

SAMLESBURY
BUILDING

**PHASE 1 GEO-ENVIRONMENTAL
DESKTOP REPORT**

VOLUME 1

REVISION P01

Prepared for

[REDACTED]

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Project 7272

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GEO-ENVIRONMENTAL DESKTOP REPORT

VOLUME 1

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DUTY OF CARE

This report was prepared at the request of Ridge and Partners LLP on behalf of the client, ■■■ ■■■■, in response to a specific brief. No reliance is to be placed on the content of this report for any use other than that for which it was prepared. This report has been prepared in the light of Legislation and best practice current at the time of writing.

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Nothing contained in this report confers or purports to confer a duty of care or benefit of any kind to any third party.

1.0 INTRODUCTION

1.1 THE BRIEF

TRP Consulting was commissioned by Wilson Mason LLP on behalf of the client, ■■■■ ■■■■, to carry out an initial geo-environmental desktop appraisal of a site located within the ■■■■ ■■■■ complex at Samlesbury Aerodrome in Balderstone, Blackburn. The desk study report is required to identify any significant geo-environmental issues that may affect the development of a new ■■■■ ■■■■ Building.

The desk study report has been prepared to identify any significant geo-environmental issues that may affect development of the site and to provide information necessary to support a detailed planning application for redevelopment of the site.

This report has been based on consultation, desk study research of information generally accessible in the public domain and site reconnaissance. Primary sources of information are listed in Section 2.1.

This report sets out the findings of the desk study, confirms the geo-environmental site setting and documents preliminary risk assessments. The environmental appraisal follows the procedures set out in LCRM 'Model Procedures for the Management of Land Contamination' (2023) and BSI 'Code of Practice for Investigation of Potentially Contaminated Land' (2011).

The findings of this report are based on finite information obtained from research and consultations. TRP Consulting cannot guarantee the reliability of all such information and the searches should not be considered exhaustive. The findings of the report may need to be reviewed as any future exploratory investigations progress and in the event that additional archive information becomes available.

1.2 THE SITE AND PROPOSED DEVELOPMENT

The Site

The ■■■■ ■■■■ site at Samlesbury, a former World War 2 airfield, is located in Balderston, Blackburn BB2 7LF and is centred on Ordnance Survey grid co-ordinates 362250, 431440. The site is located between Myerscough Smithy Road (A59) to the north and Preston New Road (A677) to the south. The area of Mellor Brook lies just over 1km to the east, Turner Green lies approximately 1.5km to the west and Samlesbury town centre is located almost 4km to the west.

The site and proposed development area are shown in Fig 1 below:

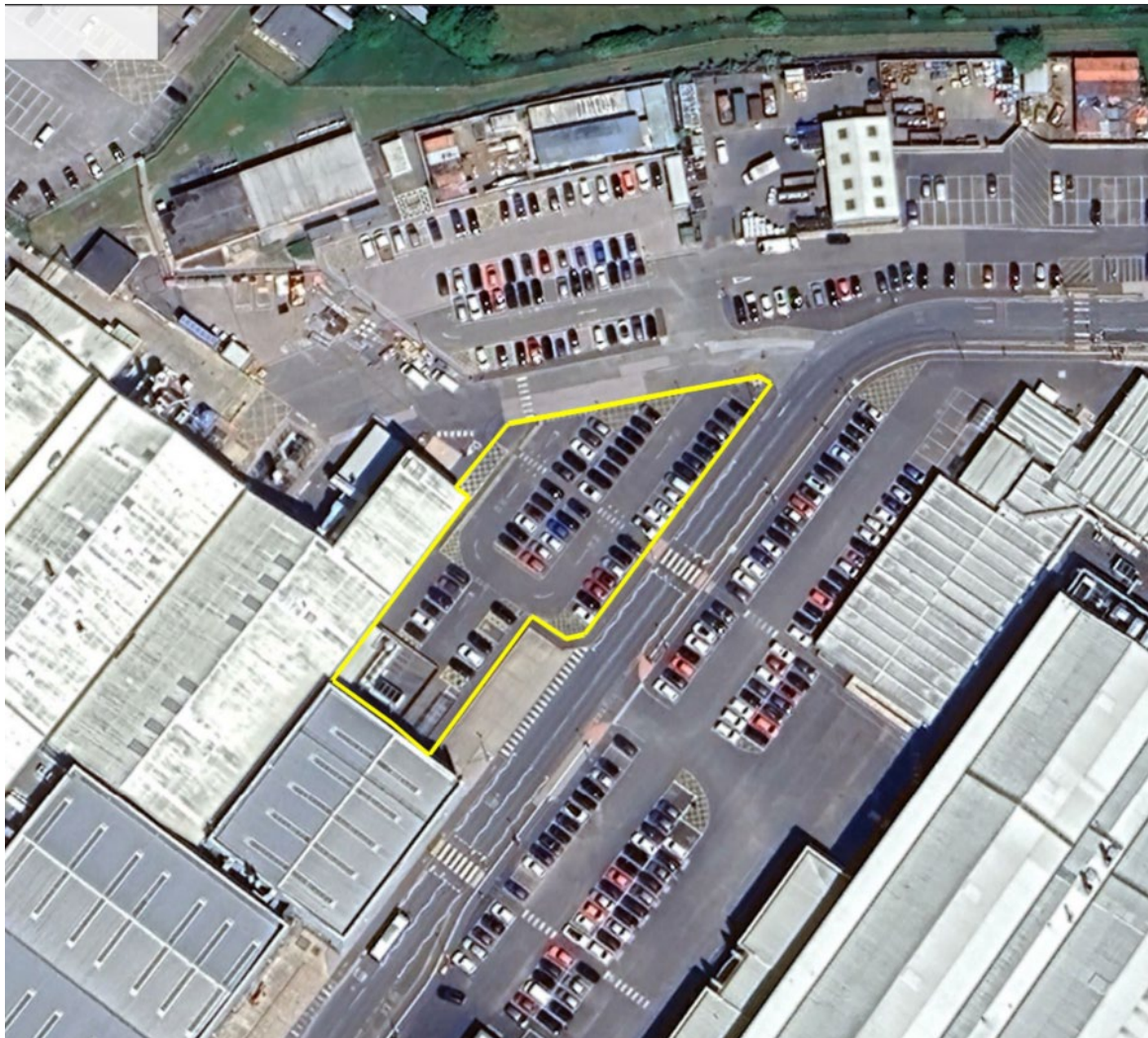


Figure 1: Aerial view of the site indicating red line planning boundary

The site forms an irregularly shaped area of approximately 0.3 hectares and currently comprises a tarmac surfaced car park.

The site boundaries are formed as follows:

- The northern and south-eastern boundaries are formed by an access road with further car parking beyond;

- The western and south-western boundaries are formed by production sheds.

The Proposed Development

The site is proposed to be redeveloped with a new shed building. A layout of the proposed development is shown in Fig 2 below.

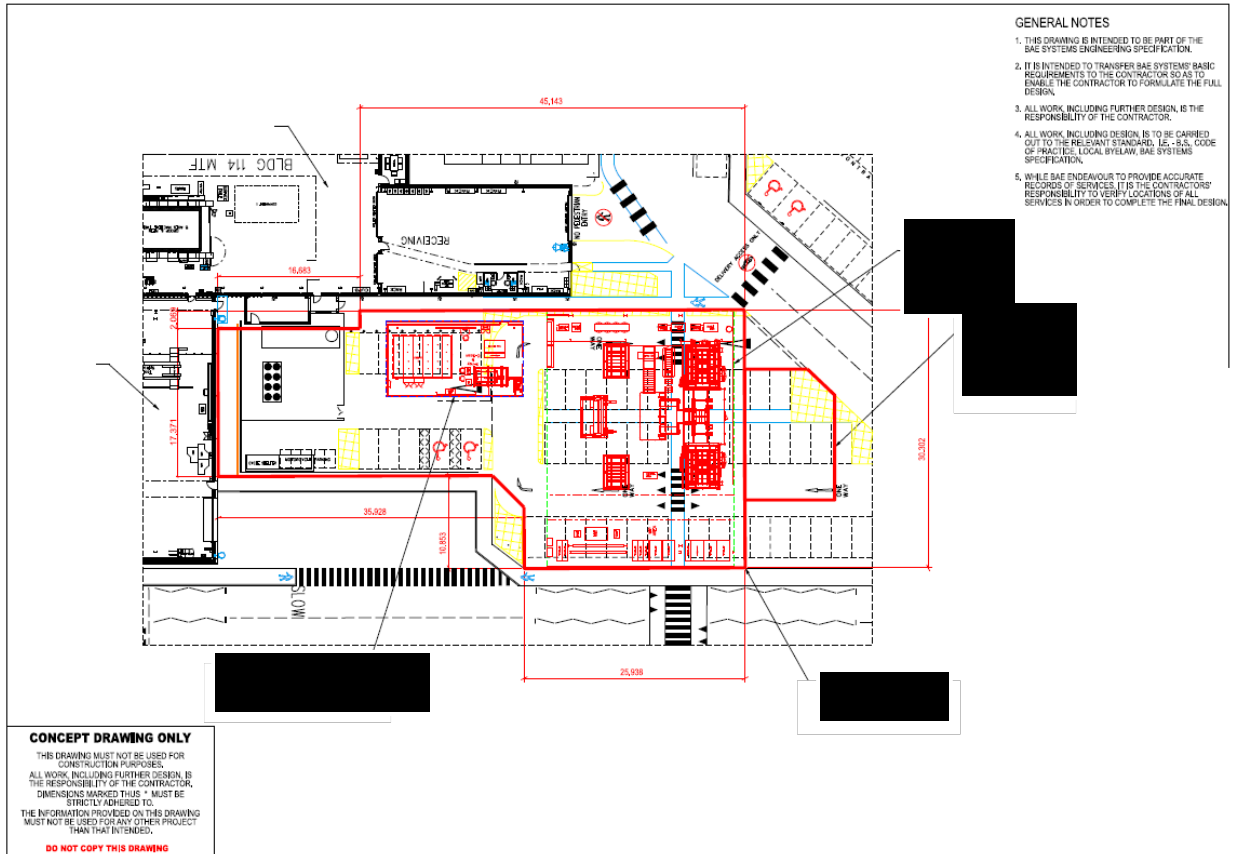


Figure 2: Proposed Development

In summary, the proposed development works comprise:

- Site clearance and the breaking out and grubbing up of all existing hardstanding and below ground structures.
- The construction of the new shed building including a new 2000 tonne foundations, 2 No ovens, a 20 tonne overhead crane, HVAC Mezzanine Floor Platform, workshops, offices and store rooms.

1.3 OBJECTIVES

The preliminary investigation and desk study documented in this report has been developed to meet the following objectives: -

- Provide information on current and former uses of the site, the geology, hydrology and hydrogeology of the site and surrounding area.
- Identify potential sources of contamination, receptors and pathways to assist in preparing the preliminary conceptual model and risk assessment.

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- Identify the nature of any potential hazards or liabilities associated with on-site contamination.
- Identify the nature of any potential hazards or physical constraints to development.
- Identify requirements for further investigation, monitoring or testing in respect of geotechnical issues or potential contamination on the site.
- Identify outline requirements for remediation or control measures.
- Provide information relevant to Health and Safety during field investigations.

The information obtained for the desk study has been reviewed in relation to the proposed site use as set out in Section 1.2.

2.0 DESK STUDY AND CONSULTATION

2.1 INFORMATION SOURCES AND CONSULTATION

The desk study comprises a combination of documentary research, consultation and site reconnaissance. Information regarding the site was obtained from the following sources:

- Current and historic ordnance survey mapping, documentation and searches provided by Landmark Information Group Service (Landmark) – Envirocheck Report ref. 357092240_1_1, dated 3rd September 2024
- Ground Investigation at ■■■■ ■■■■ Building, ■■■■ Samlesbury, Lancashire For Wilson Mason & Partners - Report ref. 5230B, prepared by Sub Surface North West Ltd, August 2009
- Desk Study for Defence Use and German Air-Dropped UXO, ■■■■ ■■■■ Samlesbury, Investment Delivery I&SP – Report ref A0783-00-R1-1, prepared by ■■■■ ■■■■ Environmental dated May 2008
- Ground Investigation at 1, Shed, ■■■■ Samlesbury for D&S (Engineering Facilities) Ltd - Report ref. 4413, prepared by Sub Surface North West Ltd, December 2004
- Contaminated Site Investigation No 1 Shed, ■■■■, Samlesbury – Report ref. 40134INTi1r0 prepared by REC dated September 1997
- Results of Ground Investigation at 4 Shed Annexe, ■■■■ Samlesbury, prepared by Soil Surveys Ltd dated March 1997 (No Report Reference No.)
- Ground Investigation at A320, Spray Booth, Samlesbury for British Aerospace Defence Ltd - Report ref. 2939, prepared by Sub Surface North West Ltd, December 1996
- Ground Investigation at Shed 1, ■■■■ Samlesbury for British Aerospace Defence Ltd - Report ref. 2893, prepared by Sub Surface North West Ltd, September 1996
- Ground Investigation at Shed 1, Samlesbury for British Aerospace Defence Ltd - Report ref. 2821, prepared by Sub Surface North West Ltd, March 1996
- Ground Investigation at No. 1 Shed, Samlesbury for British Aerospace PLC - Report ref. 1914, prepared by Sub Surface North West Ltd, April 1991
- Ground Investigation at No. 1 Shed, Samlesbury for British Aerospace PLC - Report ref. 1433, prepared by Sub Surface North West Ltd, November 1988

- Accessible information in the public domain

Details of research are set out in the following sections. A copy of the Envirocheck report is included in Volume 2 for reference.

2.2 THE SITE AND SITE RECONNAISSANCE

A site inspection was undertaken on 4th September 2024 to check for evidence of the site’s former uses or any features which might have an impact on the proposed development. The weather at the time of the inspection was dry.

The Site

The site occupies and are of approximately 0.21 hectares and is located towards the northern boundary of the Samlesbury site adjacent to 1 Shed and Building . The site is laid out as a ground level car park accommodating approximately 50 spaces with tarmac surfacing. The car park is laid to a shallow fall with surface run off draining to the north west towards a series of gullies along the external wall of building .

The is a small chiller plant compound towards the western end of the site as shown in Fig 3 below

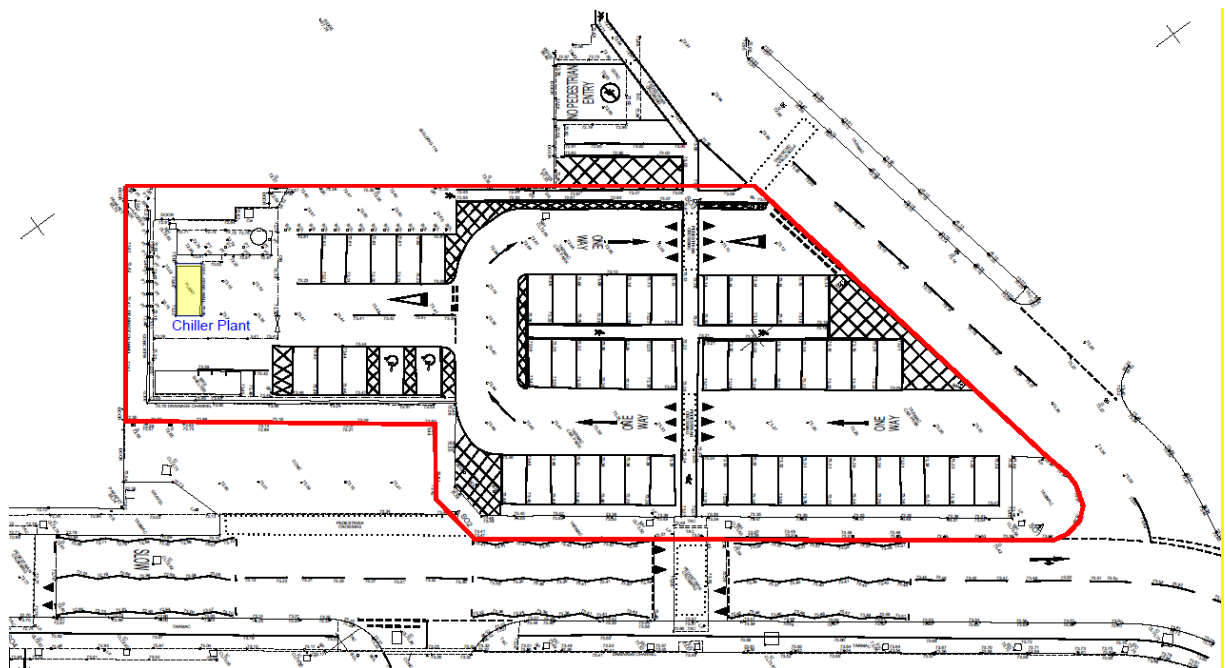


Figure 3: Current site layout (outlined in red)

A topographical survey undertaken by Survey Operations in September 2024 indicates that ground levels across the site are generally level in the range of 72.8- – 73.4m AOD .

The use of the buildings around the site are associated with aircraft component manufacture and metal treatment.

2.3 HISTORIC SITE USE

Ordnance Survey Mapping

Former land use on the site has been reviewed by reference to historic Ordnance Survey maps. The earliest detailed mapping, provided by Landmark, dates back to 1848. A summary of the site history based on the plans and maps is recorded below.

A list of the maps consulted is included in Appendix B.

OS Historic Mapping & Aerial Photography - The Site

Year	Scale	Comments
1848-1895	1:10,560 and 1:2,500	The site comprises open agricultural land with field boundaries splitting the site in half running north-west to south-east and in the southern tip of the site running south-west to north-east.
1912-1913	1:10,560 and 1:2,500	A drain is shown in the centre of the north-eastern half of the site, running south-west to north-east.
1932	1:10,560 and 1:2,500	The drain in the north-eastern half is no longer shown although a drain is shown on the southern tip of the site along the field boundary.
1956	1:10,000	The site is shown as part of an 'airfield' although no features are shown, presumably due to national security reasons.
1967-1992	1:2,500 and 1:10,000	No development shown although the site is shown as part of Samlesbury Aerodrome.
2000-2001	Google Earth and Historical aerial photography	The site is occupied by a car park.
2024	1:10,000	Unmarked structures are shown in the south of the site.

Summary – The Site

The site formed part of open undeveloped agricultural land until at least the 1930s with drains located in the north-east and south. From the 1940s, the site was in use as an airfield / aircraft works although this was not shown on historical plans. Since at least 2000, the site has been occupied by a car park as part of the overall airfield / aircraft works.

Potential contamination associated with former use of the site include:

- Made Ground under car park and potentially infilled drains;
- Potential for localised contamination associated with car park use (heavy metals & hydrocarbons)
- Any organic rich soils associated with former drains may also be a potential source of hazardous ground gases.

2.4 HISTORIC USE OF SURROUNDING LAND

OS Historic Mapping - Surrounding area

Year	Scale	Comments
1848-1932	1:10,560 and 1:2,500	The surrounding area comprises agricultural land with farms and sporadic residential properties. A number of field ponds are located in the surrounding area, the closest approximately 50 m to the north and 80 m to the north-west.
1956	1:10,000	The site is shown as part of an 'airfield' although no features are shown. A tank is shown approximately 350 m to the south-west.
1967-1970	1:2,500 and 1:10,000	A number of small to large buildings are shown associated with the aerodrome with two large buildings/sheds located 80 m to the west and south-east and 140 m to the south-west. A pond is shown 120 m to the south-west.
1982-1988	1:2,500 and 1:10,000	Further buildings shown 100 m to the south and beyond. A number of tanks are shown, the nearest located 150 m to the south-west.
1992	1:2,500	The building to the west has been extended up to the site's western boundary with further extension of existing buildings between 200 and 300 m to the south. New buildings are shown 50 m to the north-west with a club and associated bowling green 120 m to the north-west.
2000-2006	Google Earth, Historical aerial photography and 1:10,000	Car parking is shown to the north, east and south with new buildings 50 m to the east and beyond.
2013-2024	Google Earth and 1:10,000	New sheds have been built immediately to the south-west and 40 m to the south-west.

Summary – Surrounding Area

The surrounding area was formed by undeveloped agricultural land with associated field ponds, local farms and residential buildings until at least the 1930s. From the 1940s, the site was in use as an airfield / aircraft works with increasing development comprising sheds, tanks, outbuildings and pond.

A list of the Ordnance Survey maps consulted is included in Appendix B.

The Envirocheck Data Report lists the following potentially active contaminative sources within 250m of the site:

- Distribution Centre – 95 m west
- Cleaning services – 160 m west
- Tanks – 165 m south-west and 250 m south

In addition to the above, numerous infilled field ponds are located within 250 m of the site, the nearest located 50 m to the north-east.

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Potential contamination associated with former land existing and uses in the surrounding area include:

- Made Ground
- Infilled former field ponds
- Current local industrial potentially contaminative uses including tanks, production facilities and car parking associated with aerodrome and local businesses (distribution and cleaning services)
- Hazardous ground gases from Made Ground associated with local development and infilled field ponds
- Volatile vapours associated with potential tank spillages / fuels

2.5 GEOLOGY

The source geological information is from the British Geological Survey (BGS) Geological Map of Great Britain. In addition, information has been obtained from the BGS website.

Geological Mapping Summary	
Strata	Description
Made Ground	None shown
Superficial Strata	Diamicton (Glacial Till also know as Boulder Clay)
Bedrock	Mudstone (Silsden Formation)
Faults	None within close proximity to the site.

British Geological Survey (BGS) provides online access to a large number of borehole logs at locations across the United Kingdom. There are no historical BGS boreholes located within 1 km of the site.

A number of site investigations have previously been carried out at the aerodrome. It is considered likely that strata beneath the site will generally be similar to those on the nearby airfield sites. Generally, strata have been identified as top soil or Made Ground overlying boulder clay (Glacial Till).

- The site is not located in an area affected by historical coal mining.
- There are no BGS Recorded mineral sites located within 1 km of the site.

The site is located within a lower probability radon area (less than 1% of homes are estimated to be at or above the Action level). No radon protection measures will be required in the construction of new buildings or extensions.

2.6 HYDROLOGY AND HYDROGEOLOGY

Environment Agency Groundwater Vulnerability maps have been consulted and the information is presented in the table below.

Environment Agency Vulnerability Summary	
Strata	Majority of site
Superficial	Potentially Low Vulnerability Secondary Undifferentiated Aquifer
Bedrock	Potentially Low Vulnerability Secondary A Aquifer
Source Protection Zone (SPZ)	The site is not located within any source protection zones

The groundwater vulnerability potential has been assessed as low.

The closest surface water feature is a pond located 115 m to the south-west. Aside from other field ponds in the local area, Huntley Brook is located 370 m to the south-west and Mellor Brook is located 390 m to the north-east.

Environment Agency Main River Mapping confirmed the nearest main river is the River Ribble located 1.2 km north of the site as shown in Fig 5 below.

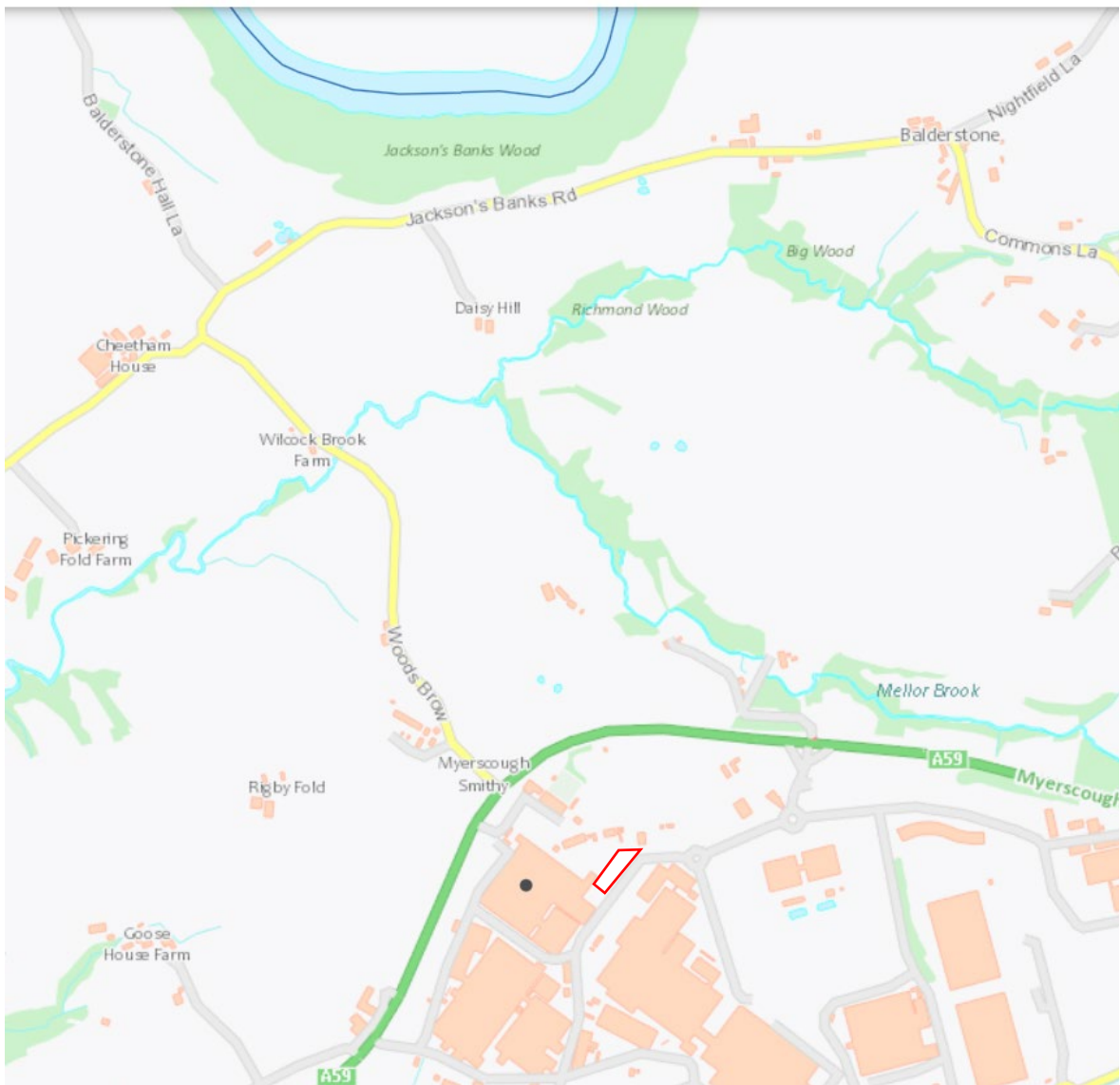


Figure 5: Environment Agency Main River Mapping

The Envirocheck data report records no surface water/groundwater abstraction licences within 2km of the site.

One discharge consent (lapsed) is recorded within 250 m of the site, located 240 m to the north-east, relating to sewage discharge into Mellor Brook.

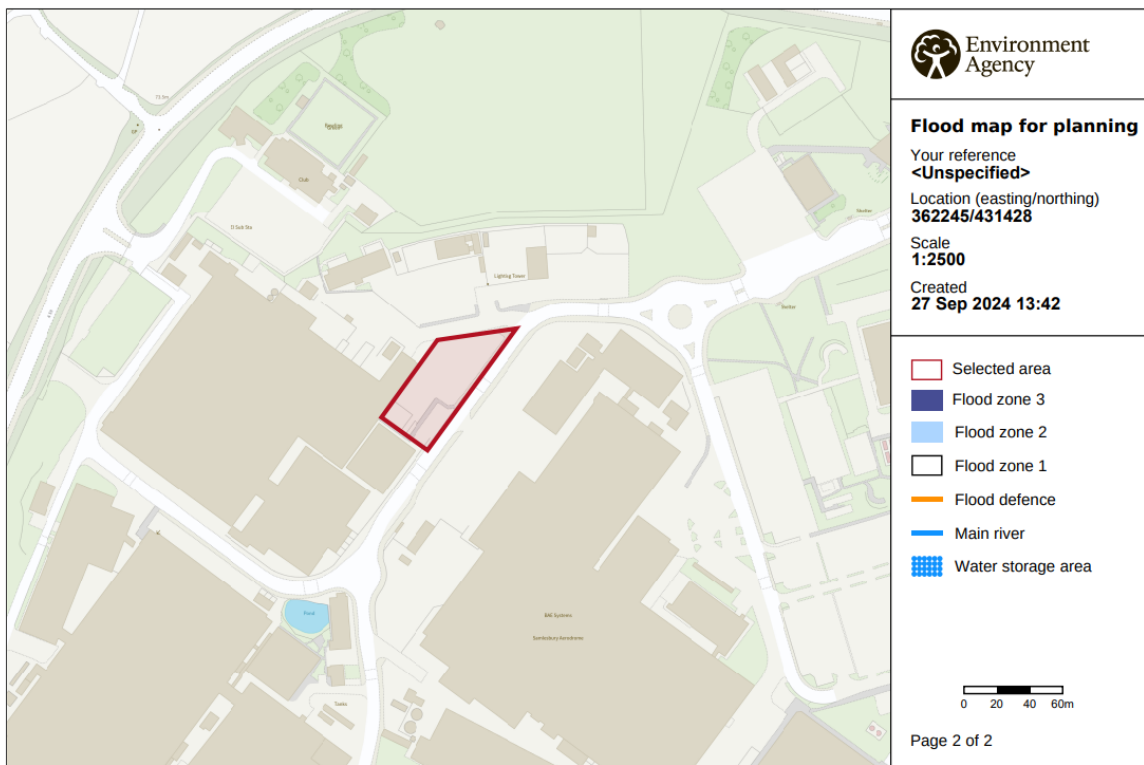
One Category 2 – significant pollution incident to controlled waters is recorded within 250 m of the site. This relates to the spillage of gas oil into Mellor Brook, 210 m to the north of the site in 1994. Given the distance from the site and the time elapsed since the incident, this is not considered to pose a contamination risk to the site.

2.7 FLOOD RISK

It should be noted that a formal flood risk assessment is outside the scope of this report. However, the following information has been provided for reference.

The closest surface water features (apart from ponds) are Huntley Brook and Mellor Brook, located 370 and 390 m to the south-west and north-east respectively.

Environment Agency Flood Mapping indicates that the site is located in Flood Zone 1 (low probability of flooding). Flood Zone 1 land has been assessed as having 0.1% (1 in 1000 year) chance of flooding from rivers or the sea in any given year. The location of the site is outlined in red on the plan below.



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Figure 5: Environment Agency Flood Map – site outlined in red

Flood Zone 1 land is defined as land which has a less than 0.1% chance of flooding in any year, i.e. a 1:1000 year chance of flooding from rivers or the sea.

Reference to EA / DEFRA surface water flood mapping has confirmed that the majority of the site is not at risk of flooding. However, the western boundary and immediately beyond is at low to high risk (30 to 1000 year return).

The superficial strata are low permeability glacial till/clay and there are several ponds in the area surrounding the site. The flooding probably represents the accumulation of surface run off in low lying areas of the site underlain by impermeable soils.

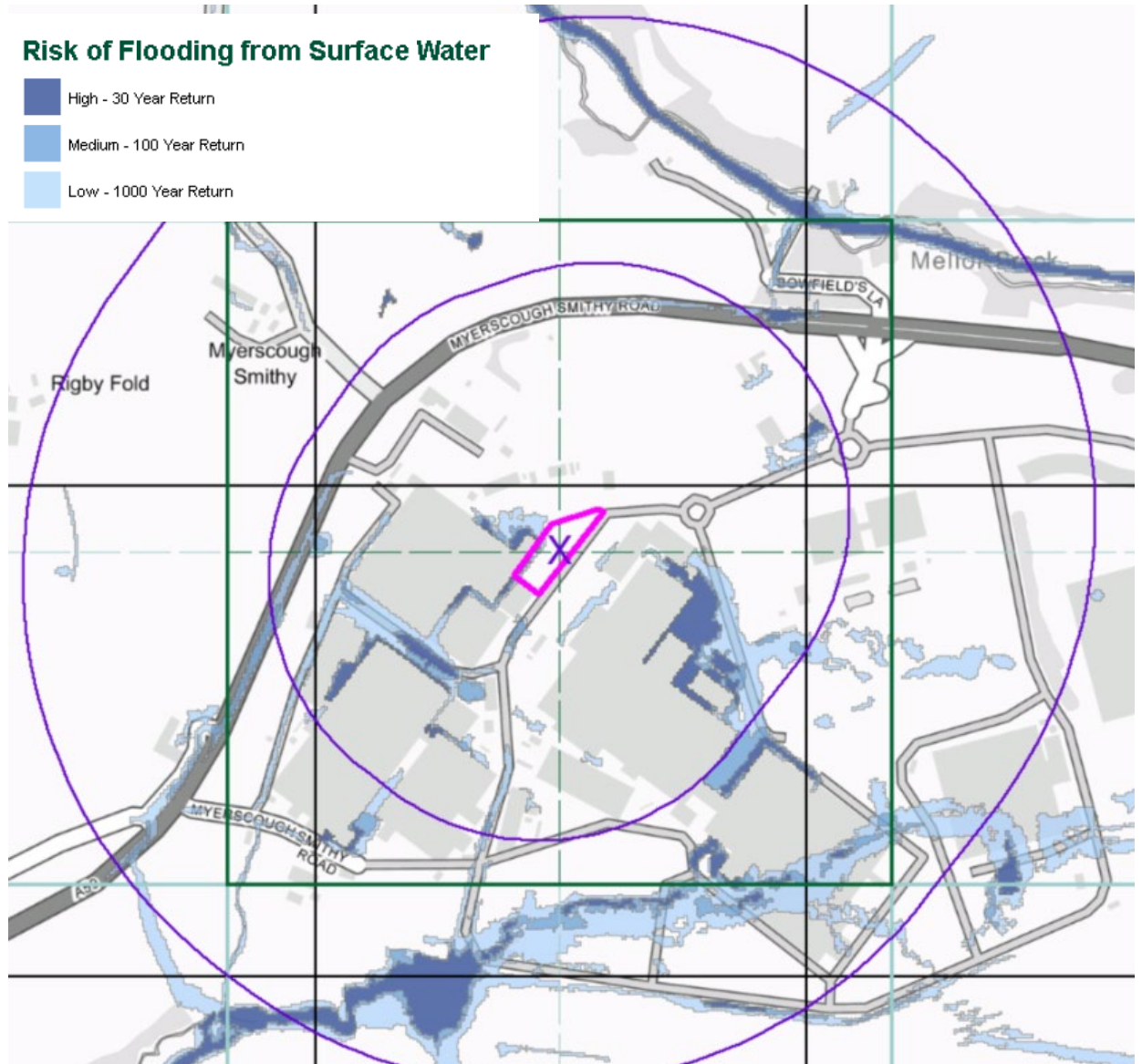
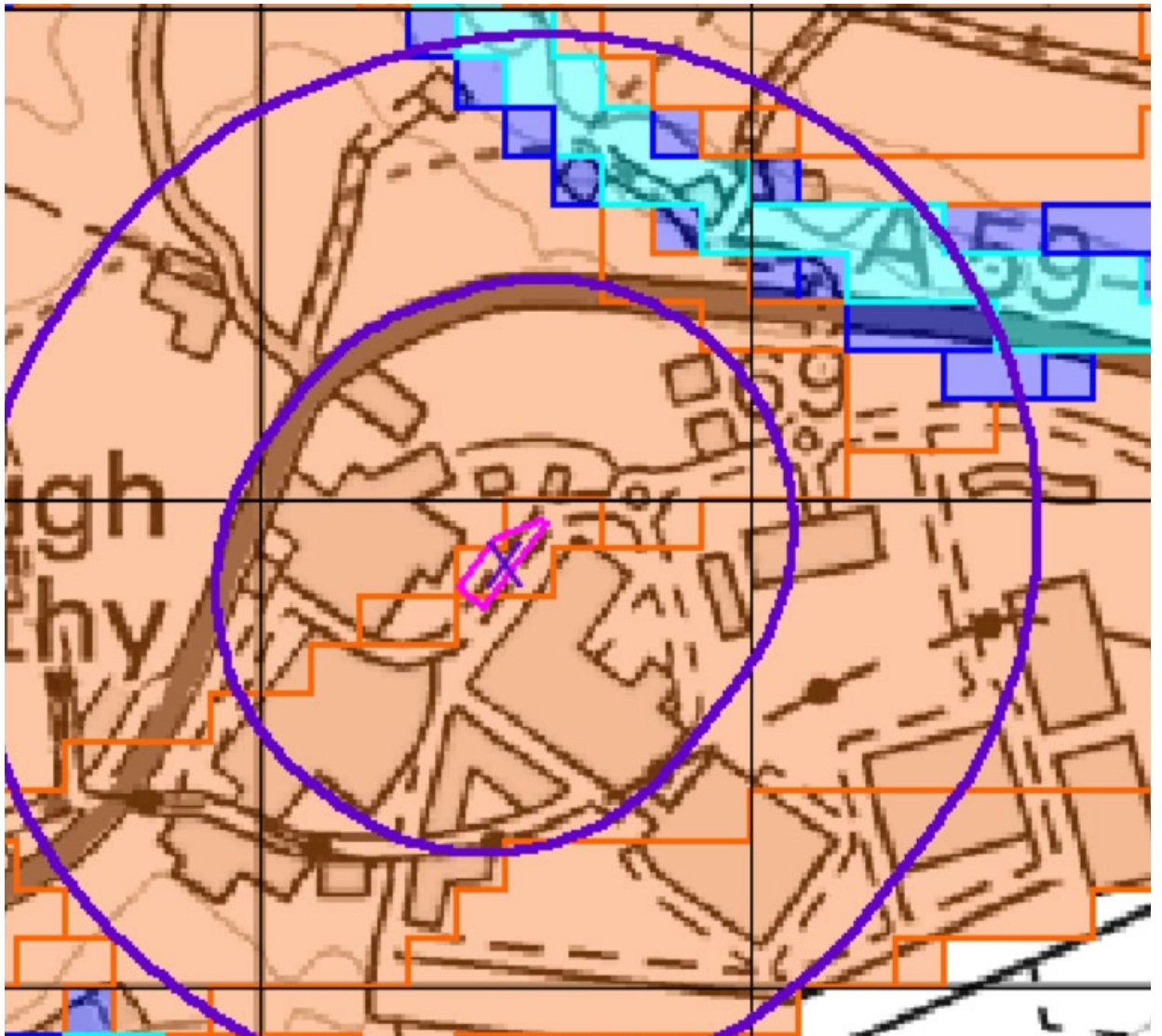


Figure 6: Surface Water Flood Map

BGS data shows that the site is in an area with limited potential for groundwater flooding to occur, as shown in Figure 7 below.



Agency and Hydrological (Flood)

- Limited Potential for Groundwater Flooding to Occur
- Potential for Groundwater Flooding of Property Situated Below Ground Level
- Potential for Groundwater Flooding to Occur at Surface

Figure 7: BGS Flood Map for groundwater flooding

2.8 LANDFILL AND WASTE

Local Authority landfill coverage information was supplied by South Ribble Borough Council, Ribble Valley Borough Council and Lancashire County Council to the Environment Agency.

No waste sites are listed within 1 km of the site.

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At least 9 infilled field ponds are located within 250 m of the site, the nearest located 50 m to the north-east. These were infilled by the 1940s, when the airfield was constructed. In addition, two drains were also located on site during this time period.

Any made ground and organic naturally occurring soils associated with infilled ponds and drainage ditches can be considered potential sources of hazardous ground gas.

2.9 EXISTING SERVICES

Searches on existing below ground services fall outside the scope of the Phase I Study, however it is considered highly likely that services are present within the study area.

2.10 UNEXPLODED ORDNANCE (UXO)

A desk study for defence use and German air-dropped unexploded ordnance (UXO) was undertaken by Environmental in May 2008.

A single German attack was recorded during the 2nd World War in which incendiaries were dropped on Samlesbury Aerodrome and neighbouring Balderstone. Incendiary bombs had little penetration potential and if they did not function, often broke up on impact. The report concludes that although there is potential for incendiaries to be present at the site, the chance of encountering a device is very low. The likelihood of harm being caused by a detonating device of this type is also considered to be very low.

The site has been classified as low risk in terms of unexploded ordnance but vigilance should be exercised in all investigations and subsequent excavation works on the site. Operatives should be briefed on procedures to be implemented during groundwork operations

2.11 PREVIOUS REPORTS

2.11.1 GROUND INVESTIGATION AT BUILDING: REPORT NO. 5230B

A ground investigation was undertaken by Sub Surface North West Ltd in 2009 at the building which is located immediately to the south-west of the site. The investigation comprised the drilling of 4 No cable percussive boreholes, 7 No mini boreholes, laboratory geotechnical testing, a contamination assessment of the soils and a programme of gas / groundwater monitoring.

Ground conditions were found to comprise tarmac / concrete over granular and cohesive made ground to depths ranging from 0.4 to 1.3 m. The granular made ground comprised ashy sand and gravel with fragments of clinker, slag, stone, brick, concrete and macadam. Cohesive made ground comprising gravelly sandy clay with fragments of stone, brick, concrete, clinker and macadam was also recorded. In one location adjacent to a pond the made ground comprised sandy gravelly silt with roots and rootlets.

The natural soils comprised glacial drift deposits of sandy gravelly clay with pockets of silty / gravelly sand. Localised roots and rootlets were encountered at depths ranging from 1.8 to 3.0 m. The maximum proven depth of clay was 25.0 m.

Groundwater was not encountered during the intrusive investigation works although during subsequent monitoring, groundwater levels were recorded between ground level and 1.7 m.

Chemical testing of the soils recorded localised elevated concentrations of benzo(a)pyrene when the results were compared against commercial end use assessment criteria.

Samples of surface water (pond) and groundwater were analysed and these recorded marginally elevated concentrations of selenium, extractable petroleum hydrocarbons (EPH) and phenols compared to UK DWS, although these were not considered to be significant given that the site is not located in a Source Protection Zone and no groundwater abstractions for potable drinking water are located in the local area. The report recommended buried concrete classification DS-2 AC-2 should be used.

A programme of gas monitoring was undertaken and this recorded a maximum methane concentration of 3.3%, a maximum carbon dioxide concentration of (9.5%) and a maximum flow rate of 2.1 l/hr. This equates to CS2 and therefore basic gas protection measures were recommended to be installed in new structures. Sub-surface recommended either a piled foundation solution or pads. The exploratory hole location plan is presented in Figure 8 below.

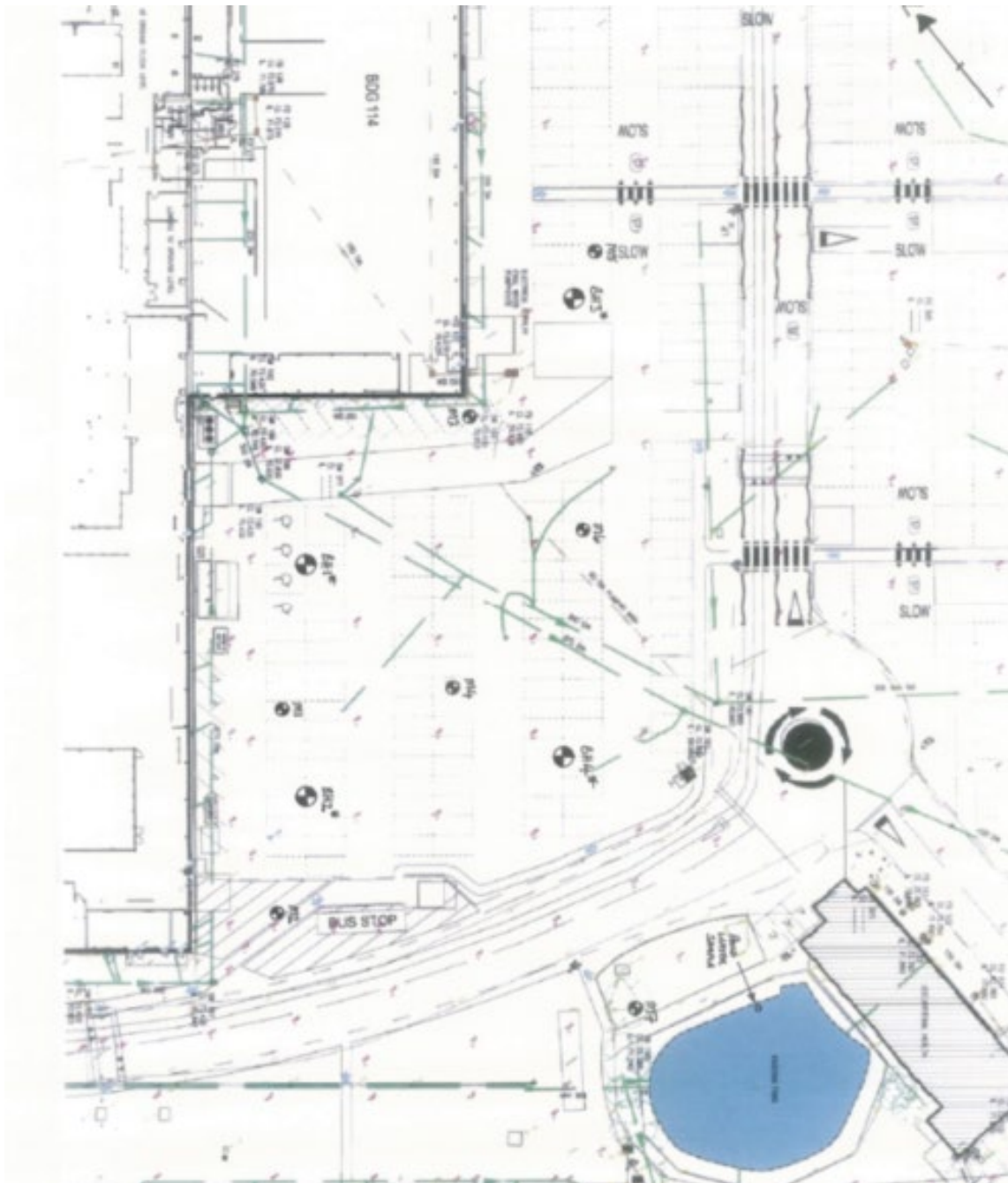


Figure 8: Sub Surface Trial pit and borehole location plan

2.11.2 GROUND INVESTIGATION AT No 1 SHED: REPORT NO. 4413

In 2004, a ground investigation was undertaken by Sub Surface North West Ltd at No 1 Shed which is located approximately 50 m to the west of the site. The investigation comprised the drilling of 8 No mini boreholes and laboratory geotechnical testing in order to assist in the design of an industrial ██████████.

Ground conditions were found to comprise a lightly reinforced concrete slab (between 0.20 and >0.45 m thick). This was underlain by granular sub-base to depths of between 0.5 and 1.0m. In three locations, a second concrete slab was encountered at depths ranging from 0.5 to 0.6 m (base not proven).

Natural soils comprising glacial clay were encountered from 1.0 to a maximum proven depth of 6.0 m. Groundwater was not encountered. Buried concrete classification DS-1 AC-1 was recommended.

2.11.3 GROUND INVESTIGATION AT No 1 SHED: REPORT NO. 40134

REC undertook a contaminated land site investigation in 1997 at No 1 Shed to the west of the site. The investigation comprised the drilling of 28 No augered boreholes, laboratory chemical testing of soils and a hazardous gas risk assessment.

Ground conditions comprised made ground to an average depth of 0.5 m comprising ash with brick fragments. This was underlain by natural strata comprising silty clay.

Chemical analysis of the soils recorded elevated concentrations of heavy metals which were largely considered to be insignificant. Concentrations of trichloroethylene were also recorded in the location of an external drum store although again, these were not considered significant. REC did not consider that remedial action was required. Concentrations of gas recorded did not exceed CS1 conditions.

The REC exploratory hole location plan is presented overleaf in Figure 9.

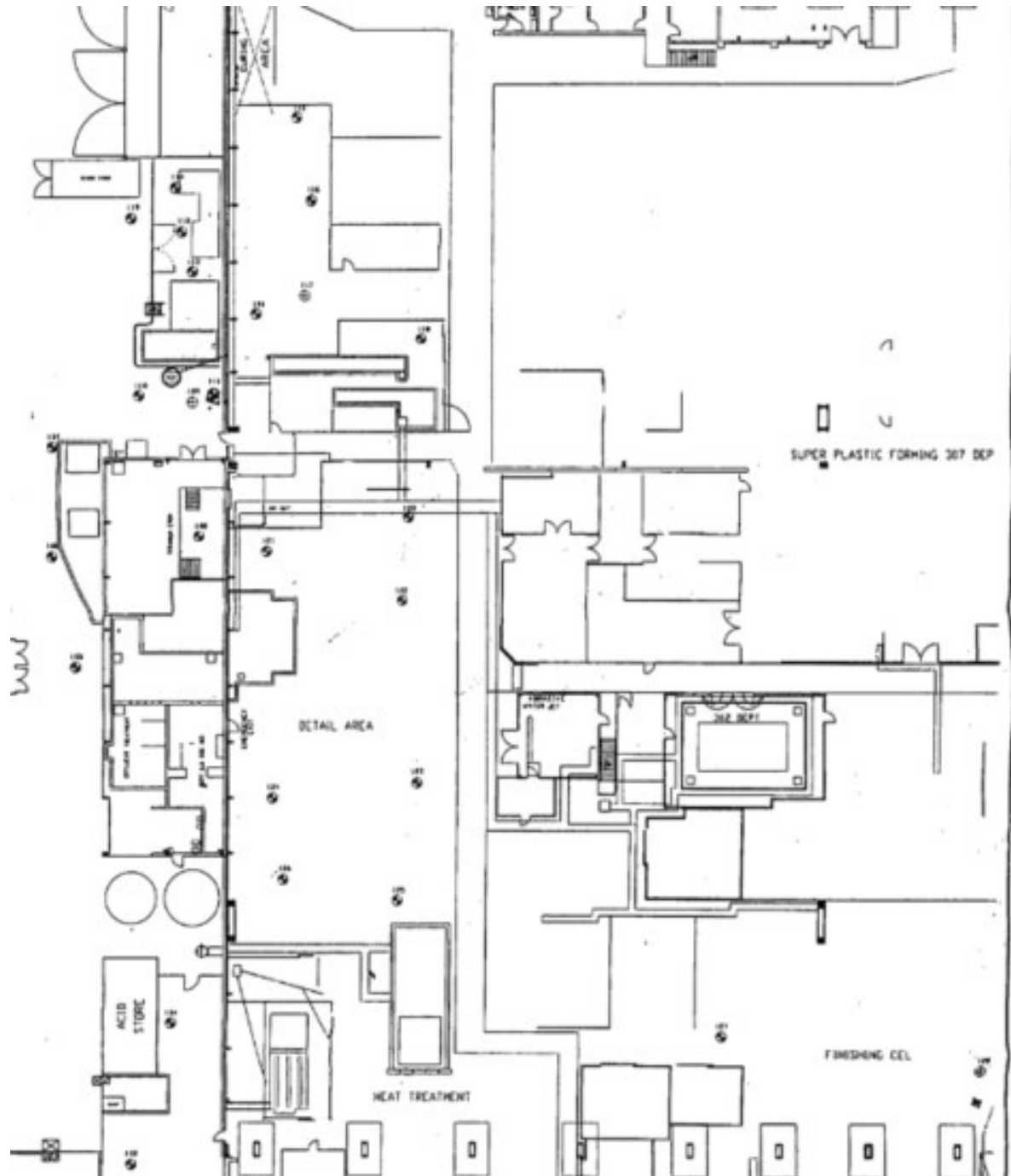


Figure 9: REC borehole location plan

2.11.4 RESULTS OF GROUND INVESTIGATION AT No 4 SHED (No Report Reference No.)

In 1997, Soil Surveys Ltd undertook a ground investigation at No 4 Shed which is located 60 m to the south-east of the site. The information does not represent a report merely presenting logs and laboratory test results.

The investigation comprised the drilling of 5 No cable percussion boreholes to a maximum depth of 10.6 m. Ground conditions comprised concrete over ashy made ground locally, to a maximum depth of 0.5 m. This was underlain by natural clay soils.

The borehole logs record 'fuel' odours within the natural soils at depths ranging from 0.5 to 6.5 m although no contamination testing was undertaken.

2.11.5 GROUND INVESTIGATION AT A320, SPRAY BOOTH: REPORT NO. 2939

A ground investigation was undertaken by Sub Surface North West Ltd in 1996 in No 4 Shed in order to assist in the design of a new spray booth with associated drainage trenches.

The investigation comprised the drilling of 2 No cable percussive boreholes. Ground conditions were found to comprise 0.2 m of concrete overlying made ground of ash, stone and brick to a maximum depth of 0.5 m. This was underlain by silty clay to a maximum proven depth of 6.0 m.

Groundwater was not encountered.

2.11.6 GROUND INVESTIGATION AT No 1 SHED: REPORT NO. 2893

In order to assist in structural design for the installation of new machinery, a ground investigation was undertaken by Sub Surface North West Ltd in 1996 in the area of No 1 Shed.

The investigation comprised the drilling of 2 No cable percussive boreholes and ground conditions were found to comprise tarmac / concrete over made ground of silty clay with fragments of ash and brick to a maximum depth of 1.4 m. Natural strata was found to comprise sandy gravelly silty clay to a maximum proven depth of 6.0 m.

Again, groundwater was not encountered.

2.11.7 GROUND INVESTIGATION AT No 1 SHED: REPORT NO. 2821

Sub Surface North West Ltd undertook another investigation in 1996 within Shed No 1, again to assist in structural design for the installation of new machinery.

The investigation comprised the drilling of 2 No cable percussive boreholes to a depth of 6.0 m with ground conditions comprising concrete and associated sub-base over made ground of silty gravelly cobbly clay with fragments of limestone to a maximum depth of 1.7 m. Natural strata was found to comprise sandy gravelly silty clay to a maximum proven depth of 6.0 m.

Rapid groundwater influx was recorded in one borehole at a depth of 2.3 m.

2.11.8 GROUND INVESTIGATION AT No 1 SHED: REPORT NO. 1914

In 1991, Sub Surface North West Ltd undertook another within Shed No 1, again to assist in structural design for a new extension.

The investigation comprised the drilling of 6 No cable percussive boreholes to a depth of 10.0 m. Tarmac and concrete were encountered to 0.3 m underlain in five locations by Made Ground of ash, clinker, brick, sandstone and sand to a maximum depth of 0.9 m. In the sixth location, clay fill with organic fragments was encountered to a depth of 0.8 m. In three locations, the granular Made Ground was underlain by sandy silty clay with rootlets and brick fragments to a maximum depth of 1.8 m.

Natural strata was found to comprise sandy gravelly silty clay to a maximum proven depth of 10.0 m.

Moderate to rapid groundwater influx was recorded at depths ranging from 1.3 to 8.5 m.

2.10.9 GROUND INVESTIGATION AT No 1 SHED: REPORT NO. 1433

Sub Surface North West Ltd undertook an initial ground investigation adjacent to Shed No 1 in 1988 to assist in structural design for a new extension.

The investigation comprised the drilling of 3 No cable percussive boreholes to a depth of 10.0 m.

Ground conditions were found to comprise tarmac and reinforced concrete to a depth of 0.2 m underlain by Made Ground of ash, brick and boulders and cobbles of sandstone to a maximum depth of 0.65 m. This was in turn underlain by silty clay (possible fill) to a maximum depth of 1.0 m.

Natural strata were found to comprise sandy gravelly silty clay to a maximum proven depth of 10.0 m.

Groundwater was not encountered during the investigation.

3.0 ENVIRONMENTAL ASSESSMENT

3.1 CONCEPTUAL SITE MODEL

The risks associated with contamination must be assessed on a site-by-site basis in respect of specific, current or proposed use.

Section 78A(2) of the Environmental Protection Act 1990 (revised April 2012) defines contaminated land for the purposes of the Act as land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land that –

- Significant harm is being caused or there is a significant possibility of such harm being caused; or
- Significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused

The presence of contaminants above normal threshold levels does not in itself indicate the potential for harm to occur. The potential for harm is dependent on identifying a plausible Pollutant Linkage i.e. linkage between the contaminant and the receptor. The potential for harm requires the following:

- A “contaminant” is a substance which is in, on or under the land and which has the potential to cause significant harm to a relevant receptor, or to cause significant pollution of controlled waters.
- A “receptor” is something that could be adversely affected by a contaminant, for example a person, an organism, an ecosystem, property, or controlled waters.
- A “pathway” is a route by which a receptor is or might be affected by a contaminant.

Risk is only considered to exist if all three components of the linkage are present.

A conceptual model has been developed for the site based on the source – pathway – receptor model as set out in LCRM ‘Model Procedures for the Management of Land

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Contamination' (2023) and BSI 'Code of Practice for Investigation of Potentially Contaminated Land' (2011).

3.2 CONTAMINATION SOURCES – ON-SITE

Historically, the site formed part of open undeveloped agricultural land until at least the 1930s with drains located in the north-east and south. From the 1940s, the site was in use as an airfield / aircraft works and since at least 2000, the site has been occupied by a car park as part of the overall airfield / aircraft works.

Potential contamination associated with former use of the site include:

- Made Ground under car park and potentially infilled drains;
- Potential for localised contamination associated with car park use (heavy metals & hydrocarbons)
- Any organic rich soils associated with former drains may also be a potential source of hazardous ground gases.

3.3 CONTAMINATION SOURCES – IN THE VICINITY OF THE SITE

The surrounding area was formed by undeveloped agricultural land with associated field ponds, local farms and residential buildings until at least the 1930s. From the 1940s, the site was in use as an airfield / aircraft works with increasing development comprising sheds, tanks, outbuildings and pond.

A list of the Ordnance Survey maps consulted is included in Appendix B.

The Envirocheck Data Report lists the following potentially active contaminative sources within 250m of the site:

- Distribution Centre – 95 m west
- Cleaning services – 160 m west
- Tanks – 165 m south-west and 250 m south

In addition to the above, numerous infilled field ponds are located within 250 m of the site, the nearest located 50 m to the north-east.

Potential contamination associated with former land existing and uses in the surrounding area include:

- Made Ground
- Infilled former field ponds
- Current local industrial potentially contaminative uses including tanks, production facilities and car parking associated with aerodrome and local businesses (distribution and cleaning services)
- Hazardous ground gases from Made Ground associated with local development and infilled field ponds
- Volatile vapours associated with potential tank spillages / fuels.

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A number of third party investigations have been undertaken at the aerodrome within close proximity to the site with some encountering localised heavy metals, strong fuel odours, volatile organic compounds (trichloroethylene) and PAHs (benzo(a)pyrene). Given the industrial use of the surrounding site, localised contamination such as this is not considered unusual and third party analysis did not consider the concentrations to be significant. Nevertheless, off-site contamination can be considered to represent a risk to the site.

3.4 CONTAMINATION SUMMARY

The Department of the Environment published a range of industry profiles in 1996 setting out the potential contaminants associated with a range of industrial uses. Although the guidance has since been superseded we have referred to this information in compiling the summary below. The list of potential contaminants should be regarded as illustrative rather than definitive.

Sources of Contamination	Potential Contaminants
Made Ground and fill	Metals, arsenic, copper, lead, zinc, cyanide, sulphate, PAH, ash, clinker, etc. Organic matter, phenol, leachates, etc.
Made Ground and fill	Landfill gases from decaying organic matter, methane and carbon dioxide
Former and current industrial site uses	Metals (e.g. Arsenic, Copper, Lead, Chromium and Zinc), ash, clinker, chlorine, phenol, hydrocarbons, VOCs, SVOCs, PCBs, dioxins, PAH, non-metals, cyanide, chlorides, sulphates, asbestos, etc.

3.5 RECEPTORS

The CLEA framework identifies 3 standard land uses, see Science report – SC050021/SR3 ‘Updated technical background to the CLEA model’. These are: residential, allotments and commercial.

The development includes the construction of a new shed which is therefore a commercial development.

Future and current site users will be limited to employees and sub-contractors.

Potential receptors to the effects of the contaminants identified are summarised below

- Current and future site users
- Construction workers involved in the new development
- Below ground structures and services
- Groundwater and the underlying secondary aquifers
- Surface water features (ponds and brooks)

3.6 PATHWAYS

Contaminants could pose a hazard to potential receptors via preferential pathways such as: inhalation and ingestion of soil dust, direct dermal contact with or ingestion of exposed soils, inhalation of vapours from the ground or migration and accumulation of ground gas. Contaminated material could pose a hazard to groundwater and nearby water features

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through surface water run off or through lateral and vertical sub surface migration of mobile contaminants in groundwater.

3.7 POLLUTANT LINKAGES

A series of possible ‘source-pathway-receptor’ pollutant linkages have been identified associated with former land use on the site and in the surrounding area. These have been summarised in the following table.

The pollutant linkages are reviewed and a qualitative risk assessment undertaken in section 3.8. A summary of the findings is included in Appendix C for reference.

No	Source	Contaminant	Pathway	Receptor
1	Onsite Made Ground	Metals, (e.g. Arsenic, Copper, Lead and Zinc), cyanide, PCBs, PAHs, hydrocarbons, fuel oils, lubricating oils, phenol, acetone, chlorinated and organic solvents, acids and alkalis, asbestos, cleaning agents, sulphates, pathogens, biocides, etc Organic matter, leachates, etc.	Direct contact, ingestion or inhalation of contaminated soils or dust or volatilised compounds.	Current site users Users of future development
2	Onsite Made Ground	Metals, (e.g. Arsenic, Copper, Lead and Zinc), cyanide, PCBs, PAHs, hydrocarbons, fuel oils, lubricating oils, phenol, acetone, chlorinated and organic solvents, acids and alkalis, asbestos, cleaning agents, sulphates, pathogens, biocides etc Organic matter, leachates, etc.	Direct contact, ingestion or inhalation of contaminated soils or dust or volatilised compounds.	Construction Workers
3	Made Ground Nearby current and former industrial uses including aeroplane manufacturing, associated tanks	Metals, (e.g. Arsenic, Copper, Lead and Zinc), cyanide, PCBs, PAHs, hydrocarbons, fuel oils, lubricating oils, phenol, acetone, solvents, acids and alkalis, cleaning agents, sulphates, pathogens, biocides etc Organic matter, leachates, etc.	Vertical and lateral migration of potential contaminants through groundwater	Groundwater, underlying secondary aquifers
4	As above	Metals, (e.g. Arsenic, Copper, Lead and Zinc), cyanide, PCBs, PAHs, hydrocarbons, fuel oils, lubricating oils, phenol, acetone, solvents, acids and alkalis, cleaning agents, sulphates, pathogens, biocides etc Organic matter, leachates, etc.	Vertical and lateral migration of potential contaminants through groundwater	Surface water features: pond 115 m to the south-west. Huntley Brook 370 m to the south-west and Mellor Brook located 390 m to the north-east.
5	As above	Metals, (e.g. Arsenic, Copper, Lead and Zinc), cyanide, PCBs, PAHs, hydrocarbons, fuel oils, lubricating oils, phenol, acetone, solvents, acids and alkalis, cleaning agents, sulphates, pathogens, biocides etc Organic matter, leachates, etc.	Vertical and lateral migration of potential contaminants through groundwater	Below ground services Below ground structures

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No	Source	Contaminant	Pathway	Receptor
6	As above	Metals, hydrocarbons, chlorides, sulphates, phenol, etc.	Uptake of contamination from soil	Planting
7	Made Ground	Landfill gas, methane, carbon dioxide	Lateral and vertical migration and accumulation of gases in confined spaces	Future site users Infrastructure Construction workers

The risk assessment follows the source target pathway concept set out in the Environmental Protection Act 1990. The risk assessment procedures adopted are in accordance with CIRIA Report 552, 'Contaminated Land Risk Assessment, and a guide to good practice.

The definitions of probability, consequence and overall rating of risk used in the following sections are defined in Appendix B3.

3.8 QUALITATIVE RISK ASSESSMENT

Possible pollutant linkages have been described in the Summary of Source – Pathway – Receptor table. These linkages are discussed below and the risks assessed.

In summary, the proposed development works comprise the construction of a building.

Future site users will be limited to employees and sub-contractors.

Current site users comprise staff who use the area as car park.

LINKAGE No 1

Source: Made Ground

Pathway: Direct Contact or inhalation

Receptors: Current and Future Users

The site was historically occupied by fields with associated drainage ditches and a car park associated with the aerodrome. As such, made ground is likely to be present beneath the site and this is considered to represent the principal on-site source of contamination. However, any contamination, if present, is likely to be localised and could potentially comprise heavy metals, hydrocarbons and asbestos.

Possible receptors for the contamination contained within the Made Ground strata include current and future site users. The pathway to the receptor has been identified as direct contact, ingestion or inhalation of contaminated soils or dust or volatilised compounds.

The development work will generally involve the breaking up and grubbing up of hardstanding and the excavation of made ground. Any retained excavated materials will be tested for contamination and, where appropriate, reused beneath the new development. Upon completion of the proposed development any residual fill will be encapsulated below buildings or disposed of off-site under Duty of Care regulations. The building footprint will provide an effective barrier to prevent direct contact between potential contamination and site users.

The consequence to health of future site users due to exposure to contamination contained within superficial site materials is **medium** in that long-term exposure is likely to result in

significant harm to human health. The nature and setting of the proposed development is such that long-term exposure is considered to be **unlikely**.

Subject to appropriate remediation, the probability of harm occurring to future site users is considered to be **unlikely**. The risk to future site users is classified as **low risk**.

LINKAGE No 2

Source: Made Ground

Pathway: Direct Contact

Receptors: Construction Workers

There is potential for contamination to be present within Made Ground such as heavy metals, hydrocarbons and asbestos. Made Ground soils may need to be excavated and removed or replaced with clean materials as part of the development works.

Construction workers could be exposed to direct contact with contaminated soils during construction or be at risk of inhalation of contaminated soils or dust or volatilised compounds.

The consequence to health for site workers is considered to be **medium** in that long-term exposure could result in significant harm to human health. Without the use of PPE and the use of appropriate safety measures the risk to construction workers has been assessed as **moderate**.

Information on the potential for contamination should be included in the site health and safety management plan so that appropriate PPE and safe working measures can be used.

Provided the necessary precautions are taken, it is considered **unlikely** that harm will occur with short term exposure and therefore the pollutant linkage is considered to represent a **low risk**.

LINKAGE No 3

Source: On site and nearby current and former uses – leachable contaminants within superficial strata.

Pathway: Migration through Ground Water

Receptors: Underlying Aquifers

There are few active potentially contaminative sources located in the vicinity of the site, principally the aircraft works itself as well as distribution and cleaning services. A number of Above Ground Storage Tanks (ASTs) have been identified within close proximity to the site.

A number of third party investigations have been undertaken at the aerodrome within close proximity to the site with some encountering localised heavy metals, strong fuel odours, volatile organic compounds (trichloroethylene) and PAHs (benzo(a)pyrene) and these could present a risk to groundwater.

Leaching of contaminants could provide a potential pathway for the contamination of groundwater and the underlying Aquifers through vertical and lateral migration within the superficial strata.

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The superficial strata on the site are low permeability glacial clays with very limited potential for infiltration. Lateral and vertical migration of contaminants through the clay soils is considered to be unlikely.

The Envirocheck Data Report does not record any abstraction licences located within 2km of the site.

The bedrock and superficial strata at the site have been assessed as being of potentially low vulnerability Secondary A and Secondary Undifferentiated Aquifers respectively. The site is outside any source protection zones.

The potential for groundwater migration will be limited by the geology underlying the site, which is likely to comprise Diamicton (Glacial Till) and mudstone. Where clays are present, they will limit the lateral and vertical migration of contamination within the groundwater.

Following development, any residual on site contamination will be encapsulated beneath the buildings and hardcover, limiting the area that may be available for infiltration. In addition, an effective underground drainage system will be designed to serve the new development.

The consequence of harm occurring has been conservatively assessed as **medium** to reflect the possibility of a long-term exposure risk which is likely to result in significant harm to human health, a long-term risk of pollution to a potentially sensitive water resource or a change in a particular ecosystem. The probability of harm occurring is considered to be **unlikely**. The pollutant linkage is considered to represent a **low risk**.

To refine the risk assessment, an intrusive site investigation should be undertaken to identify the nature of the superficial strata and actual levels of contamination.

LINKAGE No 4

Source: On site and nearby current and former uses – leachable contaminants within superficial strata.

Pathway: Migration through Ground Water

Receptors: Surface Water Bodies

As stated previously, the aircraft works (including ASTs) and nearby distribution and cleaning services are considered potential sources of contamination.

Localised heavy metals, strong fuel odours, volatile organic compounds (trichloroethylene) and PAHs (benzo(a)pyrene) have been identified in the surrounding area and these could present a risk to surface water bodies via migration and leaching.

The superficial strata on the site are low permeability glacial clays with very limited potential for infiltration. Lateral and vertical migration of contaminants through the clay soils is considered to be unlikely.

The closest surface water features are a pond 115 m to the south-west, Huntley Brook 370 m to the south-west and Mellor Brook located 390 m to the north-east.

Given the presence of low permeability superficial strata and the distance of the site from the nearest watercourses it is considered that the probability of contamination leaching to the ponds and watercourse from construction phase is **unlikely**. The consequence of migration is **medium** in that there is a risk of pollution to a potentially sensitive water resource (the watercourse).

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The potential for contamination of surface water has therefore been conservatively assessed as **low risk**.

LINKAGE No 5

Source: On site and nearby current and former uses – leachable contaminants within superficial strata

Pathway: Migration through Ground Water/Direct Contact

Receptors: Below Ground Services and Below Ground Structures

There is limited potential for the presence of contamination in the form of heavy metals, sulphate, chloride and hydrocarbons associated with the potential presence of Made Ground and industrial uses.

Below ground services will be provided to the new facilities.

Short term exposure to the more mobile fractions of such contaminants, if any, can lead to tainting of water supplies in HDPE pipelines. Long term exposure can also result in the deterioration of buried pipelines and sheathings to cables. On this basis, consequence has been assessed as **medium**.

Protection can be provided to buried services by the appropriate use of materials and the provision of clean backfill to all service trenches. Provided such measures are adopted in consultation with the service provider, then the probability of harm occurring is **unlikely**. The consequence of harm is considered to be **medium** in that long-term exposure is likely to result in harm to human health. The overall risk to buried services is considered to be **low risk**. The nature of the underlying materials on site needs to be investigated in order to refine the risk assessment.

Long term exposure to sulphates and chlorides, particularly in damp conditions, can be harmful to buried concrete, resulting in deterioration of the foundations and corrosion of embedded reinforcement. The probability of damage occurring has been assessed as **low likelihood**. The consequence of long-term exposure has been assessed as **medium**. On this basis, the risk to below ground structures has been assessed as **moderate/low**.

Elevated levels of sulphate and chlorides in the ground can be accommodated providing appropriate concrete mixes and cement types are specified. In severe cases external membranes may need to be applied to protect reinforced concrete.

The probability of harm occurring to below ground structures has been assessed as **unlikely**. Assuming that appropriate concrete specifications are adopted the potential for harm to the concrete is considered to be **unlikely**.

Overall, there is considered to be a **very low risk** to buried structures providing that appropriate specifications are adopted.

An intrusive site investigation should be undertaken to identify the nature of the superficial strata and actual levels of contamination to identify the correct concrete specification and type of water supply pipes.

LINKAGE No 6

Source: Made Ground

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Pathway: Uptake from Soil

Receptors: Planting

TRP understands that the proposed development will not include landscaped areas and therefore there is **no** risk of plant uptake of contamination.

LINKAGE No 7

Source: Made Ground

Pathway: Lateral and vertical migration of ground gases/vapours and accumulation within confined spaces

Receptors: Construction Workers, Future Site Users and Infrastructure

Made Ground will likely be present on site and beneath the site associated with infilled drainage ditches and car park construction. In addition organic rich natural soils may be present associated with the former drainage ditches.

A number of potential off-site sources of hazardous ground gas have also been identified including infilled historic field ponds and made ground associated with the aerodrome development. Third party investigations have also identified volatile contamination (albeit low level) and this could be a source of volatiles vapours. Gas monitoring of adjacent sites have also recorded methane and carbon dioxide equating to CS₂ conditions, requiring the installation of basic gas protections measures.

Ground gases / volatile vapours could be generated within Made Ground and organic rich natural soils or migrate laterally from off-site sources and accumulate in confined spaces within buildings or voids, resulting in potential for explosion or asphyxiation.

The potential for the generation of landfill gases within the fill materials will have diminished over time.

The development comprises a new building and therefore ground gases / vapours could accumulate and it is considered **likely** that landfill gases could be pose a hazard. However, the presence of low permeability boulder clay beneath the site and local area would likely mitigate against the migration of any off-site hazardous gas / volatile vapours.

Landfill gases are considered a **severe** risk to human health as short term exposure may result in severe harm to human health. In accordance with current guidance, the risk is defined as the probability of occurrence of a defined hazard and the magnitude of the consequences. The pollutant linkage associated with landfill gas is therefore considered to represent **moderate to low risk**.

3.9 RISK ASSESSMENT SUMMARY

The results of the risk assessment undertaken in Section 3.8 are summarised in the table below.

No	Source	Receptor	Risk Classification	Actions Required
1	Onsite Contaminated Made Ground	Current site users Users of future development	Low Risk	Further investigation and contamination testing.
2	Onsite contaminated Made Ground	Construction Workers	Low Risk	Further investigation and contamination testing.
3	Off Site Made Ground, aerodrome, tanks, distribution centre and cleaning services	Groundwater, underlying secondary aquifers	Low Risk	Further investigation and contamination testing.
4	On and Off-site leachable contamination	Surface water features, ponds and water courses	Low Risk	Further investigation and contamination testing.
5	On and Off site contaminated ground	Below ground services and structures	Very Low Risk	Further investigation and contamination testing. Possibly protective piping for water supply services
6	Onsite contaminated ground	Planting	None	None as no landscaped areas proposed
7	Made Ground Land Fill Gas Volatile Vapours	Future site users Construction workers	Moderate/low Risk	Further investigation including ground gas / vapour monitoring
Overall Risk Classification			Low Risk	Subject to completion of Phase 2 physical ground investigations

3.10 FURTHER INVESTIGATIONS

A Phase 2 physical ground investigation will be required to provide comprehensive information with respect to geo-technical and environmental issues to enable appropriate remedial action to be defined and designs for substructures and drainage to be progressed.

The investigation will include sampling and testing for contamination to allow the environmental risk assessment to be refined and to determine whether any remedial measures are necessary to protect current and site users and the environment.

The investigation will need to address the following:

- i The succession of superficial strata across the site and in particular the nature and depth of made ground and underlying natural drift deposits.
- ii Geotechnical parameters for design of foundations, floor slabs and external paved areas.
- iii Ground water levels across the site.
- iv Contamination levels in superficial strata and groundwater in order to assess hazards to the development and to classify materials for disposal.
- v Concentrations of methane and carbon dioxide in boreholes together with gas flow

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rates necessary to design any gas protection measures for the development.

- vi Concentrations of volatile vapours in soils.
- vii Permeability coefficients for superficial strata necessary for the design of infiltration and other SUDS systems

The site investigation should be designed in accordance with BS10175: Investigation of Contaminated Sites – Code of Practice. The investigation should target the specific areas identified as being potentially at risk of contamination during the desktop review and site walkover. These include:

- General sampling and chemical testing across the site to determine the nature and depth of any Made Ground
- Ground gas / vapour monitoring in boreholes across the site undertaken over a minimum 3-month period in order to classify the site and to identify any protection measures required.

4.0 CONCLUSIONS AND RECOMMENDATIONS

TRP Consulting was appointed to carry out a geo-environmental desktop appraisal of the site located at ■■■■ ■■■■ complex at Samlesbury Aerodrome in Balderstone, Blackburn. The site area is approximately 0.3 hectares.

The site currently comprises a tarmac surfaced car park which is proposed to be redeveloped with a new ■■■■ ■■■■ Building.

The anticipated solid geology beneath the site comprises mudstone of the Silsden Formation with superficial geology of potentially low permeability Diamicton (Glacial Till also known as Boulder Clay).

The site is located within a low probability radon area and no special radon protection measures will be required in the construction of new buildings or extensions.

The site is located within Environment Agency Flood Zones 1 which is land assessed as having a minimal risk of flooding (less than 0.1% chance of flooding in any year from rivers or the sea). There is limited potential for groundwater flooding in the area.

The closest surface water feature is a pond located 115 m to the south-west. Aside from other field ponds in the local area, Huntley Brook is located 370 m to the south-west and Mellor Brook is located 390 m to the north-east. The bedrock and superficial strata at the site have been assessed as low vulnerability Secondary A and Secondary Undifferentiated Aquifers respectively. The site lies outside any source protection zones. The Envirocheck data report does not record any surface water/groundwater abstraction licences within 2km of the site.

Potential contamination associated with former uses on the site have been identified as follows:

- Made Ground under car park and potentially infilled drains;
- Potential for localised contamination associated with car park use (heavy metals & hydrocarbons)
- Any organic rich soils associated with former drains may also be a potential source of hazardous ground gases.

Potential contamination sources identified in the surrounding area, within 250m of the site, include the aircraft works (including ASTs) a distribution centre and cleaning services.

The development includes the construction of a new ■■■■ building and has therefore been assessed for commercial standard land use.

The nature of development contained in with the current application is such that future site users will be ■■■■ site workers and sub-contractors / construction workers. Current site users are those currently using the site as a car park.

It is considered that the potential for lateral or vertical migration of contamination from on or off-site sources via groundwater will be significantly limited by the superficial geology comprising low permeability Glacial Till.

The risks associated with the potential sources of contamination to receptors including current and future site users, construction workers, ground and surface water and building structures and services have been assessed in Section 3.8. The contamination sources identified are considered to be limited. With the use of appropriate remediation and procedures the overall risk to the development associated with the pollutant linkages identified by the Phase 1 study is generally considered to be low.

It is considered that the nature of potential contamination identified by the desk study should not impose undue restriction or hazard to the proposed development.

An intrusive site investigation will be required for geotechnical purposes and to refine the risk assessment by identifying the nature of the superficial strata and actual levels of contamination. The site investigation should target sources of potential contamination and include groundwater and gas / volatile vapour monitoring carried out in accordance with current guidance.

APPENDIX A

A1 LOCATION PLANS

A1 General Area

A2 Existing site layout

A3 Proposed Site Layout

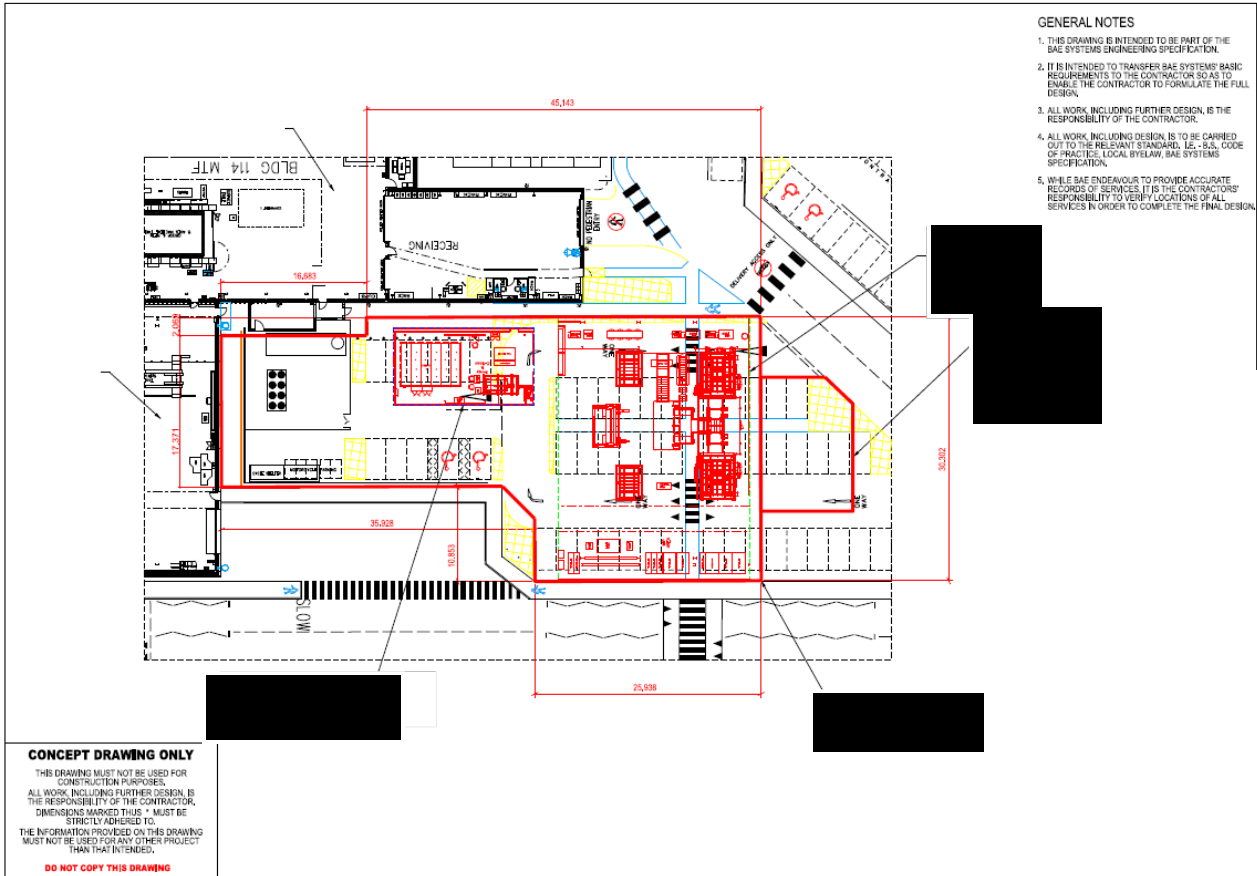
A1 SITE LOCATION



A2 EXISTING SITE LAYOUT



A3 PROPOSED SITE LAYOUT



APPENDIX B

CONTAMINATION ASSESSMENT

- B1 Historical Site and Surrounding Land Use
- B2 Legislative Framework
- B3 Qualitative Risk Assessment

B1 HISTORICAL SITE AND SURROUNDING LAND USE

A summary of the mapping is provided below.

Mapping Type	Scale	Date
Lancashire And Furness	1:10,560	1848
Lancashire And Furness	1:10,560	1894 - 1895
Lancashire And Furness	1:10,560	1912 - 1913
Lancashire And Furness	1:10,560	1932
Ordnance Survey Plan	1:10,000	1956
Ordnance Survey Plan	1:10,000	1970
Blackburn	1:10,000	1974
Preston	1:10,000	1976
Ordnance Survey Plan	1:10,000	1988
10K Raster Mapping	1:10,000	2001
10K Raster Mapping	1:10,000	2006
VectorMap Local	1:10,000	2024

Mapping Type	Scale	Date
Lancashire And Furness	1:2,500	1892
Lancashire And Furness	1:2,500	1912
Lancashire And Furness	1:2,500	1932
Ordnance Survey Plan	1:2,500	1967 - 1968
Additional SIMs	1:2,500	1982
Large-Scale National Grid Data	1:2,500	1992
Historical Aerial Photography	1:2,500	2001

B2 LEGISLATIVE FRAMEWORK

B2.1 An assessment of the site has been carried out in accordance with the procedures set out in Part IIA of the Environmental Protection Act 1990 and The Contaminated Land (England) Regulations 2000. Part IIA was inserted into the 1990 Act by section 57 of the Environmental Act 1995. Reference has also been made to DETR Circular 02/2000, which provides statutory guidance on the new contaminated land regime and regulations. The regulations came into force with effect from 1 April 2000. The Part 2A Contaminated Land Regime was extended to cover radioactivity in 2006 in both England and Wales. The Radioactive Contaminated Land (Modification of Enactments) (Wales) (Amendment) Regulations 2007 came into force in December 2007. A full public consultation was held between December 2010 and March 2011 and revised Contaminated Land Statutory Guidance was published in April 2012.

The overarching objectives of the Government's policy on Contaminated Land and the Part 2A regime are stated as being:

- (a) To identify and remove unacceptable risks to human health and the environment.
- (b) To seek to ensure that contaminated land is made suitable for its current use.
- (c) To ensure that the burdens faced by individuals, companies and society as a whole are proportionate, manageable and compatible with the principles of sustainable development.

Section 78A(2): defines “contaminated land” as any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land that:

- (a) significant harm is being caused or there is a significant possibility of such harm being caused; or
- (b) significant pollution of controlled waters is being caused, or there is a significant possibility of such pollution being caused.

B2.2 The hazards posed by any given level of contamination vary greatly according to the use of the land and a wide range of other factors such as geology and hydrology of the site. The hazards posed by any given level of contamination vary greatly according to the use of the land and a wide range of other factors such as geology and hydrology of the site. The overarching objectives of the Government's policy on contaminated land and the Part 2A regime are:

- To identify and remove unacceptable risks to human health and the environment.
- To seek to ensure that contaminated land is made suitable for its current use.
- To ensure that the burdens faced by individuals, companies and society as a whole are proportionate, manageable and compatible with the principles of sustainable development.

B2.3 The risks associated with contamination must be assessed on a site-by-site basis in respect of specific, current or proposed use.

B2.4 The presence of contaminants above normal threshold levels does not in itself indicate the potential for harm to occur. The potential for harm is dependent on identifying a plausible Pollutant Linkage i.e. linkage between the contaminant and the receptor. The potential for harm requires the following:

- A “contaminant” is a substance which is in, on or under the land and which has the potential to cause significant harm to a relevant receptor, or to cause significant pollution of controlled waters.
- A “receptor” is something that could be adversely affected by a contaminant, for example a person, an organism, an ecosystem, property, or controlled waters.
- A “pathway” is a route by which a receptor is or might be affected by a contaminant.

Risk is only considered to exist if all three components of the linkage are present.

B3 QUALITATIVE RISK ASSESSMENT

- B3.1 Based on the findings of the desk study, risk assessment has been carried out in order to classify the potential hazards associated with contamination.
- B3.2 The risk assessment follows the source target pathway concept set out in the Environmental Protection Act 1990. The risk assessment procedures adopted are in accordance with CIRIA Report 552, 'Contaminated Land Risk Assessment, and a guide to good practice'.
- B3.3 Risk is defined as the combination of the probability of occurrence of a defined hazard (Table C4.2) and the magnitude of the consequences (Table C4.3). The following risk classifications have been defined.

- Very Low Risk -** The pollutant linkage identified is such that it is unlikely that harm will occur or there will be cost or liability implications for the site owner.
- Low Risk -** The pollutant linkage identified is such that there is a low possibility that harm will occur or there will be cost or liability implications for the site owner. Harm if realised would at worst be mild.
- Moderate Risk -** The pollutant linkage identified is such that it is possible that harm will occur and that there will be cost or liability implications for the site owner. It is unlikely that harm arising from the linkage would be severe; it is more likely to be relatively mild. Further investigation work is normally required to define the risk. Some remedial works may be required in the longer term
- High Risk -** The pollutant linkage is such that harm is likely to arise and that the site owner is likely to incur substantial costs or liability for remediation. Urgent investigation is required and remedial works may be necessary in the short term and are likely to be required over the longer term.
- Very High Risk -** The pollutant linkage is such that severe harm is likely to arise or there is evidence that severe harm is currently happening. The site owner is likely to incur substantial costs or liability for remediation. Urgent investigation and remediation are likely to be required.

B3.4 The risks presented by each pollutant linkage have been assessed by reference to the matrix shown in Table B4.1, which combines the consequence of a particular hazard and the probability of occurrence.

		CONSEQUENCE			
		Severe	Medium	Mild	Minor
PROBABILITY	High Likelihood	Very high risk	High risk	Moderate risk	Moderate/low risk
	Likely	High risk	Moderate risk	Moderate/low risk	Low risk
	Low Likelihood	Moderate risk	Moderate/low risk	Low risk	Very low risk
	Unlikely	Moderate/low risk	Low risk	Very low risk	Very low risk

Table B3.1 Risk assessment comparing consequence against probability

CLASSIFICATION	DEFINITION OF CONSEQUENCE
Severe	Short-term exposure risk likely to result in severe harm to human health. Short-term risk of pollution to sensitive water resource or ecosystem. Risk of catastrophic damage to buildings.
Medium	Long-term exposure risk likely to result in significant harm to human health. Long term risk of pollution to sensitive water resource or a change in a particular ecosystem.
Mild	Pollution of non-sensitive water resources. Significant damage to crops, buildings and structures.
Minor	Non-permanent effects to human health. Superficial damage to buildings, structures and services.

Table C3.2 Classification of consequence.

B3.5 The probability of harm occurring is defined for the purpose of risk assessment in the following table

CLASSIFICATION	DEFINITION OF PROBABILITY
High Likelihood	There is a pollution linkage and an event which appears very likely in the short term or inevitable in the long term
Likely	There is a pollution linkage and all the elements are present which means that it is probable that an event will occur. Circumstances are such that an event is possible in the short term and likely over the long term.
Low Likelihood	There is a pollution linkage and it is possible that an event could occur. It is by no means certain that even over a long period the event would occur and is less likely in the short term.
Unlikely.	There is a pollution linkage, but circumstances are such that it is improbable that an event would occur even in the long term

Table C3.3 Classification of probability

Contaminant	Location	Receptor	Pathway	Consequence	Probability	Risk Classification	Further action
On site contamination: <ul style="list-style-type: none"> Made Ground Current and former industrial uses 	Potentially within underlying strata found on-site	Proposed end-users of the site: Current site users Users of future development Leisure	Direct contact, ingestion or inhalation of contaminated soils or dust or volatilised compounds.	Medium	Unlikely	Low Risk	1. Investigation recommended to determine nature and extent of potential contamination and remediate as appropriate
		Construction workers	Direct contact, ingestion or inhalation of contaminated soils or dust or volatilised compounds.	Medium	Unlikely using PPE	Low Risk	2. Investigation recommended to determine nature and extent of potential contamination
		Groundwater: Underlying Secondary A and Secondary Undifferentiated Aquifers	Vertical and lateral migration of potential contaminants to groundwater	Medium	Unlikely	Low Risk	3. Investigation required for geotechnical purposes and to determine nature and extent of potential contamination
		Surface Water Feature: Watercourse 74m west of site	Vertical and lateral migration of potential contaminants to groundwater	Medium	Unlikely	Low Risk	4. Water monitoring may be not required.
		Below Ground Structures	Direct contact with contaminated soils and groundwater	Medium	Unlikely	Medium/Low Risk	5. Investigation required to confirm levels of chlorides and sulphate.
On site contamination: <ul style="list-style-type: none"> Made Ground Current and former industrial uses 	Potentially within the Made-Ground and underlying strata found on-site	Below Ground Services	Direct contact with contaminated soils and groundwater	Medium	Unlikely with remediation	Low Risk	6. Investigation required to determine levels of potential contamination
		Plant Growth – Phytotoxicity: Planting	Uptake of contaminants from soil	Medium	Unlikely	Low Risk	7. Investigation may not be required.
Methane and carbon dioxide		Proposed end-users of the site: Current site users Construction Workers Users of future development	Lateral migration of ground gases and accumulation in confined spaces.	Severe	Unlikely if PPE, gas membranes and venting implemented, as appropriate	Moderate/ Low Risk	8. Gas monitoring is recommended to accurately assess the gas regime
OVERALL RISK RATING FOR DEVELOPMENT PRIOR TO INVESTIGATION/ REMEDIATION				Generally Low Risk			

APPENDIX C SITE PHOTOGRAPHS
