



**Castledine  
Environmental**

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LAND CONTAMINATION SURVEYS

**Phase 3 Remediation Strategy  
and Verification Plan  
for  
Change of Use of Agricultural  
Buildings to Dwellings (C3) with  
Associated Site Works  
on the site of  
Hill Farm, Markfield Lane,  
Botcheston LE9 9FH**

**Date: March 2021**

Status:

Final Report

Reference:

3114D P3 Gill - Botcheston

Date:

04/03/2021

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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

(Proprietor)

## **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 Mr. J. Singh and Mrs. H.K. Gill to undertake a Phase 3 remediation Strategy and Verification Plan at Hill Farm, Markfield Lane, Botcheston, Leicestershire LE9 9FH

The following reports previous reports on the site are

- Phase 1 Land Contamination Risk Assessment for Change of Use of Agricultural Buildings to Dwellings (C3) with Associated Site Works on the site of Hill Farm, Markfield Lane, Botcheston – Dated 08/12/2020 and referenced: 3073D
- Phase 2 Land Contamination Risk Assessment for Change of Use of Agricultural Buildings to Dwellings (C3) with Associated Site Works on the site of Hill Farm, Markfield Lane, Botcheston – dated 01/03/2021 and referenced: 3103D

### 4.0 SCOPE

Castledine Environmental have prepared this report for the sole use and reliance of Mr. J. Singh and Mrs. H.K. Gill and his appointees for the purpose of ensuring compliance with:

- paragraphs 170, 178, & 179 of the National Planning Policy Framework 2018,
- part C1 of the building regulations.
- Condition No.1 of the Hinckley and Bosworth Borough Council planning approval reference 18/00143/CQGDO
- <https://pa.hinckley-bosworth.gov.uk/online-applications/simpleSearchResults.do?action=firstPage>

1. *No development approved by this permission shall be commenced until a scheme for the investigation of any potential land contamination on the site has been submitted to and agreed in writing by the Local Planning Authority which shall include details of how any contamination shall be dealt with. The approved scheme shall be implemented in accordance with the agreed details and*

*any remediation works so approved shall be carried out prior to the site first being occupied.*

*Reason: To ensure there are no adverse risks to the health of the occupiers resulting from contamination of the site, to ensure compliance with condition Q.2(1)(c) of Class Q, Part 3 of the Town and County Planning (General Permitted Development) (England) Order 2015.*

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 Remediation Strategy and Verification Plan in accordance with

- BS10175:2011+A2:2017, Investigation of potentially contaminated sites. Code of practice
- CLR11 "Model Procedures for the Management of Land Contamination".

The objectives of the report are:-

- Report the existing information relating to the soil contamination and the ground gas regime within the area of the site.
- Set out the remediation measures and validation processes to be followed on site to ensure the site development does not pose a risk to human health.

## **5.0 SITE DESCRIPTION**

The site is located in the village of Botcheston at National Grid Reference: 448423,305312 and is approximately 0.29ha in area.

The site is an irregular rectangle in shape orientated north east to south west. The site is directly bounded by field to the south east and north east, neighbouring dwellings south and west and scrubland to the north west. The surrounding areas are predominantly agricultural in usage.

The site interior comprises a series of barns orientated in a line running from the south west of site to the north east (see attached site walkover photographs and plan for barn number designations). The remainder of site is occupied by a grassed area, an open area where a barn has been demolished, shipping containers, an access track and an area of rough ground.

Photos of the site are present in Appendix C of the previous Phase 1 report for the site.

## **6.0 OVERVIEW OF FINDINGS AND RECOMMENDATIONS FROM PREVIOUS REPORTS**

The following previous reports have been referred to and should be read in conjunction with this report:

- Phase 1 Land Contamination Risk Assessment for Change of Use of Agricultural Buildings to Dwellings (C3) with Associated Site Works on the site of Hill Farm, Markfield Lane, Botcheston – Dated 08/12/2020 and referenced: 3073D
- Phase 2 Land Contamination Risk Assessment for Change of Use of Agricultural Buildings to Dwellings (C3) with Associated Site Works on the site of Hill Farm, Markfield Lane, Botcheston – dated 01/03/2021 and referenced: 3103D

The most pertinent information is summarised in the following sections.

## **6.1 SUMMARY OF SOIL CONTAMINATION**

A number of potentially contaminative sources were identified on-site in the previous Phase 1 Report. These include: the general historical agricultural usage of the site over time; the potentially asbestos containing roofing and cladding materials noted on the buildings; broken roofing and cladding materials noted on historical satellite imagery (residual asbestos fibres); broken asbestos sheeting noted within some of the barns; made ground deposits noted in the north eastern extent of site and along and within the north western boundary of site (glass, tarmac, demolition rubble etc); historical skips, refuse heaps and miscellaneous storage noted along

and within this boundary; demolition rubble and a potential former fuel tank plinth noted at the location of Barn No.3; and the area of former burning with evidence of melted plastics, household refuse and foodstuffs noted.

No significant sources of potential ground gas generation have been identified. A potential former fuel tank plinth noted in the north eastern extent of site at Barn No.3 may have the potential to be producing localised hazardous ground vapours. As such, this area was recommended to be investigated.

Accordingly, a Phase 2 Intrusive Site Investigation was planned and carried out on 15th of February 2021. The aim of the site investigation was to identify any potential contamination in shallow site soils and the areas in which they are located. This involve the formation of trial pits across the site, to facilitate to the taking of environmental samples for laboratory analysis. The trial pits were advanced using a mechanical excavator to minimum and maximum depths of 0.45m and 1.10m, respectively. Of the 7 No. trial pits, 2 No. were hand excavated due to their placement in, around and above a known (with additional unknown) services runs. Castledine Environmental utilised a targeted sampling regime, to fully characterise the site conditions.

Laboratory analysis of samples taken on the 15/02/2021 identified exceedances of Arsenic GAC of 37mg/kg by 130mg/kg and 110mg/kg at the locations of TP02 and TP07; Lead GAC of 200mg/kg by 790mg/kg, 1700mg/kg, 1200mg/kg and 1100mg/kg at TP01, TP02, TP03 and TP04, respectively; Nickel GAC of 130mg/kg by 190mg/kg at TP07 and Zinc GAC of 3700mg/kg by 5100mg/kg at TP02. No asbestos or pesticide detected.

Laboratory analysis also identified exceedances of Benzo(a)pyrene GAC of 3.2mg/kg and 2.2mg/kg by 3.2mg/kg at TP03 0.20m; Benzo(b)fluoranthene GAC of 2.2mg/kg by 6.2mg/kg at TP03 0.20m; Dibenzo(a,h)anthracene GAC of 0.24mg/kg by 0.54mg/kg and 0.24mg/kg at TP03 0.20m and TP03 0.40m, respectively; and Indeno(1,2,3,-cd) pyrene GAC of 2.3mg/kg by 2.3mg/kg.

## 7.0 ENCAPSLATION OF AFFECTED AREAS

Due to the exceedances identified from the Phase 2 works, the client has chosen to encapsulate the entirety of the affected areas in hard-standing (a plan can be found in Appendix B). The affected area running the length of the north western boundary is to be encapsulated beneath hard-standing, with a minimum of 200mm of crushed brick/stone or MoT Type 1, with the hard surfacing at finished ground level to be determined by the client.

The area around the location of TP07 in which PAH contamination was noted is to be excavated to natural soils, with clean materials such as crushed brick/stone or MoT Type 1 imported in place. Should made ground prove extensive at this location, then a geotextile would be required at the base of the excavation.

The remaining area on site (area of noted burnt ground and storage) is proposed to be hard-standing car parking, and as such, this is also reflected on the encapsulation and excavation plan (found in Appendix B). Should it be decided at a later date that this area is to be soft-landscaping, then this area *must* be capped in a minimum of 600mm of certified clean materials.

Imported material can be sourced from other developments and commercial companies. Dependent on the source of the material it can be classified as either from a 'Greenfield/Manufactured' or 'Brownfield/Screened' source.

Broadly speaking material can be classified as follows:

- Greenfield - if it can be demonstrated that it has not been developed and that no past contaminative uses have occurred at the site.
- Manufactured – from a commercial company who manufacture material by mixing or blending mineral soils (subsoil or sand) with an organic amendment (compost).
- Brownfield – material from a donor site that has previously been developed

- Screened – material from a company who deal with skip/demolition waste which is screened for unsuitable material i.e. bricks, wood, plastic etc.

Brownfield and screened material are more likely to be of a lesser quality and will require more robust testing to prove their suitability therefore Greenfield or Manufactured material will be used.

Any supplied testing results from a commercial company must be from the actual material to be imported and be no more than two months old.

If certificates are not supplied then testing should be done before being brought to site, there should be either

- one sample per 250 m<sup>3</sup> with a minimum of three tests

Each test must include as a minimum

- Standard metals/metalloids (should include as a minimum As,Cd,Cr,CrVI,Cu,Hg,Ni,Pb,Se,Zn)
- PAH (16 USEPA speciation)
- Asbestos

Imported material should preferably not be stockpiled on site but placed in the intended area straight away so as to not cause cross contamination.

**Test results for the intended imported material must be submitted to the local authority and approved before being brought onto site.**

All transfer notes and/or receipts for the soil should be retained.

The thickness of the soil placed will require evidence either via photographs during its placement or by digging of post placement verification trial holes

**8.0 VERIFICATION PLAN****8.1 CAPPING MATERIAL****8.1.1 VERIFICATION OF CORRECT DEPTH OF COVER LAYER**

There are two main ways to confirm the depth of cap.

- **TOPOGRAPHICAL SURVEYS**

This method requires an accurate survey of the base, following removal of any material as required, and final formation layer height to establish the depth of cover.

- **DEPTH TESTING IN SITU**

Small trial pit excavated to allow measurement of its depth by tape measure or measuring staff. This would normally be one pit per garden area. Photograph each test pit showing depth of cap.

**8.1.2 PHOTOGRAPHIC EVIDENCE FOR VALIDATING THE ENCAPSULATION AND EXCAVATION AREAS**

The following is guidance on photographs as additional evidence to support either of the above methods.

- Proof that the depth of inert cover/encapsulation has been installed
- Proof there is a geotextile separator and visual warning membranes (if used) between the made ground and suitable for use soils.
- Proof of the method of placement and different layers if appropriate
- Proof of the completed project
- Inclusion of geographic background features which will aid locating the photograph

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**9.0 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, 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 (Appendix C) 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.

## **10.0 REPORTING**

### **10.1 ENCAPSULATION SYSTEM**

When the encapsulation system and excavated area has been completed and verified, a report should be produced for submission to the Local Authority. This should confirm that the works have been done and confirm that the site is now suitable for its intended use.

The report should contain

- A summary of the remediation strategy and work undertaken.
- Copies of waste transfer note(s) and / or invoice(s) showing how much material has left site and its destination.
- A copy of the laboratory analysis results for imported material
- Copies of the transfer note(s) and / or invoice(s) for imported material showing the amount imported.
- Good quality photographs as indicated in section 8.1.2

**11.0 REFERENCES****11.1 LEGISLATION AND REGULATIONS****11.1.1 ACTS**

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

**11.1.2 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

**11.1.3 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

**11.2 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, 2012: National Planning Policy Framework.

**11.3 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 - 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)

**11.4 NON STATUTORY TECHNICAL GUIDANCE****11.4.1 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.

**11.4.2 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

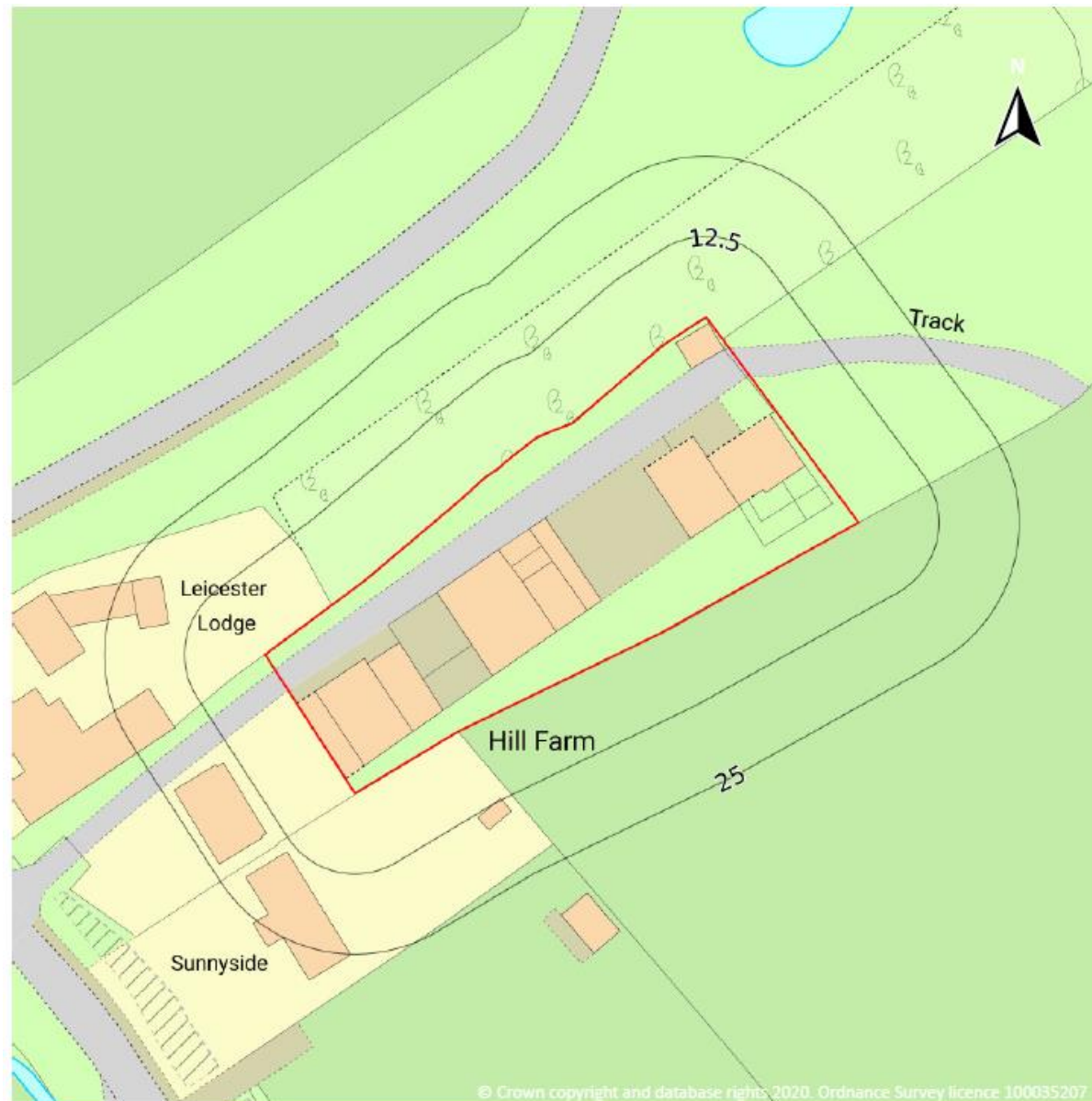
**11.4.3 CL:AIRE**

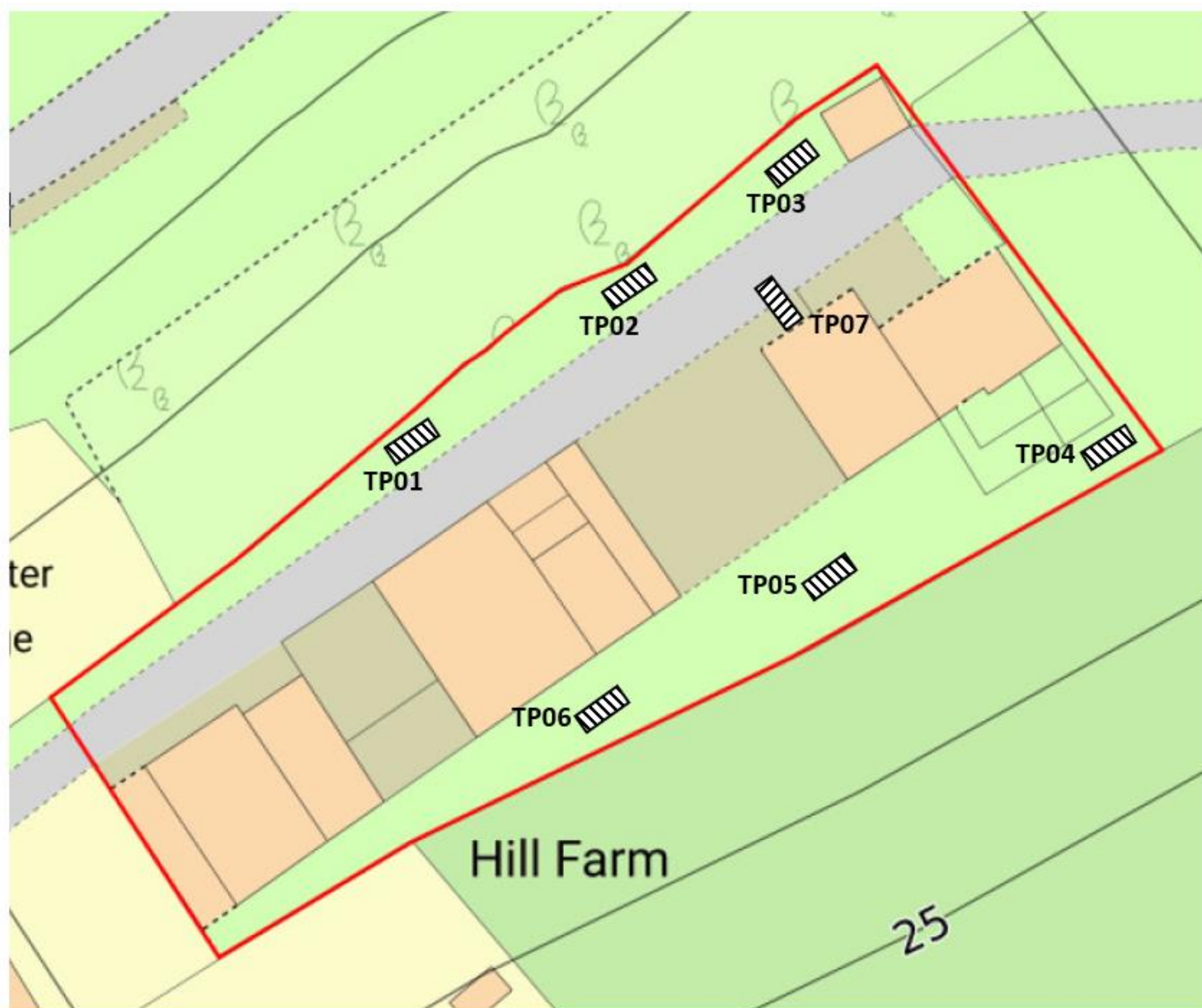
- [16] Card G, Wilson S, Mortimer S. 2012. *A Pragmatic Approach to Ground Gas Risk Assessment. CL:AIRE Research Bulletin RB17.* CL:AIRE, London, UK. ISSN 2047- 6450 (Online)

**12.0 APPENDICES**

**APPENDIX A**

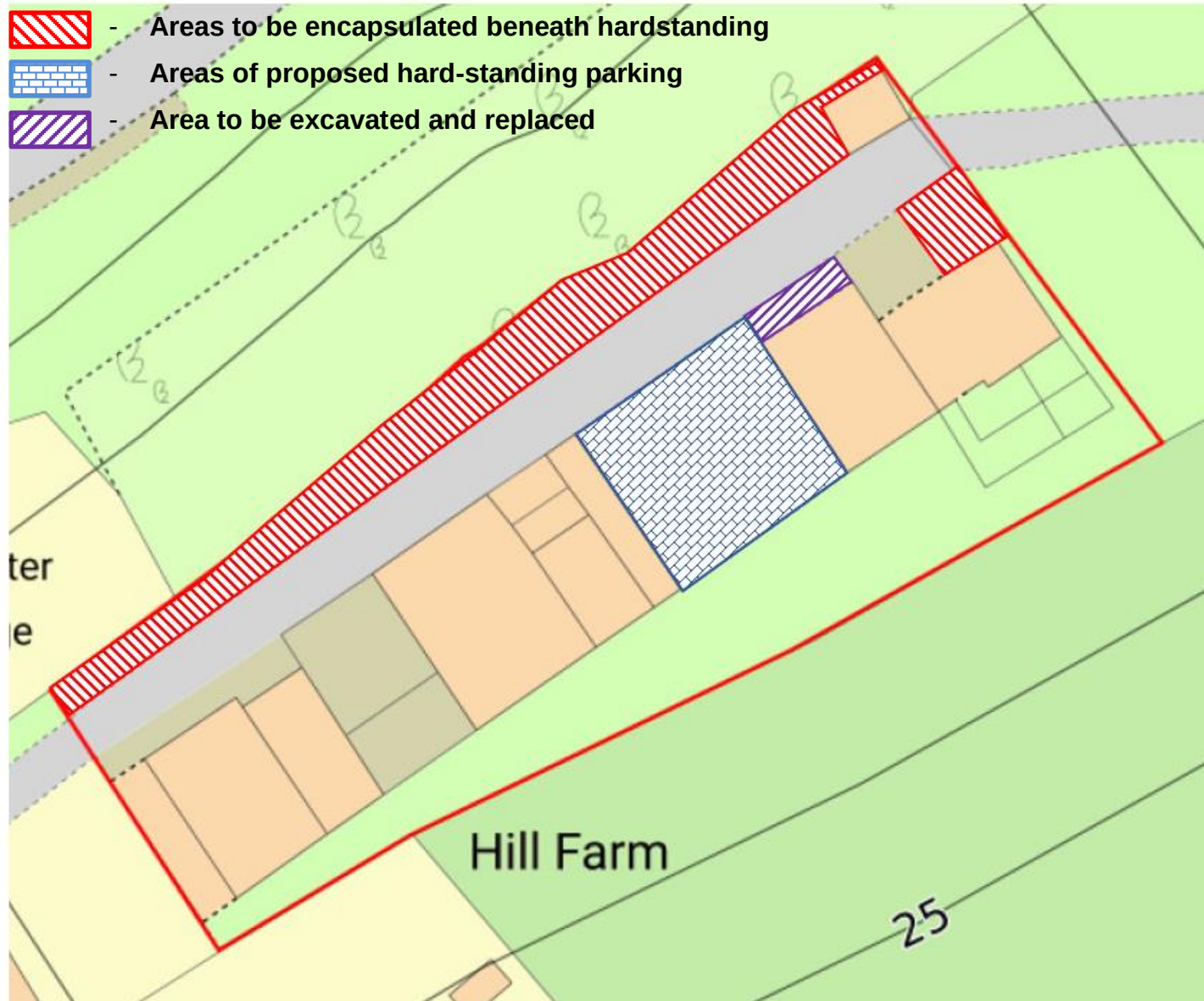
**CURRENT SITE PLANS AND TRIAL PIT PLAN**





APPENDIX B

ENCAPSULATION AND EXCAVATION SITE PLAN



## APPENDIX C

## DISCOVERY STRATEGY

