



**Castledine  
Environmental**

LAND CONTAMINATION SURVEYS

# **Phase 1 Land Contamination Risk Assessment**

for

## **Conversion of Existing Barn into a New Steel Frame Agricultural Storage Shed**

on the site of

**Cobbold West Street, Walsham  
Le Willows, Suffolk IP31 3AP**

**Date: November 2023**

Status:

Final Report

Reference:

3652A P1 Long – Suffolk

Date:

30/11/2023

**EXECUTIVE SUMMARY**

The site is currently occupied by a relatively new barn, present since at least circa.2001 (thus unlikely to have possessed inherent asbestos within the design), prior to which the site remained unoccupied and within the garden area of an associated dwelling to the north west of site. Both the site and surrounding areas have been noted to be well-maintained with no significant vehicle, machinery nor fuel, oil or lubricant storage nor spillages noted, with the interior concrete base unmarked and undamaged.

Based on the information contained in this report, it is the opinion of Castledine Environmental that the site represents a **LOW** level of risk with respect to the proposed development.

**It is not envisaged that any further works or investigation are required.**

**It is recommended that a Watching Brief (as outlined in Appendix E) should be carried out by the site supervisor during the course of demolition, site clearance and construction works for any obvious contamination (e.g. oil spillage in ground, buried waste, possible asbestos containing material). Should previously unreported or undiscovered contamination be identified, then development should stop and Castledine Environmental should be contacted to determine if further assessment or changes to the remediation scheme are required.**

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**1.0 QUALITY ASSURANCE**

Castledine Environmental confirm that all reasonable efforts have been made to ensure that the information outlined within this report is accurate.

Castledine Environmental would further confirm that due care, attention and technical skill were used in the creation of this report.

For and on behalf of Castledine Environmental

Kevin Castledine

(Director)

**2.0 LIMITATIONS**

The conclusions and recommendations made in this report are limited to those based on the findings of the investigation. Where comments are made based on information obtained from third parties, Castledine Environmental assumes that all third-party information is true and correct. No independent action has been undertaken to validate the findings of third parties. The assessments and interpretation have been made in line with legislation and guidelines in force at the time of writing, representing best practice at the time.

This survey has not included asbestos within existing structures, invasive plant species, geotechnical considerations or any elements unconnected with potential ground contamination at the site. If required, such surveys should be undertaken by suitably accredited organisations.

There may be other conditions prevailing at the site which have not been disclosed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for conditions not revealed by the investigation.

### 3.0 INTRODUCTION AND SITE PROPOSALS

Castledine Environmental have been appointed by Ms. J. Long to undertake a Phase 1 Desk study on a site at Cobbold, West Street, Walsham Le Willows, Suffolk IP31 3AP.

### 4.0 SCOPE

Castledine Environmental have prepared this report for the sole use and reliance of Ms. J. Long and associated appointees for the purpose of ensuring compliance with:

- Paragraph(s) 174, 179, 183 & 184 of the National Planning Policy Framework 2023
- Part C1 of the building regulations
- Support of a Planning Application

This report may not be used or relied upon by any unauthorised third party, or for any other proposed use than that specified above, without the explicit written agreement of Castledine Environmental

This report is to be regarded as a Preliminary Risk Assessment in accordance with the Environment Agency's Land Contamination Risk Management (LCRM – 2021), which replaces *CLR11 "Model Procedures for the Management of Land Contamination"*, carried out in accordance with BS 10175:2011+A2:2017, "*Investigation of Potentially Contaminated Land - Code of Practice*" and relevant sections of BS5930:2015+A1:2020, "*Code of Practice for Ground Investigations*".

The objectives of the report are:-

- To assess historical activities at the site with respect to their potential impact on the site environment;
- To assess historical and current surrounding land use in relation to known or potential off-site contamination issues that may impact on the subject site;

- Review of geological, hydrological and hydrological conditions at the site, pertaining to land contamination issues;
- To characterise the environmental setting of the site, identify migration pathways and vulnerable receptors for contamination originating at the site, focusing on potential soil and groundwater liabilities;
- To develop a preliminary conceptual site model (CSM).

## 5.0 SITE DESCRIPTION

The site is located in a site named Cobbold within Walsham Le Willows, Suffolk at National Grid Reference: 598671,270905 and is approximately 0.04ha in area.

The site is located in a predominantly rural area, within the garden area of an associated dwelling directly north west. The site is directly bounded by the associated dwelling directly north west, garden areas with fields beyond to the north, further field east and west (beyond the roadside and further gardens) with a small, well-maintained and clean farmyard directly south of site.

The site interior comprises a metal-cladded barn and very limited exterior areas around each face of the barn. Access to site is provided via a track leading eastwards off Ixworth Road, via the associated dwelling and terminating at site. The barn itself was seen to be constructed of metal cladding, roofing and structuring with significant, agricultural grade concrete forming the base and flooring. The interior of the barn was also observed to be well-maintained, in a clean state and used for the storage of a vehicle, tractor, associated agricultural trailers, fencing materials alongside other, generally miscellaneous garden furniture and toys. No significant fuel, lubricant, oil or chemical storage was noted nor was an evidence of hydrocarbon release noted (either visibly or olfactorily), with the concrete base also being in good condition with no significant cracking or fractures noted. The remaining areas on site then comprise very limited exterior spaces, extending for approximately 1m from the footprint of the barn. Directly north of the barn and east lies grassed areas, directly south lies a small garden area and wooded area, within



which a dilapidated caravan was noted and the area directly west of the barn was seen to be formed of a gravelled access route.

No significant potential sources of contamination were noted on the site walkover, with no asbestos or significant vehicle storage or signs of hydrocarbon release noted with the site overall being clean and well-kept. Topographically, both the site and surrounding areas are level.

Photos of the site are present in Appendix D.

## 6.0 REGULATORY AUTHORITY AND OTHER ENVIRONMENTAL DATA

An environmental search listing historical and environmental factors likely to affect the property has been reviewed.

The most pertinent information is summarised in the following sections.

A copy is presented in Appendix A.

Additional geological and hydrological data was obtained from the British Geological Survey.

## 6.1 HYDROLOGICAL

### 6.1.1 AQUIFER

#### 6.1.1.1 SUPERFICIAL GEOLOGY

ID	Distance (m)	Direction	Designation	Description
1	0	On site	Secondary (Undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general, these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

ID	Distance (m)	Direction	Designation	Description
2	102	E	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

#### 6.1.1.2 BEDROCK GEOLOGY

ID	Distance (m)	Direction	Designation	Description
1	0	On site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers

#### 6.1.2 ABSTRACTIONS AND PRIVATE WATER SUPPLIES

The Groundsure report records no abstraction sites – either potable, groundwater or surface water – within 500m of site and no active abstraction are recorded within 1000m of site.

#### 6.1.3 SOURCE PROTECTION ZONE

The site is recorded to lie within a Source Protection Zone (SPZ) Zone 3 (Total Catchment).

#### 6.1.4 GROUNDWATER VULNERABILITY AND SOIL LEACHING POTENTIAL

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one-kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

ID	Location	Summary	Soil / Surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary superficial Aquifer – Medium Vulnerability Combined Classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching Class: Low Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer Type: Secondary Thickness: 3-10m Patchiness value: >90% Recharge Value: Low	Vulnerability: Low Aquifer type: Principal Flow

**6.1.5 POTENTIAL SURFACE WATER**

Several water surface features are recorded near to the site, and include three ponds located, 10m west, 67m west and 255m south west of the site.

Two small contained perimeter streams are also located 108m and 195m south west within a residential property and an additional larger stream situated 135m east at its closest point, trending north to south and flowing to the south.

**6.1.6 DISCHARGE CONSENTS**

The Groundsure report does not record any licensed discharged consents with 500m of the site.

**6.2 PERMITTED PROCESSES**

The Groundsure report does not record any historical or active industrial activities or pollutant releases within 500m of the site.

**6.3 POLLUTION INCIDENTS**

The Groundsure report does not record any pollution incidents within 500m of the site.

**6.4 RADIOACTIVE SUBSTANCES REGISTRATIONS**

None recorded within 500m of site.

**6.5 WASTE****6.5.1 LICENSED WASTE MANAGEMENT FACILITIES (LOCATIONS)**

The Groundsure report does not record any licensed waste site within 500m of the site.

**6.5.2 LANDFILL SITES**

No historical or active landfill site have been identified within 500m of the site.

**6.6 HAZARDOUS SUBSTANCES**

None recorded within 500m of site.

**6.7 ECOLOGICAL RECEPTORS**

The Groundsure report does not record the presence of any ecological receptors within 500m of the site.

**6.8 SOILS AND GEOLOGY**

"Contains British Geological Survey materials © NERC 2023" obtained from <http://www.bgs.ac.uk/data/mapViewers/home.html> under the [Open Government Licence](#)

**6.8.1 SUPERFICIAL DEPOSITS**

Both BGS geological mapping and the Groundsure report record superficial deposits of the Lowestoft Formation as present on site, which is recorded to generally comprise dark grey to brown, chalky till, predominantly formed of clay with outwashes of sand, silts and gravels.

Head deposits (variable mix of clay, silts sands and gravels) are also located offsite 78m to the south east, and peat deposits (organic clays and silts with decomposed plant matter) are recorded 102m to the east.

**6.8.2 SUPERFICIAL DEPOSITS PERMEABILITY**

The Groundsure report records the site as being within an area where the maximum permeability of superficial deposits is recorded as ‘moderate’ and the minimum permeability as ‘low’, facilitated by mixed flow mechanisms.

This is a qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

**6.8.3 BEDROCK DEPOSITS**

Both BGS geological mapping and the Groundsure report record a bedrock geology of the Lewes Nodular Chalk Formation comprising hard to very hard interbedded chalks and marls and with abundant flints.

**6.8.4 BEDROCK PERMEABILITY**

The Groundsure report records the site as being within an area where both the minimum and maximum permeability of bedrock geology is recorded as ‘very high’ and facilitated by fracture flow mechanisms.

**6.8.5 ARTIFICIAL GROUND**

The BGS geological mapping and Groundsure both do not record the presence of artificial ground within or nearby to the site.

**6.8.6 COAL MINING**

The site is not located in a coal mining reporting area and the local geology is not considered appropriate for such extraction. Therefore, the risk from coal mining activities is considered to be negligible.

**6.8.7 NON-COAL MINING**

The Groundsure report records no non-coal mining operations located within 500m of site.

**6.8.8 SURFACE WORKINGS**

ID	Distance [m]	Direction	Land Usage	Year of Mapping
A	67	W	Ponds	1950
A	67	W	Ponds	1883

The pond identified above is still currently existing within a residential garden and can be identified on recent OS mapping, aerial imagery dated 2023 and was also noted on the site walkover. Therefore, it is considered that the feature does not require further investigation.

**6.8.9 RADON**

The property is not in a Radon Affected Area, as between 1% and 3% of properties are above the Action Level. As such no radon protective measures are necessary as described in publication BR211:2015 by the Building Research Establishment.

**6.9 AERIAL PHOTOGRAPHY**

Aerial photography shows the following:

**6.9.1 GOOGLE EARTH**

13 No. images are held in the historic imagery dataset, as follows:

Date	Description
December 1945	Imagery is extremely indistinct; however, the site appears to remain within the gardened area of an associated dwelling directly NW of site. No onsite features are discernible.
December 1999	Site is now clearly occupied by the present-day barn structure seen during the site walkover. Gardened areas are now located directly north, north east and east of site with the small, wooded area directly south, as in the present-day as is the pond directly west of site.
December 2000	No discernible change on site nor site relevant change to the surrounding areas.
August 2007	No discernible change on site nor site relevant change to the surrounding areas.
December 2007	No discernible change on site nor site relevant change to the surrounding areas.
September 2008	No discernible change on site nor site relevant change to the surrounding areas.
April 2015	No discernible change on site nor site relevant change to the surrounding areas.
July 2018	No discernible change on site nor site relevant change to the surrounding areas.
March 2020	No discernible change on site nor site relevant change to the surrounding areas.
April 2020	No discernible change on site nor site relevant change to the surrounding areas.
September 2020	No discernible change on site nor site relevant change to the surrounding areas.
April 2021	No discernible change on site nor site relevant change to the surrounding areas.
March 2023	No discernible change on site nor site relevant change to the surrounding areas.

**6.10 GOOGLE STREET VIEW**

The site can be viewed from imagery provided along Ixworth Road facing east. The northern and western faces of the barn can be seen as local trees block the view of the remaining barn. However, where observed, the barn seem to be in generally good condition and set to the south east and rear of an adjacent residential property.

**6.11 HISTORIC MAPPING**

The following historic maps have been reviewed as part of this assessment, found in the appendices.

<b>Map</b>	<b>Onsite</b>	<b>Offsite</b>
OS County Series: 1883, 1:2,500	The site is situated to the rear of a residential property. The interior of the site itself is featureless except for some adjacent trees and sits along the property's southern boundary.	The site lies on the eastern extents of hamlet of residential dwellings set within a wider agricultural surrounding land use. The site itself is located within a residential property with an associated building present between 5m and 40m to the north east. An unnamed road (later named Ixworth Road) forms the eastern boundary of the property. Further residential dwellings are present along the unnamed road to the north and south. Ponds are located 10m and 67m west (both persistent until the present-day), 105m (with associated drain) and 255m south west of the site (again, remaining persistent) and an unnamed stream is located 135m east and flowing to the south.
OS County Series: 1888, 1:10,560	No discernible change on site.	No site relevant changes to the surrounding areas.
OS County Series: 1903-1904, 1:2,500	No discernible change on site.	No site relevant changes to the surrounding areas.
OS County Series: 1903-1905, 1:10,560	No discernible change on site.	No site relevant changes to the surrounding areas.
OS County Series: 1950, 1:10,560	No discernible change on site.	No site relevant changes to the surrounding areas.
Provisional: 1958, 1:10,560	No discernible change on site.	No site relevant changes to the surrounding areas.
Provisional: 1966, 1:10,560	No discernible change on site.	No site relevant changes to the surrounding areas.
National Grid: 1974-1975, 1:2,500	No discernible change on site.	No site relevant changes to the surrounding areas.
National Grid: 1978-1982, 1:10,000	No discernible change on site.	No site relevant changes to the surrounding areas.



Map	Onsite	Offsite
National Grid: 1995, 1:2,500	No discernible change on site.	No site relevant changes to the surrounding areas.
National Grid: 2001, 1:10,000	Mapping confirms the present-day barn now located on site.	No site relevant changes to the surrounding areas.
Landline: 2003, 1:1,250	No discernible change on site.	No site relevant changes to the surrounding areas.
National Grid: 2010, 1:10,000	No discernible change on site.	Barn (presently seen) approximately 45m SW of site has now been erected.
National Grid: 2023, 1:10,000	No discernible change on site.	No site relevant changes to the surrounding areas.

#### 6.12 CURRENT LAND USE DATA

None recorded within 250m of site.

#### 6.13 PETROL AND FUEL SITES

None recorded within 500m of site.

#### 6.14 HISTORICAL PETROL AND FUEL SITE DATABASE

None recorded within 500m of site.

#### 6.15 POTENTIAL CONTAMINATIVE LAND USES IDENTIFIED ON MAPPING

ID	Distance [m]	Direction	Use	Date
A	297	NE	Unspecified ground workings	1982
A	298	NE	Unspecified pit	1883
A	298	NE	Unspecified pit	1950
B	382	NE	Unspecified pit	1905
B	384	NE	Unspecified pit	1950
B	384	NE	Unspecified pit	1982
B	384	NE	Unspecified pit	1950

#### 6.16 HISTORICAL TANK DATABASE

None recorded within 500m of site.

#### 6.17 HISTORICAL ENERGY FACILITIES

None recorded within 500m of site.

**6.18 HISTORICAL GARAGE DATABASE**

The Groundsure report records a historical garage formerly located 297m north east of site and identified from historical mapping dated circa.1975.

**7.0 PRELIMINARY CONCEPTUAL SITE MODEL**

The risk posed by any contaminants in soil or groundwater will depend on the nature of the hazard, the probability of exposure, the pathway by which exposure occurs, and the likely effects on the receptors. A contaminant is defined as a substance in, on or under land (or within groundwaters) that has the potential to cause harm, while a risk is considered to exist if such a substance is present in sufficient concentration to cause harm and a pathway exists for a receptor to be exposed to the substance. The following sections discuss all the identified potential on and off-site sources, pathways and receptors in the context of the proposed development and plausible pollutant linkages which may represent a risk to identified receptors from the data gained from the desk study. At this stage the assessment is qualitative and aimed to determine all pollutant linkages, irrespective of significance or allowing for uncertainty.

<b>Source</b>	A contaminant or pollutant that is in, on or under land that has the potential for cause harm or pollution to a receptor.
<b>Pathway</b>	The physical route by which a receptor is or could be affected by a contaminant or pollutant
<b>Receptor</b>	Something or someone that could be adversely affected by a contaminant, i.e. people, controlled waters, ecological systems, buildings, crops, livestock

By considering each of the three elements above, an assessment of actual and potential hazards to receptors can be carried out, taking into account the significance and degree of risk of each. The three elements above can exist separately; however, they only create a risk where they are linked together, thus creating a contaminant linkage. During the Preliminary Risk Assessment Stage the linkages are referred to as 'Potential Contaminant Linkages', until they are confirmed via intrusive sampling, thus becoming 'Relevant

Contaminant Linkages'. A tabled, diagrammatic or matrix of pollutant linkages is considered to be a Conceptual Site Model (CSM), the source-pathway-receptor linkages are reviewed and displayed, apportioning a risk-rating and mitigation suggestion after each summary.

Three impact potentials exist for any given site, these are:

- The site impacting upon itself;
- The site impacting on its surroundings; and
- The surroundings impacting on the site.

All three impacts need to be considered in a risk assessment.

## **7.1 SOURCES**

The following potential sources of contamination have been identified.

### **7.1.1 ONSITE**

No significant potential sources of contamination identified on site.

### **7.1.2 OFFSITE**

No significant potential sources of offsite contamination identified.

## **7.2 PATHWAYS**

A pathway is defined as a mechanism or route by which a contaminant comes into contact with, or otherwise affects a receptor. Pathways by which the identified receptors may be impacted upon in the context of the proposed development are identified as follows:

- Ingestion (direct and indirect via crop uptake);
- Dermal contact;
- Inhalation;
- Plant uptake,
- Direct contact by buried structures (i.e. pipe degradation and leaching, pH & Sulphate attack on concrete);
- Leaching of soluble contamination into groundwater;

### 7.3 RECEPTORS

Receptors are defined as people, living organisms, ecological systems, controlled waters, atmosphere, structures and utilities that could be adversely affected by contaminant(s).

- Human Health
  - Current users of the site;
  - Future users of the site;
  - Users of neighbouring sites;
  - Construction workers; and
  - Services personnel working in trenches.
  - Construction Materials
- Buried concrete, which may be affected by high concentrations of sulphate and/or low pH, in the soils and groundwater underlying the site; and
- Buried water pipes.
- Controlled Waters
- Ecological Receptors
- Flora and fauna using the proposed development

### 8.0 CONCEPTUAL SITE MODEL

The Conceptual Site Model (CSM) is a hypothesis of the nature and sources of contamination, potential receptors that may be the recipient of contamination arising from those sources and any pathways that may exist. It creates a plausible source-pathway-receptor pollutant linkage (hazard), set within the context of the ground and proposed end use of the site.

#### 8.1 PRELIMINARY CONCEPTUAL SITE MODEL

##### 8.1.1 SOIL CONTAMINATION

The site is currently occupied by a relatively new barn, present since at least circa.2001 (thus unlikely to have possessed inherent asbestos within the design), prior to which the site remained unoccupied and within the garden area of an associated dwelling, north west of site. Both the site and surrounding areas have been noted to be well-maintained with no significant vehicle, machinery nor fuel, oil or lubricant storage nor spillages noted, with the interior concrete base unmarked and undamaged.

**8.1.2 HAZARDOUS GROUND GAS AND VAPOURS**

No significant sources of either ground gas nor vapour generation have been identified. No infilled ponds, pits, quarries or landfills have been identified in influencing distance to site, with all ponds present on historical mapping remaining persistent until the present-day. No significant sources of potential hazardous vapours have been identified, with no significant on site storage of heavy machinery, fuel, oil, lubricant or tank storage noted (both historically and contemporarily) and the interior of the barn was seen to possess an intact, unmarked agricultural grade concrete base (storage of tractor and trailer discounted as significant source).

TABLE 1. SUMMARY OF SIGNIFICANT POLLUTION LINKAGES

Contaminant	Pathway	Receptor	Probability of Pollutant Linkage	Conseq.	Risk	Possible Mitigation
Contaminated Soils (no significant potential sources identified)	Direct Ingestion & Direct Contact	Site Workers (during site works, excavations, eating and drinking)	UI	Md	L	Site workers to wear appropriate PPE for health and safety reasons, suitable of PPE and adherence to relevant HSE guidance during site works considered sufficient to mitigate the hazards to LOW.
Contaminated Soils (no significant potential sources identified)	Inhalation of Dust, Dry Arisings	Site Workers (during site works, excavations, eating and drinking)	UI	Md	L	
Contaminated Soils (no significant potential sources identified)	Crop Uptake & Direct Ingestion, Direct Contact	End Users (site workers & service personnel, visitors, customers) / (residents / tenants, children, visitors, service personnel)	UI	Md	L	No significant potential sources of soil contamination identified from the site walkover, desktop information and production nor historical maps nor satellite imagery. As such, recommend that a recommended that a Watching Brief (as outlined in Appendix F) should be carried out by the site supervisor during the course of demolition, site clearance and construction works for any obvious contamination (e.g. oil spillage in ground, buried waste, possible asbestos containing material). Should previously unreported or undiscovered contamination be identified, then development should stop and Castledine Environmental should be contacted to determine if further assessment or changes to the remediation scheme are required.
Contaminated Soils (no significant potential sources identified)	Inhalation of Dust, Dry Arisings	End Users (site workers & service personnel, visitors, customers) / (residents / tenants, children, visitors, service personnel)	UI	Md	L	
Contaminated Soils (no significant potential sources identified)	Crop Uptake & Direct Ingestion, Direct Contact	Flora and Fauna (on and offsite)	UI	Md	L	
Contaminated Soils (no significant potential sources identified)	Vertical and lateral migration (bedrock & superficial geology pathways)	Controlled Waters (Aquifers, nearby surface waters etc)	UI	Md	L	
Contaminated Soils (no significant potential sources identified)	Direct contact (pipe degradation and leaching)	Services (impacted new potable supply piping)	UI	Md	L	
Ground Gases (Methane and CO <sub>2</sub> ) (no significant potential sources identified)	Vertical and lateral migration (bedrock & superficial geology pathways)	Site Workers & Excavations, End Users & Building Envelope (ingress and build-up)	UI	Md	L	
Volatile and Semi-volatile Organic Compounds (no significant potential sources identified)	Vertical and lateral migration (bedrock & superficial geology pathways)	Site Workers & Excavations, End Users & Building Envelope (ingress and build-up)	UI	Md	L	
Radon	Vertical and lateral migration	End Users & Building Envelope	UI	Md	L	Site it not located in a Radon Affected Area.

KEY: Probability of pollutant linkage Hi = Highly likely, Li = Likely, Lw = Low Likelihood, UI = Unlikely  
 Consequence Sv = Severe, Md = Medium, Mi = Mild, Mr = Minor,  
 Overall Risk VH = Very High, H = High, M = Moderate, M/L = Moderate/Low, L = Low, VL = Very Low

Based on the preliminary CSM for the site, an environmental risk assessment has been undertaken. A simple matrix can provide a consistent basis for decision making. It should be used with caution, recognising the oversimplification that it will normally represent. The probability and consequences are defined according to parameters relevant to the situation; the boundaries of risk acceptability (and tolerability, where relevant) indicated on the matrix provided in Table 2, can be tailored to the factors influencing the significance of the risk. Individual situations are mapped onto the matrix to provide a ready and consistent indication of their acceptability or tolerability.

TABLE 2. RISK CLASSIFICATION MATRIX

		Consequence			
		Severe (Sv)	Medium (Md)	Mild (Mi)	Minor (Mr)
Probability	High (Hi)	Very high risk	High risk	Moderate Risk	Moderate/Low Risk
	Likely (Li)	High risk	Moderate Risk	Moderate/Low Risk	Low Risk
	Low Likelihood (Lw)	Moderate Risk	Moderate/Low Risk	Low Risk	Very Low Risk
	Unlikely (UI)	Moderate/Low Risk	Low Risk	Very Low Risk	Very Low Risk

Source: CIRIA Report C552, Contaminated Land Risk Assessment. A Guide to Good Practice, 2001

These attributes are evaluated qualitatively against individual hazard assessments to determine the likelihood of a given hazard occurring. The risk evaluations for each plausible pollutant linkage are given in the last three columns of Table 1.

TABLE 3. CLASSIFICATION OF RISK

<b>Very high risk (Vh)</b>	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
<b>High risk (Hi)</b>	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short-term and are likely over the longer term.
<b>Moderate risk (Md)</b>	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer-term.
<b>Low risk (Lw)</b>	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
<b>Very low risk (VI)</b>	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

Source: CIRIA Report C552, Contaminated Land Risk Assessment. A Guide to Good Practice, 2001

## 9.0 ENVIRONMENTAL RISK ASSESSMENT

Based on the information contained in this report, it is the opinion of Castledine Environmental that the site represents a **LOW** level of risk with respect to the proposed development.

**It is not envisaged that any further works or investigation are required.**

**It is recommended that a Watching Brief (as outlined in Appendix E) should be carried out by the site supervisor during the course of demolition, site clearance and construction works for any obvious contamination (e.g. oil spillage in ground, buried waste, possible asbestos containing material). Should previously unreported or undiscovered contamination be identified, then development should stop and Castledine Environmental should be contacted to determine if further assessment or changes to the remediation scheme are required.**



**10.0 SUMMARY OF RISKS****11.0 HUMAN HEALTH**

The risks to end-users of the site are considered to be low when based upon the site's location, history and usage. No significant, extensive or historic agricultural usage has been identified on or directly adjacent to site, with the site largely remaining within the rear garden area of the associated dwelling, north west of site. The site is proposed to be entirely encapsulated beneath building footprint and hardstanding, as such, the hazards from soil contamination to end-users on site are considered to be low. Furthermore, vapour and ground gas hazards to end-users via the building envelope have been discounted, as below.

**12.0 STRUCTURES****12.1.1 GROUND GASES & VAPOURS**

No significant sources of either ground gas nor vapour generation have been identified. No infilled ponds, pits, quarries or landfills have been identified in influencing distance to site, with all ponds present on historical mapping remaining persistent until the present-day. No significant sources of potential hazardous vapours have been identified, with no significant on-site storage of heavy machinery, fuel, oil, lubricant or tank storage noted (both historically and contemporarily) and the interior of the barn was seen to possess an intact, unmarked agricultural grade concrete base (storage of tractor and trailer discounted as significant source).

**13.0 RECOMMENDATIONS**

It is recommended that a Watching Brief (as outlined in Appendix E) should be carried out by the site supervisor during the course of demolition, site clearance and construction works for any obvious contamination (e.g. oil spillage in ground, buried waste, possible asbestos containing material). Should previously unreported or undiscovered contamination be identified, then development should stop and Castledine Environmental should be contacted to determine if further assessment or changes to the remediation scheme are required.

**14.0 FURTHER ENVIRONMENTAL INVESTIGATION**

It is not envisaged that further testing will be required.

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**15.0 REFERENCES****15.1 LEGISLATION AND REGULATIONS****15.1.1 ACTS**

- [1] Environmental Protection Act 1990, Part IIA: inserted by Environment Act 1995, Section 57. See Environment Act 1995 for text of Part IIA.

**15.1.2 PLANNING REGULATIONS**

- [2] The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 SI1999/No.293
- [3] The Town and Country Planning (Environmental Impact Assessment) (England and Wales) (Amendment) Regulations 2000 SI2000/No.2867

**15.1.3 CONTAMINATED LAND REGULATIONS**

- [4] The Contaminated Land (England) Regulations 2000. SI2000/No.227
- [5] The Contaminated Land (England) (Amendment) Regulations 2001 SI2001/No.663
- [6] The Contaminated Land (England) Regulations 2006 SI2006/No.1380

**15.2 STATUTORY GUIDANCE**

- [7] Department of Environment, Food and Rural Affairs. 2012. *Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance*. Department of Environment, Food and Rural Affairs
- [8] Communities and local Government, 2018: National Planning Policy Framework.

**15.3 BRITISH STANDARDS**

- [9] BS 5930:2015 Code of practice for site investigations
- [10] BS 10175:2011+A2:2017 Investigation of potentially contaminated sites - Code of practice
- [11] BS 8485:2015+A1:2019 BS 8485 - 2015 - Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings
- [12] BS 8576:2013 Guidance on investigations for ground gas. Permanent gases and Volatile Organic Compounds (VOCs)

**15.4 NON STATUTORY TECHNICAL GUIDANCE****15.4.1 ENVIRONMENT AGENCY**

- [13] Cassella Stranger, 2002. Model Procedures for the Management of Contaminated Land, Contaminated Land Report (CLR) 11, Department for Environment, Food, and Rural Affairs.

**15.4.2 CIRIA PUBLICATIONS**

- [14] Wilson, S., Oliver, S., Mallett, H., Hutchings, H., and Card, G.. 2007, *C 665 Assessing risks posed by hazardous ground gases to buildings* London: Construction Industry Research and Information Association
- [15] Mallett, H., Cox, L., Wilson, S. and ,Corban M... 2014, *C 735 Good practice on the testing and verification of protection systems for buildings against hazardous ground gases* London: Construction Industry Research and Information Association

**15.4.3 CL:AIRE**

- [16] Card G, Wilson S, Mortimer S. 2012. *A Pragmatic Approach to Ground Gas Risk Assessment. CL:AIRE Research Bulletin RB17.* CL:AIRE, London, UK. ISSN 2047- 6450 (Online)

**16.0 APPENDICES**

**APPENDIX A ENVIRONMENTAL SEARCH**

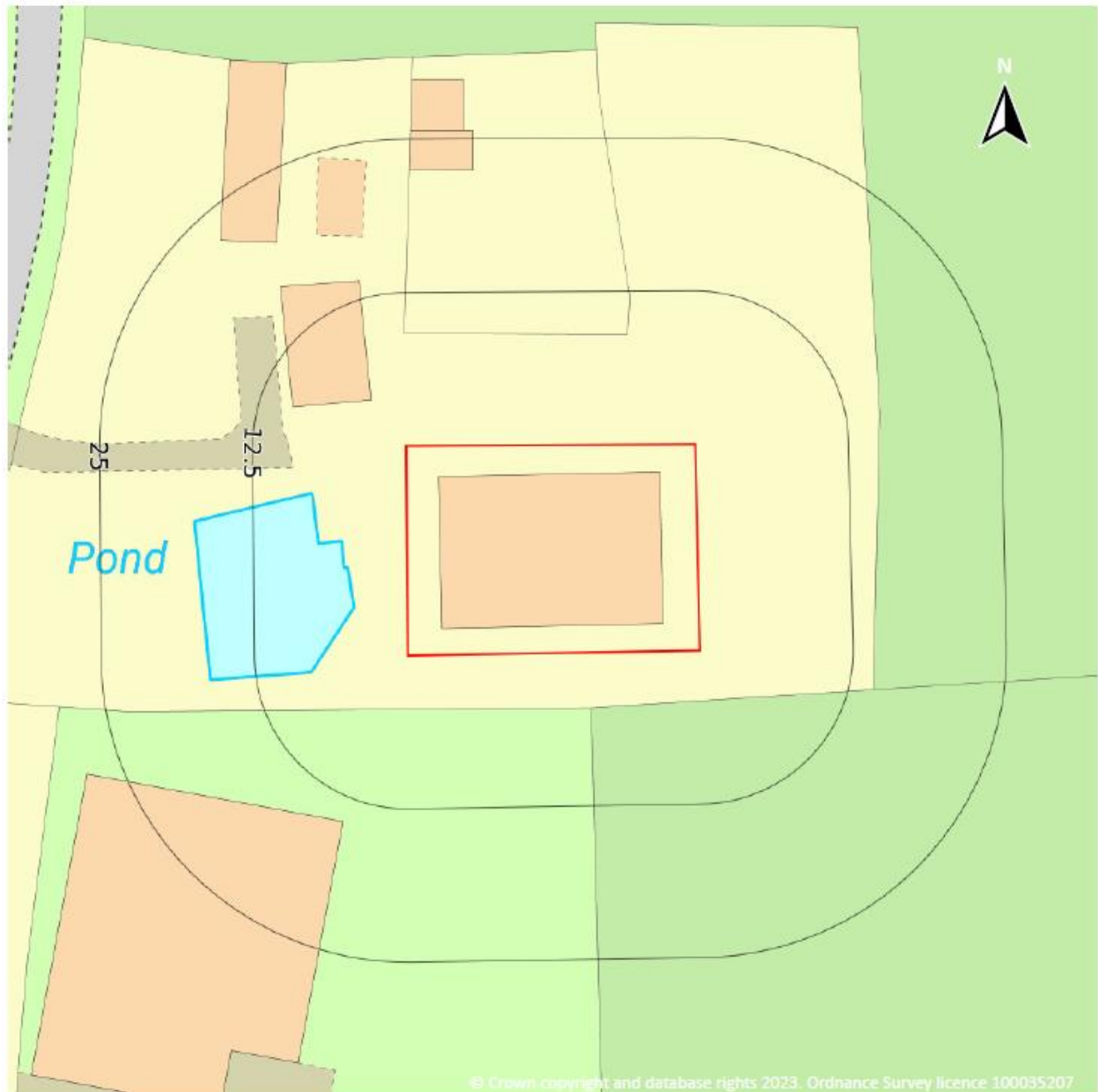
Separate Groundsure Report

**APPENDIX B HISTORICAL MAPPING**

Separate Map Packs (2 No. files)

**APPENDIX C**

**CURRENT SITE PLANS**



APPENDIX D

SITE PHOTOS AND LOCATIONS



**Site Walkover Photos**

**Address: Cobbold, West St, Walsham Le Willows  
Client: Ms. J. Long**

**Photo No.1: Facing slightly SE from outside the NW corner of site showing the front (western) face of the barn**

**Photo No.2: Facing southwards from outside the NW corner of site showing both front (western) and northern faces**



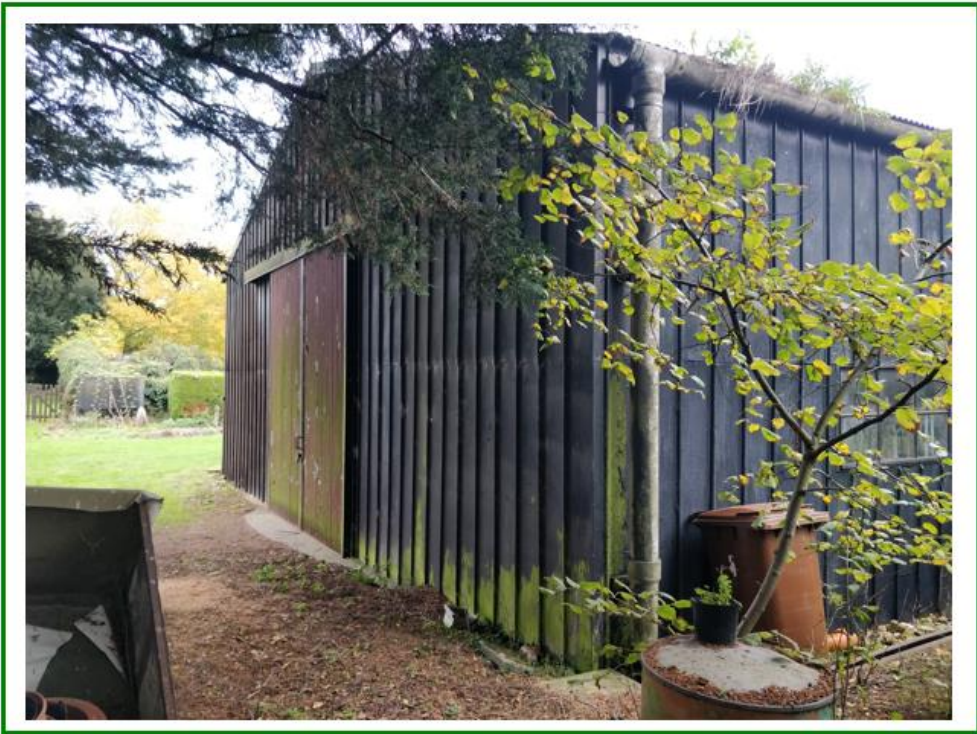


**Site Walkover Photos**

**Address: Cobbold, West St, Walsham Le Willows  
Client: Ms. J. Long**

**Photo No.3: Facing N/NE from outside the SW corner of site**

**Photo No.4: Facing NE/E from same location showing southern face of barn and small garden area here**







**Site Walkover Photos**

**Photo No.5: Facing west from inside the barn showing general, miscellaneous storage and concrete flooring throughout**



**Address: Cobbold, West St, Walsham Le Willows  
Client: Ms. J. Long**

**Photo No.6: Facing west from inside the barn showing tractor, attachments, trailers and fencing storage and concrete flooring**





**Site Walkover Photos**

**Address: Cobbold, West St, Walsham Le Willows  
Client: Ms. J. Long**

**Photo No.7: Facing west from outside the NE corner of site**

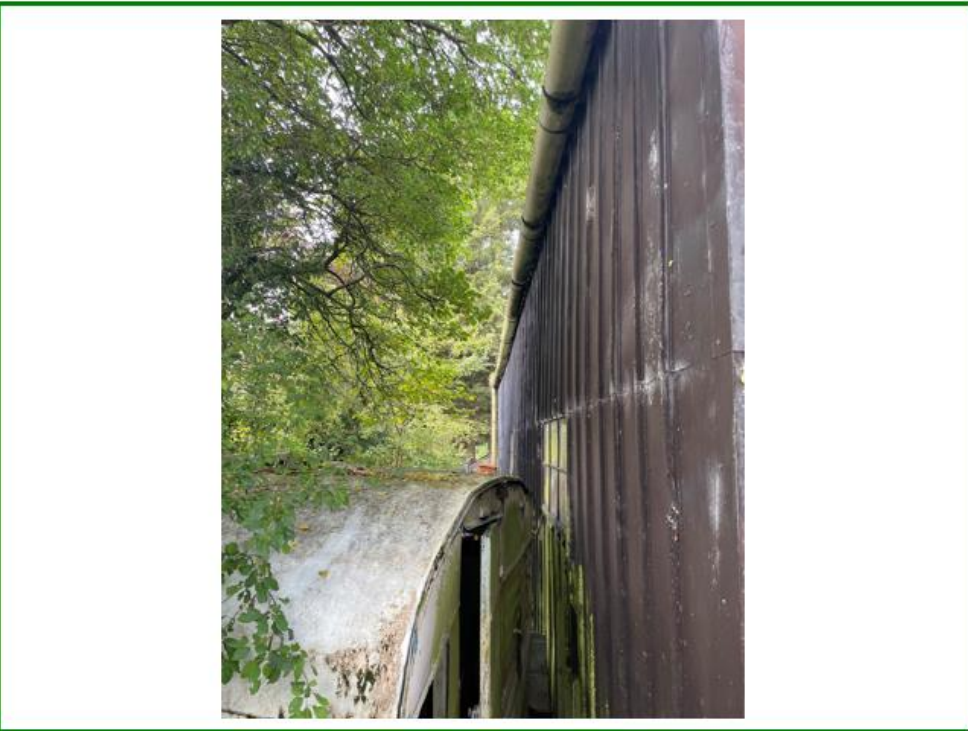
**Photo No.8: Facing SW from outside the NE corner of site**





**Site Walkover Photos**

**Photo No.9: Facing west along the southern face of the barn, showing dilapidated caravan and garden area to rear**



**Address: Cobbold, West St, Walsham Le Willows  
Client: Ms. J. Long**

**Photo No.10: Facing west outside the western face of the barn showing pond here (to remain)**



**APPENDIX E****WATCHING BRIEF**

It remains possible that previously unexpected soil conditions may be encountered during the construction process. Examples may include oily pockets within the soil, potential for asbestos containing materials, black ashy materials, soils exhibiting strong odours, brightly coloured materials, and former demolition materials.

Should previously undiscovered contamination be encountered during the demolition/construction of the new buildings the following course of action should be adhered to:

1. The ground workers should report any suspected contamination immediately to the Client's site supervisor. The supervisor should contact the Client or their appointed agent who will in turn contact Castledine Environmental to request an engineer to visit the site to assess the extent of the 'contamination'.
2. Castledine Environmental shall make records of their inspection, and pass details of these to the Local Authority.
3. Where the conditions revealed differ from those previously anticipated, the Castledine Environmental shall take samples as deemed appropriate to be dispatched for appropriate chemical testing.
4. Depending on the results of the testing either:
  - a. no further work will be required;
  - b. a further detailed risk assessment will be required; and/or
  - c. Localised specific remedial measures will be necessary. Appraisal criteria will vary depending on the nature of the assessment.
5. The results of any such testing will be sent to the Local Authority Pollution Control Section, Local Authority development control section, and the appointed building inspector. If remediation is required, the LA/Building inspector will be informed of the date and time of the proposed works.
6. Remediation will be undertaken in accordance with a method statement submitted for approval. The works shall be supervised where necessary

by Castledine Environmental who shall provide a Verification Report for the Local Authorities.

7. A copy of the discovery strategy should be lodged on site and provisions made to ensure that all workers are made aware of their responsibility to observe, report and act on any potentially suspicious or contaminated materials they may encounter.

APPENDIX F

DISCOVERY STRATEGY

