PADDOCK GEO ENGINEERING

Barn 4, Mill Barn Farm, Bridge Road, Broughton, Huntingdon, PE28 3AZ

Preliminary Contamination Risk Assessment



AgReserves UK Ltd

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Milton Keynes: The Log Cabin, Manor Farm, Whaddon Road, Newton Longville, Milton Keynes, MK17 0AU
Swindon/Oxford: 21 Tyrell Close, Stanford in the Vale, Oxon, SN7 8EY
[redacted]
W: www.paddockgeoengineering.co.uk

Company Number: 8613165
VAT Number: GB 166 8087 72

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ISSUE	DATE	Written By	Comments
1	05/09/2024	[redacted] BSc MSc FGS **Checked by** [redacted] BSc MSc FGS	-
For and on behalf of Paddock Geo Engineering Limited			

1.0 INTRODUCTION

Paddock Geo Engineering Limited (PGE) were instructed by AgReserves UK Ltd; the Client, to undertake a Preliminary Contamination Risk Assessment (Stage 1 Tier 1 (formerly Phase 1) of a Site Contamination Assessment) of the subject site, referred to as Barn 4, Mill Barn Farm, Bridge Road, Broughton, Huntingdon, PE28 3AZ.

The overall objective of the Preliminary Contamination Risk Assessment was to inform the Client of the ground conditions, and any potential environmental or ground-related risks associated with the development of the site. The Risk Assessment undertaken relates to the demolition of the existing barn and the development of 3no. residential dwellings with associated car parking and soft landscaped garden areas.

1.1 Terms of Reference

- British Standard BS10175:2011+A2:2017 Investigation of Potentially Contaminated Sites - Code of Practice;
- CLR7 Assessment of Risks to Human Health from Land Contamination 2002, DEFRA / Environment Agency (withdrawn);
- CLR8 Potential Contaminants for the assessment of Land 2002, DEFRA / Environment Agency (withdrawn);
- CLR11 Model Procedures for the Management of Land Contamination 2010, DEFRA / Environment Agency;
- PPG23 (PPS23) Planning and pollution control (contaminated land aspects) 2002;
- GPLC1 Guiding Principles for Land Contamination 2010, Environment Agency;
- Environmental Protection Act: 1990 – Contaminated Land Statutory Guidance, April 2012, DEFRA;
- CIRIA C665 Assessing risks posed by hazardous ground gases to buildings, CIRIA 2007;
- BS 8576:2013 Guidance on investigations for ground gas - Permanent Gases and Volatile Organic Compounds (VOCs);
- Land Contamination Risk Management (LCRM), 2023, Environment Agency.

2.0 THE SITE

2.1 Site Description

The subject site is located in a rural area near the village of Broughton, located approximately 5km north-west of Huntingdon. The site comprises an irregularly shaped plot of land, which forms part of Mill Barn Farm. The investigated area is surrounded to the north by recent residential development, to the south by hardstanding surfaces and agricultural field, to the east and west by agricultural field.

On a larger scale the site is surrounded in all directions by agricultural fields. The main access to the site is via a private road off Bridge Road.

The subject site covers an area of approximately 0.06 hectares, with the centre of the site at approximate national grid reference 528390, 277080 and postcode PE28 3AZ.

A Site Location Plans and an Aerial Photograph are presented in Appendix A.

2.2 Proposed Development

The proposed development scheme involves the partial demolition of the existing barn and the subsequent development of 4no. residential properties with associated car parking and soft landscaped garden areas.

Therefore, the soil contamination exposure characteristics for the assessment of risk will be analogous to residential with plant uptake.

A proposed development plan is presented within Appendix A.

2.3 Walkover Survey

2.3.1 Site Area

A site walkover survey was conducted on 5th September 2024 by a representative of Paddock Geo Engineering Limited. A series of photographs taken during the walkover survey are presented in Appendix B along with a Site Walkover Survey Plan.

Access to the site is via an access track joining the nearby Bridge Road c.85m north of the site. The site boundaries are defined by the track and a residential property with associated soft landscaped garden areas to the north, a converted barn and farm building are located adjacent to the northeastern of the site.

The site is currently occupied by a large, steel framed cement sheet clad barn. This barn was used for general food produce (grain) storage and storage of building materials including machinery storage. Suspected asbestos cement sheet cladding fragments were noted in heaps adjacent to the south of the existing barn.

The land to the west, south and east of the site comprise open agricultural fields with mature to semi-mature hedgerows. The land immediately north of the site is occupied by several newly developed residential dwellings which did not appear occupied at the time of PGE's attendance. Newly placed fuel oil tanks were observed to present adjacent to the site boundary, c.10m north east, c.25m west, c.50m north of the site.

During PGE's walkover no obvious signs of contamination, spillages or leaks was observed on the ground around any of the tanks.

Topographically, the site is flat, surfaced with concrete hardstanding and slopes to the south.

Surrounding Area

The site is situated in a rural area with the nearest village, Broughton, located c.600m north-west of the subject site. Mill Barn Farm is located adjacent to the east of the site whilst a residential property and associated garden area is located to the northeast. Agricultural fields are located to the south, east and west sides.

No trade directories are recorded within 1km of the site on the Envirocheck in the site environ

2.4 Geology

Information on the underlying geology at the site has been obtained from the British Geological Survey (BGS) Sheet 172 and 187 (scale: 1:50,000 dated 1995 and 1975) for Ramsey and Huntingdon, the BGS Geological Map Viewer and Geological Mapping provided by Landmark within the Envirocheck Report (a copy of which is provided in Appendix C).

The superficial deposits underlying the site comprise Oadby Member Glacial Diamicton Till which were formed up to 2 million years ago during the Quaternary Period in a local environment dominated by ice age conditions. The Diamicton Till deposits are known variable and comprises clay, silt, sand and gravel.

The bedrock at the site is indicated to comprise the Oxford Clay Formation which was formed approximately 164 to 166 million years ago during the Jurassic Period in a local environment dominated by shallow seas. These deposits are known to comprise predominantly mudstone and clay.

The geological maps provided within the Envirocheck Report (Appendix C) identifies no areas of Worked Ground or Made Ground within 1km of the site.

2.4.1 Borehole Records

A search was made of the online BGS database for published borehole records within the area. No boreholes are located within 1km of the subject site.

2.5 Hydrogeology

The groundwater vulnerability maps for the site and the surrounding areas indicates that the superficial Oadby Member has been designated as a Secondary Undifferentiated Aquifer. In most cases, this means the layer in questions has been assigned in cases where it has not been possible to attribute either category A or B to a rock type.

The bedrock mudstone of the Oxford Clay Formation has been designated as an unproductive strata. In most cases, these are rock layers or deposits with low permeability that have negligible significance for water supply or river base flow.

The combined groundwater vulnerability on site is considered by Envirocheck to be 'high' vulnerability secondary aquifer. The rating provided is due to likely intermediate pollutant speed and the potential for well-connected fractures within the superficial deposits.

The Envirocheck Report indicates the site and surrounding 1km are not located on or within a Source Protection Zone (SPZ).

The Envirocheck Report indicated that there are no groundwater abstractions within 1km of the subject site.

Given the hydrogeological status of the site, the groundwater beneath the site is considered to be of high sensitivity with regards to near surface contamination.

The BGS groundwater flood susceptibility mapping area indicates there is the potential for groundwater flooding to occur at surface. The EnviroCheck Report identifies several records for potential for groundwater flooding of property situated below ground level with the closest located at 7m north from the site.

2.6 Hydrology

The EnviroCheck Report identifies the nearest surface water feature to be an unknown feature located 61m south.

The Envirocheck Report indicates 1 no. pollution incidents to controlled water recorded at 985m northwest of the site and related to Chemical industry in the location of Ely District and has no listed contaminant, however the incident severity is recorded to be 'Category 3 – Minor incident'.

The Envirocheck Report indicates no surface water abstractions within 1km of the subject site.

The Envirocheck Report recorded 3 no. discharge consents all within 500m to 1km of the subject site. The closest identified a G E Gowlett is located 528m north-east of the subject site. The discharge has been identified within the report as 'Agriculture - Livestock Farming' onto land/soakaway. The discharge appears to be still active. The second discharge is identified as Bev Mortlock Limited and located 557m north-west of the subject site. The discharge is recorded as Unknown into a land/soakaway. The discharge has been revoked 1st October 1996.

The site and surrounding area 500m do not fall within a flood risk zone. The site and surrounding area do not benefit from flood defences.

2.7 Geotechnical Risks

The geotechnical risks that could impact the site and any shallow foundations present are listed below.

Table 1: Geotechnical Risks

Hazard	Assessed On-Site Risk (and area within 10m of the site)	
	Present	Level
Potential for Collapsible Ground Stability	✓	Very Low
Potential for Compressive Ground Stability	✗	No Hazard
Potential for Ground Dissolution Stability	✗	No Hazard
Potential for Landslide Ground Stability	✓	Very Low
Potential for Running Sand Ground Stability	✓	Very Low
Potential for Shrinking or Swelling Clay	✓	Low

2.8 Ground Stability and Mining

The site is not located within an area with a history of coal mining and no mining records or records of natural cavities are listed within 1km.

The Envirocheck Report indicates that no recorded mineral sites are listed within the 1km of the subject site.

2.9 Radon

The property is indicated within the Envirocheck Report to be in a lower probability radon area, with less than 1% of homes estimated to be at or above the action level. Therefore, no radon protection measures are necessary in the construction of any new dwellings, buildings or extensions on site.

It is noteworthy that the BRE and BGS / HPA information is based on statistical analysis of measurements made in dwellings in combination with geological units, which are known to emit radon. Consequently, there is a risk for actual radon levels at the site to exceed the levels assessed by the BGS / HPA / BRE. Currently, the only true method of checking actual radon levels is by measurement within a building on the site over a period of several months. It should be noted that it is not currently a requirement of the Building Regulations to test new buildings for radon, however the BRE publications recommend testing on completion or occupation of all new buildings (domestic and non-domestic), extensions and conversions.

2.10 Waste Management and Landfill

There are no recorded BGS Recorded Landfills Site, Historical Landfill Sites, Local Authority Recorded Landfill Sites, Registered Landfill Sites, Licensed Waste Management, Registered Waste Transfer Sites and Registered Waste Treatment or Disposal Sites within 1km of the site.

2.11 Sensitive Land Uses

The Envirocheck Report indicates the site is located on a Nitrate Vulnerable Zones. The zone is identified as Middle Level Nvz (Surface Water).

2.12 Hazardous Substances

There are no recorded in the EnviroCheck Report of Hazardous Substances within 1km of the site.

3.0 HISTORIC LAND USE MAPPING SUMMARY

A review of available historical topographic mapping obtained from the Envirocheck Report has been carried out and comprises County Series, Ordnance Survey Plans and Unpublished Survey Information (at scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560). Maps covering the site were published between 1887 and 2021. Extracts from this mapping data set are presented in Appendix D.

The maps are reproduced in accordance with Landmark Information Group Limited's Ordnance Survey License. All directions and distances are therefore approximate. A summary of the history of the site and immediate area is provided in the table below.

Table 2: Historical Map Review

Date of mapping	Site History	History of the area surrounding the site
1887-1888	Structure related to a previous development of the Mill Barn Complex are present within the site.	The site is situated in a rural setting with occasional farms, farm building and residential properties located within the surrounding 1km. Mill Barn comprising numerous farm buildings located to the west and north site boundary.

Date of mapping	Site History	History of the area surrounding the site
		A windmill is located c.70m north of the site. Dam Pit located c.550m north-west. The village of Broughton is located c.700m north/north-west of the subject site.
1901-1902	No changes noted.	Structure c.20m to the north and east of the site appears to be extended. The windmill is no longer recorded c.70m north. Allotment gardens are recorded c.180m west/north-west. No further changes noted.
1926-1927	No changes noted.	Part of the structure c.20m to the north and east of the site appears to be reduced/demolished. Minor residential development noted within the village of Broughton.
1952	No changes noted.	Minor residential development noted c.1km north/north-west of the site.
1959	No changes noted.	No significant changes noted.
1974-1977	A barn has been built centrally on site. Suspected to be the existing barn.	A further farm building is noted c.40m east and west of the subject site. The allotment gardens are no longer recorded.
1989-1991	No changes noted.	No significant changes noted.
1994	No changes noted.	No significant changes noted.
2000	No changes noted	A residential property has been development c.30m to the northwest corner of the site. Dam Pit is recorded as a small pond.
2021	Site remains as current.	No significant changes noted.

3.1 Historical Mapping Summary

The earliest available map, dated 1887, shows the site comprising a structure related to a previous development of the Mill Barn complex. Those features remained generally unchanged until before 1974, when a barn has been constructed on the approximate centre of the site suspected to be the current barn. These conditions remained largely unchanged until current days.

In the earliest historical maps, the surrounding site was predominantly rural with occasional farm buildings and residential properties located within 1km of the site. A number of farm buildings associated with Mill Barn Farm were located adjacent to the western and northern site boundary. There has only been minor development noted throughout the historical maps. The village of Broughton is located c.700m north/north-west although only minor development has been noted within and surrounding the village historically.

3.2 Planning Search

A search of the Huntingdonshire District Council planning portal was undertaken for the site and the immediate area using the site postcode and plan location as search terms on the 30th August 2024 to gather details of relevant planning applications. The relevant search results are as follows:

Table 3: Planning application search

On-Site Planning Applications		
Application Number	**Address**	**Application Proposal**
24/00458/HHFUL	Mill Barn Farm Bridge Road Broughton Huntingdon PE28 3AZ	Single storey rear extension – 11/03/2024 – WITHDRAWN
22/80002/COND	Mill Barn Farm Bridge Road Broughton Huntingdon PE28 3AZ	Conditional Information for 20/00828/FUL: C3 (Materials), C4 (Architectural Details), C5 (Contamination), C6 (Landscaping and Boundary Treatments), C8 (Biodiversity Method Statement) - 04/01/2022 – CONDITION REPLY
20/01536/NMA	Mill Barn Farm Bridge Road Broughton Huntingdon PE28 3AZ	Non-Material Amendment to planning permission 20/00315/HHFUL to construct and complete the ground floor aspects of the approved two storey rear and side extension to proceed to first floor level – 10/08/2020 - APPROVED
20/00828/FUL	Mill Barn Farm Bridge Road Broughton Huntingdon PE28 3AZ	The demolition of an agricultural barn (pre-approved under prior approval class q, part a and b) and the erection of two four-bed dwellings and one two-bed dwelling with associated amenity areas – 11/06/2020 – APPROVED
20/00315/HHFUL	Mill Barn Farm Bridge Road Broughton Huntingdon PE28 3AZ	Proposed two storey rear and side extension, entrance porch, conservatory and internal alterations – 26/02/2020 – APPROVED
18/02512/FUL	Mill Barn Farm Bridge Road Broughton Huntingdon PE28 3AZ	Regularisation of a converted agricultural barn as a single dwelling – 29/11/2018 – APPROVED

Off-Site Planning Applications		
Application Number	**Address**	**Application Proposal**
Numerous 2000-2022	Off-site	Various applications for erection of redevelopment of structures conversion and development of a solar farm.

The planning search has not identified any recent significant potentially contaminative uses within 1000m of the subject site.

3.3 Summary of Environmental Search Data

A review of the environmental data obtained from the Envirocheck Report and the site walkover survey has indicated the following potential contamination risk driver features generally within 500m of the site (or further if considered significant):

Current or Recent Land Uses

- Site is currently an agricultural barn: **Low to Moderate Risk**;
- Potential asbestos containing material used within Farm building: **Moderate Risk;**
- Mill Barn Farm and associated structures located adjacent to the north and east of the site: **Low to Moderate Risk;**

- Modern and older above ground fuel oil tanks are located to the c.10m, c.25m, c.50m from the site: **Low Risk**

- Agricultural and pastured field are located within the surrounding 250m of the site: **Very Low Risk.**

Historical Land Uses

- Agricultural barn previously used for storage of farm equipment and other miscellaneous items: **Low to Moderate Risk;**

- Site was historically agricultural / pastured field covered with vegetation: **Low Risk**;

- Allotment gardens located c.200m west/ north-west: **Very Low Risk;**

Site Environmental Features

- Superficial, Oadby Member, are classified as a Secondary Undifferentiated Aquifer.

- Oxford Clay Formation is classified as Unproductive Strata.

- Drainage ditch located in north/ north-east of site.

4.0 Preliminary Conceptual Site Model and Risk Assessment

4.1 Risk Assessment Guidance

Guidance has been published by the Department of the Environment, Transport and the Regions (DEFRA) 'Environmental Protection Act 1990: Part 2A - Contaminated Land Statutory Guidance' (DEFRA April 2012) which promotes the 'risk-based approach' for defining contaminated land. The statutory guidance states:

"Part 2A takes a risk-based approach to defining contaminated land. For the purposes of this Guidance, "risk" means the combination of: (a) the likelihood that harm, or pollution of water, will occur as a result of contaminants in, on or under the land; and (b) the scale and seriousness of such harm or pollution if it did occur."

A means to assess the risk posed by potential contamination on or under a site is to carry out a preliminary contaminated land risk assessment. The risk assessment process if defined within the statutory guidance:

"For a relevant risk to exist there needs to be one or more contaminant- pathway-receptor linkages - "contaminant linkage" - by which a relevant receptor might be affected by the contaminants in question. In other words, *for a risk to exist there must be contaminants present in, on or under the land in a form and quantity that poses a hazard, and one or more pathways by which they might significantly harm people, the environment, or property; or significantly pollute controlled waters. For the purposes of this Guidance:*

(a) A "contaminant" is a substance which is in, on or under the land and which has the potential to cause significant harm to a relevant receptor, or to cause significant pollution of controlled waters.

(b) A "receptor" is something that could be adversely affected by a contaminant, for example a person, an organism, an ecosystem, property, or controlled waters. The various types of receptors that are relevant under the Part 2A regime are explained in later sections.

(c) A "pathway" is a route by which a receptor is or might be affected by a contaminant."

The contaminant linkage is described within the statutory guidance as:

"The term "contaminant linkage" means the relationship between a contaminant, a pathway and a receptor. All three elements of a contaminant linkage must exist in relation to particular land before the land can be considered potentially to be contaminated land under Part2A, including evidence of the actual presence of contaminants. The term "significant contaminant linkage", as used in this Guidance, means a contaminant linkage which gives rise to a level of risk sufficient to justify a piece of land being determined as contaminated land. The term "significant contaminant" means the contaminant which forms part of a significant contaminant linkage".

The following sections relate to a qualitative risk assessment of the site and surrounding environs.

The data within this assessment will be employed to produce a Conceptual Site Model which will be tested to assess if a 'significant possibility of significant harm' to human health, non-human health or significant pollution to controlled waters is likely to occur and the risk level posed by any such linkages. The risk level classification system employed in the risk assessment is generally based upon those described in CIRIA C552[1].

4.2 Potential Contaminant Sources

The potential contamination sources identified as part of this Preliminary Contamination Risk Assessment are summarised in the table below. The potential contaminants are based on the data within CL8, Department of the Environment (DoE) Industry Profiles, the current and historic site uses.

Table 4: Potential Contamination Sources

Current Potential On-Site Contaminant Sources	Potential Contaminants
Material result from the demolition of the previous development and building materials used for the current barn (potential asbestos containing fibre cement roof sheeting)	Asbestos
Storage of agricultural machinery within the east side of the barn	Hydrocarbon, heavy metals, fuels, lubricating oils
Agricultural field/ Pastured field	None significant
Historic Potential On-Site Sources	**Potential Contaminants**
Storage of agricultural machinery within the barn (but not maintenance or repair)	Hydrocarbon, heavy metals, fuels, lubricating oils
Agricultural field/ Pastured field	None significant

[1] Rudland, D., Lancefield, R.M., Mayal, P.N. (2001) Contaminated Land Risk Assessment: A Guide to Good Practice. CIRIA C552. UK.

Current Potential Off-Site Contaminant Sources	Potential Contaminants
Agricultural field/ Pastured field	None significant
Storage of agricultural machinery and other materials in adjacent farm buildings	Metals, Inorganics, Acids, Alkalis, Asbestos, hydrocarbons
Above ground fuel tank located adjacent to the barn (approximately just) outside the site boundary	Hydrocarbons
Historical Potential Off-Site Contaminant Sources	**Potential Contaminants**
Agricultural field/ Pastured field	None significant
Storage of agricultural machinery and other materials in adjacent farm buildings to the east	Metals, Inorganics, Acids, Alkalis, Asbestos, hydrocarbons
Allotment gardens located c.200m west/north-west	PAHs and asbestos

4.3 Conceptual Source-Pathway-Receptor Model

The information gathered in this Preliminary Contamination Risk Assessment has been compiled to produce a Contaminant-Pathway-Receptor (C-P-R) model for the indicated continued commercial use of the site, which is summarised in the table below and overleaf. A Contamination Conceptual Site Model Cross Section is presented in Appendix F.

The risk posed to site construction workers has not been assessed as any risks are considered to be mitigated through good site practices such as dust suppression and the use of Personal Protective Equipment (PPE).

Table 5: Source-Pathway-Receptor Model for Onsite sources

Potential Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification
Current Potential ACM building materials result from demolition of the previous development and construction of the barns	Dermal / direct contact	Current site users (Disused Barn)	No	
	Direct ingestion		No	
	Direct inhalation		No	
	Inhalation of Radon		No	
	Inhalation of wind-blown dust		No	
	Vapour migration		No	
	Ground gas migration		No	
Agricultural fields / Pastured fields Storage of agricultural machinery and other	Dermal / direct contact	Future site users (equivalent to residential with plant uptake)	Yes	Low to Moderate
	Direct ingestion		Yes	Low to Moderate
	Direct inhalation		Yes	Low to Moderate
	Inhalation of Radon gas		No	

Potential Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification
materials in the farm buildings. Above ground fuel tank adjacent to site boundary. **Historic** Agricultural field/ Pastured field. Storage of agricultural machinery and other materials in the farm buildings.	Inhalation of wind-blown dust		Yes	Low to Moderate
	Vapour Migration onto the site			
	Ground gas migration			
	Direct contact	Services (following redevelopment)	Yes	Low to Moderate
	Migration of contaminants: non-aqueous phase		Yes	Low
	Migration of contaminants: aqueous phase		Yes	Low
	Migration of contaminants off-site: non-aqueous phase	Adjacent Properties	No	
	Migration of contaminants off site: aqueous phase		No	
	Vapour migration		No	
	Inhalation of wind-blown dust	Ecological Impacts	Yes	Low
	Migration of contaminants: non-aqueous phase		Yes	Low
	Migration of contaminants: aqueous phase		Yes	Low
	Migration of contaminants from site: non-aqueous phase	Controlled groundwater	Yes	Low
	Migration of contaminants from site: aqueous phase		Yes	Low
	Migration of Contaminants: non-aqueous phase	Surface Waters	Yes	Low
	Migration of contaminants: aqueous phase		Yes	Low

Table 6: Source-Pathway-Receptor Model for off-site sources

Potential Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification
Current Agricultural fields / Pastured fields Storage of agricultural machinery and other materials in adjacent farm buildings. **Historical** Agricultural field/ Pastured field. Allotment gardens located c.200m west/north-west.	Dermal / direct contact	Current site users (Disused Barn)	No	
	Direct ingestion		No	
	Direct inhalation		No	
	Inhalation of Radon		No	
	Inhalation of wind-blown dust		No	
	Vapour migration		No	
	Ground gas migration		No	
	Dermal / direct contact	Future site users (residential with plant uptake)	Yes	Low to Moderate
	Direct ingestion		Yes	Low to Moderate
	Direct inhalation		Yes	Low to Moderate
	Inhalation of Radon gas		No	
	Inhalation of wind-blown dust		Yes	Low to Moderate
	Vapour Migration onto the site			
	Ground gas migration		No	

Potential Site Contaminant Sources	Potential Pathways	Potential Receptors	Pathway Complete	Risk Level Classification
Farm buildings located to the north and west of the site.	Direct contact	On Site Services (following redevelopment)	Yes	Low to Moderate
	Migration of contaminants: non-aqueous phase		Yes	Low
	Migration of contaminants: aqueous phase		Yes	Low
	Inhalation of wind-blown dust	Ecological Impacts	Yes	Low
	Migration of contaminants: non-aqueous phase		Yes	Low
	Migration of contaminants: aqueous phase		Yes	Low

4.4 Potential Contamination Risk Summary

The preliminary contamination risk assessment has identified complete Contaminant-Pathway-Receptor (CPR) linkages with a maximum **Low to Moderate** risk level from the potential contamination sources and risk drivers identified on the site and surrounding area.

The most significant of these potential source drivers representing the greatest potential to impact the proposed site user (equivalent to residential with plant uptake) is the storage of agricultural machinery and other general agricultural storage historically within the existing barn located on site. Due to the uncertain nature of what has been stored within the barns there is a risk of heavy metal, hydrocarbon and fuel contamination via leaks and spillages through the storage of agricultural machinery. An additional significant contaminative risk are the building materials results from the demolition of the previous barn development and used in the construction of the barn. Suspected asbestos containing materials (fibre cement sheeting) are likely to have been used in the historical construction phase with potential loose fragments noted around the barn during the walkover, these fragments can release fibres to enter the near surface soils when disturbed, broken or degraded.

Furthermore, a potential contamination source has been identified adjacent to the site boundary associated with the above ground suspected heating oil tank. This has the potential to have led to hydrocarbon contamination that could have impacted the ground around this tank via spillages or leaks. However, during PGE's attendance there was no obvious evidence of leaks or spillages on the ground around any tanks observed.

An additional potential source of contamination is via the farm buildings located within the site and adjacent the site boundary. These barns have likely been used for storage of agricultural machinery and potential fuels which could, due to the proximity to the site, have affected the underlying geology.

4.5 Recommended Intrusive Investigation

Given the discussion above, to prevent 'Significant Possibility of Significant Harm' from potential contamination sources to the proposed future residential site users it is recommended that an intrusive soil investigation be undertaken at the site focusing on the highlighted potential contaminative features within the near surface soils and deeper soils should significant near surface contamination be identified.

Key items to investigate include the near surface soils and ground gases/volatile contamination.

It is recommended that sampling and chemical testing of shallow soils is undertaken to quantify the risk present beneath the subject site, especially in soft landscaped areas of the proposed development. Testing of soils should include hydrocarbons (TPH and PAH), heavy metals and asbestos as a minimum.

4.6 Potential Geotechnical Risk Summary

A very low geotechnical risk was identified with the Envirocheck Report. A geotechnical appraisal would be recommended in order to gather details on the geology and groundwater beneath the site to allow a ground model to be derived for the site especially regarding the volume change of the indicated potentially fine grained superficial and bedrock soils.

CERTIFICATION

This report is produced for the sole use of the Client, and no responsibility of any kind, whether for negligence or otherwise, can be accepted for any third party who may rely upon it.

The site walkover survey was carried out within reasonably accessible areas of the site. No responsibility of any kind can be accepted for any conditions or features not identified due to inaccessibility of areas such as locked, unstable or unsafe buildings and heavily overgrown areas.

The conclusions and recommendations given in this report are based on our understanding of the future plans for the site and based on a scope of works agreed by the Client and afforded by the agreed budget. No responsibility is accepted for conditions not encountered, which are outside of the agreed scope of work.

If the future plans for the site are changed, such as the site is developed for a more or less sensitive use, then a different interpretation might be appropriate.

The report has been prepared following the guidelines and principles established in the British Standards, BS 10175:2011, entitled 'Investigation of Potentially Contaminated Sites – Code of Practice' and the DEFRA / EA Contaminated Land Reports CLR7 and CLR8. It necessarily relies on the co-operation of other organisations and the free availability of information and total access. No responsibility can, therefore, be accepted for conditions arising from information that was not available to the investigating team as a result of information being withheld or access being denied.

This report may suggest an opinion on a possible configuration of strata or conditions between exploratory points and below the maximum depth of investigation. However, this is for guidance only and no liability can be accepted for its accuracy.

REFERENCES

1) Investigation of Potentially Contaminated Sites – Code of Practice, British Standards Establishment BS 10175:2001.

2) Code of Practice for Site Investigations, British Standards Establishment BS5930:2015.

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APPENDIX A

Site Location Plan
Site Plan
Aerial Photograph
Proposed Development Plan



This drawing is a print and must not be scaled from. Use only noted dimensions and check all measurements on site before proceeding with the works. Any queries regarding areas, levels or dimensions must be referred back to BBR Design Services Ltd. All dimensions of existing buildings to be verified on site.

This drawing is the copyright of BBR Design Services Ltd and shall not be in any way used or reproduced without their prior written consent.

All design and construction is to be in accordance with the Construction Design and Management (CDM) Regulations 2015, and HSE guidance.

Scale bar (m) 1:500

0 10 20

N

Rev:	Date:	Note:	By:
-	-	-	-

FOR PLANNING

BBR DESIGN

01462 420800 | 01799 530097
info@bbr-design.co.uk
www.bbr-design.co.uk

CIAT CHARTERED PRACTICE

Contract:
Mill Barn Farm
Bridge Road
Broughton, Huntingdon
PE28 3AZ

Drawing Title:
Existing Site Plan

Scale:
1:500
@ A3

Drawn/check:
cf

Job No:
24289

Date:
December 2024

Drawing No:
PL02

Revision:
-

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AERIAL PHOTOGRAPH



CLIENT:	AgReserve UK Ltd
PROJECT No:	P24-215
PROJECT TITLE:	Barn 4, Mill Barn Farm, Bridge Road, Broughton, Huntingdon, PE28 3AZ



This drawing is a print and must not be scaled from. Use only noted dimensions and check all measurements on site before proceeding with the works. Any queries regarding areas, levels or dimensions must be referred back to BBR Design Services Ltd. All dimensions of existing buildings to be verified on site.

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All design and construction is to be in accordance with the Construction Design and Management (CDM) Regulations 2015, and HSE guidance.

Scale bar (m) 1:500

0 10 20

N

Rev:	Date:	Note:	By:
A	-	-	-

FOR PLANNING

D E S I G N

01462 420800 | 01799 530097

info@bbr-design.co.uk

www.bbr-design.co.uk

CIAT CHARTERED PRACTICE

Contract:

Mill Barn Farm
Bridge Road
Broughton, Huntingdon
PE28 3AZ

Drawing Title:

Proposed Site Plan

Scale: 1:500 @ A3

Drawn/check: cf

Job No: 24289

Date: December 2024

Drawing No: PL42

Revision: -

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APPENDIX B

Site Walkover Survey Plan
Site Photographs



PADDOCK GEO ENGINEERING

Walkover Site Plan

**Barn 4, Mill Barn Farm,
Bridge Road,
Broughton,
Huntingdon,
PE28 3AZ**

AgReserves UK Ltd

September 2024

**Not to scale.
All positions are approximate.
Based on plan provided by the client.**



Situated in the south of the site facing east showing building materials.



Situated in the south of the site facing south showing adjacent land.

PADDOCK GEO ENGINEERING

Client:	**AgReserves**
Project No:	**P24-215**
Project Title:	**Barn 4, Mill Barn Farm, Bridge Road, Broughton, Huntingdon, PE28 3AZ**
Date:	**September 2024**



Situated in the south of the site facing east showing building materials.



Situated in the south of the site facing north showing the existing barn and building materials.

PADDOCK GEO ENGINEERING

Client:	**AgReserves**
Project No:	**P24-215**
Project Title:	**Barn 4, Mill Barn Farm, Bridge Road, Broughton, Huntingdon, PE28 3AZ**
Date:	**September 2024**



Situated in the south of the site facing north showing the existing barn and building materials.



Situated in the south of the site facing north showing the existing barn and building materials.

PADDOCK GEO ENGINEERING

Client:	**AgReserves**
Project No:	**P24-215**
Project Title:	**Barn 4, Mill Barn Farm, Bridge Road, Broughton, Huntingdon, PE28 3AZ**
Date:	**September 2024**



Situated in the north of the site showing the internal aspects of the existing barn and building materials.



Situated in the north of the site showing the internal aspects of the existing barn and building materials.

PADDOCK GEO ENGINEERING

Client:	**AgReserves**
Project No:	**P24-215**
Project Title:	**Barn 4, Mill Barn Farm, Bridge Road, Broughton, Huntingdon, PE28 3AZ**
Date:	**September 2024**



Situated in the existing barn showing grain storage.



Example of cement sheet cladding.

PADDOCK GEO ENGINEERING

Client:	**AgReserves**
Project No:	**P24-215**
Project Title:	**Barn 4, Mill Barn Farm, Bridge Road, Broughton, Huntingdon, PE28 3AZ**
Date:	**September 2024**



Located east of the existing barn showing fuel tanks.



Situated west of the site showing newly placed fuel oil tanks.

PADDOCK GEO ENGINEERING

Client:	**AgReserves**
Project No:	**P24-215**
Project Title:	**Barn 4, Mill Barn Farm, Bridge Road, Broughton, Huntingdon, PE28 3AZ**
Date:	**September 2024**



Located north of the site showing adjoining land.



Situated west of the site facing northwest showing raised tank and newly developed dwellings.

PADDOCK GEO ENGINEERING

Client:	**AgReserves**
Project No:	**P24-215**
Project Title:	**Barn 4, Mill Barn Farm, Bridge Road, Broughton, Huntingdon, PE28 3AZ**
Date:	**September 2024**

APPENDIX C

Geology Report

Geology 1:50,000 Maps Legends

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	T1T2	River Terrace Deposits, 1 to 2	Sand and Gravel	Not Supplied - Holocene
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Not Supplied - Holocene
	ODT	Oadby Member	Diamicton	Not Supplied - Anglian

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	WWAC	West Walton Formation and Ampthill Clay Formation (Undifferentiated)	Mudstone	Not Supplied - Oxfordian
	OXC	Oxford Clay Formation	Mudstone	Not Supplied - Callovian

PADDOCK GEO ENGINEERING

Geology 1:50,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID:	2	**Map ID:**	1
Map Sheet No:	187	**Map Sheet No:**	172
Map Name:	Huntingdon	**Map Name:**	Ramsey
Map Date:	1975	**Map Date:**	1995
Bedrock Geology:	Available	**Bedrock Geology:**	Available
Superficial Geology:	Available	**Superficial Geology:**	Available
Artificial Geology:	Not Available	**Artificial Geology:**	Available
Faults:	Not Supplied	**Faults:**	Not Supplied
Landslip:	Not Available	**Landslip:**	Not Available
Rock Segments:	Not Supplied	**Rock Segments:**	Not Supplied

Geology 1:50,000 Maps - Slice A



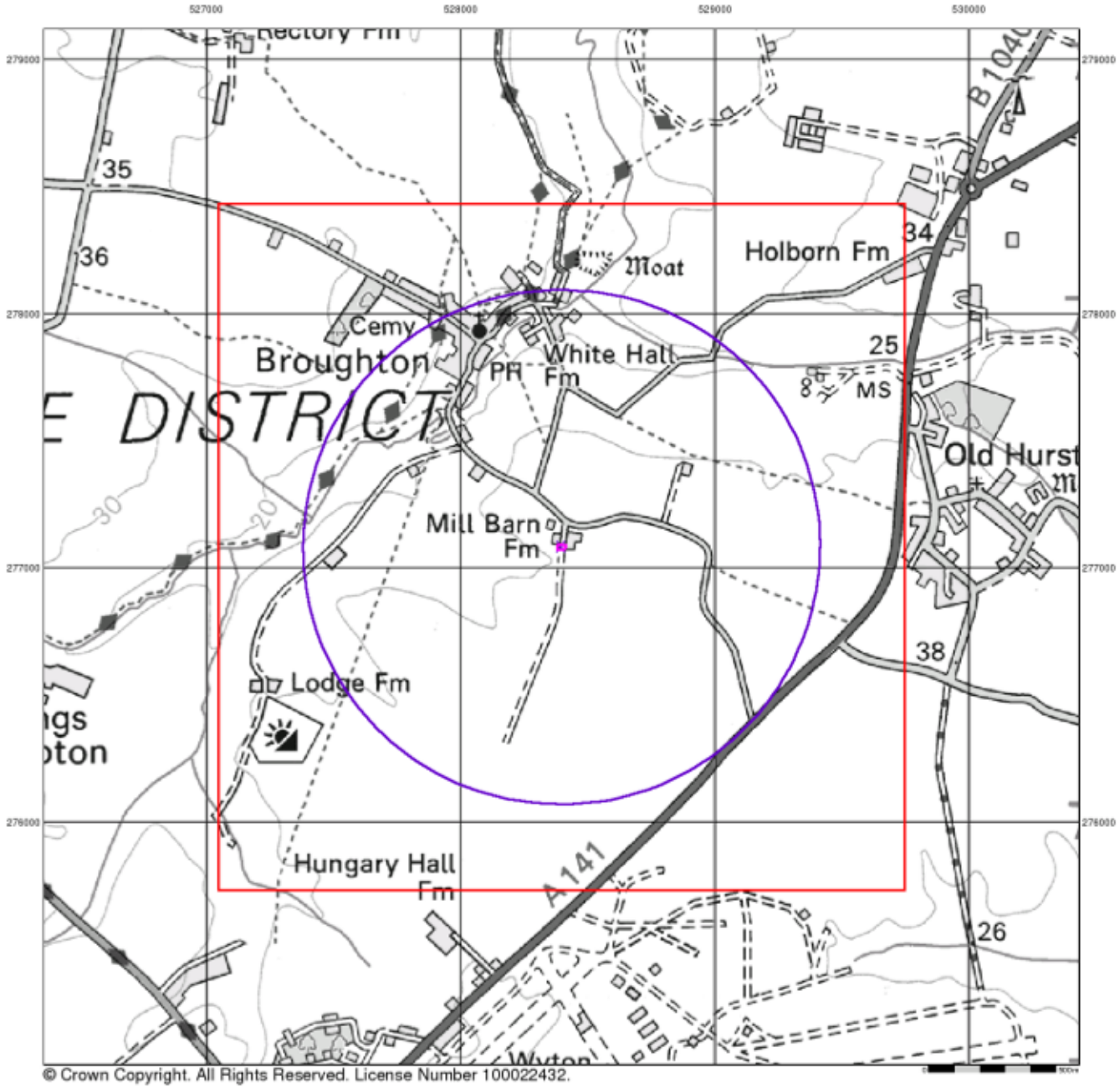
Order Details:

Order Number:	355682197_1_1
Customer Reference:	P24-215
National Grid Reference:	528390, 277080
Slice:	A
Site Area (Ha):	0.06
Search Buffer (m):	1000

Site Details:

Barn 4, Mill Barn Farm,, Bridge Road,, Broughton, HUNTINGDON, PE28 3AZ

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



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PADDOCK GEO ENGINEERING

Artificial Ground and Landslip

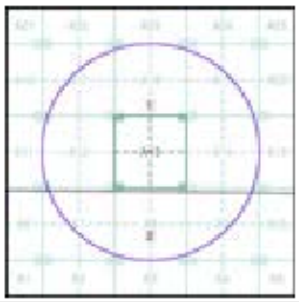
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



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Order Number:	355682197_1_1
Customer Reference:	P24-215
National Grid Reference:	528390, 277080
Slice:	A
Site Area (Ha):	0.06
Search Buffer (m):	1000

Site Details:

Barn 4, Mill Barn Farm,, Bridge Road,, Broughton, HUNTINGDON, PE28 3AZ

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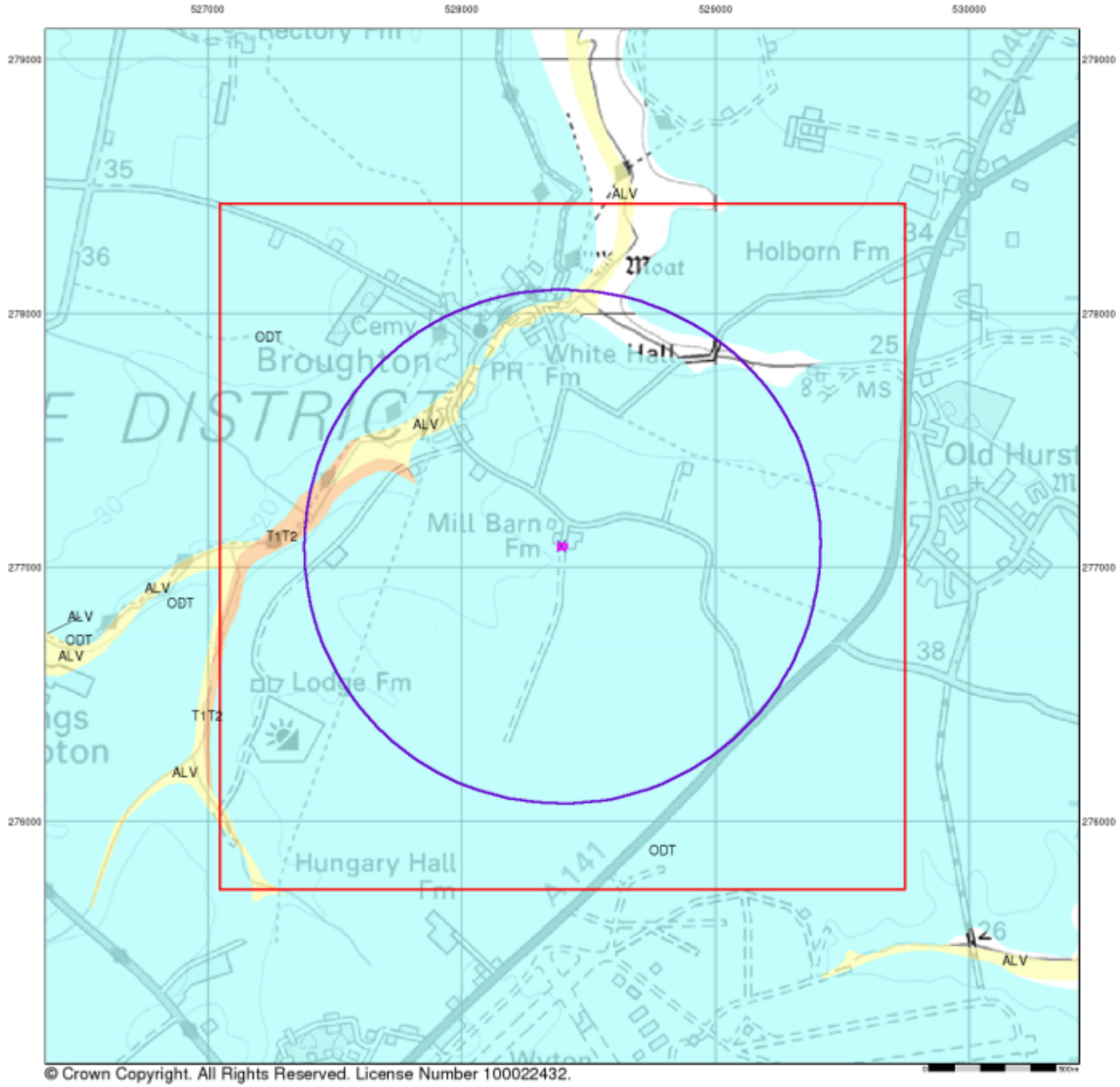

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PADDOCK GEO ENGINEERING

Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



Order Details:

Order Number:	355682197_1_1
Customer Reference:	P24-215
National Grid Reference:	528390, 277080
Slice:	A
Site Area (Ha):	0.06
Search Buffer (m):	1000

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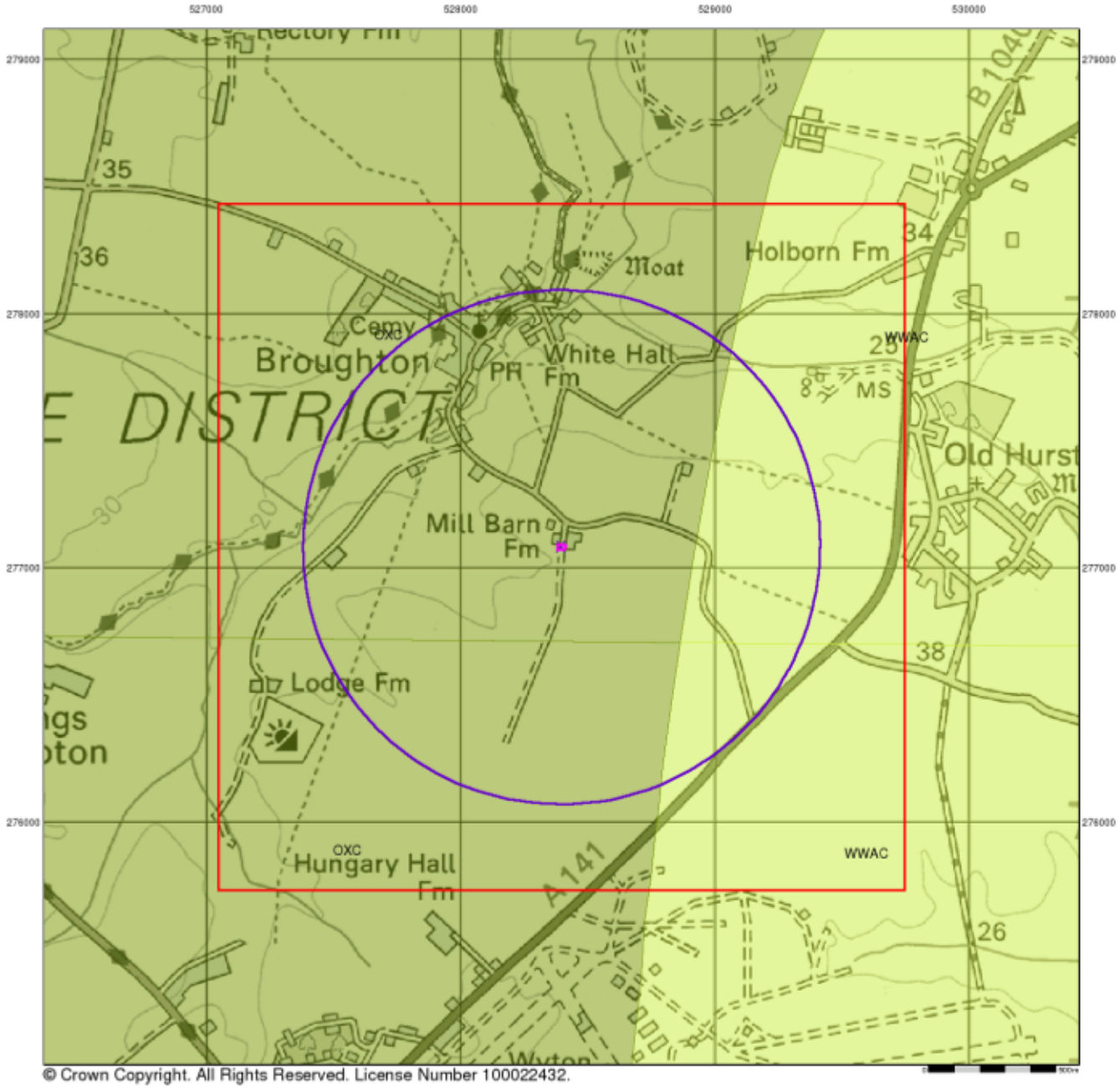

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PADDOCK GEO ENGINEERING

Bedrock and Faults

Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A



Order Details:

Order Number:	355682197_1_1
Customer Reference:	P24-215
National Grid Reference:	528390, 277080
Slice:	A
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Search Buffer (m):	1000

Site Details:

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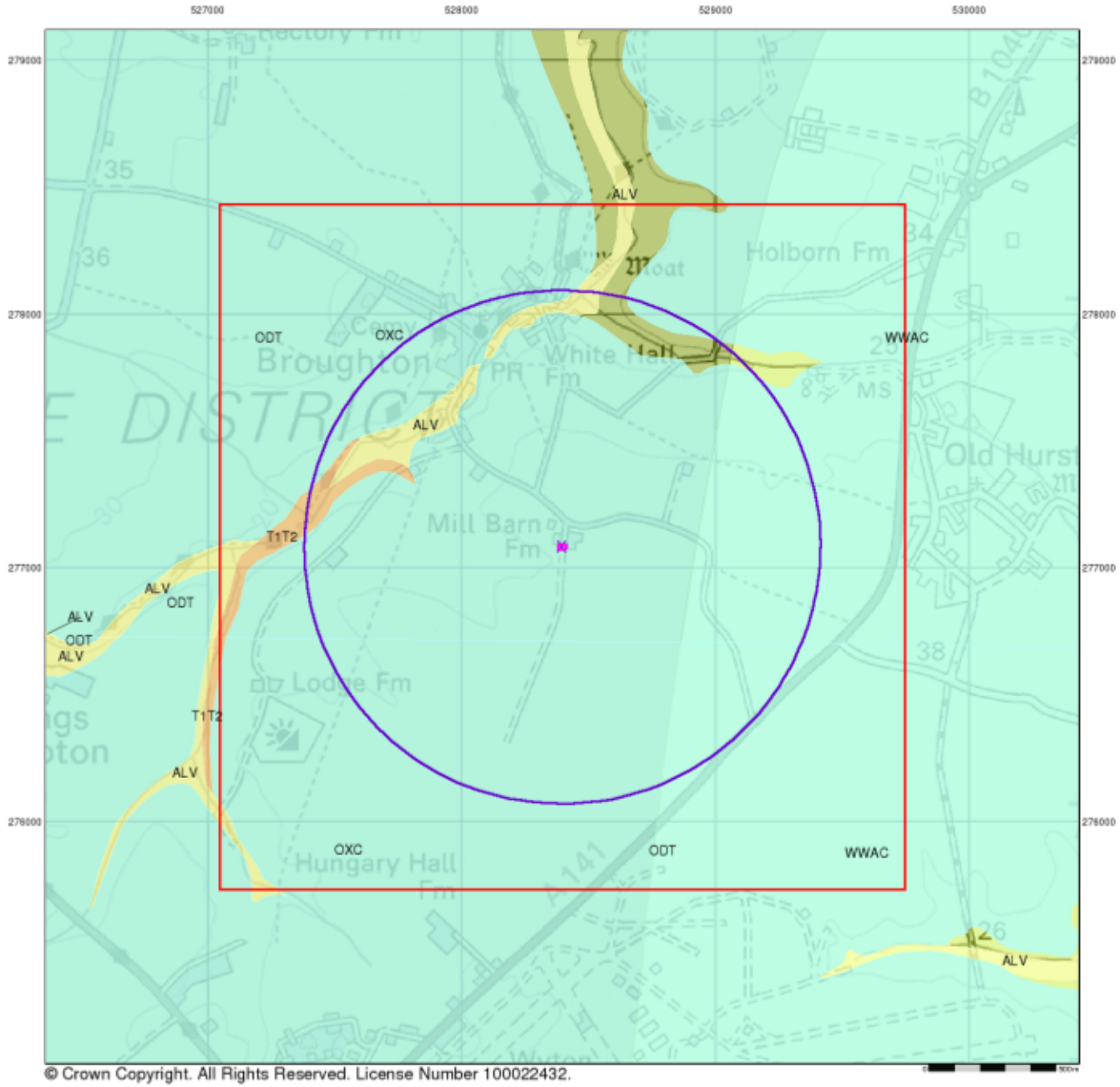

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PADDOCK GEO ENGINEERING

Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

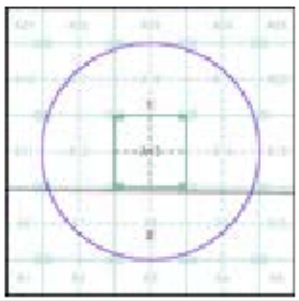
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A



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National Grid Reference:	528390, 277080
Slice:	A
Site Area (Ha):	0.06
Search Buffer (m):	1000

Site Details:

Barn 4, Mill Barn Farm,, Bridge Road,, Broughton, HUNTINGDON, PE28 3AZ

APPENDIX D

Historical Mapping

Historical Mapping Legends

Ordnance Survey County Series 1:10,560

Gravel Pit
Sand Pit
Other Pits
Quarry
Shingle
Orchard
Osiers
Reeds
Marsh
Mixed Wood
Deciduous
Brushwood
Fir
Furze
Rough Pasture
Arrow denotes flow of water
Trigonometrical Station
Site of Antiquities
Bench Mark
Pump, Guide Post, Signal Post
Well, Spring, Boundary Post
285 Surface Level
Sketched Contour
Instrumental Contour
Main Roads
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
Sunken Road
Raised Road
Road over Railway
Railway over River
Railway over Road
Level Crossing
Road over River or Canal
Road over Stream
Road over Stream
County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)
RD. Bdy. Rural District Boundary
Civil Parish Boundary

Ordnance Survey Plan 1:10,000

Chalk Pit, Clay Pit or Quarry
Gravel Pit
Sand Pit
Disused Pit or Quarry
Refuse or Slag Heap
Lake, Loch or Pond
Dunes
Boulders
Coniferous Trees
Non-Coniferous Trees
Orchard
Scrub
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Sloping Masonry
Electricity Transmission Line
Pole
Cutting
Embankment
Standard Gauge Multiple Track
Standard Gauge Single Track
Road Under
Road Over
Level Crossing
Foot Bridge
Siding, Tramway or Mineral Line
Narrow Gauge
Geographical County
Administrative County, County Borough or County of City
Municipal Borough, Urban or Rural District, Burgh or District Council
Borough, Burgh or County Constituency
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

BP, BS	Boundary Post or Stone	Pol Sta	Police Station
Ch	Church	PO	Post Office
CH	Club House	PC	Public Convenience
F E Sta	Fire Engine Station	PH	Public House
FB	Foot Bridge	SB	Signal Box
Fn	Fountain	Spr	Spring
GP	Guide Post	TCB	Telephone Call Box
MP	Mile Post	TCP	Telephone Call Post
MS	Mile Stone	W	Well

1:10,000 Raster Mapping

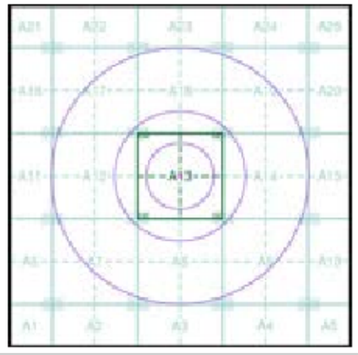
Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or community boundary
District, Unitary, Metropolitan, London Borough boundary
Constituency boundary
Area of wooded vegetation
Non-coniferous trees
Non-coniferous trees (scattered)
Coniferous trees
Coniferous trees (scattered)
Positioned tree
Orchard
Coppice or Osiers
Rough Grassland
Heath
Scrub
Marsh, Salt Marsh or Reeds
Water feature
Flow arrows
MHW(S) Mean high water (springs)
MLW(S) Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m Bench mark (where shown)
Triangulation station
Point feature (e.g. Guide Post or Mile Stone)
Pylon, flare stack or lighting tower
Site of (antiquity)
Glasshouse
General Building
Important Building

PADDOCK GEO ENGINEERING

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Huntingdonshire	1:10,560	1887	2
Huntingdonshire	1:10,560	1902	3
Huntingdonshire	1:10,560	1927	4
Huntingdonshire	1:10,560	1952	5
Ordnance Survey Plan	1:10,000	1959	6
Ordnance Survey Plan	1:10,000	1977	7
Ordnance Survey Plan	1:10,000	1989	8
10K Raster Mapping	1:10,000	2000	9
Street View	Variable		10

Historical Map - Slice A



Order Details

Order Number: 355682197_1_1
Customer Ref: P24-215
National Grid Reference: 528390, 277080
Slice: A
Site Area (Ha): 0.06
Search Buffer (m): 1000

Site Details

Barn 4, Mill Barn Farm,, Bridge Road,, Broughton, HUNTINGDON, PE28 3AZ

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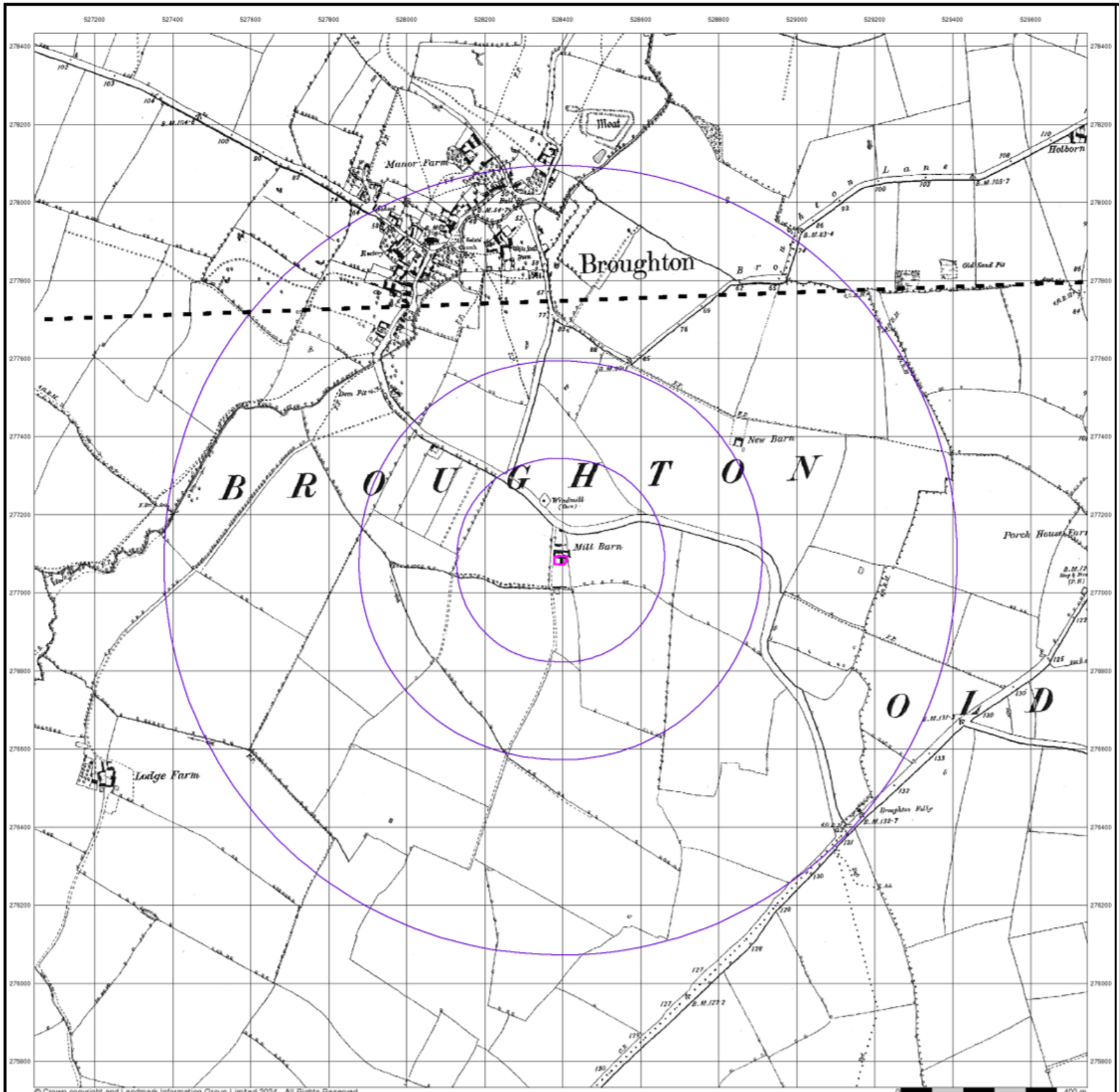

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PADDOCK GEO ENGINEERING

Huntingdonshire

Published 1887

Source map scale - 1:10,560

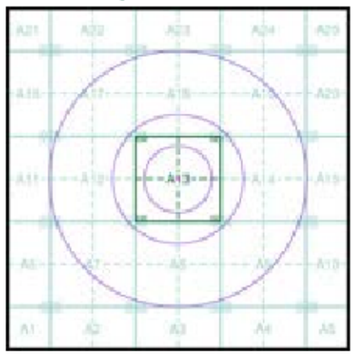
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

Map Name(s) and Date(s)

014SE
1887
1:10,560

018NE
1887
1:10,560

Historical Map - Slice A



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Order Details

Order Number:	355682197_1_1
Customer Ref:	P24-215
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