Risk Assessments

The following risk assessments, listed below, are not included within the main CSM and QRA but none-the-less can be of critical importance to the onward development of the site.

- The risk presented by Mining is discussed and assessed in Section 4.4.
- The risk presented by Radon is discussed and assessed in Section 4.6.
- The risk presented by Unexploded Ordnance is discussed and assessed in Section 3.1.

Under current health and safety legislation, employers are required to carry out their own appropriate risk assessments and mitigation to protect themselves and their employees, other human receptors, and the environment from potential contamination. Such risks must be adequately mitigated by law, specifically the Construction Design Management (CDM) Regulations (2015) which require that potential risks to human health and the environment from construction activities are appropriately identified and all necessary steps taken to eliminate / manage that risk. It has been assumed that any future construction works on site will be undertaken in compliance with these requirements and therefore construction workers involved in the building works at the site have been discounted as a human receptor in the conceptual site model.



- The table below represents the first stage in the land quality risk assessment process: The Qualitative Risk Assessment.
- For a development site to be deemed 'suitable for use', the level of risk needs to be brought down to acceptable levels, i.e. low to negligible risk. The purpose of each stage of risk assessment is ultimately to establish, if there is a requirement for additional levels of assessment to be made to have sufficient confidence to support a risk characterisation or management decision, e.g. remedial action.
- In the absence of specific site data, a Generic Quantitative Risk Assessment is invariably recommended.

Conceptual Site Model			Qualitative Risk Assessment			Recommended Actions
Source	Pathway(s)	Receptor(s)	Consequence (with explanations, if applicable)	Likelihood of Occurrence (with explanations if applicable)	Risk Rating	
On-Site Sources of Potential Contamination: <ul style="list-style-type: none"> • Uncontrolled deposition of Made Ground associated with multiple stages of construction and demolition across the site. Previous investigation identified elevated concentrations of PAHs and Arsenic. • Potential contamination of asbestos within subsurface due to buildings on-site pre-dating before 2000. • Potential leakages from tanks, electrical substations, pumping rooms and historical use as sewage treatment facility. • Potential use of Victorian fertilizers/pesticides comprising heavy metals. <p><i>Potential contaminants of concern associated with the above sources include, amongst others; hydrocarbons including diesel/petrol range organics from fuel spillages, polycyclic aromatic hydrocarbons arising from incomplete combustion, and inorganic compounds including metals, non-metals (from chemical spillages) and asbestos.</i></p>	Inhalation of vapours Inhalation of dust/fibres, ingestion of soil/produce and dermal contact with soil have been discounted owing to proposed soft landscaping areas.	End user of site Site users, staff/maintenance users and the public	Medium Chronic health risk	Likely The site comprises various historical and current uses from a detention centre, residential housing and sewage treatment works. Given the large geographic area of the site, Made Ground is anticipated to be heterogeneous, with some areas having no or limited Made Ground and others exhibiting significant thicknesses of Made Ground (>1.00m). Made Ground is expected to be present in significant thicknesses in and around the areas of historical development. With the previous investigation identifying elevated concentrations of PAHs and arsenic, within an area of limited historical development, it is likely that areas that have been subject to multiple phases of development will also show elevated values in various contaminants. Given the less sensitive end use of the site as a detention centre, areas of soft landscaping may not be accessible to end users. However, much of the western portions of the site is left undeveloped/as soft landscaping outside the area of the detention centre which could be a pathway to the general public or other end users. Consequently, a Generic Quantitative Risk Assessment (GQRA) is required to further determine the risk.	Moderate	Generic Quantitative Risk Assessment as part of ground investigation.
	Vertical and horizontal migration through the Made Ground and superficial soils via a preferential pathway. May occur due to existing service corridors, basements, and physical processes including capillary action and downwards into the natural deposits through infiltration.	Controlled Waters Secondary A Aquifer across a majority of the site. No potable groundwater abstractions within 1km of the site and site not within SPZ.	Medium Pollution of sensitive water resources	Likely The site comprises various historical and current uses from a detention centre, residential housing and sewage treatment works. Given the large geographic area of the site, Made Ground is anticipated to be heterogeneous, with some areas having no or limited Made Ground and others exhibiting significant thicknesses of Made Ground (>1.00m). Made Ground is expected to be present in significant thicknesses in and around the areas of historical development. With the previous investigation identifying elevated concentrations of PAHs and arsenic, within an area of limited historical development, it is likely that areas that have been subject to multiple phases of development will also show elevated values in various contaminants. Superficial deposits of sand and gravel provide a potential pathway into the Secondary A Aquifer of the bedrock below, and the superficial deposits themselves. However, there are limited potential sources of gross or mobile contamination identified within historical mapping and previous investigations. The main sources of potential mobile contamination, tanks, and pumps are located above areas of the Kellaways Clay Member, an unproductive aquifer, however, there is potential for this to migrate into Secondary A Aquifers nearby. It is considered low likelihood that potential on-site contaminant sources would present a risk to controlled waters. With ground investigation and a GQRA to confirm the risk to controlled waters.	Moderate	
Off-site Sources of Potential Contamination: <ul style="list-style-type: none"> • Uncontrolled deposition of Made Ground associated with 	Horizontal migration of mobile phase contaminants through the granular superficial deposits and bedrock – followed by inhalation of vapours.	End user of site Site Users, staff/maintenance users and the public	Medium Chronic health risk	Unlikely The potential off-site sources of contamination are considered no greater than the development site and consequently, it is considered unlikely that off-site sources would present a risk to future site users.	Low	No further action recommended.

Conceptual Site Model			Qualitative Risk Assessment			Recommended Actions
Source	Pathway(s)	Receptor(s)	Consequence (with explanations, if applicable)	Likelihood of Occurrence (with explanations if applicable)	Risk Rating	
<p>construction of offsite buildings in the surrounding area.</p> <p><i>Potential contaminants of concern associated with the above sources include, amongst others; hydrocarbons including diesel/petrol range organics from fuel spillages, polycyclic aromatic hydrocarbons arising from incomplete combustion, and inorganic compounds including metals, non-metals, and asbestos.</i></p>						
<p>Potential on-site and off-site sources of ground gases</p> <ul style="list-style-type: none"> Uncontrolled deposition of Made Ground associated with multiple stages of construction and demolition across the site. 	<p>Vertical and horizontal migration through existing service corridors and the underlying superficial deposits</p>	<p>End user of site</p> <p><i>Site Users, staff/maintenance users and the public</i></p>	<p>Severe</p> <p>Acute health risk, e.g., asphyxiation or risk from explosion</p>	<p>Low Likelihood</p> <p>Made Ground has the potential to be in excess of 1.0m in areas that are subject to multiple phases of demolition and construction, particularly in the southeast of the site. In the absence of knowing the presence, thickness, lateral extent and organic composition of onsite made ground the risk of ground gas from onsite Made Ground cannot be ruled out. In addition, the sewage treatment works features a filter bed that is likely to have been infilled with unknown material, imposing a potential gas risk.</p> <p>The ground gas generating potential off-site is considered low due low proximity to landfills and absence of potential pathways. On this basis, it is considered the development site has a 'low' gassing potential in line with BS8576.</p> <p>Notwithstanding this, it is recommended that ground gas monitoring is undertaken as part of a ground investigation to inform ground gas risk assessment for the site.</p>	<p>Moderate</p>	<p>Ground Investigation to confirm the nature and thickness of potential Made Ground deposits and ground gas monitoring.</p>

6 CONCLUSION AND RECOMMENDATIONS

The qualitative risk assessment (QRA) determined an overall Moderate-Low level of risk to human health and Moderate risk to controlled waters associated with on-site sources of potential contamination. A Low risk from off-site sources of potential contamination was considered. A Moderate level of risk was identified for potential on-site and off-site sources of ground gases.

The QRA concluded by recommending that generic quantitative risk assessments (GQRA) were conducted to confirm the assessment of risk ascribed to each of the respective potential pollutant linkages (PPLs). It is recommended that the GQRA is conducted as part of a ground investigation in support of the engineering design of the proposed development an outline scope for which is detailed in the section hereafter.

In summary, the following recommendations are made:

- Undertake an intrusive ground investigation to support civil and structural design.
- Undertake a GQRA for human health and controlled waters as part of ground investigation.
- Undertake ground gas monitoring as part of GQRA.

It is further recommended that this work is completed in advance of any development works taking place.

6.1 Outline Scope of Works for Ground Investigation

It is envisaged that the ground investigation will comprise the following actions, all undertaken under the supervision of a suitably qualified engineer in line with current guidance and best practice:

- Boreholes - to determine shallow and deep ground conditions, potential dissolution features and provide in-situ geotechnical information. Install standpipes to be able to facilitate ground gas monitoring and groundwater level monitoring to inform design.
- Machine excavated trial pits to mass characterise soils.
- In-situ CBR tests (using TRL DCP) to inform preliminary road and hardstanding design.
- Associated geotechnical and environmental laboratory testing – to develop a working ground model, classify the natural material for re-use on site and assess the potential risk to end users of the site and other sensitive receptors.

6.2 Contaminants of Concern

It is recommended that screening of the materials arising from the ground is undertaken to confirm their suitability for retention and/or re-use on site. Potential contaminants of concern (CoC) associated with the on-site sources identified within the tabulated Conceptual Site Model in Section 5.0 of this reporting include, but are not limited to:

- Polycyclic aromatic hydrocarbons (PAHs);
- Aliphatic and aromatic hydrocarbons present within fuel oils.
- Volatile Organic Compounds.
- Inorganic compounds including toxic metals, non-metals, metalloids; and,
- Asbestos.

The potential for other CoC's to exist that are not listed above is considered unlikely and shall be at the discretion of the supervising Engineer.

The potential for off-site sources of free product or mobile contaminants within the sub-surface environment is considered unlikely and is considered to be accounted for by the contaminants of concern detailed above.

7 REFERENCES

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