



Lime Kiln Farm, Coddenham, Suffolk

Ecological Impact Assessment

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CONTENTS

1.0	SUMMARY	3
2.0	INTRODUCTION	5
3.0	METHODOLOGY	8
4.0	RESULTS (<i>Baseline Conditions</i>)	14
5.0	CONCLUSIONS AND RECOMMENDATIONS	24
6.0	MITIGATION & ENHANCEMENT MEASURES	29
7.0	REFERENCES	30
8.0	LEGISLATION	31

Appendix 1: Proposed Layout & Elevations

Appendix 2: DNA Results

Figure 1: Site Location Plan

Figure 2: Building Location Plan



1.0 SUMMARY

- 1.1 The site (located at NGR: TM 11839 54746) was found to comprise a semi-detached farmhouse, with one side in a liveable state and the other entirely stripped back to brick walls and bare earth floors. A single storey brick storage shed is present immediately to the north of the house. Planning permission and listed building consent is being sought to change the farmhouse from two semi-detached dwellings into a single dwelling, incorporate the rear storage shed into a single storey extension, and re-roof the northern side of the house. Permission is also being sought to erect a new storage shed with new access across an area of patchy short grass and ruderal vegetation.
- 1.2 A site survey carried out on 31st July 2023 identified the presence of hundreds of brown long-eared droppings through the roof space on the eastern side of the house (the western half was not accessible), indicative of a small breeding colony. Further detailed survey is being carried out in August and September 2023 to determine the number of bats using the loft to roost, and the access points used. Given that the loft space will be retained in full, with no alternations proposed other than the lining of the northern roof façade; that all identified roost access points can be retained and / or recreated; and that the works will be timed to avoid the breeding period (May to August inclusive), no specific on site mitigation is required. Whilst the works are likely to require a mitigation licence due to the addition of Type 1F felt on the northern side of the roof, no further survey is necessary to determine the extent of the impacts of the proposals upon bats, only to inform the licence application and the location of the access points. Note that this applies to the farmhouse only – the proposals to construct a new shed and access will not have any significant adverse impacts upon roosting or foraging / commuting bats.
- 1.3 Given that the species of roosting bat has been confirmed via DNA analysis; that the number and age of bat droppings indicates a small breeding colony; that the proposals will not result in the loss of any roosting space (regardless of roost size) and that measures can and will be taken to ensure all access points are retained and / or recreated for bats (e.g. via raised tiles, gaps beneath wedged tiles, purpose built bat tiles, gaps in soffits and gaps in felt - as required) further detailed survey information is not considered necessary in order to provide the LPA with certainty of impacts on bats. The bats will not be adversely affected by the proposals, subject to the access provision, timing constraints and felt type detailed above. The tiles across the northern roof façade are also unlikely to be used by other crevice dwelling bat species, since they are currently unlined and have very little overlap.



- 1.4 The farmhouse provides some suitable habitat for nesting birds, most notably around the eaves. The works will be limited to the northern façade of the house, and any birds using the remaining facades are likely to remain undisturbed. Whilst ideally building works should commence during September to February inclusive to avoid the bird nesting season, if it is not possible to avoid the nesting bird season, immediately prior to commencement of works a check for nesting birds should be undertaken by a suitably experienced ecologist. All active nests will need to be left in situ until the young have left the nest. In order to achieve an overall net gain for biodiversity, new bird and bat boxes will be installed on the new storage shed – see section 6.0.
- 1.5 The leggy shrubs and trees in the footprint of the proposed new storage shed provide suboptimal habitat for nesting birds, but should be subject to the same timing and / or pre-commencement checks as detailed above.
- 1.6 Neither site is deemed suitable for any other protected species.
- 1.7 The mitigation and enhancement measures detailed in section 6.0 can be secured via a planning condition, and should result in a minor overall enhancement for local biodiversity at the site scale.



2.0 INTRODUCTION

Instruction

- 2.1 This report has been prepared by Liz Lord following instruction by Ms B Spall of Peter Wells Architects to carry out an ecological appraisal of the farmhouse and surrounding land at Lime Kiln Farm, Needham Road, Coddendam, Suffolk IP6 9UG.

Site Proposals

- 2.2 Planning permission and listed building consent is being sought to change the farmhouse from two semi-detached dwellings into a single dwelling, incorporate the rear storage shed into a single storey extension, and re-roof the northern side of the house. Permission is also being sought to erect a new storage shed with new access.

Site Description

- 2.3 Lime Kiln Farm is located on the western outskirts of the village of Coddendam, close to the junction of the A14 and A140 to the north of Ipswich. A recent barn conversion (previously surveyed in 2017) lies to the south east of the farmhouse, with a small mown grass field / paddock extending south between the farmhouse and converted barn. Amenity grassland also surrounds the farmhouse to the north, east and west. There is good connectivity to a significant area of woodland c.400m to the south west of the site which further adjoins a large area of parkland to the south. There is also a well-connected network of hedges, copses and small woodlands to the north east. An aerial site location plan and aerial site photograph are provided below and overleaf.



Fig 1: Site location, with site location indicated beneath red arrow. Aerial photograph sourced from Google Earth Pro



Fig 2: Building location plan, with farmhouse and shed outlined in blue, and location of proposed new shed with access outlined in red. Aerial sourced from Google Earth Pro

Objectives

- 2.4 This report has been written broadly in accordance with the report writing guidelines produced by the Chartered Institute of Ecology and Environmental Management (CIEEM) (CIEEM 2018, 2017a, 2017b). In accordance with the client brief, this survey and report aims to:
- 2.4.1 Identify and describe all potentially significant ecological effects on protected and notable species / sites associated with the proposals;
 - 2.4.2 Set out the mitigation measures required to ensure compliance with nature conservation legislation and address any potentially significant ecological effects;
 - 2.4.3 Identify how mitigation measures will / could be secured;
 - 2.4.4 To provide an assessment of the significance of any residual effects;
 - 2.4.5 Identify appropriate enhancement measures; and
 - 2.4.6 Where deemed necessary, set out the requirements for post construction monitoring.
- 2.5 This survey and report is intended to inform, as necessary, the layout and design of the proposals, future landscape design and management on site, and where required the methodology and timing of development works.



Timescales

- 2.6 The works period is expected to last around 12-18 months following the granting of relevant permissions.
- 2.7 This report is valid for a period of 18 months from the date of survey. Beyond this time, changes to the vegetation and buildings and / or use of the buildings may have occurred which could require re-assessment and potentially further survey to re-determine the presence / likely absence of protected species.

Relevant Documents

- 2.8 The site assessment was based upon drawing numbers PW1225_PL10 and PW1225_PL11 both dated November 2021, and PW1225_PL13 Rev B dated May 2023 by Peter Wells Architects, as shown in Appendix 1. Note that any minor amendments to the scheme are unlikely to alter the conclusions and recommendations of this report.
- 2.9 Recommendations included within this report are the professional opinion of an experienced ecologist based on the client's proposals for the site, the site surveys, the results of the desk study, and features present in the surrounding environment.



3.0 METHODOLOGY

Desk Study

- 3.1 The Multi Agency Geographic Information for the Countryside (MAGIC) website was consulted on 4th August 2023 to determine the presence of any nationally or internationally designated sites such as Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites within influencing distance of the proposals.
- 3.2 The MAGIC website was also used to search for any records of European Protected Species Mitigation (EPSM) licences that have been approved by Natural England within a 5km radius of the application site since late 2008 (last updated January 2022). The website was checked for any data from Natural England's great crested newt eDNA Habitat Suitability Index pond surveys for District Level Licensing 2017-2019 (last updated August 2022); and data from Natural England great crested newt Class Survey Licence returns within a 5km radius of the site (last updated August 2022).
- 3.3 A records search was carried out with the Suffolk Biodiversity Information Service (SBIS) for information on County Wildlife Sites and protected and notable species within a 2km radius of the adjacent barn conversion in July 2017. Given the additional data recorded during the 2017 surveys of the adjacent barn, and the confirmed presence of a brown long-eared bat roost in the roof of Lime Kiln farmhouse, a repeated records search was not considered likely to provide additional information of significant relevance. An updated search for bat records will be undertaken as part of any mitigation licence application.

Site Survey

- 3.4 An initial daytime building inspection and site survey was carried out on 31st July 2023. The survey was based upon the standard methodology for Extended Phase 1 Habitat Surveys (JNCC 2010), with habitats classified according to the abundance of plant species present. Any evidence of invasive species such as Japanese knotweed was noted.
- 3.5 The survey area was limited to the land within the red line boundary as shown in Figure 2, plus land immediately adjacent and within the potential Zone of Influence.
- 3.6 The survey also included an assessment of the site's potential to support any legally protected species; or Species and Habitats of Principal Importance, as identified by Section 41 of the Natural Environment and Rural Communities Act 2006.
- 3.7 Where best practice guidelines exist, these have been used to assess the likelihood that individual species will be present, for example Bat Surveys: Good Practice Guidelines (Collins, J. 2016) and Habitat Suitability Index for Great Crested Newt (Oldham *et al*, 2000).



- 3.8 Using criteria provided in best practice guidelines, habitats have been assessed for their potential to support protected species; notably bats, barn owls *Tyto alba*, badgers *Meles meles*, great crested newts *Triturus cristatus*, reptiles, water voles *Arvicola amphibius*, dormice *Muscardinus avellanarius* and otters *Lutra lutra*.
- 3.9 Where methodologies, classification or recommendations deviate from best practice guidelines, this report provides ecological justification for such changes.

Building Inspection

- 3.10 The buildings were surveyed and assessed in accordance with criteria outlined in Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, J. 2016).
- 3.11 The internal and external inspection of the buildings were carried out using – as necessary – a powerful torch, a ladder, a pair of Nikon 12 x 50 binoculars and an Easyview 8mm digital recording endoscope to inspect gaps and crevices for bats and evidence of bats.
- 3.12 Floors, walls and storage surfaces beneath all possible access points or crevices which may be used for roosting were checked for droppings, scratching and urine or fur staining, and particular attention was paid to the areas beneath tie beams from which bats may hang or rest.
- 3.13 The ridge boards, tie beams, barge boards and door / window frames of the buildings were specifically checked for scratching and staining, as well as roosting bats. Particular attention was paid to any gaps in and around timbers, roofs and walls; and the walls, ledges and ground area below.
- 3.14 Floor surfaces were concrete across the single storey shed, and fibreglass insulation across the loft space of the farmhouse. A large number of undisturbed stored items were present within the shed, which provided good elevated surfaces for inspection for bat droppings and insect remains. There was no indication that the buildings had been recently swept or cleared.
- 3.15 A sample of bat droppings was taken from the loft space of the farmhouse, and analysed by Surescreen Scientifics.

Surveyors

- 3.16 The building inspection was carried out by Liz Lord. Liz has been a professional ecologist since 2005, and holds current Natural England licences to survey bats - Class Licence Reg. No. 2015-13305-CLS-CLS; great crested newts - Class Licence Reg. No. 2020-44816-CLS-CLS; and barn owls – Class Licence Reg. No. CL29/00160. Liz is a full member of CIEEM.



3.17 The weather at the time of the building inspection was overcast with occasional light rain, little to no wind (BF0-1) and a temperature of 20°C.

Limitations

3.18 The conclusions in this report are based on the best information available during the reported period of survey.

3.19 Ecological surveys provide only a 'snapshot' of the site in time, and many species, such as bats and badgers, are capable of colonising a site in a very short space of time. Lack of evidence of a species at the time of survey can only allow conclusion of the *likely* absence of this species, since no level of survey effort is capable of proving absence beyond doubt.

Zone of Influence

3.20 The potential impacts of a development are not always limited to the boundaries of the site concerned, such as where there are ecological or hydrological links beyond the site boundaries. In order for the proposed works to have an impact on habitats and species outside of the site boundaries, there needs to be a source of impact, a pathway and a receptor for that impact.

3.21 The Zone of Influence will vary for different habitats and species depending on their sensitivity to predicted impacts, the distribution and status of the relevant species, whether a species is mobile, migratory, and whether its presence and activity varies according to the seasons.

3.22 An assessment of the Zone of Influence has been made based on the site layouts shown in Appendix 1, and where necessary recommendations to avoid any significant adverse impacts beyond the site boundaries have been provided in section 5.0.

Geographic Context

3.23 Where applicable, the importance of each ecological feature has been considered in a geographic context as follows:

- International and European
- National
- Regional
- Metropolitan, County, vice-county or other local authority-wide area
- River Basin District
- Estuarine system/Coastal cell
- Local (further categorized into District, Borough or Parish)
- Site



Assessment of Impacts and Effects

3.24 The following definitions are used for the terms 'impact' and 'effect' in accordance with CIEEM (2018) guidelines:

- Impact – actions resulting in changes to an ecological feature
- Effect – outcome to an ecological feature from an impact

3.25 The importance of any ecological feature has been determined via the site surveys detailed in this report. Note that species and habitats afforded legal protection are, by default, always considered within the EclA assessment process to be 'important'.

3.26 Potential impacts of the proposals on any such features have been assessed based on the client proposals for the site, and following a review of all phases of the project.

3.27 Impacts are assessed through consideration of the extent, magnitude, duration, reversibility, timing and frequency of works which may result in likely 'significant' impacts to any ecological features present. The route through which impacts may occur (direct, indirect, secondary or cumulative) has also been considered. Positive impacts are assessed as well as negative ones.

3.28 The results of the surveys have been used to identify any potentially significant impacts in the absence of any avoidance, mitigation or compensation measures. Any such appropriate measures have then been proposed where necessary.

Characterisation of Ecological Impacts

3.29 When considering ecological impacts and effects, the following characteristics have been considered:

- positive or negative
- extent
- magnitude
- duration
- frequency and timing
- reversibility

3.30 Where various characteristics have not been specifically referred to in this report, they have been considered insignificant or irrelevant to that specific feature.

3.31 A 'significant effect' is defined within the current CIEEM guidelines (2018) as: *"an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide*



range of scales from international to local."

- 3.32 Where a significant effect is predicted, this requires assessment and reporting in order to provide the decision maker with sufficient information to determine the environmental consequences of a project. A significant effect can be either positive or negative, and its extent will determine the requirement of conditions, restrictions or monitoring works.
- 3.33 The current CIEEM guidelines (2018) also state that: *"After assessing the impacts of the proposal, all attempts should be made to avoid and mitigate ecological impacts. Once measures to avoid and mitigate ecological impacts have been finalised, assessment of the residual impacts should be undertaken to determine the significance of their effects on ecological features. Any residual impacts that will result in effects that are significant, and the proposed compensatory measures, will be the factors considered against ecological objectives (legislation and policy) in determining the outcome of the application."*
- 3.34 This report has taken into account the factors detailed above for each important ecological feature in the absence of mitigation. Recommendations have then been made with respect to avoidance / mitigation / compensation / enhancement as necessary, and an assessment of the residual impacts after such measures has been made.

Mitigation Hierarchy

- 3.35 In order to minimise the likelihood of any significant negative residual effects on environmental features, this assessment has followed the mitigation hierarchy (listed below in order of preference):
- Avoidance – measures that avoid harm to ecological features, both spatially and temporally;
 - Mitigation – avoidance or minimisation of negative effects through appropriate timing of works, or the provision of mitigation measures within the scheme design which can be guaranteed by condition or similar;
 - Compensation – measures taken to offset residual effects which result in the loss of, or permanent damage to, ecological features despite mitigation;
 - Enhancement – measures to provide net benefits for biodiversity, either by improved management of existing features, or the provision of new features, and over and above that which is required to mitigate / compensate for an impact. Delivery should be secured via planning condition or similar.

Legislation and Policy

- 3.36 Specific reference has been made to the individual legal protection of the species detailed within this report, however additional information with respect to other relevant legislation and planning policy is provided in section 8.0.



- 3.37 The legislation of particular relevance within the body of this report is the Conservation of Habitats and Species Regulations 2017 (as amended) and the Wildlife and Countryside Act 1981 (as amended). The former confers legal protection to 'European' Protected Species against both disturbance and harm, and extends to the full protection of their habitats. This legislation also provides legal protection for a number of internationally designated sites within the UK, and remains in place following Brexit.
- 3.38 The Wildlife and Countryside Act 1981 (as amended) is UK specific, and generally only provides protection against direct harm to individuals of a species.



4.0 RESULTS (Baseline Conditions)

Site Summary

- 4.1 The site comprises a semi-detached farmhouse, with one side in a liveable state and currently inhabited, and the other entirely stripped back to brick walls and bare earth floors. A single storey brick storage shed is present immediately to the north of the house, and large garden extends to the north and north east.

Desk Study: Statutory Designated Sites

- 4.2 Natural England's MAGIC website indicates that there are no national or international statutory designated sites located within a 2km radius of the site boundary, and the site does not lie within any Impact Risk Zones.

Desk Study: Non-Statutory Designated Sites

- 4.3 No County Wildlife Sites are present within potential influencing distance of the site. Shrubland Park CWS (part of the Beacon Hill Plantation) is located c.400m to the south west of the site, and comprises a large area of mixed woodland with a wide range of species and habitat structures, and is of note for its invertebrate assemblages. This site will not be adversely affected by the proposals.

Habitats

Invasive species

- 4.4 No aerial evidence of Japanese knotweed *Fallopia japonica* was recorded within the site or immediately adjacent areas at the time of survey.

Water bodies

- 4.5 No water bodies are present on site. Ordnance Survey maps at 1:10,000 scale highlighted the presence of one pond (WB1) located c.20m to the south west of the house, and 60m from the proposed storage shed. A second pond (WB2) lies c.15m to the west of the house, and 60m from the proposed storage shed. No other water bodies were identified within 250m of the site.
- 4.6 Both WB1 and WB2 are seasonal water bodies, with neither seen to hold water at the time of survey, and with WB1 fully colonised by grasses. Both have also been previously surveyed by Liz Lord to determine the presence / absence of great crested newts, between 21st April and 7th June 2017, when water levels in WB2 dropped too low for bottle trapping after the first visit, and levels in WB1 were found to be too low during the fourth visit. As a result, it is concluded that both ponds remain unlikely to support great crested newts, and both ponds are scoped out of this assessment.



Ephemeral / short perennial vegetation

- 4.7 The proposed access track for the new storage shed runs through an area of lawn which is overhung by mature trees, and as a result contains significant areas of bare ground. Vegetation cover is patchy, and comprises white deadnettle *Lamium album*, yarrow *Achillea millefolium*, violet *Viola sp.*, speedwell *Veronica sp.*, patches of colonising grasses and scattered low growing bramble *Rubus fruticosus agg.*
- 4.8 Across the proposed location of the shed is an area of low growing ruderal species dominated by comfrey *Symphytum officinale* and nettles *Urtica dioica*, with scattered ground ivy *Glechoma hederacea*, creeping thistle *Cirsium arvense* and white deadnettle.

Native scrub

- 4.9 A small, leggy collection of mature elder *Sambucus nigra* shrubs grow between the proposed track and the proposed storage shed, with a predominantly bare earth and leaf litter understorey.

Trees

- 4.10 The eastern boundary of the site, alongside the proposed new access track and shed, supports a row of mature trees, none of which will be removed or adversely affected by the proposals. At the site entrance stands a mature, multi-stemmed whitebeam *Sorbus aria*, a mature field maple *Acer campestre* and a sycamore *Acer pseudoplatanus* all of which will be retained.
- 4.11 The only tree to be removed is a leggy young twin-stemmed ash *Fraxinus excelsior* standing along a line of trees and shrubs between the proposed access road and storage shed. The tree supports a sparse covering of ivy *Hedera helix* and no potential bat roost features.

Buildings

- 4.12 Lime Kiln farmhouse comprises two semi-detached two storey cottages, one of which is currently inhabited, whilst the other has been stripped internally back to brickwork and beams. The external walls are rendered, with a proportion of the south eastern (front) half of the house currently missing render. Door and window frames are wooden, and closely fitting.
- 4.13 The roof has been constructed with old, ill-fitting timbers, with the rafters strengthened in places with the addition of modern wooden supports, resulting in the creation of small crevices between adjacent timbers. The majority of the 8m long eastern loft is just under 3m high for c.5m of the roof space, with the ceiling at the hipped gable end raised to reduce the loft to c.2m height for the remaining 3m length of roof space. This appears to be reflected on the western side of the house, as could be seen from first floor ceiling heights.



- 4.14 The southern, eastern and western facades of the roof appear to have been relatively recently re-roofed (within the last 10-20 years), with closely fitting peg tiles, well fitted lead flashing around chimneys and wooden soffits in reasonably good condition. The peg tiles have been lined internally with a breathable roofing membrane, which has been extended up and over the ridge beam by around 200mm. Otherwise the northern side of the roof is unlined, and covered with poorly fitting clay pantiles. Numerous potential access points into the roof were noted on this façade, beneath the pantiles, beneath loose ridge tiles, around poorly fitting lead flashing, and around partially rotten wooden soffits and barge boards. Most of the northern side of the roof also extends down to single storey height to cover a small rear extension.
- 4.15 Potential access for birds and bats into the roof on all facades was also noted around the eaves, however no bat droppings were recorded on the white rendered walls beneath.
- 4.16 Only the eastern half of the roof space was accessible for inspection, running from a large, central chimney breast across to the hipped eastern end. The floor is covered with thick fibreglass insulation, which did not appear to have been disturbed for a significant period of time. Across the insulation were various large collections of bat droppings, of various ages from fully disintegrated and dusty, to old grey intact droppings, to dark fresh droppings.
- 4.17 Immediately adjacent to the northern rear wall of the house is a long, narrow, single storey brick and render storage shed. Roof beams are closely fitting, and are covered with black bitumen felt and clay pantiles. The tiles are well fitted, with numerous holes and tears in the felt beneath. No evidence of the presence of bats was recorded internally or externally on this building.



Photo 1: North western facades of farmhouse



Photo 2: Eastern facades of farmhouse and rear shed





Photo 3: South western facades of farmhouse



Photo 4: Potential bat and bird access point around eaves of farmhouse



Photo 5: Potential bat access points around ridge and rotten soffits on eastern façade of farmhouse



Photo 6: Gaps beneath tiles around chimney base on northern façade of farmhouse



Photo 7: Gaps around tiles and lead flashing on northern façade of farmhouse



Photo 8: Gaps between tiles and rotten barge boards on northern façade of farmhouse





Photo 9: Internal view of eastern loft space (western side thought to be a mirror image, but inaccessible due to excessively small loft hatch)



Photo 10: Eastern end of loft space, where floor is raised



Photo 11: Ridge area of loft space, with breathable membrane running over ridge and c.200m down northern side of roof



Photo 12: Collections of bat droppings of varying age beneath ridge – fully disintegrated, dry and dull, and dark and shiny



Photo 13: North eastern facades of rear shed



Photo 14: Closely fitting soffits and barge board of rear shed





Photo 15: Closely fitting tiles of rear shed



Photo 16: Internal view of rear shed



Photo 17: Proposed location of new storage shed



Photo 18: Typical vegetation cover across location of new storage shed



Photo 19: Small stand of leggy elder located along northern half of proposed new access route



Photo 20: Bare earth and sparse vegetation along southern half of proposed new access route



Animals

Bats

- 4.18 The SBIS records search returned 12 records of bats within 2km of the site, generally to the south. Two records were from the barns offsite to the south east, dating from 2003: one of a natterer's bat *Myotis nattereri*, and one of a brown long-eared bat *Plecotus auritus*. Remaining records were of four unidentified bats, common pipistrelle *Pipistrellus pipistrellus* and brown long-eared bats. In 2017, surveys of the barn by Liz Lord confirmed the presence of individual roosting common and soprano pipistrelle, up to three barbastelle *Barbastella barbastellus* and a possible daubenton's *M. daubentoniid*.
- 4.19 The desk study identified two bat EPSM licences within 5km of the site, at 0.7km north for a non-breeding roost of barbastelle, brown long-eared, common and soprano pipistrelle; and at 2.5km south west for a non-breeding roost of common and soprano pipistrelle.

Bats - roosting

- 4.20 DNA analysis of dropping samples from the loft of the farmhouse confirmed the presence of roosting brown long-eared bat roost, whilst the large numbers of droppings present strongly indicate the presence of a breeding roost.
- 4.21 Further surveys will be undertaken in August and September 2023 to fully determine the number of bats present and the access points being used. This information will then be used to ensure access points are retained and / or recreated, in order that the bats may continue to access the loft space to roost. Given the likely presence of a breeding roost, timing restrictions will also be followed i.e. no works to the roof between May and August inclusive, and due to the tendency for brown long-eared bats to remain in their summer roosts longer than other species, where reasonable and possible re-roofing works will be delayed until the middle / end of September.
- 4.22 As indicated by the various locations of bat droppings beneath the ridge area, the bats appear to be roosting in a number of positions along the ridge beam, however one particular area was noted close to the central roof chimney stack where the roof membrane fibres have been noticeably pulled and worn – see photographs 21 and 22 overleaf.
- 4.23 A second obvious roosting location was noted along the southern façade of the roof, in a low crevice created between two rafters. An estimated 2-300 droppings of various ages were recorded on the fibreglass insulation immediately below. See photos 23 and 24 overleaf.





Photo 21: Red circle - likely favoured location of roosting brown long-eared bats



Photo 22: Likely location of roosting bats indicated by piling and pulling of roof membrane fibres

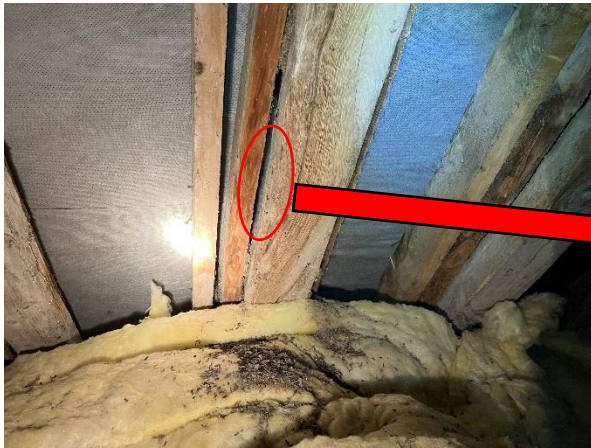


Photo 23: Red circle - likely favoured location of roosting brown long-eared bats



Photo 24: Likely location of roosting bats indicated by piling and pulling of roof membrane fibres

4.24 Tiles across the northern shed are closely fitted, soffits and barge boards are in very good condition, and the shed itself is shaded by the immediately adjacent house. This building is assessed as being of negligible suitability for roosting bats.

4.25 The only tree to be removed as part of the proposals – a young twin stemmed ash tree located along the proposed access route for the new shed – was not found to support any potential roosting features, and was deemed to be of ‘negligible’ suitability for roosting bats.

Bats - commuting / foraging

4.26 The garden surrounding the farmhouse supports a number of mature trees and shrubs, and provides a small area of bat foraging and commuting habitat. Whilst these areas are unlikely to be of significant importance to foraging bats in the context of the surrounding environment, they are likely to be of importance to the roosting brown long-eared bats, and will be retained. The loss of the young twin-stemmed ash and a small area of leggy elder will not result in any severance of potential commuting or foraging flight lines.



Amphibians

- 4.1 The MAGIC data search returned a cluster of ten class licence and one EPSM record at 4.5-5km to the south west of the site, with five further individual GCN records in all directions from the site, with the closest 1.5km to the south east. The SBIS search returned one record of great crested newt within 2km of the site, dating from 2006 and located c.1.3km to the north east.
- 4.2 Given the seasonal nature of the two nearby water bodies, and the likely absence of GCN from both water bodies following surveys undertaken in 2017, the likelihood of GCN being present on site and adversely affected by the proposals is negligible.

Reptiles

- 4.3 The site does not provide suitable habitat for reptiles, nor is it located adjacent to any significant areas of potential reptile habitat.

Birds

- 4.4 The farmhouse provides potential opportunities for nesting birds, however no evidence of the presence of nesting birds was recorded at the time of survey.
- 4.5 The semi-mature ash tree to be removed as part of shed construction provides sparse and suboptimal opportunities for nesting birds, as do the overhanging branches of the mature trees growing alongside the eastern site boundary.

Badger

- 4.6 Badgers are a common and widespread species, not of conservation concern. No badger records were returned within 2km of the site.
- 4.7 No evidence of badger was recorded on or within 30m of the site. No setts, footprints, hairs, latrines, snuffle holes or scratching indicative of the presence of badgers was recorded.

Otter

- 4.8 There are no waterbodies on, adjacent or connected to the site which have potential to support otters.

Water vole

- 4.9 There are no waterbodies on, adjacent or connected to the site which have potential to support water voles. A tributary of the River Gipping runs over 30m to the south west of the farmhouse, well outside of the potential zone of influence of the proposed works.



Dormice

- 4.10 The young ash tree and the leggy elder scrub immediately adjacent provide low quality potential habitat for dormice, and there is poor connectivity from the site to larger areas of offsite woodland and scrub which may be capable of supporting this species.

Invertebrates

- 4.11 The site is considered likely to support common and widespread invertebrate species typical of the habitats present.

Other Legally Protected Species

- 4.12 Due to a lack of suitable habitats the site is not considered likely to support any other legally protected species.

Species of Principal Importance

- 4.13 The site provides some limited habitat for Species of Principal Importance in England (SPIE), including foraging hedgehog *Erinaceus europaeus* and nesting birds such as house sparrow *Passer domesticus* and starling *Sturnus vulgaris*, however none of these species, or potential evidence of the presence of these species, were recorded on site during survey.



5.0 CONCLUSIONS AND RECOMMENDATIONS

Designated Sites

- 5.1 The proposals are very unlikely to have an adverse impact upon any national or international designated, and no further works are required in this regard.
- 5.2 The proposals are not considered to be detrimental to any CWS. No further survey or mitigation is recommended.

Bats

- 5.3 All species of bat are protected under the Conservation of Habitats and Species Regulations 2017 (as amended) and by the Wildlife and Countryside Act 1981 (as amended). In summary, this makes it an offence to harm or disturb a bat; damage or destroy a roost; and obstruct access to a roost (whether or not bats are present at the time).
- 5.4 Potential effects on roosting bats: DNA sampling has confirmed the presence of brown long-eared bats in the loft space of the farmhouse, and the relatively large number of droppings (numerous piles of 2-500 droppings each), and apparent wide range in the age of droppings indicate that a small brown long-eared bat maternity roost is present. In the absence of avoidance measures and precautionary methods of working, the proposals could result in disturbance, injury or death to a small breeding colony of a common bat species. In the absence of avoidance and mitigation measures, a significant adverse impact is predicted for brown long-eared bat at a site level, and a moderate adverse impact at a local level.
- 5.5 The proposed conversion of the single storey shed is unlikely to have any adverse impacts upon roosting bats, and no further measures are necessary with respect to this building, aside from general best practice removal of tiles by hand and with care.
- 5.6 Mitigation measures for roosting bats: despite the proposals to retain, in full, the loft space of the house for use by bats, to only re-roof the northern façade, and to re-instate all recorded roost access points, due to the lining of the northern side of the roof with felt the works are likely to require an EPSM licence. Whilst the addition of felt is unlikely to have a significant adverse impact upon the roosting bats, ultimately it will result in a modification to the roost, and as such is licensable.
- 5.7 A licence can only be applied for once planning permission has been granted, and the exact timing of works and number and location of any access points will be agreed directly with Natural England, and as such will supersede all details provided in this report. Note that there is no requirement to provide any specific mitigation features, since the loft space will be retained in full and all access points can be retained and / or recreated.



- 5.8 Work to the loft space will avoid the May to August breeding period, and ideally as much of September as possible given the tendency for brown long-eared bats to remain in summer roosts for extended periods. The loft is very unlikely to be used by hibernating brown long-eared bats due to their apparent preference for very low hibernation temperatures, and is deemed to be of low suitability for hibernating bats overall. Works to the loft could therefore be carried out between mid-September and end of April.
- 5.9 Only traditional Type 1F bitumen felt will be used to line the northern façade of the roof, and not a breathable membrane due to the potential for bats to become entangled in loosened fibres of breathable membranes. A breathable membrane has already been used across the southern façade of the roof, but since no alterations are proposed to this or the eastern and western facades, this membrane will remain insitu. Due to the apparent loosening of the fibres already, it is recommended that the internal sides of the breathable membrane are at least partially relined with Type 1F felt in the areas most used by bats i.e. c.200mm down from the ridge beam. This will prevent bats inside the loft roosting against the breathable membrane, and will reduce the likelihood of bats further loosening the fibres and becoming entangled. It is noted however, that this is not the responsibility of the current home owner to do this, and it will effectively result in an enhancement of the current conditions inside the roost.
- 5.10 Given that the species of roosting bat has been confirmed via DNA analysis; that the number and age of bat droppings indicates a small breeding colony; that the proposals will not result in the loss of any roosting space (regardless of roost size) and that measures can and will be taken to ensure all access points are retained and / or recreated for bats (e.g. via raised tiles, gaps beneath wedged tiles, purpose built bat tiles, gaps in soffits and gaps in felt - as required) further detailed survey information is not considered necessary in order to provide the LPA with certainty of impacts on bats. The bats will not be adversely affected by the proposals, subject to the access provision, timing constraints and felt type detailed above. The tiles across the northern roof façade are also unlikely to be used by other crevice dwelling bat species, since they are currently unlined and have very little overlap.
- 5.11 Potential effects on commuting / foraging bats: subject to the implementation of a bat friendly lighting scheme as detailed below, negligible effects are predicted with respect to foraging or commuting bats since very little vegetation will be removed as part of the proposals, and the farmhouse has always been used as a residential dwelling, with a number of external lighting features.
- 5.12 Mitigation measures for commuting / foraging bats: as part of the mitigation licence, a bat friendly lighting scheme will be implemented to avoid lighting the wider site or any bat roost access points or commuting routes at night. Any new lighting features will be minimal, limited to small porch lights only, and located as close to the ground as possible. Any additional



external lighting will be on short duration motion sensitive timers, use hoods, cowls, louvres and shields to direct light to the ground, and use warm white (<3000K) LED bulbs.

- 5.13 Residual effects: with the implementation of the above avoidance and mitigation measures, negligible effects are predicted upon the brown long-eared bat roost or any other bats which may be using the roof to roost. A minor overall enhancement could result with the covering of parts of the breathable roofing membrane with Type 1F felt and the provision of new roosting features on the walls of the new storage shed.

Birds

- 5.14 Breeding birds and their nests are protected under the Wildlife and Countryside Act 1981 (as amended).
- 5.15 Potential effects: the buildings, trees and shrubs provide nesting opportunities for birds to varying degrees, and the disturbance and destruction of an active nest could have a negative effect on some bird species at the site level. There will be negligible loss of foraging habitat in the context of the surrounding environment.
- 5.16 Mitigation measures: ideally building works and vegetation removal / branch trimming would commence during September to February inclusive to avoid the bird nesting season. Where this is not possible, immediately prior to commencement of works a check for nesting birds should be undertaken by a suitably experienced ecologist. Any active nests will need to be left in situ until the young have left the nest.
- 5.17 Residual effects: following implementation of the mitigation and enhancement measures detailed in section 6.0 – the provision of three bird boxes targeting house sparrow – no significant adverse effect is predicted on bird species at any level in the medium to long term, and a minor enhancement may result for house sparrow.

Amphibians

- 5.18 Great crested newts (GCNs) and their habitats are fully protected under the Conservation of Habitats and Species Regulations 2017 and by the Wildlife and Countryside Act 1981 (as amended).
- 5.19 Potential effects: negligible.
- 5.20 Mitigation measures: none.
- 5.21 Residual effects: negligible.



Reptiles

- 5.22 All Suffolk reptile species are protected against harm under the Wildlife and Countryside Act 1981 (as amended).
- 5.23 Potential effects: negligible.
- 5.24 Mitigation measures: none.
- 5.25 Residual effects: negligible.

Badger

- 5.26 Badgers and their setts are afforded protection under the Protection of Badgers Act 1992 (as amended). This legislation includes protection against damage to badger setts and against interference and disturbance of badgers whilst they are occupying a sett.
- 5.27 Potential effects: negligible. No evidence of badgers was found on site or immediately adjacent, and there is no indication that badgers are likely to colonise the site in the near future.
- 5.28 Mitigation measures: none.
- 5.29 Residual effects: negligible.

Otters

- 5.30 Otters and their habitats are fully protected under the Conservation of Habitats and Species Regulations 2017 (as amended), and by the Wildlife and Countryside Act 1981 (as amended).
- 5.31 Potential effects: none.
- 5.32 Mitigation measures: none.
- 5.33 Residual effects: none.

Water voles

- 5.34 Water voles and their habitats are fully protected by the Wildlife and Countryside Act 1981 (as amended).
- 5.35 Potential effects: negligible.
- 5.36 Mitigation measures: none.
- 5.37 Residual effects: negligible.



Dormice

5.38 Dormice and their habitats are fully protected under the Conservation of Habitats and Species Regulations 2017 (as amended) and by the Wildlife and Countryside Act 1981 (as amended).

5.39 Potential effects: negligible.

5.40 Mitigation measures: none.

5.41 Residual effects: negligible.

Invertebrates

5.42 Potential effects: negligible.

5.43 Mitigation measures: none.

5.44 Residual effects: negligible.

Other Legally Protected or Notable Species

5.45 The proposed development is not anticipated to impact on any other legally protected species, therefore no mitigation measures are recommended.

5.46 Mitigation and enhancement measures will provide artificial nesting and roosting features. They will ensure the site is of increased value to Species of Principal Importance including house sparrow and a range of crevice dwelling bat species.

5.47 The measures detailed in section 6.0 can be secured via planning condition.



6.0 MITIGATION & ENHANCEMENT MEASURES

- 6.1 **2 no. wooden Kent bat boxes** will be fixed to the new storage shed – one on the south western wall and one on the north western wall – to provide a variety of roosting conditions for crevice dwelling bats. Each box will be located at least 3m high, and well away from all sources of artificial lighting. The recommended box type is shown below.



Wooden Kent Bat Box

Made of thick, untreated wood with two vertical cavities. Based on a design by the Kent Bat Group

Available to purchase on eBay, or from wildcare.co.uk

- 6.2 **3 no. bird boxes suitable for house sparrows** will be fixed to the northern or eastern elevation of the new storage shed, at a height of 2-4m. The boxes will be positioned as close as possible (at least within 300mm) of one another. The boxes will each have a 32mm diameter access hole (suitable for use by house sparrows).

Bird boxes with 32mm wide entrance holes such as that pictured below are widely available online or from garden centres.



'Travis' style wooden nest box with 32mm diameter hole and predator-proof metal plate.

Available from CJ Wildlife



7.0 REFERENCES

CIEEM (2018) *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine Version 1.1*. Chartered Institute for Ecology and Environmental Management, Winchester.

CIEEM (2017a) *Guidelines for Preliminary Ecological Appraisal, 2nd edition*. Chartered Institute for Ecology and Environmental Management, Winchester.

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Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)* The Bat Conservation Trust, London.

Hoskin, R., Liley, D. & Panter, C. (2019). *Habitats Regulations Assessment Recreational Disturbance Avoidance and Mitigation Strategy for Ipswich Borough, Babergh District, Mid Suffolk District and East Suffolk Councils – Technical Report*. Footprint Ecology.

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Multi-agency Geographic Information for the Countryside (MAGIC) Interactive Map. Department for Environment, Food and Rural Affairs.

Oldham, R.S., Keeble, J., Swan, M.J.S. & Jeffcote, M., (2000). Evaluating the suitability of habitat for the great crested newt (*Triturus cristatus*). *Herpetological Journal*, 10, pp. 143-155.



8.0 LEGISLATION

The Conservation of Habitats and Species Regulations 2017 (as amended)

- 8.1 The Conservation of Habitats and Species Regulations 2017 (as amended) continue to provide safeguards for European Protected Sites and Species as listed in the Habitats Directive. As a result, the same provisions remain in place for European protected species, licensing requirements and protected areas after Brexit.
- 8.2 Species protected by the former European legislation includes great crested newt, all UK bat species, dormice and otter. A number of other plant and animal species are also included such as sand lizard, smooth snake and natterjack toad, however these additional species are rare, with restricted geographical ranges and specific habitat types.
- 8.3 Under The Conservation of Habitats and Species Regulations 2017 (as amended) it is an offence to:
- Damage, destroy or obstruct access to an EPS breeding or resting place;
 - Deliberately capture, injure or kill an EPS (including their eggs);
 - Deliberately disturb an EPS, in particular any actions which may impair an animals ability to survive, breed or nurture their young; or their ability to hibernate or migrate; or which may significantly affect the local distribution or abundance of the species to which they belong.
- 8.4 The legislation applies to all stages of amphibian life cycles (eggs, larvae and adult), and to active bat roosts even when they are not occupied at that particular time of year.
- 8.5 Natural England can, under certain circumstances, grant a licence to permit actions which would otherwise be unlawful, subject to the species concerned being maintained at a Favourable Conservation Status and there being a true need for the proposed works to take place.
- 8.6 Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) are also afforded protection under the Conservation of Habitats and Species Regulations 2017 (as amended). Ramsar sites, which are designated under the Convention on Wetlands of International Importance (1971), are afforded the same level of protection as SPAs and SACs via national planning policy.



The Wildlife and Countryside Act 1981 (as amended)

- 8.7 The Wildlife and Countryside Act 1981 (as amended) provides varied levels of protection for a range of species including those already listed above. Water vole are one of the species not listed under the Conservation of Habitats and Species Regulations 2017 (as amended), but are afforded the highest level of protection under the Wildlife and Countryside Act 1981 (as amended).
- 8.8 It is an offence to intentionally kill, injure or take a water vole, to intentionally or recklessly damage or destroy a structure or place used for shelter and/or protection, to disturb a water vole whilst occupying a structure and/or place used for shelter and protection, or to obstruct access to any structure and/or place used for shelter or protection.
- 8.9 Other species, such as common lizard, slow worm, adder and grass snake, are afforded less protection. For these species it is an offence to intentionally or recklessly kill or injure animals.
- 8.10 All active bird nests, eggs and young are protected against intentional destruction. Schedule 1 listed birds e.g. barn owls, kingfishers, are further protected from intentional and reckless disturbance whilst breeding.
- 8.11 Schedule 9 of The Wildlife and Countryside Act lists plant species for which it is an offence for a person to plant, or otherwise cause to grow in the wild. This includes Japanese Knotweed which, under the Environment Protection Act 1990 (as amended) is classed as 'controlled waste'. If any parts of the plant including stems, leaves and rhizomes are taken off-site they must be disposed of safely at a landfill site licensed to deal with such contaminated waste.
- 8.12 Sites of Species Scientific Interest (SSSI) are afforded protection by the Wildlife and Countryside Act 1981 (as amended).

The Protection of Badgers Act 1992 (as amended)

- 8.13 The Protection of Badgers Act (1992) makes it an offence to wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so, and to intentionally or recklessly interfere with a sett.

The Protection of Mammals Act 1996 (as amended)

- 8.14 The Act protects all wild mammals against actions which have the intention of causing unnecessary suffering, including crushing and asphyxiation.



The Natural Environment and Rural Communities Act 2006 (as amended)

- 8.15 Under sections 40 and 41 of the Natural Environment and Rural Communities Act (NERC) 2006 local authorities have an obligation to have regard to the purpose of conserving biodiversity in carrying out their duties. The majority of UK legally protected species are listed under Section 41 the NERC Act.
- 8.16 Section 41 (S41) of the Natural Environment and Rural Communities (NERC) Act (2006) also requires the Secretary of State to publish a list of habitats and species which are of 'principal importance for the conservation of biodiversity' in England (Species of Principal Importance in England – SPIE). The S41 list is used to guide decision-makers, including local and regional authorities, in implementing their duty under Section 40 of the act to have regard to the conservation of biodiversity in England when carrying out their normal functions.

Statutory Designated Sites

- 8.17 Under the National Parks and Access to the Countryside Act 1949 (as amended), statutory conservation agencies were able to establish National Nature Reserves (NNRs), with provisions for these areas strengthened by the Wildlife and Countryside Act 1981 (as amended). They are managed to conserve their habitats or to provide special opportunities for scientific study of the habitats communities and species represented within them.
- 8.18 Local Nature Reserves (LNRs) can be declared by local authorities after consultation with the relevant statutory nature conservation agency under the National Parks and Access to the Countryside Act 1949 (as amended). LNRs are not subject to legal protection, but are afforded protection against damaging operations via byelaws, and against development via local planning policies.

Non-Statutory Designated Sites

- 8.19 Local Wildlife Sites (LWS), Sites of Importance for Nature Conservation (SINCs), Sites of Nature Conservation Importance (SNCIs) and County Wildlife Sites (CWS) are often designated by the local Wildlife Trust. They are not usually afforded any legal protection, but are recognised in the planning system and given some protection through planning policy.

National Planning Policy Framework (NPPF)

- 8.20 The National Planning Policy Framework (2019) sets out the Government's planning policies for England and how these should be applied. The NPPF must be taken into account when preparing a Local Authority's development plan, and is also a material consideration in planning decisions.



8.21 As well as highlighting the importance of protecting ecologically valuable sites and habitats, the NPPF highlights the duty of local planning authorities (LPA's) to deliver net gains for biodiversity within the planning system. Planning policies and decisions should, as per Paragraph 170d, contribute to and enhance the natural and local environment by:

d) 'minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures'

8.22 To protect and enhance biodiversity, policies and plans should, as per Paragraph 174b:

b) 'promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.'

8.23 When determining planning applications, LPA's should apply principles which avoid an adverse effect on natural environments and notable species:

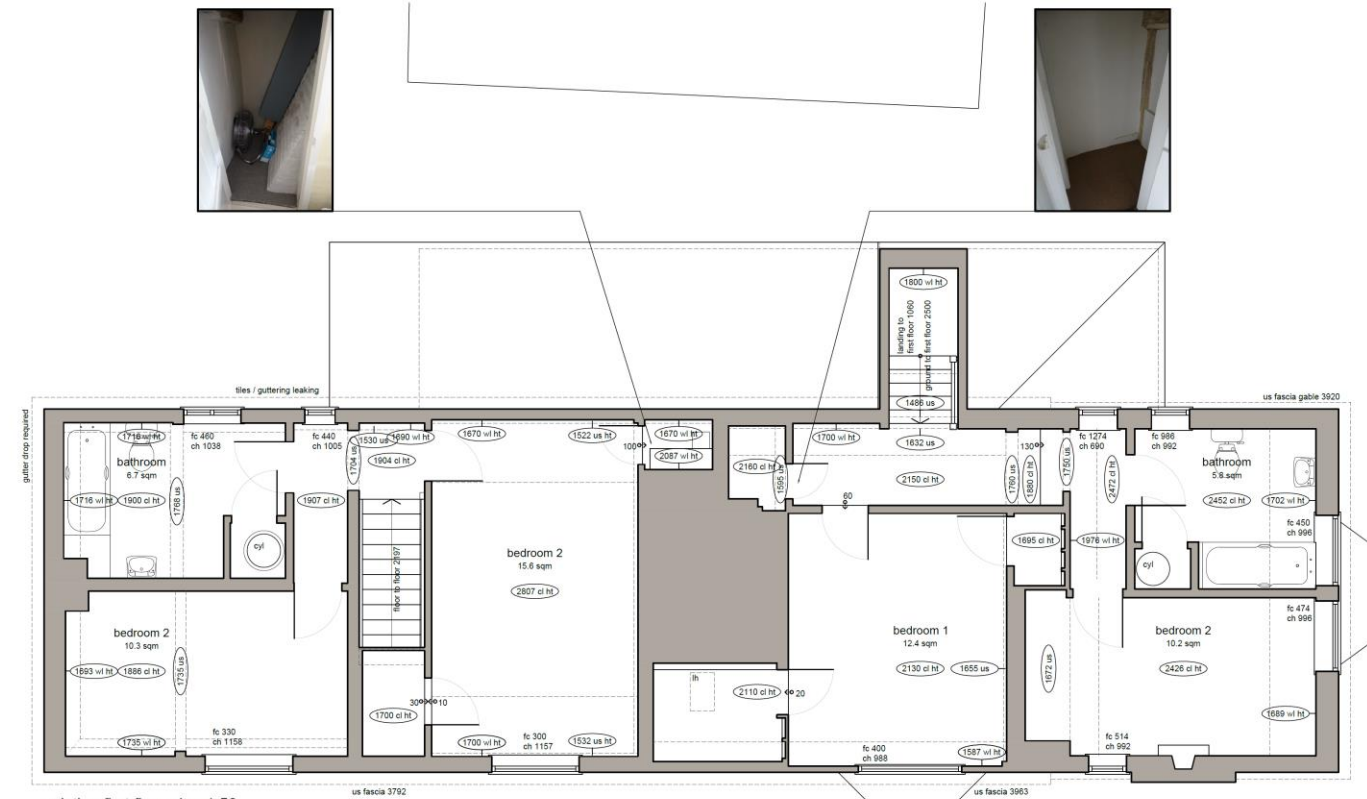
d) 'if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;'



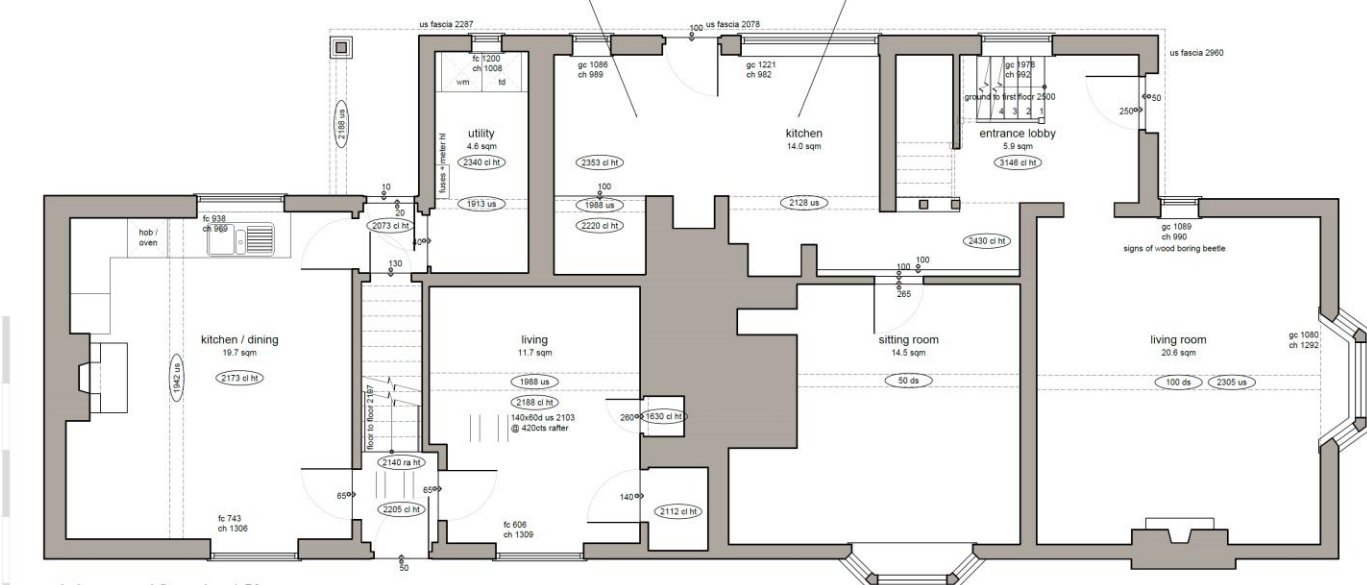
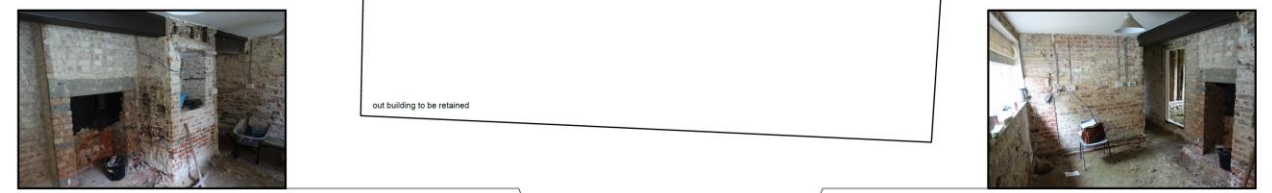
Appendix 1:
Existing and Proposed Site Layout



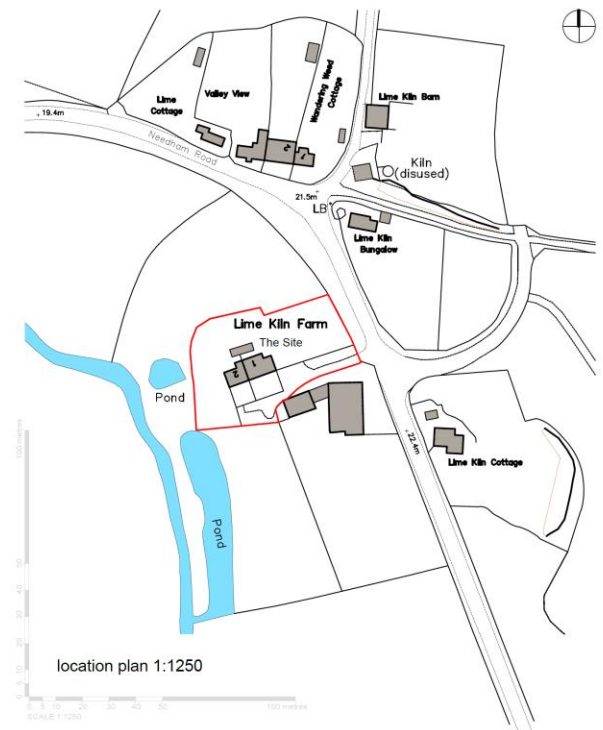
NOTES ON MATERIALS:
 Roof Pitch 60 deg plain tile front & sides, Norfolk cap
 Slate roof to single storey porch
 Rendered brickwork pitch colour: painted black
 Render colour: butterscotch
 Gutters half round and Downpipes metal, colour: painted cream
 Downpipes uPVC, colour: black
 Fascia, soffit & bargeboards, colour: painted white
 Windows timber, colour: painted white & butterscotch
 Windows metal, colour: painted white
 Gullfrench entrance & utility doors, colour: painted lime green & baby blue
 Chimneys London stock, colour: red & pink



existing first floor plan 1:50
 First Floor Gross Internal Area Plot 1 = 43.7 sqm [470 sqft]
 First Floor Gross Internal Area Plot 2 = 45.7 sqm [491 sqft]



existing ground floor plan 1:50
 Ground Floor Gross Internal Area Plot 1 = 44.5 sqm [479 sqft]
 Total Gross Internal Area Plot 1 = 88.2 sqm [949 sqft]
 Ground Floor Gross Internal Area Plot 2 = 63.4 sqm [682 sqft]
 Total Gross Internal Area Plot 2 = 109.1 sqm [1173 sqft]



07/06/23		A	Final line adjusted	WJG	PW
Date	Revision	Description	Drawn	Checked	
peterwellsarchitects					
office farm, letheringham, woodbridge, suffolk, ip13 76A - 01728 745356 - info@peterwellsarchitects.co.uk					
Project:	House at Lime Kiln Farm, Coddham, Suffolk, IP6 9UD				
Proj. Title:	Existing Ground & First Floor Plans, Elevations & location Plan				
Client:	Mr Dan Wythe	Proj. Status:	Planning		
Date:	Nov 2021	Scale:	1:50, 1:100 1:1250 @ A1	Proj. No.:	PW1225_PL10
		Revision:	A		

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CDM
 CONSTRUCTION (DESIGN AND MANAGEMENT) REGULATIONS 2015
 Designer's Hazard Information for Construction
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 1. If you do not fully understand the risks involved during the construction of the items indicated on this drawing ask your health & safety advisor or a member of the design team before proceeding.

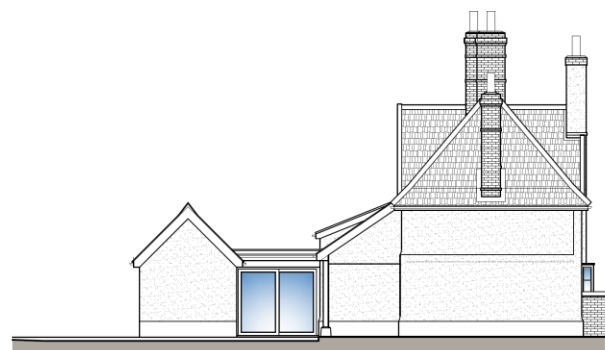


proposed south-east elevation 1:100

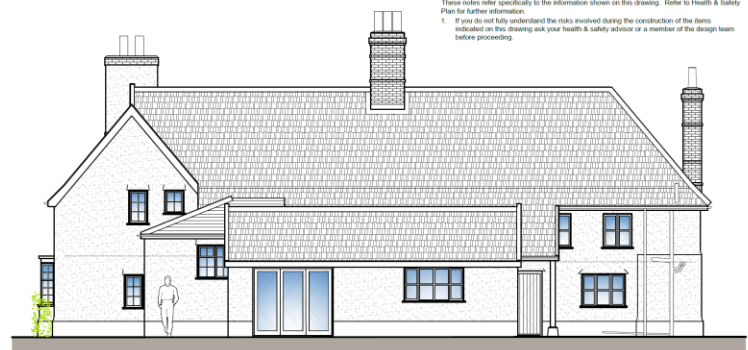


proposed north-east elevation 1:100

NOTES ON LINK MATERIALS:
 Flat roof single ply colour: grey
 Gutters half round and Downpipes uPVC, colour: painted cream
 Fascia, soffits & bargeboards, colour: painted white
 Windows timber, colour: painted white & butterscotch
 Softwood doors, colour: painted white



proposed south-west elevation 1:100

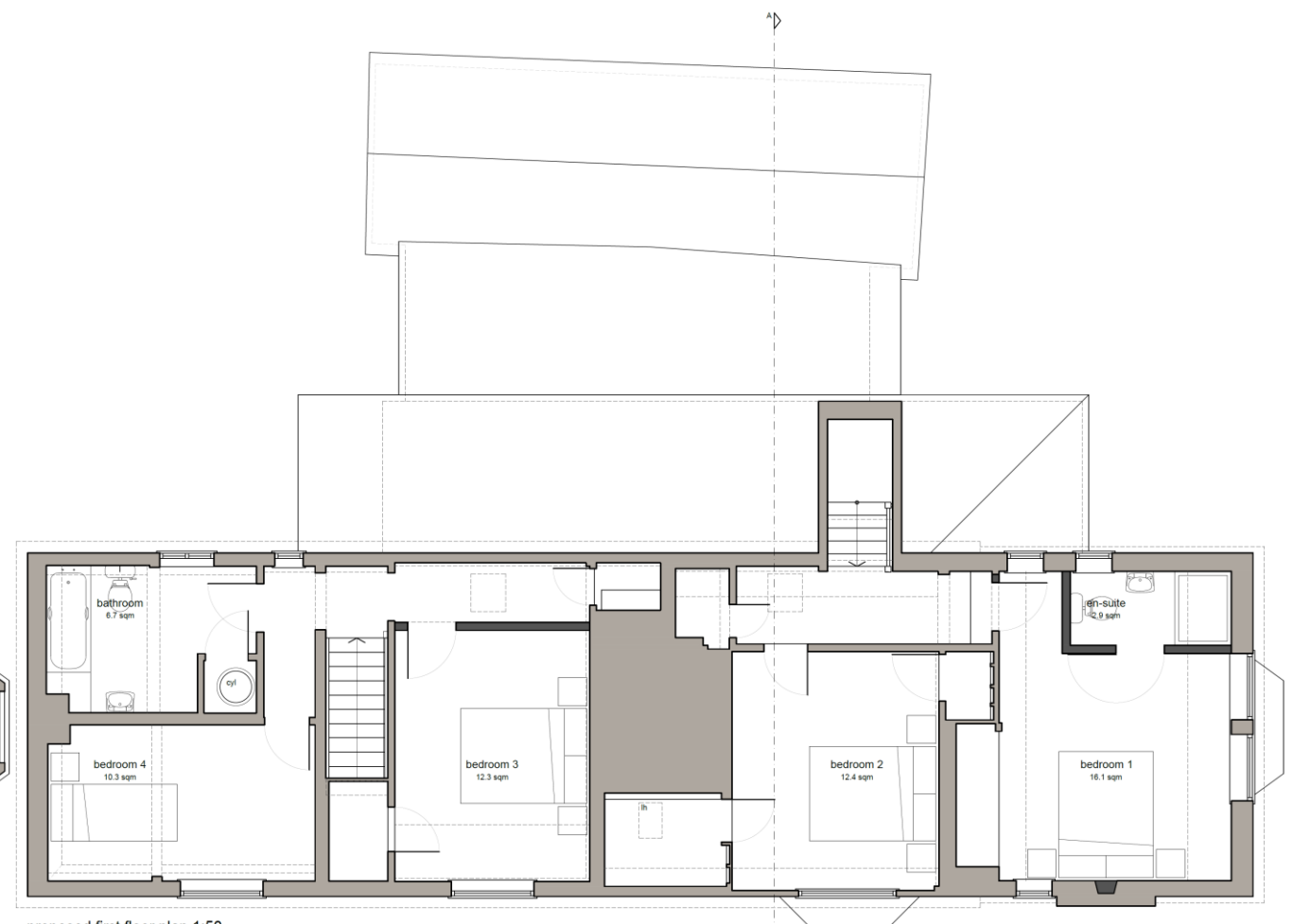


proposed north-west elevation 1:100



proposed ground floor plan 1:50
 Ground Floor Gross Internal Area = 158.3 sqm [1703 sqft]
 Total Gross Internal Area = 254.4 sqm [2737 sqft]

SCALE 1:50
 0 1 2 3 4 5 metres



proposed first floor plan 1:50
 First Floor Gross Internal Area = 96.1 sqm [1034 sqft]

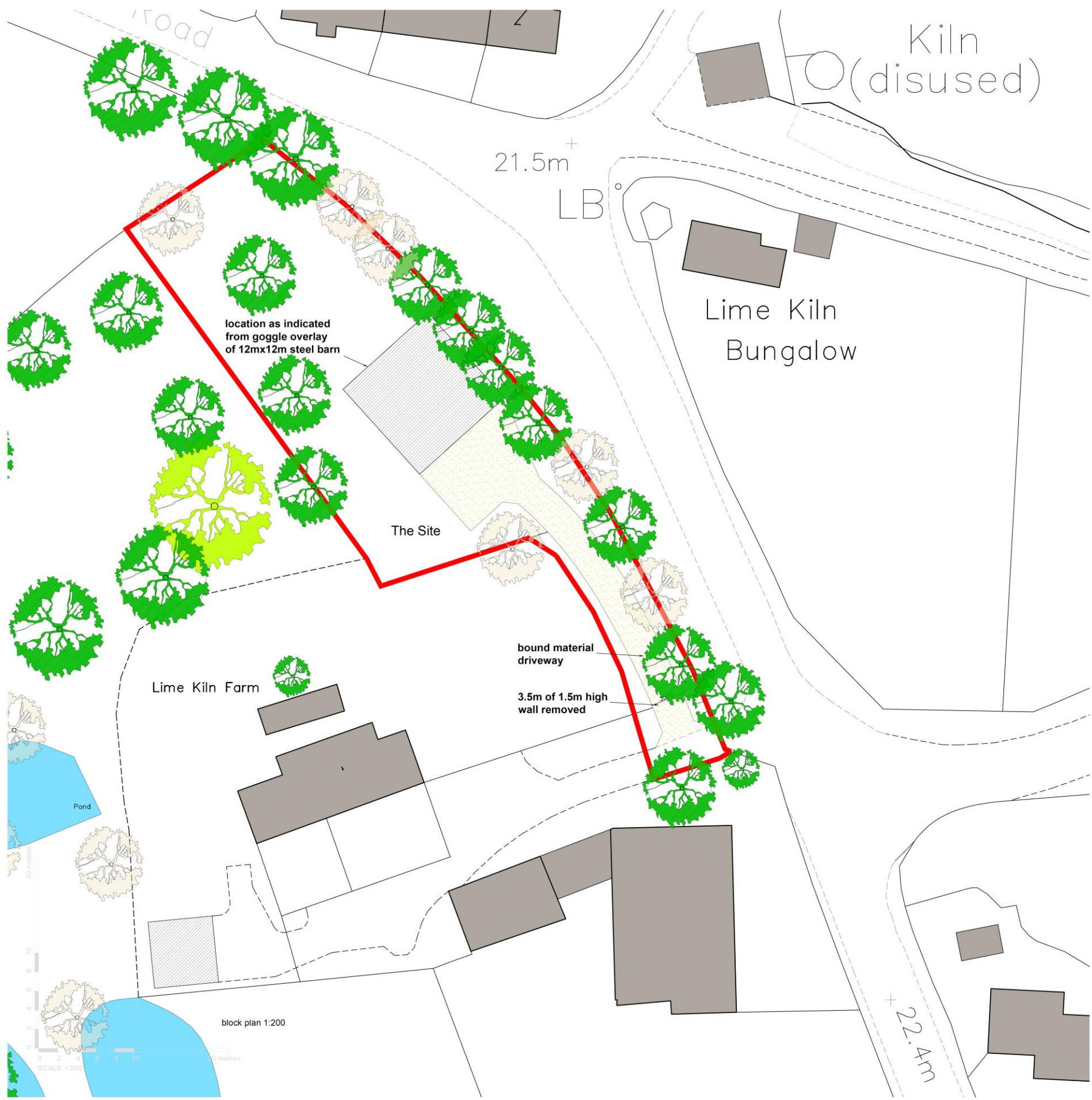
peterwellsarchitects
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Project:	House at Lime Kiln Farm, Coddham, Suffolk, IP6 9UD		
Dwg. Title:	Proposed Ground & First Floor Plans		
Client:	Mr Dan Wythe	Dwg. Status:	Planning
Date:	Nov 2021	Scale:	1:50, 1:100 @ A1
Dwg. No.:	PW1225_PL11	Revision:	/

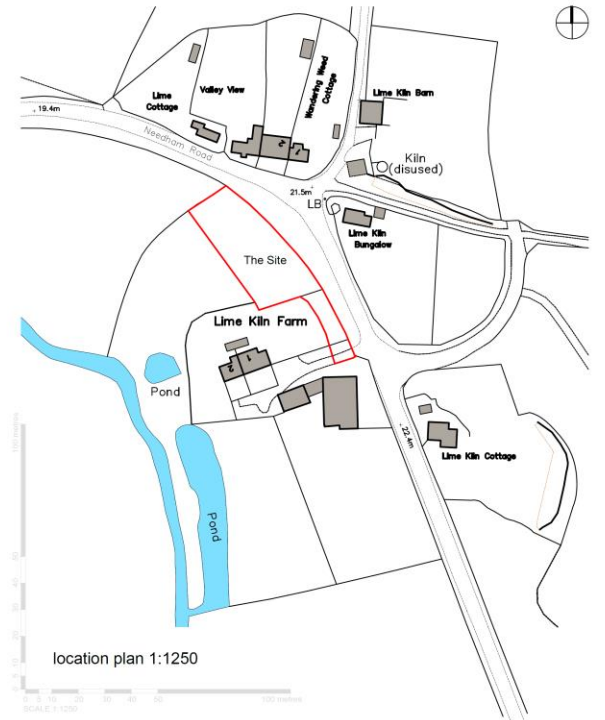
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View looking Northeast towards entrance showing 1.5m high garden wall, 3.5m section to be removed as indicated on block plan



location plan 1:1250

01/06/23	R	Red line adjusted	ing	PW
06/05/23	A	Trees & photograph of garden wall added	ing	PW
Date	Revision	Description	Drawn	Checked
peterwellsarchitects				
office farm, litheringham, woodbridge, suffolk, IP13 7RA - 01728 745356 - info@peterwellsarchitects.co.uk				
Project:	House at Lime Kiln Farm, Coddeman, Suffolk, IP6 9UD			
Dwg Title:	Proposed Block Plan of 12x12m Steel Barn & Location Plan			
Client:	Mr Dan Wythe	Dwg Status:	Planning	
Date:	May 2023	Scale:	1:200, 1:1250 @ A1	Revision: B
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Appendix 2:

DNA Results

Folio No: E19020
 Report No: 1
 Purchase Order: 032
 Client: LIZ LORD
 Contact: Liz Lord

TECHNICAL REPORT

ANALYSIS OF BAT DROPPINGS FOR SPECIES OF ORIGIN IDENTIFICATION

SUMMARY

The droppings of bats contain small amounts of DNA belonging to the organism from which they originated. By analysing droppings collected from a bat roost or colony for the presence of DNA, a robust identification of the species present can be made. Recent advancements in molecular methods including PCR (polymerase chain reaction) and DNA sequencing mean that 92% of bat species worldwide can be identified including all 17 UK resident bat species.

RESULTS

Date sample received at Laboratory: 02/08/2023
Date Reported: 10/08/2023
Matters Affecting Results: None

Lab Sample ID.	Site Name	O/S Reference	Genetic Sequence	Common Name	Result	Sequence Similarity
B2196	Lime Kiln Farm	-	TTCGGGACTGGTTAGTGCCA CTGATAATTGGAGCCCTGA CATAGCTTTTCCCGAATAA ATAACATAAGCTTCTGACTG CTTCGCCATCTTTTCTACTA CTTTtagcttCGTCTGCAGT AGAGGCTGGGGCAGGTACC GGTTGAACAGTCTACCCCTCC TTTAGCGGAAATCTAGCCC CATGCTGGAGAG	Brown long-eared bat	<i>Plecotus auritus</i>	98.85%

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

Reported by: Chelsea Warner

Approved by: Lauryn Jewkes



METHODOLOGY

Once samples have arrived in the laboratory, a single bat dropping is selected for its suitability (freshness and size). The DNA is then isolated using a commercial DNA extraction kit. Using PCR, bat DNA (if present within the sample) is amplified using bat DNA-specific molecular markers designed to amplify a short fragment of the mitochondrial gene. If amplification is successful, the resulting DNA sequence is revealed using a process known as Sanger Sequencing in order to obtain the genetic sequence. The sequence results are aligned against a library of known bat reference sequences using bioinformatics software, which enables us to determine which species the extracted DNA matches with, informing the species identity and sequence similarity (%).

If the initial analysis is unsuccessful, the entire process is repeated up to two additional times with fresh reserve droppings. If no DNA is detected after three attempts, we can be confident that any further analysis of the sample will likely also fail to result in species identification.

INTERPRETATION

- Genetic Sequence:** The unique DNA sequence obtained from the sample.
- Sequence Similarity:** How closely matched the DNA sequence from your sample is to the sequences within our reference database. This can be interpreted as a score of result accuracy, with the maximum score of 100% indicating an exact match of dropping to the indicated species' reference sequence. Lower scores (80-99%) indicate some variation between the sample and reference sequence, likely due to natural variation between individual genetic sequences and/or systematic variations generated through the sequencing process. Scores below 80% similarity should be interpreted with care and can indicate part degraded or part contaminated samples.
- Inconclusive Result:**
- Degraded sample:**
DNA degraded, unable to determine species identification due to degradation of sample DNA. This can happen either before sample collection (old droppings, exposure to UV etc.) or after sample collection if stored for long periods before analysis or not handled correctly.
- Inhibited/contaminated sample:**
Unable to determine species identity due to contamination or the suspected presence of large quantities of PCR inhibitors. Contamination sources can come from other species which come into contact with droppings, human contamination during sample collection.
- Alternative Result:** Sometimes, other mammalian species such as rodents are detected. We find this to be a common occurrence as some bat droppings can be similar in appearance to rodent droppings. Although sometimes unexpected, repeat analyses in these cases would likely return the same results.





Liz Lord Ecology

