



**Castledine
Environmental**

LAND CONTAMINATION SURVEYS

**Phase 1 Land Contamination
Risk Assessment**

for

**Proposed Residential Conversion
of Agricultural Building**

on the site of

**Brindlewood, Dakings Lane,
Felsham IP30 0QW**

Date: February 2023

Status: Final Report

Reference: 3474D P1 Scaife – Bury St. Edmunds

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EXECUTIVE SUMMARY

The site is currently occupied by a former agricultural building, adjoined stables, a gravelled car parking area and an exterior concreted area (formerly occupied by structures) with the remainder of site presently occupied by grassed areas. Historically, the site remained unoccupied from at least circa.1884 until circa.1974/75, when the site was developed into 'Moat Farm'. The development included numerous exterior, unknown usage structures including 2 No. possible Nissen huts, 2 No. silos and various outbuildings and storage spaces. These features were then removed from site between the dates of circa.2018/2021 and the site remained as seen on the site walkover, following vegetation recovery in these areas.

Due to the historical development of and usage of the site for agricultural purposes, noted PACM's on both remaining structures and likely former structures and the demolition of aforementioned structures and the potential for remnant made ground deposits, there exists the potential for the site to have been contaminated.

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

It is recommended that further investigation inline with Section 11.0 is planned and carried out on site.

It is recommended that the remaining structure on site be subject to an asbestos survey (and subsequent removal, if required) by appropriately qualified personnel. This should be carried out prior to any demolition or redevelopment occurring in order to ensure site works do not cause future contamination of the site.

This report should be submitted to your Local Planning Authority for agreement to allow the Phase 2 intrusive testing to be undertaken.

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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

Castledine Environmental have been appointed by Ms. R. Dunn to undertake a Phase 1 Desk study on Brindlewood, Dakings Lane, Felsham IP30 0QW.

4.0 SCOPE

Castledine Environmental have prepared this report for the sole use and reliance of Ms. R. Dunn and her appointees for the purpose of ensuring compliance with:

- Paragraph(s) 174, 179, 183 & 184 of the National Planning Policy Framework 2021
- 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

The report consists of a preliminary risk assessment in accordance with BS10175:2011+A2:2017, CLR11 “Model Procedures for the Management of Land Contamination” and LCRM “Land Contamination Risk Management”.

The objectives of the report are:-

- To assess historical activities at the site with respect to their potential impact on the site environment.
- 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 assess historical and current surrounding land use in relation to known or potential off-site contamination issues that may impact on the subject site and
- To develop a preliminary conceptual site model (CSM).

5.0 SITE DESCRIPTION

The site is located in Felsham, Mid Suffolk at National Grid Reference: 493780,256082 and is approximately 0.26ha in area.

The site resembles a square in shape and is orientated east to west, north to south. The is located in a predominantly rural area and is directly bounded by Dakings Lane to the east, a neighbouring dwelling and its garden spaces north, a moat with a dwelling beyond to the south and field to the west.

The site interior comprises a linear barn unit with adjoined stables located on the southern face, with the remainder of site occupied by exterior areas formed by a car parking area, small yard area and field.

Access to site was provided via an access track in the north east of site which leads west off Dakings Lane and terminates at the car parking area on site. Both the access track and the car parking area were noted to be formed by pea-gravels. Also in the car parking area, adjacent to the north eastern corner of the building a self- bunded oil tank was seen. The tank was seen to be atop a concrete base and no visual or olfactory evidence of hydrocarbon spillage was noted. The barn structure itself is then located directly south of the car parking area and is constructed of brick with timber structuring with concrete flooring seen throughout. The corrugated roofing seen on the building appeared to be of potentially asbestos composition with corrugated metal sheeting then laid atop this. The storage of miscellaneous items such as gym equipment, bikes, timber and firewood, a ride-on lawnmower, garden furniture such as chairs, tables and a barbeque and construction materials such as slabs, paving stones, insulation and ladders were noted within the barn unit. On the southern face of the barn lies a series of stable units, constructed of the same materials and with the same concrete flooring throughout. Access to these units is via the southern face of the building and the interior of which was seen to be in use for the storage of further garden furniture such as patio heaters and fire wood and construction materials such as insulation.

The remaining areas on site are then formed by a small concrete yard area directly south again of the stables and the open, unoccupied grassed areas leading to the western and southern boundaries of site. The concreted area was seen to be fractured in places with vegetation growing through cracks and was occupied by a heap of soil, wooden sheeting and timber, concrete bags and further insulation and cut-wood in one-tonne bags.

Potential sources of contamination noted on the walkover include potentially asbestos containing materials (PACM's) noted on the building itself, the oil tank on the northern face of the building (seen to be self-bunded and atop a clean, intact concrete base) and the scattered refuse and debris along with the heap of topsoil seen south of the building. The ride-on lawn mower and adjacent fuel canister were not considered significant potential sources of contamination, with no visual or olfactory evidence of hydrocarbon spillage associated with the machinery noted.

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

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

None recorded within 500m of site.

6.1.3 SOURCE PROTECTION ZONE

The site is located in a Type 3 Total Catchment Source Protection Zone (SPZ) – Source protection zones define the sensitivity of an area around a potable abstraction site to contamination.

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: Intermediate Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Principal Flow mechanism: Intergranular
2	49m S	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: Low	Vulnerability: Low Aquifer type: Principal Flow mechanism: Intergranular

6.1.5 POTENTIAL SURFACE WATER

The Groundsure report records an unnamed, surface level watercourse located 199m and 215m north and being culverted 207m north of site. Satellite imagery also shows a moat encompassing a house directly south of site, a large pond approximately 24m west and a second, larger pond located approximately 63m east of site.

6.1.6 DISCHARGE CONSENTS

The Groundsure report records an active licenced discharge consent held 50m south of site. The consent relates to final / treated effluent discharges (not on behalf of the local water company) into a tributary of the River Gipping and has been in effect since 10/06/2020.

6.2 PERMITTED PROCESSES

None recorded within 500m of site.

6.3 POLLUTION INCIDENTS

None recorded within 500m of site.

6.4 RADIOACTIVE SUBSTANCES REGISTRATIONS

None recorded within 500m of site.

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

None recorded within 500m of site.

6.5.2 LANDFILL SITES

None recorded within 500m of site.

6.6 HAZARDOUS SUBSTANCES

None recorded within 500m of site.

6.7 ECOLOGICAL RECEPTORS

The Groundsure report records the site as being located within the River Gipping surface waters Nitrate Vulnerable Zone (NVZ), the Lower Stour surface waters NVZ and the Sandlings and Chelmsford groundwaters NVZ.

No further sensitive land usages are recorded within 1000m of site other than additional records of the above NVZ's.

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 geological deposits of the Lowestoft Formation on site, comprising an extensive sheet of chalky till, together with outwash sands and gravels, silts and clays. The till is characterised by its chalk and flint content.

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' and 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 Groundsure report record bedrock geology of the Crag Group comprising sands, gravels and clays. The sands are characteristically dark green from glauconite but weather bright orange with haematite 'iron pans'. The gravels in the lower part of the group are almost entirely composed of flint. Those higher in the group include up to 10% of quartzite from the Midlands, igneous rocks from Wales, and chert from the Upper Greensand of south-eastern England.

6.8.4 BEDROCK PERMEABILITY

The Groundsure report records the site as being within an area where the maximum permeability of bedrock geology is recorded as 'high' and the minimum permeability as 'high' and facilitated by intergranular flow mechanisms.

6.8.5 ARTIFICIAL GROUND

BGS geological mapping records no artificial deposits located on or within 250m of site.

6.8.6 COAL MINING

The site is not located in a coal mining reporting area.

6.8.7 NON-COAL MINING

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

6.8.8 SURFACE MINING / NONE-COAL MINING

ID	Distance [m]	Direction	Land Usage	Year of Mapping
A	19	SE	Pond	1905
A	19	SE	Pond	1884
A	27	SE	Pond	1977

ID	Distance [m]	Direction	Land Usage	Year of Mapping
B	57	E	Pond	1905
B	57	E	Pond	1884
B	59	E	Pond	1905
B	60	E	Pond	1977
B	60	E	Pond	1953

6.8.9 RADON

The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level. 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 MAPS

The site is shown as located within a wider, predominantly rural area and as directly bounded by a neighbouring dwelling north, Dakings Lane with a farmyard beyond to the east, a moat with a dwelling beyond south and field to the west. The site interior at this time resembles that seen on the site walkover, with an east to west orientated barn seen with adjoined stabling on the southern face and the gravelled car parking area north of the structure.

6.9.2 GOOGLE EARTH

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

Date	Description
December 2000	The site is shown as occupied by the linear, east to west orientated barn, as seen on the site walkover; however, the building is encompassed by concreted areas and has what appears to be an extension on the western face. Further extensions or sheds are then located atop the concreted areas seen south of the barn. South again of this lie further structures, not seen on the site walkover and 2 No. silos and 2 No. possible Nissen huts or large tanks are located in the SW corner of site. The fielded area west of site appears to be demarcated into numerous field plots at this time for animal grazing. The area east of site remains occupied by the roadside with a farm beyond.
August 2007	A bus or static caravan is now located in the NE of site, north of the 2 No. silos here and a second, similar feature is located between the huts and unit in the south of site.
December 2007	No major change on site nor site relevant change to the surrounding areas.
April 2011	No major or discernible change on site. Field plot demarcations to the west of site have been removed.
April 2015	The bus / static caravan and the other, similar feature in the south of site have been removed.
July 2018	The site has now been cleared of the structures not seen on the site walkover. The 2 No. silos in the west, the 2 No. Nissen huts in the SW and the adjacent and adjoined sheds and units have all been removed. Bare earth and concrete remains to the west and south of the remaining building. The units adjoined to the SE of the building (atop the present-day concrete area) remain adjoined to the building. The area west of site is now shown as a single, large and unoccupied field.
April 2021	The site now resembles that seen on the site walkover with the gravelled parking area now located north of the building, the adjoined sheds on the SE extent of the building removed and the former bare earth / concreted areas are now vegetated. The pond seen west of site in the present-day is now also present.
September 2021	No major change on site nor site relevant change to the surrounding areas.
March 2022	No major change on site nor site relevant change to the surrounding areas.

6.10 GOOGLE STREET VIEW

Google Street View imagery for the site is unavailable due to the sites located to the rear of a densely vegetated eastern site boundary, obscuring the remainder of site from view.

6.11 HISTORIC MAPPING

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

Map	Onsite	Offsite
OS County Series: 1884, 1:2,500	The site is shown as unoccupied field.	The roadside is located directly east, as in the present-day with 'The Grange' farmyard directly beyond the roadside. A large pond is then located approx. 63m east of site on the far side of the farm buildings, as second, linear pond is located approx.33m SE and a moat is located directly south of site (all of which are persistent until the present-day).
OS County Series: 1884-1888, 1:10,560	No discernible change on site.	Surrounding areas see little site relevant change.
OS County Series: 1902-1903, 1:2,500	No discernible change on site.	Surrounding areas see little site relevant change.
OS County Series: 1905, 1:10,560	No discernible change on site.	Surrounding areas see little site relevant change.
Provisional: 1953, 1:10,560	No discernible change on site.	Surrounding areas see little site relevant change.
National Grid: 1974-1975, 1:2,500	The site is now shown as occupied by the structure seen in the present-day along with further, unknown usage structures in SE, S, SW (likely Nissen huts) and W extents of site. The site is now named 'Moat Farm'.	A dwelling named 'Moat House' is now located south of site within the moat itself. The farmyard east of site has been extended slightly eastwards and northwards.
National Grid: 1979-1983, 1:10,000	No discernible change on site.	Further Grange Farm associated structures have been erected approx.400m south of site.

Map	Onsite	Offsite
National Grid: 1993, 1:2,500	No discernible change on site.	Surrounding areas see little site relevant change.
National Grid: 2001, 1:10,000	No discernible change on site.	Surrounding areas see little site relevant change.
Landline: 2003, 1;1,250	The silos are now present in the west of site.	Surrounding areas see little site relevant change.
National Grid: 2010, 1:10,000	No discernible change on site.	Surrounding areas see little site relevant change.
National Grid: 2023, 1:10,000	The site has now been cleared of the exterior structures and is as appeared on the site walkover.	Ponds to the east, SE and south of site remain persistent.

6.12 CURRENT LAND USE DATA

ID	Distance [m]	Direction	Company	Activity	Category
1	0	W	Silo	Hoppers and silos	Farming
A	17	S	A J Davey	Vehicle repair, testing and servicing	Repair and servicing

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

The Groundsure report records a smithy located 497m north west of site and identified from historical mapping dated circa.1884.

No further potentially contaminative land usages are recorded within 500m of site.

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

None recorded within 500m of site.

7.0 POLLUTANT LINKAGE ASSESSMENT

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 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.

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

- Development of and usage of the site for agricultural purposes ('Moat Farm' from circa.1974/75 to contemporary times)
- Demolition of silos, unknown usage structures and Nissen Huts (circa.2018/2021)
- PACM's on remaining site structures and likely former structures
- Potential for made ground associated with former development, usage and demolition of features on site
- Storage on site of bus / static caravan, likely further machinery (no immediate hazard from ride-on lawnmower, no significant spillages noted either visually or olfactorily)

7.1.2 OFFSITE

- Adjacent farmyard usage (directly east, circa.1884 onwards)

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;
- Skin contact;
- Inhalation;
- Plant uptake,
- Direct contact by buried structures;
- 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 former agricultural building, adjoined stables, a gravelled car parking area and an exterior concreted area (formerly occupied by structures) with the remainder of site presently occupied by grassed areas. Historically, the site remained unoccupied from at least circa.1884 until circa.1974/75, when the site was developed into 'Moat Farm'. The development included numerous exterior, unknown usage structures including 2 No. possible Nissen huts, 2 No. silos and various outbuildings and storage spaces. These features were then removed from site between the dates of circa.2018/2021 and the site remained as seen on the site walkover, following vegetation recovery in these areas.

Due to the historical development of and usage of the site for agricultural purposes, noted PACM's on both remaining structures and likely former structures and the demolition of aforementioned structures and the potential for remnant made ground deposits, there exists the potential for the site to have been contaminated with various substances including:

- Metals and metalloids (agricultural usage, unknown usage structures and storages, potential for made ground deposits)
- Polycyclic aromatic hydrocarbons (PAH's) (concrete bases historically laid atop ashy subbases, domestic fires, made ground deposits)
- Petroleum hydrocarbons (potential fuel and/or machinery storage in exterior structures, onsite storage of bus – no hazard identified inside remaining structure)
- Asbestos (age of the structures on site, noted PACM's on remaining site structure in poor repair, demolition of prior structures on site)
- SVOC's / VOC's / agricultural chemicals (pesticides, insecticides and fungicides)

8.1.2 HAZARDOUS GROUND GAS AND VAPOURS

No significant potential sources of ground gas identified on or in proximity to site with a number of ponds and a moat identified in the local area; however, these features persist until the present-day and as such are of little risk to site. No immediate, significant potential sources of vapours have been identified; however, it is considered prudent to sample for TPH CWG during site sampling in exterior areas formerly occupied by a bus / static caravan and prior structures.

TABLE 1. SUMMARY OF SIGNIFICANT POLLUTION LINKAGES

Contaminant	Pathway	Receptor	Probability of Pollutant Linkage	Consequence	Risk	Possible Mitigation
Contaminated Soils <i>(development of and usage of site for agricultural usages, PACM's past and present, potential for made ground, storage of bus / static and likely further machinery)</i>	Direct Ingestion & Direct Contact	Site Workers <i>(during site works, excavations, eating & drinking)</i>	Lw	Md	M/L	Site workers to wear appropriate PPE for health and safety reasons, considered usage and adherence to relevant HSE guidance would be sufficient to mitigate this risk to LOW – following confirmation via an Intrusive Phase II Site Investigation. Due to the sites historical development and usage for agricultural purposes, the subsequent demolition of said features, the potential for made ground, likelihood for PACM materials on historical buildings (and noted on present building in poor repair) and likelihood for historical machinery and fuels storage, it is recommended that an Intrusive Phase II Site Investigation is planned and carried out on site. This should involve trial pit formation across the site, to facilitate the assessment of ground conditions (i.e. natural, reworked natural or made ground deposits, their nature, extent and depth) and the taking of environmental samples, for laboratory analysis. Combination of these works will inform the suitability of site soils, the extent of remediation required (if any) and suitability of soils for new potable supply piping.
Contaminated Soils <i>(development of and usage of site for agricultural usages, PACM's past and present, potential for made ground, storage of bus / static and likely further machinery)</i>	Inhalation of Dust, Dry Arisings / Deposits	Site Workers <i>(during site works, excavations, eating & drinking)</i>	Lw	Md	M/L	
Contaminated Soils <i>(development of and usage of site for agricultural usages, PACM's past and present, potential for made ground, storage of bus / static and likely further machinery)</i>	Plant Uptake, Direct Ingestion & Direct Contact	End Users <i>(site residents, visitors, children, pets, service personnel)</i>	Li	Md	M	
Contaminated Soils <i>(development of and usage of site for agricultural usages, PACM's past and present, potential for made ground, storage of bus / static and likely further machinery)</i>	Inhalation of Dust, Dry Arisings / Deposits	End Users <i>(site residents, visitors, children, pets, service personnel)</i>	Li	Md	M	
Contaminated Soils <i>(development of and usage of site for agricultural usages, PACM's past and present, potential for made ground, storage of bus / static and likely further machinery)</i>	Plant Uptake, Direct Ingestion & Direct Contact	Flora and Fauna <i>(on and offsite)</i>	Li	Md	M	
Contaminated Soils <i>(development of and usage of site for agricultural usages, PACM's past and present, potential for made ground, storage of bus / static and likely further machinery)</i>	Vertical and lateral migration <i>(superficial geology provides some protection from onsite features, being predominantly low in permeability)</i>	Controlled Waters <i>(Principal Aquifer, nearby moat & ponds)</i>	Lw	Md	M/L	
Contaminated Soils <i>(development of and usage of site for agricultural usages, PACM's past and present, potential for made ground, storage of bus / static and likely further machinery)</i>	Direct contact <i>(pipe degradation and leaching)</i>	Services <i>(impacted potable supply piping)</i>	Lw	Md	M/L	
Ground Gases (Methane and CO ₂) <i>(no significant potential sources identified)</i>	Vertical and lateral migration <i>(no significant potential sources identified – superficial geology provides some protection being predominantly low in permeability)</i>	End Users & Building Envelope <i>(ingress and build up)</i>	UI	Md	L	No significant potential sources of ground gas identified on or in proximity to site with a number of ponds and a moat identified in the local area; however, these features persist until the present-day and as such are of little risk to site.
Volatile and Semi-volatile Organic Compounds <i>(potential made ground, storage of bus / static caravan, likely historical machinery storage)</i>	Vertical and lateral migration <i>(superficial geology provides some protection being predominantly low in permeability)</i>	End Users & Building Envelope	Lw	Md	M/L	Likelihood for historical machinery storage and noted bus / static caravan storage may have impacted site soils with hydrocarbons – recommend further investigation.
Radon	Vertical and lateral migration	End Users & Building Envelope	UI	Md	L	Site is 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 over-simplification 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

Very high risk (Vh)	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.
High risk (Hi)	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.
Moderate risk (Md)	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.
Low risk (Lw)	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.
Very low risk (VI)	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 **MODERATE** level of risk with respect to the proposed development.

It is recommended that further investigation inline with Section 11.0 is planned and carried out on site.

It is recommended that the remaining structure on site be subject to an asbestos survey (and subsequent removal, if required) by appropriately qualified personnel. This should be carried out prior to any demolition or redevelopment occurring in order to ensure site works do not cause future contamination of the site.

This report should be submitted to your Local Planning Authority for agreement to allow the Phase 2 intrusive testing to be undertaken.

10.0 SUMMARY OF RISKS**10.1.1 SOIL CONTAMINATION**

The site is currently occupied by a former agricultural building, adjoined stables, a gravelled car parking area and an exterior concreted area (formerly occupied by structures) with the remainder of site presently occupied by grassed areas. Historically, the site remained unoccupied from at least circa.1884 until circa.1974/75, when the site was developed into 'Moat Farm'. The development included numerous exterior, unknown usage structures including 2 No. possible Nissen huts, 2 No. silos and various outbuildings and storage spaces. These features were then removed from site between the dates of circa.2018/2021 and the site remained as seen on the site walkover, following vegetation recovery in these areas.

Due to the historical development of and usage of the site for agricultural purposes, noted PACM's on both remaining structures and likely former structures and the demolition of aforementioned structures and the potential for remnant made ground deposits, there exists the potential for the site to have been contaminated.

10.1.2 GROUND GASSES AND VAPOURS

No significant potential sources of ground gas identified on or in proximity to site with a number of ponds and a moat identified in the local area; however, these features persist until the present-day and as such are of little risk to site. No immediate, significant potential sources of vapours have been identified; however, it is considered prudent to sample for TPH CWG during site sampling in exterior areas formerly occupied by a bus / static caravan and prior structures.

11.0 RECOMMENDATIONS

It is recommended that an Intrusive Phase II Site Investigation is planned and carried out on site. This should involve trial pit formation across the site, to facilitate the assessment of ground conditions (i.e. natural, reworked natural or made ground deposits, their nature, extent and depth)

and the taking of environmental samples, for laboratory analysis. The combination of these works will inform the suitability of site soils for the proposed end-usage of site (residential), the extent of remediation required (if any) and suitability of soils for new potable supply piping (to prevent pipe degradation and leaching).

12.0 REFERENCES**12.1 LEGISLATION AND REGULATIONS****12.1.1 ACTS**

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

12.1.2 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

12.1.3 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

12.2 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.

12.3 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)

12.4 NON STATUTORY TECHNICAL GUIDANCE**12.4.1 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.

12.4.2 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

12.4.3 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)

13.0 APPENDICES

APPENDIX A ENVIRONMENTAL SEARCH

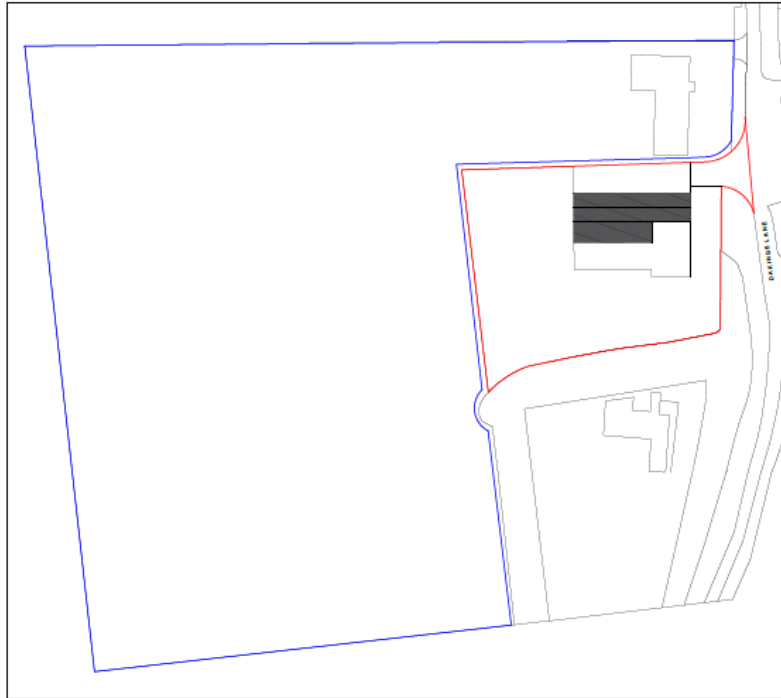
Separate Groundsure Report

APPENDIX B HISTORICAL MAPPING

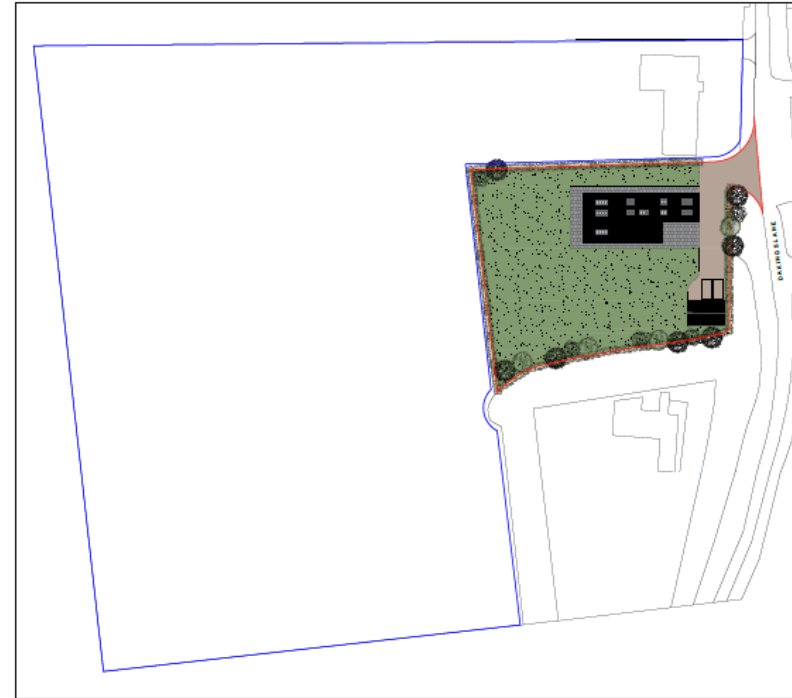
Separate Map Packs (2 No. files)

APPENDIX C

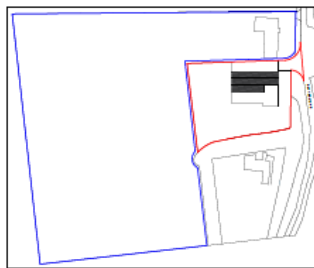
PROPOSED AND CURRENT SITE PLANS



EXISTING BLOCK PLAN - SCALE 1:200



PROPOSED BLOCK PLAN - SCALE 1:200



PROPOSED SITE LOCATION PLAN



Brindlewood Barn - Site & Block Plans



NO.	DESCRIPTION	DATE
01	SITE & BLOCK PLANS	
PROJECT	BRINDLEWOOD BARN, DANFORTH LANE, BURY ST. EDMUNDS, SUFFOLK IP13 0JN	
CLIENT	MR & MRS DUNN	
SCALE	1:500/A1	DATE: JAN 2023
DISCIPLINE	PLANNING	ISSUE NO. 01
JOB NO.	1592	ISSUE NO. 01



Architectural Design
11 High Hill, Ipswich, IP1 3JG
01473 355555

APPENDIX D

SITE PHOTOS AND LOCATIONS



Site Walkover Photos

Photo No.1: Facing west from outside the eastern boundary of site on Dakings Lane showing the site access



Address: Brindlewood, Dakings Lane, Felsham IP30 0QW
Client: Ms. R. Dunn

Photo No.2: Facing SW from the NE corner of site showing the gravelled parking area north of the site building





Site Walkover Photos

Photo No.3: Bunded oil storage on NE corner of the building and atop a concrete base – visual or olfactory evidence of spillages



Address: Brindlewood, Dakings Lane, Felsham IP30 0QW
Client: Ms. R. Dunn

Photo No.4: Facing SE from outside the NW corner of the building on site showing the front (northern) face of the building





Site Walkover Photos

Address: Brindlewood, Dakings Lane, Felsham IP30 0QW
Client: Ms. R. Dunn

Photo No.5: Facing slightly NE from the SW extent of site

Photo No.6: Facing east from the western extent of the area directly south of the buildings and adjoined stabling





Site Walkover Photos

Address: Brindlewood, Dakings Lane, Felsham IP30 0QW
Client: Ms. R. Dunn

Photo No.7: Facing slightly NW from outside the stable units located on southern face of the larger building

Photo No.8: Facing NW from the SE extent of site showing small yard area on southern face of larger building adj. to stables





Site Walkover Photos

Address: Brindlewood, Dakings Lane, Felsham IP30 0QW
Client: Ms. R. Dunn

Photo No.9: Showing concrete flooring noted in stables

Photo No.10: Showing potentially asbestos roofing beneath newly installed corrugated metal roofing atop stables





Site Walkover Photos

Photo No.11: Example shot of interior of stables showing concrete flooring and miscellaneous storage



Address: Brindlewood, Dakings Lane, Felsham IP30 0QW
Client: Ms. R. Dunn

Photo No.12: Facing SW inside the barn unit showing interior rooms (location of gym equipment)





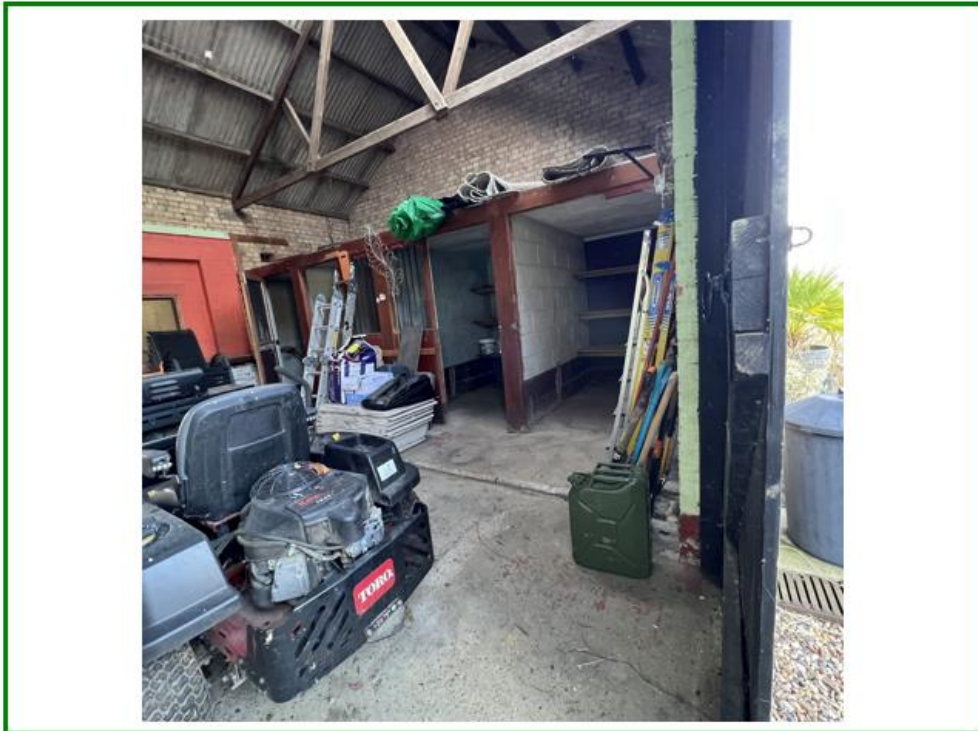
Site Walkover Photos

Address: Brindlewood, Dakings Lane, Felsham IP30 0QW

Client: Ms. R. Dunn

Photo No.13: Taken from the northern extent of the barn facing south west showing ride on mower and miscellaneous storage

Photo No.14: Taken west to east of the eastern end of the barn showing a workshop area with timber storage





Site Walkover Photos

Photo No.15: Workshop area taken facing north east showing power tools and work bench



Address: Brindlewood, Dakings Lane, Felsham IP30 0QW

Client: Ms. R. Dunn

Photo No.16: Taken facing south of the workshop area timber storage



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

