

Desk Study Report

Project Name: Wokingham

Location: Land North of School Road, Arborfield Cross,
Wokingham RG41 4TN

Client: Croudace Homes Ltd

Project ID: JT0584

Report Date: 08 August 2024

Report Issue: 2

SUMMARY

The site, which extends to approximately 8.0ha comprises two agricultural fields. It is proposed to develop the site with housing.

Geological records indicate the site to be underlain by London Clay Formation.

A desk study was carried out and indicates that the site has a history of agricultural use.

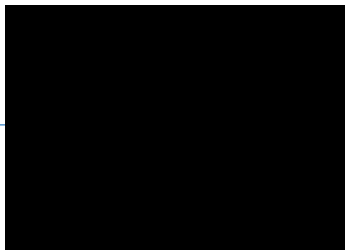
An Unexploded Ordnance (UXO) risk assessment was not included in our brief. However, a pre-desk study (UXO) risk assessment carried out on Zetica UXO risk assessment website indicates that the site is located in a Low UXO risk area

The preliminary conceptual site model identified sources of contamination associated with the potential use of agrochemicals and associated residual heavy metals and incidental leakage of oils from farming machinery on site. Although the potential contamination associated with these sources are likely to be minimal, it is recommended that a non-targeted intrusive investigation is carried out prior to development to determine the nature and extent of contamination (if any) is present on site. The investigation should include the construction of a series shallow trial holes to take soil samples for chemical analysis.

The desk study report has been prepared for the sole internal use and reliance of Croudace Homes and their appointed Engineers. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Southern Testing Laboratories Ltd. If an unauthorised third party comes into possession of this report they rely on it at their peril and the authors owe them no duty of care and skill.

The findings and opinions conveyed via this investigation report are based on information obtained from a variety of sources as detailed within this report, and which Southern Testing Laboratories Ltd. believes are reliable. Nevertheless, Southern Testing Laboratories Ltd. cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

The recommendations contained in this report are made in respect of the particular context of the investigation as described in the report and may not be appropriate to alternative development schemes. This report should be considered in its entirety and Southern Testing Laboratories Ltd accepts no responsibility for and excludes liability in respect of any omission or alteration made by others, and any use of the report for any purpose other than that for which it was produced.

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DOCUMENT HISTORY AND STATUS

Issue No.	Date	Purpose or Status	Author	Check / Review
1	16/05/2024	1 st issue	RJ	SFP
2	08/08/2024	2 nd issue	RJ	SFP

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A INTRODUCTION

1 Authority

Our authority for carrying out this work is contained in an email from Croudace Homes dated 19th April 2024 in relation to our quote with reference RJ/LF/Q24-0572, and dated 18th April 2024.

2 Location

The site is located immediately to the north of The Coombes CoE Primary School in Arborfield Cross near Wokingham, Berkshire. The approximate National Grid Reference of the site is SU 76624 67114. The site location is indicated on Figures 1 & 2 within Appendix A.

3 Proposed Construction

It is proposed to develop the site with housing.

For the purposes of the contamination risk assessment, the proposed development land use is classified as Residential with consumption of Homegrown Produce, CLEA Model Ref [1] / C4SL Report Ref [2].

The gas sensitivity of the proposed development is rated as High CIRIA C665 Ref [3].

4 Object

This is a Phase 1 Desk Study and Walkover Survey.

The object of this investigation is to determine possible sources of contamination, identify potential contaminants and allow the development of a conceptual understanding of the site to ensure that any intrusive investigation required addresses all the issues identified

5 Scope

This report presents the findings of our desk study.

A UXO risk assessment was not requested within our brief for the investigation.

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Detailed information on the proposed development, such as detailed final layout, loadings and serviceability limits was not provided. Accordingly, where geotechnical design advice is provided it is on the prescriptive basis allowed for by Eurocode 7: employing conventional and conservative design rules.

B DESK STUDY AND WALKOVER SURVEY

6 Desk Study

A desk study has been carried out. Reference has been made to the following information sources.

- Online Geological Maps Ref [4] & Ref [5]
- Online Hydrogeological Maps Ref [6]
- Aerial Photographs
- Historical Ordnance Survey Maps
- Environmental Databases
- BGS Online Historical Borehole Records Ref [7]
- Search on Local Authority Planning Portal for planning history
- MAGIC website mapping Ref [8]
- Environment Agency / Gov.UK Website Flood Risk Ref [9]
- UK Radon Ref [10] and BRE Radon Ref [11]
- Google Earth (for old aerial photographs)

The environmental databases search report compiled for this desk study contains site-specific environmental data drawn from data sets that comprise publicly available information together with data from third parties, some of which is under review. Accordingly, Southern Testing Laboratories Limited does not warrant its accuracy, reliability or completeness.

The full report is included in Appendix D and E, a summary of the salient features is included in the following sections of this report.

6.1 Geology

The British Geological Survey Map covering the site indicates that the site geology consists of London Clay Formation. No superficial deposits are mapped on the site, however, alluvial deposits are shown to the immediate south, bordering the site.

6.1.1 Alluvium

Alluvium is a geologically recent deposit found in association with watercourses. It is typically soft to firm normally consolidated, compressible silty clay, but can contain layers of silt, sand, peat and basal gravel. A stronger, desiccated surface zone may be present.

Running sand or silt may be encountered. Excavations are often unstable. Bottom heave may be encountered in clayey soils below 3 m.

It is inherently variable and rapid lateral transitions in soil type should be anticipated.

6.1.2 London Clay

The London Clay mainly comprises blue-grey or grey-brown fissured clay and silty clay, which weathers to brown near the surface. It commonly contains thin courses of carbonate concretions ('cementstone nodules'), selenite crystals and disseminated pyrite. It also includes a few thin beds of shells and fine sand partings or pockets of sand, which commonly increase towards the base and towards the top of the formation.

Although slopes will stand in the clay at steep angles in the short term, the long-term stable slope angle is about 7° for grassed, or cleared slopes, and a few degrees more for wooded slopes.

This formation is known to contain pyrite.

6.2 Historical Borehole Records

A search of previous exploratory hole records both from the online British Geological Survey database [7] and Southern Testing in-house records, revealed two records within 500m of this site, from the BGS source.

The BGS website was accessed on 13th May 2024 and a summary of the records presented in the table below.

BH Reference	Final Depth (mbgl)	Distance from site (m) & Direction	Remarks
SU76NE87 (BH date 19/12/73)	3	488 SE	GL – 0.5m: Made Ground comprising rock and brick fragments in Clay. 0.5m – 3.0m: Soft to firm brown grey mottled silty sandy Clay. No groundwater was encountered.
SU76NE137 (BH date 01/12/97)	4	522 E	GL – 0.4m: Topsoil. 0.4m – 0.6m: Very stiff desiccated friable grey brown mottled orange brown very silty Clay. 0.6m – 2.9m: Very stiff desiccated orange brown very silty Clay with occasional rootlets. 2.9m – 4.0m: Very stiff fissured brown silty Clay. No groundwater was encountered.

6.3 Geological Hazards and Mining Activities

Data from various sources relating to potential geological hazards at the site are summarized below. The Hazard Potentials listed for the BGS data are as presented in the Envirocheck report, derived from various generic BGS sources, **which are not considered as site-specific**. It is important that this information is considered in context of the actual site topography, ground conditions encountered during future investigation, and development proposals.

Data Source	Hazard	Hazard Potential to Site	Remarks
BGS	Potential for Collapsible Ground Stability Hazard	Very Low	
	Potential for Compressible Ground Stability Hazard	No Hazard	Moderate within 3m from site to the SE (mapped alluvial deposits). Moderate assumed for the site.
	Potential for Ground Dissolution Stability Hazard	No Hazard	
	Potential for Landslide Ground Stability Hazard	Very Low	
	Potential for Running Sand Ground Stability Hazard	Very Low	
	Potential for Swelling or Shrinkage Clay Ground Stability Hazard	Low	High assumed for London Clay.
	Shallow Mining Hazard	No Hazard	
	BGS recorded mineral site	No Hazard	
ARUP [Ref [12]]	Mining Instability	No hazard	No entries within 1km of the site.
CSS [Ref [13]] KURG [Ref [14]]	Underground Openings	No Hazard	

6.4 Radon Risk

With reference to the Envirocheck report, UK Radon Ref [10] and BRE Radon Ref [11] guidance, no radon protection is required on this site.

All basements are at increased risk of elevated levels of radon, regardless of geographic location.

A well-constructed waterproofing should be designed to protect against radon in accordance with guidance and recommendations on basement waterproofing as contained in BS8102:2022.

The designer should take note of any measures specific to radon protection for basements as detailed in BR211 (2023) and ensure any recommendations are followed.

The UK Health Security Agency and HSE policy and guidance recommends and, in some cases, requires, that the owner and/or occupier of buildings undertake radon monitoring in all occupied and used basement areas.

It is therefore the owner and/or occupier's responsibility to ensure that the above policy and statutory requirements regarding radon monitoring are followed.

If future monitoring identifies radon levels above 100Bq/m³ within a dwelling or above the relevant action level for occupational exposure, the Local Authority should be notified.

6.5 Hydrology and Hydrogeology

Data from the Environment Agency and other information relating to controlled waters is summarised below.

Data		Remarks	Possible Hazard to/from Site (Y/ N)
Aquifer Designation	Superficial Deposits	No Superficial Deposits mapped on site.	N
	Bedrock	London Clay Formation – Unproductive Strata.	N
Groundwater Vulnerability		Unproductive Strata.	N
Abstractions	Surface Water	None within 1km of the site.	N
	Groundwater	None within 500m of the site.	N
Source Protection Zones		None listed within 2km of the site.	N
Surface Watercourses		There are a number of drainage ditches along the site boundaries. And there is a pond within 100m to the southeast of the site.	N
Groundwater Flood Risk		Potential for Groundwater Flooding to Occur at Surface	Y
Surface Water Flood Risk*		The site is at low risk of flooding.	Y
Marine / Fluvial Flood Risk*		The site is not shown within/adjacent to an area mapped as being at risk.	N
Reservoir Flood Risk*		The site is not shown within/adjacent to an area mapped as being at risk.	N
Discharge Consents		None listed within 250m of the site except Thames Water Waste Treatment Works site located 245m to the north of the site.	N

** These sections are provided for information only, this report does not constitute a formal flood risk assessment and specialist advice should be sought in relation to potential flooding issues.*

6.6 Historical Ordnance Survey Maps

Copy extracts of historical Ordnance Survey plans dating from 1872 to 2024 were obtained and are presented in Appendix D. A summary of the salient features is presented below.

The earliest map of 1872 shows the site as agricultural land and it has remained unchanged to the present day.

The earliest map of 1872 also shows the surrounding area as predominantly agricultural land. Some-time around 1899, a school was shown along the south-western boundary of the site. By 1968, the school was shown to have expanded. Significant development of houses and the road network within the village of Arborfield Cross expanded and extended towards the site and very close to the school. Langley Pond Farm building/structures was shown adjoining the site to the southeast with the farmhouse on the opposite side of Wood Lane. Development of Arborfield Cross continued to expand and some-time around 1978, the school along the site boundary is shown to have been split into The Coombes County Infant School and Arborfield, Newland and Barkham CoE Junior School. The most recent maps shows the schools as combined.

No significant changes are recorded on the subsequent maps for the surrounding area to the present day.

6.7 Environmental Databases

Data Source	Distance (m)	Direction	Details	Possible Hazard to Site (Y/N)
Historical Industrial Land Use	237	NE	Sewage	N
Current Industrial Land Use	61	E	Used Car/Salvage Dealers - inactive	Y
	178	W	Domestic Cleaning Services -	N
	196	SW	Spraying - Paint & Coatings - active	N
	207/221	W	Tyre Dealers - inactive	N
	239	SE	Salvage Dealers - inactive	N
	242	SW	Used Car/Tyre Dealers - inactive	N
Current and Historical Landfills	/	/	None listed within 1km of the site.	N
Fuel Sites	/	/	None listed within 1km of the site.	N
Pollution Incidents	131	N	Category 1 incident involving unknown sewage. August 1995	N
	192	NE	Category 2 incident involving unknown sewage. June 1994	N
	202	N	Category 2 incident involving storm sewage. July 1998	N
IPPC/LAPPC Authorisations	/	/	None listed within 1km of the site.	N
Hazardous Substances Consents	/	/	None listed within 2km of the site.	N
Sensitive Land Uses	105	N	Ancient Woodland	N

No current or historical industrial activities have been recorded on the site. Given the relative distance from site to the majority of the identified off-site potential sources of contamination and the generally impermeable nature of the underlying geology, it is considered very unlikely that any potential contaminants from any of the off-site sources could impact the site. Given the distance to the site, potential contaminants associated with the used Car/Salvage dealership located 61m to the east of the site could impact the site. Any potential risk is considered very low.

6.8 Planning Application History

Wokingham Borough Council planning portal <https://planning.wokingham.gov.uk/FastWebPL/results.asp> accessed on 13th May 2024 showed the following relevant listings

Application Number	Application Date	Proposal Details / Comments	Decision
230110	17/01/2023	Langley Pond Farm Livery Stables School Road Barkham, Wokingham, RG41 4TN: Conversion of the existing equestrian barn, raising of the roof to create first floor accommodation and erection of a two storey front extension with porch canopy roof and 2 no. dormers to form 1 no. four bedroom dwelling with associated access, bin storage and parking, plus conversion and extension of existing stables to form a garage and storage, demolition of outbuildings and the temporary replacement of an existing trailer home.	Application Withdrawn
220684*	03/03/2022	Handpost Cottage, Handpost Farm School Road Barkham, Wokingham, RG41 4TN: Erection of a replacement dwelling and incorporation of the existing Handpost Cottage Annex into Handpost Farm (house). Demolition of menage building	Refused on appeal
213690	09/11/2021	Handpost Cottage, Handpost Farm School Road Barkham, Wokingham, RG41 4TN: Certificate of existing lawful development for the use of an existing annexe as an independent residential dwelling	Approved
213642	04/11/2021	Fieldfare School Road, Barkham Wokingham RG41 4TN: Loft conversion consisting 1 no. flat roof dormer to rear elevation and 2 no. roof lights to front elevation.	Approved
201302	29/05/2020	High Bank School Road, Arborfield, Wokingham RG2 9NX: Erection of a single storey rear extension including 1no roof light, single storey side extension following demolition of existing single storey side extension, alterations to roof, single storey front extension to create porch after demolition of existing porch and changes to fenestration.	Approved
202930	29/10/2020	Arborfield School House School Road, Arborfield, Wokingham RG2 9NX: Erection of a single storey rear extension with insertion of 4no. roof lights	Approved
180596	28/02/2018	Land North and South of School Road Arborfield Cross Wokingham Outline Planning Application for the proposed erection of up to 120 dwellings and all associated parking, landscaping, internal road network and public open space.	Refused

6.9 Ground Gas Risk

There are no current or historical landfill sites within 500m of the site. The risk of ground gas is considered negligible.

6.10 UXO Risk Management

The possibility of unexploded ordnance (UXO) being encountered on a site falls within the category of a potentially significant risk and should be addressed as a legal duty under the Construction (Design and Management) Regulations by the Client as early as possible in a project.

The CIRIA publication C681 Ref [15] has been developed to provide a consistent framework for the management of potential risks posed by UXO during site investigation and groundwork phases of construction. The process adopts a tiered approach, divided into four distinct stages; Preliminary risk assessment, Detailed risk assessment, Risk mitigation and Implementation.

The agreed scope of work did not allow for either a preliminary or detailed UXO risk assessment. However, a pre-desk study (UXO) risk assessment carried out on Zetica UXO risk assessment website indicates that the site is located in a Low UXO risk area.

7 Site Walkover Survey

A walkover survey was carried out by a geoenvironmental engineer on 24th April 2024 at which time the weather was bright and sunny.

7.1 General Site Description and Boundaries

The site is located immediately to the north of The Coombes CoE Primary School and comprises agricultural land divided into two fields by a line of trees (Field 1 to the east and Field 2 to the west). At the time of the site visit, Field 1 was noted to have been ploughed. Field 2 is covered with grass.

Access to both fields is via Wood Lane along the eastern boundary and through the northern boundary of each field.

A summary of the site boundaries is presented in the table below. .

Boundary	Field 1 (East)	Field 2 (West)
North	Farm land	Farm land
South	School Road beyond which is a farm land	The Coombes CoE Primary School
South East	Langley Pond Farm yard	-
East	Wood Lane	-
West	-	A track and drain ditch beyond which is a farm land

7.2 Topography and Drainage

The site is generally flat with a gentle slope down to the north and locally to the east. A drainage ditch runs along the eastern boundary and also along the western boundary.

7.3 Vegetation

The site is enclosed with trees of varying maturity forming the site boundaries.

7.4 Buildings and Land Use on Site and Nearby

The site is agricultural land with no structures present on it. The land use of immediate surrounding areas is predominantly farming with a school and a few houses.

7.5 Inaccessible Site Areas

All areas of the site were accessible during the walkover.

7.6 Site Photographs

A series of photographs showing the site and surrounding area is included in Appendix B.

C PRELIMINARY SITE MODELS

8 Conceptual Engineering Geological Ground Model

From the desk study information and walkover undertaken at this site the following conceptual ground model has been formulated.

Data Source	Comments
Geology	The recorded soils beneath the site comprise London Clay with no superficial covering. Alluvial soils are shown to the immediate south. The London Clay is anticipated to be a relatively uniform plastic silty clay soil, of firm or stiff consistency. In general it would be expected that low-rise structures up to two or three storeys of masonry construction would be adequately supported on normal spread foundations in the London Clay. Alluvial soils could in theory extend onto the site in which case lower bearing capacity or deeper foundations could be required.
Former Site Use	The site is agricultural land with no contaminative history where the presence of contamination would not, in general, be expected. Agro-chemicals such as pesticides and herbicides could potentially have been used. The significance of these contaminants are usually minimal.
Groundwater	Groundwater levels in clay soils such as the London Clay are typically high during wet and winter months often within 1m of ground level, representing full saturation of the low permeability soils. Groundwater ingress into excavations is however, not typically a significant problem due to the low permeability and is normally controlled by periodic pumping from sumps within the main excavation.
Surface Water	The site is located in an area of low risk from surface water flooding and from flooding from rivers without defences. Suitable surface water drainage will need to be considered for the proposed development. Given the impermeable nature of the London Clay, conventional soakaways may not be feasible at this site.
Potential Geo-hazards	The potential swelling and shrinkage of clay soils of the London Clay is a potential geohazard. London Clay would be expected to be of NHBC Medium or High Volume Change Potential. Where the proposed buildings area within the influence trees and other vegetation, foundations may require deepening to be sufficiently protective of desiccated soils.

On the basis of the available information the geotechnical categorization for the proposed structure(s) is considered to fall within Geotechnical Category 2 – Conventional structure with no exceptional risk or difficult ground or loading conditions; Eurocode 7 Ref [16].

9 Conceptual Site Model

In the context of this report, the conceptual model summarises the potential pollutant linkages identified for the site and forms the basis of the risk assessment for the site. The preliminary model comprises the potential sources of contamination, receptors that could be harmed and exposure pathways identified from the desk study and walkover survey. These potential linkages form the basis upon which the investigation is designed and reported.

9.1 Potential Sources of Contamination

The site has a history of agricultural land use and is located within a predominantly agricultural area with a school and some houses.

With the exception of farming activities, no potentially contaminative uses have been identified on site and the immediate surrounding areas.

Potential contaminants associated with these uses have been compiled from DoE industry profiles and our experience of such sites.

The likely hazard to site has been evaluated based on the UK CIRIA C552 approach (see Appendix C for details),

9.1.1 On-Site Sources

Potential Source		Potential Contaminants	Likely hazard to Site
Historic use of the site	Arable farm land	Heavy Metals, Pesticides/Herbicides, PAHs, Petroleum Hydrocarbons	Low
Current use of the site	Arable farm land	Heavy Metals, Pesticides/Herbicides, PAHs, Petroleum Hydrocarbons, nitrate, ammonia	Low
Radon		Not within an area affected by Radon	N/A
Ground and/or surface water		Heavy Metals, Pesticides/Herbicides, PAHs, Petroleum Hydrocarbons nitrate, ammonia	Very Low
Ground Gases/Vapours		Methane, carbon dioxide, carbon mono oxide, hydrogen sulphide	Negligible

9.1.2 Off-Site Sources

The site may be impacted by contamination migrating from beyond the site boundary. The following potential off-site sources have been identified.

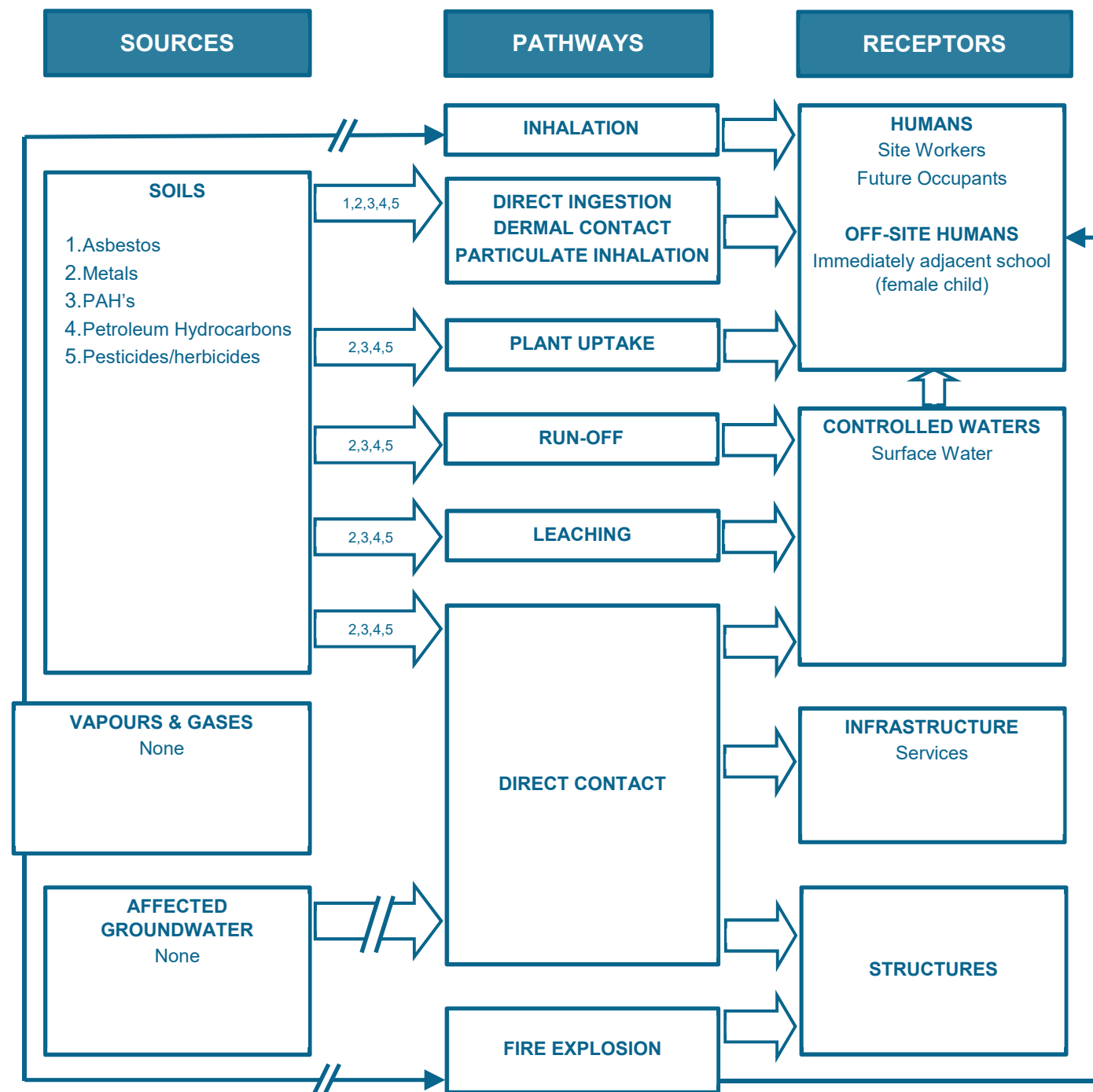
Potential Source	Distance from Site Boundary	Direction	Potential Contaminants	Likely hazard to Site
Arable farm land	Within 50	All directions	Heavy Metals, PAHs, Pesticides/Herbicides, Petroleum Hydrocarbons	Very Low
Used Car/Salvage Dealer	61	E	Heavy Metals, PAHs, Petroleum Hydrocarbons	Very Low

Only mobile phase contaminants from off-site sources could impact the site. The main pathway for these potential contaminants to migrate and impact on the site would be through groundwater or vapour/land gas.

Given the impermeable nature of the London Clay, there is no plausible preferential pathway for any of these contaminants to migrate onto the site.

9.2 Pollutant Linkages and Conceptual Site Model Summary

The following diagram shows the potential pollutant linkages identified for the site and summarises the preliminary conceptual model:



// Denotes potential pollutant linkage not complete.

10 Conclusions and Recommendations

The preliminary conceptual site model identified sources of contamination associated with the potential use of agrochemicals and associated residual heavy metals and potential incidental leakage of oils from farming machinery on site. Although, the potential contamination risks associated with these sources are likely to be minimal, it is recommended that a non-targeted intrusive investigation is carried out prior to development to determine the nature and extent of contamination (if any) is present on site. The investigation should include the construction of a series shallow trial holes to take soil samples for chemical analysis.

The investigation should be used to assess the ground conditions and to provide geotechnical parameters to support the design of foundations.

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