

# Appendices to Chapter B

## Scope and Methodology

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Contents:

Appendix B1 - EIA Scoping Report (2 October 2020)

Appendix B2 - EIA Scoping Opinion (30 November 2020) and accompanying consultee comments



# Appendix B I

## Request for an EIA Scoping Opinion

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**By Email: [elizabeth.verdegem@milton-keynes.gov.uk](mailto:elizabeth.verdegem@milton-keynes.gov.uk)**

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**Date:** 02 October 2020

**Our ref:** 12491/04/NM/AB/18858602v1

Dear Elizabeth

## **The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 – Request for a Scoping Opinion**

### **Milton Keynes East**

On behalf of our client, St James Group Limited, we request Milton Keynes Council's (MKC) formal opinion on the scope of an Environmental Impact Assessment ('EIA') to be submitted in conjunction with a hybrid planning application for proposed development to the east of the M1 motorway, south of Newport Pagnell, to provide a sustainable urban extension to Milton Keynes, referred to as Milton Keynes East ('MKE').

The request is made under Regulation 15 of the Town and Country Planning (EIA) Regulations 2017 as updated by the Town and Country Planning and Infrastructure Planning (EIA) (Amendment) Regulations 2018 (together 'the 2017 EIA Regulations'). It is accompanied by the enclosed 'MKE EIA Scoping Report' (October 2020).

The development falls within Part 10(a), (b) and (f) of Schedule 2 of the 2017 EIA Regulations. Part 10(a) includes industrial estate development projects with a site area exceeding 0.5 ha; part 10 (b) includes urban development projects with more than 150 dwellings and part 10(c) includes developments involving the construction of roads on an area of works exceeding 1ha. For Schedule 2 developments, the Regulations require that an EIA be undertaken where the development is 'likely to have significant effects on the environment by virtue of factors such as its nature, size or location'.

An EIA of the MKE development will be carried out to ensure that the potential significant environmental effects can be identified, assessed and presented to assist Milton Keynes Council in their consideration of the planning application at the appropriate time.

To assist Milton Keynes Council in forming their scoping opinion, the enclosed Scoping Report provides the following information:-

- 1 Site location and description;
- 2 Description of the nature and purpose of the development;
- 3 Possible environmental effects; and
- 4 Proposed form of the Environmental Statement ('ES').

In considering the content of the ES, we note that the focus of Schedule 4 of the 2017 EIA Regulations is the significant impacts. Other lesser effects need not be considered as part of the EIA process. On that basis, and following review of those matters specified in the enclosed report, it is considered that the scope of the EIA should include consideration of the following environmental aspects:-

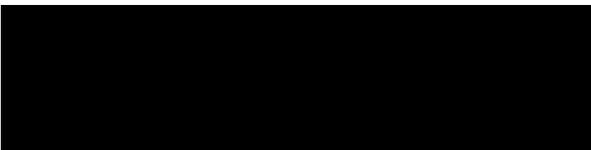
- 1 Transportation
- 2 Landscape and Views
- 3 Ecology
- 4 Air Quality
- 5 Noise
- 6 Ground Conditions and Soils
- 7 Historic Built Environment
- 8 Archaeology
- 9 Water Environment and Drainage
- 10 Socio-Economics
- 11 Climate Change and Resilience
- 12 Waste

The environmental assessment for each technical aspect will be conducted during both the construction and operational periods of development. Direct, indirect, secondary and cumulative effects will be addressed as appropriate.

We seek your confirmation as to the scope of the EIA. We trust that the above and the enclosed document provide you with sufficient information to adopt a scoping opinion and we look forward to receiving your opinion as soon as possible within the five weeks allowed by the 2017 EIA Regulations (starting from the date of this submission).

Please contact me, or my colleagues Martin Taylor or Alison Bembenek, if you require any further information or wish to discuss this further.

Yours sincerely



**Nicki Mableson**  
Planning and EIA Director  
Enc

# **Milton Keynes East Environmental Impact Assessment Scoping Report**

**Information to accompany a request for Milton  
Keynes Council to form a Scoping Report**

St James Group Limited

October 2020

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## 1.0 Introduction

### Purpose of document

- 1.1 This document provides information to assist Milton Keynes Council ('MKC') in forming an Environmental Impact Assessment ('EIA') Scoping Opinion. It has been prepared pursuant to Regulation 15 of the Town and Country Planning (EIA) Regulations 2017<sup>1</sup> as amended by the Town and Country Planning and Infrastructure Planning (Environmental Impact Assessment) (Amendment) Regulations 2018<sup>2</sup> (together 'the 2017 EIA Regulations').
- 1.2 The document is submitted on behalf of St James Group Limited. It relates to the proposed mixed residential and employment development of land to the east of the M1 motorway, south of Newport Pagnell, to provide a sustainable urban extension to Milton Keynes, referred to as Milton Keynes East ('MKE'). The proposed development that is the subject of this scoping report will incorporate approximately 4,000 new homes; 85 ha of employment land; three 2FE/3FE primary schools and one 10FE secondary school; a community hub including a range of uses; a linear park; and associated uses.

### Request for an EIA Scoping Opinion

- 1.3 Regulation 15 of the 2017 EIA Regulations establishes those matters which need to be provided to assist the relevant planning authority in forming an EIA scoping opinion and this information is provided as part of this scoping report.
- 1.4 In considering the scope of the EIA, it is important to identify that the focus of Schedule 4 of the Regulations is the significant effects. Other lesser impacts need not be addressed as part of the EIA process.
- 1.5 Regards will be had to relevant national, strategic and local planning policy guidance.
- 1.6 The technical aspects identified for consideration have been identified in the light of initial discussions with the authority and consultees and arising from initial site investigations. In addition, a summary is provided of other topics which have been reviewed but are considered should be scoped out of this EIA as they are unlikely to give rise to significant effects requiring assessment.
- 1.7 The development will be assessed during both the construction and operational phases of development; direct and indirect effects will be identified; as well as any secondary, cumulative, short, medium and long term positive and negative effects of the development.

### Report structure

- 1.8 The report is structured as follows:
- Section 2.0 – background information about the development and why the EIA is being carried out;
  - Section 3.0 – a description of the site and surroundings;
  - Section 4.0 – a description of the key features of the development;
  - Sections 5.0 to 16.0 – provides a review of the potential environmental impacts arising from the development as a means to identify those matters to be scoped into the EIA;

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<sup>1</sup> Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (published 16 May 2017)

<sup>2</sup> Town and Country Planning and Infrastructure Planning (Environmental Impact Assessment) (Amendment) Regulations 2018 (published 1 October 2018)

- Section 17.0 – considers those matters capable of being scoped out of the EIA; and
- Section 18.0 – summarises the proposed form of the Environmental Statement ('ES'), the team and refers to any other documents being submitted alongside the application.

## 2.0 Background

### Legislative Requirements

- 2.1 The need for EIA is derived from EU Directive No 2014/52/EU on the assessment of certain public and private projects on the environment. The EIA Directive was first produced in 1985 as 85/337/EEC and has been amended several times since. The Directive was originally incorporated into UK planning legislation in Regulations issued in 1988 with further key updates in 1999 and (for some parts of the UK including England) in 2011.
- 2.2 On 16 May 2017, the Town and Country Planning (EIA) Regulations 2017 came into force in England to incorporate the requirements of the 2014 Directive into domestic legislation. On 1 October 2018, minor amendments to the Regulations came into force in the form of the Town and Country Planning and Infrastructure Planning (Environmental Impact Assessment) (Amendment) Regulations 2018. This EIA has been carried out with regard to the requirements of the 2017 EIA Regulations as updated by the 2018 Amendment Regulations (together the '2017 EIA Regulations').
- 2.3 On 31 January 2020 the UK officially withdrew from the European Union (EU). On that day, known as 'exit day' the Environmental Assessments and Miscellaneous Planning (Amendment) (EU Exit) Regulations 2018 came into force. The Regulations mean that there is no change to the way in which the 2017 EIA Regulations (as updated) are applied in England at this time.
- 2.4 New requirements have recently been published under the Town and Country Planning (Development Management Procedure, Listed Buildings and Environmental Impact Assessment) (England) (Coronavirus) (Amendment) Regulations 2020. These relate to the publication of documents up to the end of 2020 during the coronavirus pandemic. Given the timescales for submission of the MKE application these Regulations may not be in place.
- 2.5 In accordance with the 2017 EIA Regulations and the procedures specified to facilitate the preparation of the Environmental Statements, the application confirms that it intends to submit an ES to MKC with the application for the proposed mixed residential and employment scheme at land to the east of the M1 motorway, south of Newport Pagnell. It has been determined by the applicant that the development should be subject to EIA to ensure that any likely significant effects can be identified, and mitigation and monitoring measures specified as required.
- 2.6 The MKE ES will be prepared with regard to the 2017 EIA Regulations.
- 2.7 The development falls within Part 10(a), (b) and (f) of Schedule 2 of the 2017 EIA Regulations. Part 10(a) includes industrial estate development projects with a site area exceeding 0.5 ha; part 10 (b) includes urban development projects with more than 150 dwellings and part 10(c) includes developments involving the construction of roads on an area of works exceeding 1ha.
- 2.8 For Schedule 2 developments, the 2017 EIA Regulations require that an EIA is undertaken where the development is *"likely to have significant effects on the environment by virtue of factors such as its nature, size and location"*.
- 2.9 Schedule 3 of the 2017 EIA Regulations goes on to identify the characteristics of the development, the sensitivity of the location and the characteristics of the potential impact as the key *'Selection Criteria for screening Schedule 2 development'*. In the light of these, EIA will be required for Schedule 2 development in three main types of case:-
- 1 Major development which is of more than local importance;
  - 2 Developments located in particularly environmentally sensitive or vulnerable locations; and
  - 3 Developments with unusually complex and potentially hazardous environmental effects.

- 2.10 To assist MKC and consultees in forming an EIA scoping opinion, this report provides as much information as possible at this stage on the MKE development, the likely environmental effects and the suggested content of the EIA. It includes information on:-
- 1 Site location and description;
  - 2 Description of the nature and purpose of the development;
  - 3 Possible environmental effects; and
  - 4 Proposed form of the ES.
- 2.11 To further assist in this consideration, the remainder of this section provides information on the background and context to the proposed development.

## **Background to the Development**

### **Preparation of Plan:MK**

- 2.12 During the preparation of Plan:MK, MKC prepared a Strategic Housing Market Assessment (SHMA) to objectively assess the housing need for the Borough over the plan period of 2016 – 2031, taking account of both the growth of the existing population and net in-migration to the area. This gave an Objectively Assessed Need (OAN) for the plan period 2016-2031 of approximately 26,500 (figure rounded up) dwellings, which equates to approximately 1,766 dwellings per annum.
- 2.13 The strategy for the allocation of sites within Plan:MK was informed by the components of the Borough's existing land supply and calculated a need for sites to deliver a minimum of 5,612 additional dwellings, to be identified over the plan period, so as to meet the OAN. To provide the required land supply buffer of at least 10% above the OAN, sites for at least a further 2,650 dwellings are also required.
- 2.14 Potential growth options were assessed during the preparation of Plan:MK, the majority of which were also consulted on as part of the Strategic Development Directions Consultation (2016) and the Draft Plan:MK Consultation (2017), the number of dwellings which could be delivered within the existing urban area, as evidenced within the updated SHLAA (2017), provided the starting point for providing the housing needed. This concluded that it would not be appropriate for the existing urban area of MK to accommodate all of this population increase through intensification and densification alone. Rather, to achieve this vision, MK will need to accommodate much (but by no means all) of the city's additional growth outside the existing built up area. Plan:MK establishes that Milton Keynes East (MKE) is considered as one of the most appropriate sites to support housing growth beyond the confines of the current urban area and allocates it under Policy SD12; albeit, its delivery is contingent on funding and delivering the strategic infrastructure needed to overcome existing development constraints.
- 2.15 The MKE site was assessed within the evidence base of Plan:MK including:
- 1 Within the Strategic Housing Land Availability Assessment (MK/HOU/004) as site U209, with an overall conclusion that the site is 'Developable' within years 6-15.
  - 2 Within the Plan:MK Initial Sustainability Appraisal Report, February 2017 (MK/SUB/013) as potential strategic housing allocation Option B and as potential strategic employment allocation Options B and C.
  - 3 Within the Plan:MK Sustainability Appraisal, October 2017 (MK/SUB/005) as site ref. 15 East of the M1 (north).

- 2.16 These all identified the site as suitable location for housing and employment development, subject to the provision of strategic infrastructure which can enable the site to be deliverable prior to 2031.

### **MKE Site Allocation**

- 2.17 Milton Keynes East is strategically well located. It is immediately north-east of Junction 14 of the M1, one of the two main motorway junctions service Milton Keynes. It is c. 3.5km north-east of Central Milton Keynes, with good and direct walking, cycling and highway links to the city centre. It is relatively well located for proximity to the central business district of Milton Keynes ('CMK').
- 2.18 The site is c. 4.5km west of Cranfield, where there is a large cluster of knowledge intensive business activity, including Cranfield Airfield with associated aerospace businesses, Cranfield University and the Cranfield Technology Park. In total over 60 science, technology and knowledge-based businesses operate from Cranfield.
- 2.19 The site is also located centrally within the Cambridge-Milton Keynes-Oxford arc. MKE is strategically located within the arc; it is geographically close to the key east-west artery formed by East-West Railway and the proposed Oxford to Cambridge Expressway, whilst is also on the key north-south artery of the M1 linking the northern and southern extents of the central part of the arc (i.e. Daventry/Northampton to the north and Luton to the south). Therefore, the delivery of MKE, a sustainable location on the edge of the urban area, would enhance the delivery of a key growth location within the CaMKOx arc, further contributing to the housing growth set out within Plan:MK which already meets and exceeds MK's Objectively Assessed Need for housing.

### **MKE Development Framework SPD**

- 2.20 A Development Framework has been produced for the MKE allocation. This is set out as requirement in Plan:MK at paras 5.19-5.22 and Policy SD12. The Development Framework was adopted as a Supplementary Planning Document (SPD) in March 2020. It provides detail on layout and design principles for the proposed development, how the constraints will be responded to and where necessary mitigated and how in practice the development will be delivered.
- 2.21 The Development Framework includes a comprehensive masterplan framework for the site in accordance with Policy SD12 of Plan:MK which allocates the site for a comprehensive residential and employment development, contingent on the necessary strategic infrastructure required to make the site deliverable being secured.
- 2.22 The SPD states that MKE has the potential to deliver c. 5,000 dwellings, along with 105ha of strategic employment land for much needed logistics and knowledge-based manufacturing. The scheme will deliver a minimum of 5,750 jobs in B-class industrial space plus a further 3,500 in the services supporting the residential communities.
- 2.23 The largest component of the MKE site is being brought forward by the applicant to which this scoping report relates. Land to the north-west corner of the site is being separately promoted as part of the SD12 allocation by Bloor Homes (Bloor). A further parcel of land, to the north east, is controlled by MKC. The remaining development parcel on the MKE site is controlled by SEGRO and will only deliver employment space.

## **Consultation**

- 2.24 The Applicant has undertaken early engagement meetings with key stakeholders including MKC. Engagement with key stakeholders and statutory and non-statutory consultees who can assist the EIA team in the production of a robust assessment will continue as the EIA proceeds.

## **Summary**

- 2.25 The remainder of this scoping report provides further detail on the site, the scheme and the matters to be assessed as part of the EIA.

## 3.0 Site Location and Description

- 3.1 In accordance with the 2017 EIA Regulations, a plan is attached (Appendix 1) which defines a maximum extent of land to which this EIA will relate. This area has been defined broadly at this time to allow flexibility in establishing the extent and form of development. The site boundary to which the EIA will relate will be within this development site boundary.

### The Site

- 3.2 The site covers an area of approximately 435 hectares and is located to the east of Milton Keynes on the eastern side of the M1. To the east of the site is open countryside and the village of Moulsoe, to the north is the town of Newport Pagnell. To the west is the built-up area of Milton Keynes which exists beyond the M1 motorway which cuts through the site.

Figure 3.1 Aerial Photograph Centred on Development Site



Source: Google Earth

- 3.3 The majority of the site is in agricultural use. There is an existing 'Holiday Inn' hotel on London Road and a travellers site on Willen Road. An area of land to the east of Willen Road and south of Caldecote Farm is currently used as a sand and gravel extraction site. There are small groups of dwellings existing and inset within the scoping boundary. These include those around Caldecote Farm and Pym's Stables, as well as a number of isolated dwellings including Hermitage Farm on Newport Road.
- 3.4 An area previously used for motocross is located adjacent to the M1 motorway but this use is now abandoned.
- 3.5 The River Ouzel is a major existing feature of Milton Keynes East and forms the primary landscape corridor. It runs south-north through the site.

- 3.6 The site is relatively flat to the west of London Road (the A509). In the eastern part of the site, the land rises up from London Road and the M1 towards Moulsoe.
- 3.7 There are a number of areas of woodland within the site, including deciduous woodland priority habitats and lengths of hedgerow within the site.

## Surroundings

- 3.8 The built-up area of Milton Keynes lies to the south and west of the site. The residential areas of Willen and Brooklands are adjacent to the site, separated by the heavily trafficked M1.
- 3.9 To the south also lies Cotton Valley Sewage Works at Pineham and the Tongwell employment area. The village of Moulsoe lies to the east of the site and has developed in a linear form along Newport Road.
- 3.10 To the north-west of the site is Newport Pagnell. Land has been allocated for residential development on the eastern edge of the town to the north of North Crawley Road at Tickford Fields.
- 3.11 To the south of the site is the Ouzel Valley linear park which provides recreation and flood attenuation for the whole of Milton Keynes and is a wildlife corridor of strategic ecological significance. To the north of the site the River Ouzel and associated floodplain continues through Newport Pagnell. Adjoining the southern edge of the site, adjacent to the M1, lies a triangle of land alongside the River Ouzel which is owned by the Park Trust. The land, which is part of the linear park, is managed as a nature reserve.
- 3.12 There are existing bus routes through the site which run along Willen Road, London Road and Newport Road. These bus routes provide connections to Newport Pagnell, Central Milton Keynes and Cranfield. The Milton Keynes Coachway interchange which supports inner-city coach services, is located close to junction 14 of the M1.

## Environmental Context

- 3.13 There is one listed building within the site; the Grade II listed 'Moulsoe Buildings Farmhouse' on London Road (listing ref. 1212914). Other listed buildings within the surrounding area are located in Moulsoe (approximately 400m east of the site):
- First Thatch Cottage – Grade II listed (ref. 1289355); Hillcrest Cottage – Grade II listed (ref. 1212919); Wistaria Cottage – Grade II listed (ref. 1212920); Church of St Mary – Grade I listed (ref. 1212922); Screen enclosing Carrington Graves to North East of Church of St Mary – Grade II listed (ref. 1212925); St Mary's Cottage – Grade II listed (ref. 1212921); The Rectory – Grade II listed (ref. 1212926).
- There are a cluster of listed buildings located in Willen (approximately 600m west of the site):
- The Hospice of Our Lady and St John – Grade II listed (ref. 1332332); Church of St Mary Magdalene – Grade I listed (ref. 1160998); Wall surrounding Church Yard with Gates at East and West Ends – Grade II listed (ref. 1125231); Brook Farmhouse – Grade II listed (ref. 1125232); Willen War Memorial Obelisk – Grade II listed (ref. 1458606); School House – Grade II listed (ref. 1161013).
- Approximately 1300m to the south of the site are the following listed buildings:
- Church of St Lawrence – Grade I listed (ref. 1332313); The Old Rectory – Grade II listed (ref. 1160062); K6 Telephone Kiosk – Grade II listed (ref. 1277068).
- 3.14 The site is not located within a Conservation Area. The neighbouring settlements of Newport Pagnell, Broughton and Willen all have Conservation Areas which are the closest to the site.

There are no Historic Parks or Gardens or Registered Battlefields adjacent or in the immediate vicinity of the site.

- 3.15 There are no nationally designated archaeological assets within the site or in close proximity. The nearest designated archaeological assets to the site are over 1.5km from the site boundary to the north and the west. An Archaeological Briefing Note was prepared for the site in June 2018 by CGMS on behalf of the applicant. Previous archaeological assessment and works within the site has indicated that the site holds an archaeological potential, in particular associated with a number of specific sites recorded on the Milton Keynes Historic Environment Record, as well as a geoarchaeological potential associated with the alluvial deposits of the River Ouzel.
- 3.16 According to the Environment Agency (EA) Flood Map for Planning (Rivers and Sea) the majority of the site is located in Flood Zone 1 (low probability of flooding). However, a large area in the centre and east of the site, is in Flood Zone 3 (land assessed as having a 1 in 100 or greater annual probability of flooding) with smaller pockets within Flood Zone 2 (land having between a 1 in 100 and 1 in 1000 probability of flooding). This reflects the pathway of the River Ouzel.

## 4.0 **Proposed Development**

4.1 The 2017 EIA Regulations require that a request for an EIA scoping opinion be accompanied by a brief description of the nature and purpose of the development.

4.2 The details provided within this section represent the likely maximum envelope of the proposed development and are sufficient to enable the Council to form its EIA scoping opinion. The final form of development, which will be submitted in hybrid, will fall within this maximum envelope. As such, it can be assumed that this scoping exercise has been conducted in respect of the likely 'worst case scenario'.

### **Description of Main Works/Form of Development**

4.3 The scheme is a Sustainable Urban Extension with new residential and employment development to meet the long-term needs of Milton Keynes. The development to be assessed will include the following: -

- 1 Approximately 4,000 homes;
- 2 Approximately 85 hectares of employment land (including B2 and B8);
- 3 A community hub including a range of shops and services;
- 4 other facilities within the site such as allotments and burial space;
- 5 A 10FE secondary school;
- 6 3 x 2/3FE primary schools;
- 7 A linear park along the River Ouzel corridor;
- 8 New redways, pedestrian and cycle routes including a number of grade separated crossings;
- 9 Strategic highway infrastructure, including a new bridge over the M1 motorway, a new bridge over the River Ouzel floodplain and a new bridge over the River Ouzel on Tongwell Street;
- 10 Access roads and other transport infrastructure, including buses, connecting into Milton Keynes;
- 11 The diversion of some existing Public Rights of Way and the Stopping Up of some lengths of Public Highway to facilitate development and delivery of the strategic highway infrastructure;
- 12 A new bridge over the M1 motorway, access route and other transport infrastructure connecting into Milton Keynes; and
- 13 Associated infrastructure, drainage and other works.

4.4 The majority of the main land uses will come forward in outline with a series of parameters plans to form a maximum envelope for the purposes of assessment in the EIA. A 'sensitivity test' will also be conducted for robustness to assess the cumulative impact should additional dwellings be brought forward on the site or wider site allocation. This is to reflect the current uncertainty around the future mass rapid transit scheme (and its need for a critical mass around a pick up stop at the site) combined with the compound effect of uncertainty around the dwelling capacities and land uses that may come forward on neighbouring landholdings within the site allocation. To ensure a robust sensitivity on maximum impacts, this sensitivity test would include a maximum uplift of 10-15% of dwellings on the site above the 4,000 dwellings which is the subject of this scoping report. For the wider MKE allocation (i.e. 5,000 dwellings) this uplift would give a cumulative maximum capacity range of 5,500 to 5,750 dwellings.

- 4.5 The main points of access to the site, the new M1 motorway bridge and access to the south connecting to Milton Keynes will be designed in detail. These will be assessed as part of the EIA
- 4.6 The maximum heights of buildings across the site will not exceed 103.5 metres AOD. The maximum height of residential uses will not exceed 6 storeys. Higher densities can be expected around key community hubs. The relationship between the development and properties 'inset' in the development boundary will be carefully considered.
- 4.7 Work to develop the layout for the main components of the development is ongoing but Figure 4.1 provides a possible configuration of the development for the purposes of scoping the EIA. This identifies the likely configuration with the main employment uses adjacent to the motorway and also identifies the major new linear park running along the River Ouzel corridor:-

Figure 4.1 One option to illustrate how MKE may be developed



Source: JTP

## Construction and Phasing

- 4.8 For the purposes of this assessment a construction phasing plan and programme will be developed. A Construction Environmental Management Plan will be prepared prior to construction to ensure the implementation of measures to reduce any significant adverse effects during the construction process.
- 4.9 The main considerations for phasing on the site will be balancing delivery of the new homes and employment space, with key triggers for infrastructure provision. In that respect the highway

capacity and junction capacity at J14 is the main constraint on phasing, related particularly to AM/PM peak movements from the residential element of the scheme; with movements from logistics employment less of a constraint as they are more spread throughout the day and related to shift-working patterns.

4.10 Construction is currently anticipated to take approximately 26 years with a possible start of construction in 2022 and concluding in 2048. A series of key assessment years will be defined for consideration in the EIA. An initial phase may include earth moving within the site boundary to create banks for key road infrastructure.

4.11 It is considered that sufficient information will be available to assess the likely significant effects arising during the construction of the development.

## **Consideration of Alternatives**

4.12 Schedule 4 of the EIA Regulations requires a consideration of the main alternatives for the development which have been studied by the applicant and the main reasons for the choices which have been made, taking account of environmental effects.

4.13 Given that the MKE site has been the only site identified for the proposed development, the applicant has not given, and will not be giving consideration as part of the EIA to other sites for the development of a similar scale.

4.14 However, the EIA will include a review of: -

- 1 The likely effects in the event that the development does not come forward ('the no development scenario'); and
- 2 Consideration of the evolution of the design of the scheme and whether alternative forms of development would achieve the same objectives.

4.15 The EIA team has been involved in the process of design iteration and emergence of the development. This process will be documented as part of the ES.

## **Other Development and Cumulative Effects**

4.16 In accordance with the 2017 EIA Regulations, the EIA will include an assessment of any direct and indirect cumulative effects arising from the inter-relationship between difference impacts arising from the development when considered alongside any other development in the area surrounding the site. The objective is to identify any combine impacts from the development or impacts from several developments; and if, whilst individually the impacts may be insignificant, could when considered together cause a further significant direct or indirect impact requiring mitigation.

4.17 In relation to other development, best practice dictates that cumulative assessments of this nature should have regard only to those schemes which are 'reasonably foreseeable' (i.e. usually those under construction or with planning permission). The assessment is only capable of being carried out based on the information available at the time of the assessment.

4.18 The assessment should focus only where there is the potential for significant cumulative impacts and, for this development, an initial review of potential developments requiring review has therefore focused on those developments which due to their proximity or scale are most likely to give rise to cumulative impacts. Consideration has also been given to the areas within which cumulative impacts are most likely.

4.19 The cumulative assessment will therefore include a review of the potential for impacts when the scheme is considered alongside the following developments: -

Table 4.1 Schemes to be assessed as part of the Cumulative Assessment

Site Address	Reference	Application Description	Status
Tickford Fields Farm, North Crawley Road, Newport Pagnell, MK16 9HG	20/00133/OUTEIS	Outline planning application (all matters reserved except access) for the demolition of the existing farm buildings on site and the development of up to 930 dwellings (including affordable dwellings), primary school, local centre, open space, sports pitches, play areas, pavilion/wellbeing centre and other associated works.	Pending Decision
Land at Brooklands, Newport Road, Broughton, Milton Keynes	19/01615/REM	Reserved matters application pursuant to outline planning permission 14/01544/OUT for access, appearance, landscaping, layout and scale for 152 new dwellings at Brooklands BDW Parcels 1B	Approved October 2019
Land at Brooklands, Newport Road, Broughton, Milton Keynes	18/02664/REM	Reserved matters application for 111 dwellings pursuant to outline planning approval 14/01544/OUT	Approved February 2019
Parcel E, Fen Street, Brooklands, Milton Keynes	18/02561/FUL	Development of 38 dwellings with associated external works	Approved April 2019
Land at Brooklands, Newport Road, Broughton, Milton Keynes	17/02553/REM	Reserved matters application pursuant to outline planning permission 14/01544/OUT for the development of Parcel D at Brooklands Square for 46 houses and associated parking and public realm for siting, design, external appearance and landscape.	Approved March 2018
Broughton Manor Business Park, Newport Road, Broughton, Milton Keynes, Newport Pagnell	17/02254/REM	Reserved matters (appearance, landscaping, layout and scale) pursuant to outline permission 11/01340/MKPCO for 62 dwellings.	Approved December 2017
Brooklands Parcel 5B – 6B Fen Street, Brooklands, Milton Keynes	17/02226/REM	Reserved matters application pursuant to outline planning permission 14/01544/OUT for access, appearance, landscaping, layout and scale for 260 new dwellings at Brooklands parcels 5B and 6B	Approved October 2018

Source: Milton Keynes Planning Register

- 4.20 Consideration will also be given where relevant to other development within the wider Strategic Allocation should applications be made as the EIA is taken forward. It is understood that a request for an EIA scoping opinion is currently under consideration by MKC.
- 4.21 If the authority is aware of any other proposals that it considers will need to be assessed in terms of potential cumulative impacts, it would be appreciated if these could be identified as part of the EIA scoping opinion.

## 5.0 **Transportation**

5.1 This chapter of the EIA Scoping Report has been prepared by WSP, who are competent and experienced in undertaking ES chapters relating to Transport, Accessibility and Movement.

5.2 Given the scale and importance of the proposals, it is considered that the Proposed Development could affect the existing transport networks and its users. As such, it is deemed appropriate to include the assessment of the potential transport effects in the EIA.

5.3 The purpose of this chapter is to set out the technical details of the assessment of Transport, Accessibility and Movement to be undertaken as part of the EIA, and the way in which it will be reported in the ES.

5.4 The Transport, Accessibility and Movement Chapter of the ES will consider the potentially significant environmental effects, which could arise as a result of the Proposed Development during both the construction and operational phases.

5.5 The chapter will provide:

- relevant legislation and transport policy context;
- the baseline transport conditions in the local area surrounding the Proposed Development;
- the methodology used for the assessment and details of the criteria used to determine the resulting significance;
- the potential impacts and effects as a result of the Proposed Development;
- any mitigation or control measures required to reduce or eliminate adverse effects; and
- the subsequent residual effects and likely significant effects associated with the Proposed Development.

5.6 The Transport, Accessibility and Movement chapter is not intended to be read as a stand-alone assessment, but as part of the wider ES. Reference will be made to several documents such as the Transport Assessment (TA) including accompanying Transportation Technical Notes (TTN), Public Transport Strategy (PTS), Framework Travel Plans (FTP) and a Construction Logistics Plan (CLP), which will be all submitted as appendices to the ES.

5.7 Detailed descriptions of the development site and the Proposed Development are provided in chapter 3 and chapter 4 of this EIA Scoping Report, respectively.

### **Legislation and Planning Policy Context**

5.8 The assessment of the transport effects of the Proposed Development will be based on policy and current best practice exemplified in several policy documents at the national and local level. The legal requirement for Environmental Impact Assessment is set out in the EU directive (85/337/EEC), and subsequent amendments were made in EU directives 2011/92/EU and 2014/52/EU.

5.9 The Transport, Accessibility and Movement chapter of the ES will provide a review of legislation and policies relevant only to the assessment of transport. A review of policies that inform the assessment of other aspects of the environment will be provided in their relevant chapters forming part of the ES.

5.10 A comprehensive review of transport policy relevant to the Proposed Development will be provided in the TA. A list of the legislation and policies directly relevant to the Transport, Accessibility and Movement chapter of the ES is provided below.

### **National Policy and Guidance**

- National Planning Policy Framework (NPPF), February 2019;
- National Planning Practice Guidance (NPPG) – Guidance for Environmental Impact Assessment, May 2020;
- IEMA Guidelines for the Environmental Assessment of Road Traffic, 2004; and
- Design Manual for Roads and Bridges (Sustainability & Environment), 2019 and 2020.

### **Local Policy and Guidance**

- Plan:MK 2016-2031, March 2019;
- Mobility Strategy for Milton Keynes 2018-2036 (LTP4): Mobility for All, March 2018;
- Mobility Strategy for Milton Keynes 2018-2036 (LTP4): Transport Infrastructure Delivery Plan, October 2019;
- Milton Keynes East Strategic Urban Extension: Development Framework Supplementary Planning Document, March 2020;
- MK Sustainability Strategy 2019-2050, December 2018; and
- Emerging Milton Keynes Draft Strategy for 2050, January 2020.

### **Best Practice Guidance**

- 5.11 The methodology for assessing the Proposed Development's traffic and transport effects will be based on the following guidance documents:
- (IEMA) Guidelines for the Environmental Assessment of Road Traffic, 2004;
  - Design Manual for Roads and Bridges (Sustainability & Environment), July 2019 and January 2020;
  - Transport Analysis Guidance (WebTAG), October 2019;

### **Current Conditions**

- 5.12 The baseline conditions will form a vital component of the TA as well as the Transport, Accessibility and Movement chapter of the ES. They will consider the existing conditions of the following transport networks:
- highway network;
  - public transport provision; and
  - Non-motorised user (NMU) routes,
- 5.13 Given the current Covid-19 situation, new traffic and NMU audit surveys cannot be undertaken. However, as part of the modelling discussions, a suite of traffic surveys was undertaken in July 2019. These surveys have been used to update the strategic model required for the site, but also provide data that is reflective of traffic conditions before the pandemic. These surveys allow for an assessment of baseline conditions of the highway network. The surveys identified that traffic conditions in 2019 were mostly similar to the current 2016 base year of the strategic model. The modelling of the Proposed Development is discussed further below.
- 5.14 Therefore, baseline conditions of both local and strategic road network in the area will be based on a combination of a desktop study, previous work in support of the Highway Infrastructure Fund (HIF) application and a strategic traffic model adjusted for the purposes of the planning

application for the Proposed Development. A detailed description of the modelling approach is provided in TTN1 accompanying the application.

5.15 The review of the current conditions, such as public transport routes and frequencies and NMU provision will be based on desktop studies of publicly available information. If required, further identification of baseline information will be undertaken through a combination of site visits and desktop studies of the local area.

5.16 In accordance with the IEMA guidelines, an assessment of sensitive receptors will be undertaken to identify the proximity of each to the local transport networks. Locations which will be considered as sensitive receptors may include locations where any of the following is located:

- Schools;
- Health facilities;
- Community facilities; and
- Areas with significant pedestrian movements.

## **Methodological Approach**

### **Traffic Model**

5.17 The assessment of transport-related effects resulting from the Proposed Development will be based on the changes in traffic volumes on the local and wider highway network.

5.18 Given the strategic nature of the proposals and the fact that the traffic associated with the construction and operation of the Proposed Development is expected to utilise the Strategic Road Network (SRN) and Primary Road Network (PRN) as well as the local roads, it is considered appropriate to base the assessment on a strategic transport model to determine the traffic volumes in the area.

5.19 It was agreed between Milton Keynes Council (MKC) and Highways England that the existing MKC's strategic multi-modal model (MKMMM) used as part of the evidence base for Plan:MK and the HIF application is fit for the purpose of modelling the proposed MKE development.

5.20 However, it should be noted that the MKMMM exists for several scenarios, with those most applicable to the MKE site being the 2031 Reference Case scenario. It is recognised that for the purposes of the planning application, the MKMMM requires further validation and calibration in the area where the MKE development is proposed. Details of the modelling adjustments and refinements are discussed in the TTN1 accompanying the application.

5.21 Furthermore, a localised micro-simulation model (using Paramics) was developed to assess Junction 14 of the M1 and the adjacent Northfields Roundabout, as part of the evidence base for the HIF application. It is intended to continue to use this platform, but, as for the update to the MKMMM, use new traffic survey data to update the model and re-validate it.

### **Assessment Extent**

5.22 The full extent of the MKMMM covers a relatively large area formed not only by the Borough of Milton Keynes but also parts of the adjacent counties/districts. A screening process will be required to identify the appropriate extent of the assessment once the modelling is complete.

5.23 The EIA scoping boundary for the Berkeley St James landholding is shown in drawing MKE-WSP-ZZ-ZZ-C-SK-0017 – P06. This indicates the indicative area of the site. In transport terms, however, and as noted above, the extent of assessment will not be limited to the red line and/or

internal highway links. The level of assessments and the highway network considered for analysis will be determined through a review of the strategic modelling outputs.

5.24 As suggested by the IEMA Guidelines for the Environmental Assessment of Road Traffic, it is proposed that to identify the relevant links to be assessed within the Transport, Accessibility and Movement chapter, an analysis of the model data will be undertaken. The guidelines set out the following two rules that will be applied to the model outputs:

- **Rule 1:** include highway links where traffic flows will increase by more than 30% due to the Proposed Development (or the number of heavy goods vehicles will increase by more than 30%).
- **Rule 2:** include any other specifically sensitive areas where traffic flows will increase by 10% or more.

5.25 Only those links that meet the IEMA rules outlined above will be considered in detail within the Transport, Accessibility and Movement chapter of the ES. However, these links can only be identified once the transport modelling has been completed.

### **Assessment Scenarios**

5.26 The assessment scenarios will be based on the scenarios within the MKMMM and will include:

- 2016 Base year (supplemented with traffic flow information from 2019 surveys in the MKE area);
- 2031 Future year reference case - without Development (to align with the Local Plan period, also includes MKMMM development growth up to 2031 plus the committed developments);
- 2031 Future year with Development (2031 reference case scenario plus the interim built out development);
- 2048 Future year reference case - without Development (built upon the 2031 reference case with additional growth and committed developments up to 2048 applied, this will include, where possible, relevant strategic sites from other boroughs); and
- 2048 Future year with Development (2048 reference case scenario plus the fully built out development).

### **Assessment Methodology**

5.27 In line with the legislative framework, the Design Manual for Roads and Bridges (DMRB) - Sustainability & Environment provides guidance regarding the aims and objectives of environmental impact assessment, including EIA scoping, the assessment and management of environmental effects and the reporting of environmental assessments.

5.28 Each of the links identified for a detailed assessment using the rules outlined above will be assigned an environmental value (sensitivity) based on their importance and scale using a five-point scale set out in DMRB LA104 - Environmental Assessment and Monitoring as follows:

- Very high – Very high importance and rarity, international scale and very limited potential for substitution;
- High – High importance and rarity, national scale, and limited potential for substitution;
- Medium – High or medium importance and rarity, regional scale, limited potential for substitution;
- Low – Low or medium importance and rarity, local scale; and
- Negligible – Very low importance and rarity; local scale.

5.29 Following the assignment of sensitivity to the selected links, a magnitude of impact or change (either adverse or beneficial) will be assigned, also based on a scale provided in DMRB LA104. It should be noted that DMRB LA104 provides a general approach to the assessment, and it is not explicitly concerned about transport and traffic. As such, the threshold values suggested by IEMA Guidelines for the Environmental Assessment of Road Traffic aimed at the effects of the transport and traffic will be applied to the DMRB LA104 scale as follows:

- Major – deterioration/improvement in local conditions or circumstances (+/- more than 90%);
- Moderate – apparent change in conditions (+/-60 to 90%);
- Minor – perceptible change in conditions or circumstances (+/-30 to 60%);
- Negligible – no discernible change in conditions (+/-10 to 30%); and
- No change – no change in conditions (+/- less than 10%).

5.30 Finally, the significance of effects will be assigned using a significance matrix as provided by DMRB LA 104 and reproduced in Table 5.1 below for illustration.

5.31 For the purposes of this assessment, any effects with a significance level of minor or less are considered to be not significant in EIA terms, while moderate and above significance of an effect would be considered significant in EIA terms.

Table 5.1 Table informing the significance of effects and magnitude of impacts based upon receptor value

		Magnitude of Impact (Degree of Change)				
		No change	Negligible	Minor	Moderate	Major
Environmental Value	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Key: white – not significant; mid grey – potentially significant; dark grey - significant

5.32 The resulting significance of an effect will be reported considering its duration (long or short term), permanence (permanent or temporary) and the type of the impact (beneficial or adverse).

5.33 In addition to the above, DMRB LA104 also sets out several factors that must be considered in the EIA, one of which is population and human health that will be subject to assessment in the Transport, Accessibility and Movement chapter of the ES. It should be noted that other factors, such as air quality and noise, might be affected by transport. However, these are considered in their respective chapters.

5.34 Guidance on the environmental assessment of population and human health effects with respect to traffic and transport is set out in DMRB LA 112 - Population and Human Health. It should be highlighted that historically, DMRB Volume 11 provided guidance regarding assessment techniques for assessing the environmental impacts of development on various aspects of the environment including pedestrians, cyclists, equestrians and community effects, and vehicle travellers. However, the guidance contained in the DMRB has been recently updated with

several documents consolidated into more concise guidelines. This is also the case of DMRB Volume 11 with Section 3, Part 8 (Pedestrians, Cyclists, Equestrians and Community Effects) and Volume 11, Section 3, Part 9 (Vehicle Travellers) replaced by DMRB LA 112.

5.35 The guidance in the documents replaced by DMRB LA 112 was aimed at the specific effects of the transport and traffic. In contrast, the reach of the current document (DMRB LA 112) is broader and suggests a more qualitative approach to the assessment than the previous guidance with its thresholds and benchmarks. As a result, reporting on some of the significant environmental effects arising from traffic and transport will be reported in the most appropriate ES chapter (e.g. noise, air quality), and some may be considered in combination with others rather than on their own (e.g. community severance).

5.36 DMRB LA 112 requires the assessment of population and human health effects to report on the following elements (and will be under separate chapters):

- land use and accessibility;
- human health.

### **Land use and accessibility**

5.37 The assessment will consider likely changes to accessibility and the risk of severance for private property and housing, community land and assets, development land and businesses and agricultural landholdings.

5.38 The assessment of changes affecting walkers, cyclists and horse riders (WCH) as a result of the Proposed Development will be based on the qualitative assessment of non-motorised users (NMU) amenity.

5.39 DMRB LA 112 provides sensitivity criteria for each of the elements as well as the magnitude of impact based on the changes resulting from the proposals. The resulting significance of the effect will be then derived by combining the assigned sensitivity value with the magnitude of change using the significance matrix (Table 5.1 above) as set out in DMRB LA 104.

5.40 Land use and accessibility effects will be assessed for all scenarios outlined above and consider both construction and operational phases (where applicable) of the Proposed Development.

### **Human health**

5.41 The environmental conditions relevant to human health are set out in DMRB LA 112 as follows:

- air quality;
- noise;
- pollution;
- landscape.

5.42 As stated earlier, the above conditions will be considered separately in the relevant chapters of the ES. Therefore, the only conditions affecting human health considered relevant as part of the transport, accessibility and movement chapter will be the impact on severance/accessibility and the ability of communities to access community land, assets and employment.. The assessment of severance/accessibility will take into consideration access to open green space/recreational facilities, opportunities for WCH and access to healthcare facilities. Also considered as part of the assessment will be personal injury accidents (PIA), specifically those involving NMU.

5.43 DMRB LA 112 suggests that the sensitivity of a community/population should be reported as low, medium or high based on the qualitative assessment. The outcome will then be identified as:

- Positive – beneficial health impact;
- Neutral – no discernible impact;
- Negative – adverse health impact;
- Uncertain.

5.44 Similar to the land use and accessibility, human health (severance) will be assessed for all scenarios set out above and will be considered in both construction and operational phases (where applicable) of the Proposed Development.

### **Other**

5.45 In addition to the DMRB, the guidance contained in IEMA Guidelines for the Environmental Assessment of Road Traffic provides advice specifically aimed at the effects of the transport and traffic. It defines the effects that should be regarded as a material consideration and then considers the weight to which those effects should be defined. The guidelines set out, inter alia, a list of environmental effects, which could be considered as potentially material or significant whenever a new development is likely to give rise to changes in traffic flows.

5.46 The IEMA list includes severance, NMU amenity, accidents/safety, and driver delay, which is the only effect not considered by DMRB. However, and as acknowledged in the IEMA guidelines, the delays are only likely to be significant when the traffic in the network is already at, or close to, the capacity of the system.

5.47 An assessment of the local highway network and its capacity at the key junctions and links carried out as part of the TA is considered to be sufficient as it will identify locations where the network may reach its capacity. The TA will also develop appropriate mitigation strategies (where needed) to minimise the impacts of the proposals. As such, it is considered appropriate to exclude driver delay from the assessment undertaken as part of the Transport, Accessibility and Movement chapter as this is covered in more detail within the TA.

5.48 A draft TA Scoping Note was issued to MKC in April 2020 and Highways England in May 2020, setting out the intended strategy to assess the application in the TA. This also included details on the modelling, which will inform this Transport, Accessibility and Movement chapter. Following recent meetings, and issue of an updated TA Scoping Note in June 2020, it is understood that the Scoping Note has been agreed in principle with MKC officers. Highways England and their consultants provided comments on the TA Scoping Note on 11 September 2020, where the approach was also agreed in principle. Some detailed items, such as future year mode shares and corresponding trip generation profiles are subject to ongoing discussions following comments from Highways England, however the application and assessment approach of the site has now been agreed by the relevant stakeholders.

5.49 Furthermore, as noted above, TTN1 Modelling Approach was issued in May 2019, which set out the over-arching modelling assessment strategy for the site, including strategic modelling and micro-simulation. The TTN1 was agreed in principle by all parties subject to the provision of supporting Technical Notes which form part of the TA and ongoing discussions with MKC and Highways England.

## Anticipated Effects

### Construction Phase

- 5.50 It is expected that there will be some effects on the elements outlined above, resulting from the construction phase of the Proposed Development.
- 5.51 However, it is noted that construction traffic is a temporary transport effect and will be significantly lower than development-related traffic. Thus, the effects tend to be less significant. The volume of traffic will also depend heavily on the rate of delivery and the triggers for the relevant phases of development.
- 5.52 As the preferred main contractor will not be identified until after a reserved matters application is submitted, various assumptions will be made for construction traffic. For the purposes of the Transport, Accessibility and Movement chapter, an indicative build-out rate will be used to identify the potential construction vehicle volumes. As such, an assessment of likely construction traffic effects will be completed and set out in the Transport, Accessibility and Movement chapter as an indicative summary of movements to and from the site as a whole.
- 5.53 It should be noted that the Proposed Development will be complemented by a Construction Logistics Plan (CLP). A Construction Environmental Management Plan (CEMP) will also be submitted as part of the EIA. These documents will set out the necessary mitigation and/or protocols required during the construction phase. Due to the early planning stages of the Proposed Development, it is envisaged that these documents will be updated as the principal contractor is appointed.

### Operational Phase

- 5.54 When the Proposed Development becomes operational, there is likely to be traffic associated with:
- Residents of the residential element of the proposals;
  - Employees and visitors to the proposed ancillary facilities;
  - Employees and pupils of the proposed educational facilities; and
  - Employees and visitors of the employment element of the proposals.
- 5.55 The changes in the traffic volume resulting from the proposals are considered to have a long-term permanent effect on the local transport networks.
- 5.56 Given the scale of the proposals, it is considered that these effects will be significant in EIA terms. As such, the impacts of the Proposed Development's operational phase will be assessed in detail within the ES chapter.

### Potential Mitigation

- 5.57 The assessment of environmental effects in line with the EIA Regulations tends to require the mitigation to be considered separately; i.e., the effect is considered and assessed, and then the effect with mitigation is assessed. As transport volumes may be affected by the capacity of the transport network, this is not always practical.
- 5.58 The IEMA guidelines suggest that associated '*...mitigation measures should be considered as a complete package*'. However, for the purposes of the current assessment, mitigation will be considered in two parts - those infrastructure improvements that are considered necessary to meet the capacity needs of the development (and therefore, considered as part of the TA) and

those additional (environmental) mitigation measures that do not require physical infrastructure and meet the collective needs of the development.

- 5.59 It is important to note that the delivery of the highway infrastructure as part of the HIF forms a significant part of the mitigation package for the MKE site. The highway infrastructure, including the new bridge over the M1, will enable the delivery of the housing and employment whilst minimising impact of the scheme on the local highway, including the M1 Junction 14 and Northgate Roundabout.
- 5.60 Once strategic modelling is complete, then a review of offsite mitigation measures will be undertaken and assessed within the TA. This may result in the need for improvements to junctions or a combination of measures, such as those identified in documents supporting additional environmental mitigation.
- 5.61 The additional environmental mitigation measures will form part of the assessment and will inform the residual development effects once traffic and other data become available. The mitigation measures would likely include a Construction Logistics Plan (CLP), Public Transport Strategy (PTS), Framework Travel Plans (FTP) as well as new and/or improved NMU routes, including crossing points and traffic management measures intended to preserve or enhance the amenity of all users.

## **Summary**

- 5.62 Given the scale and importance of the proposals, it is considered that the Proposed Development could affect the existing transport networks and its users. As such, it is deemed appropriate to include the assessment of the potential effects in the EIA.
- 5.63 The assessment of the transport effects of the Proposed Development will be based on policy and current best practice exemplified in several policy documents at the national and local level.
- 5.64 The baseline conditions will form a vital component of the Transport, Accessibility and Movement chapter of the ES. They will consider the existing conditions of the highway network, public transport provision, and NMU provision.
- 5.65 Consideration will be given to locations, which may include sensitive receptors such as schools, health facilities, community facilities, and areas with significant pedestrian movements.
- 5.66 The assessment of transport-related effects resulting from the Proposed Development will be based on the changes in traffic volumes on the local and wider highway network. These will be informed by the strategic Milton Keynes Multi Modal Model (MKMMM) outputs.
- 5.67 The extent of the assessment will be determined using the rules suggested by the IEMA guidance. The identified locations will be assessed in a range of scenarios that include the model base year, the interim year of 2031 and the development full build-out year of 2048.
- 5.68 The proposed assessment methodology is based on the current guidance contained in DMRB as well as guidance contained in the IEMA guidelines.
- 5.69 Consideration will be given to the effects during both construction and operational phases. This will be followed by a development of appropriate mitigation measures where necessary.

## 6.0 Landscape and Views

6.1 The purpose of this chapter of the ES will be to assess the potential effects of the proposed development on Landscape and Views.

6.2 It is considered that Landscape and Visual Impact can be scoped into the EIA.

6.3 The Landscape and Visual Impact Chapter of the ES will be prepared by fabrik Chartered Landscape Architects.

### Current Conditions

#### Landscape Character

6.4 Published landscape character assessments have been prepared, covering the site and its context. At the national scale, the site lies within national Character Area (NCA) 88 'Bedfordshire and Cambridgeshire Claylands'. This NCA stretches from Buckingham and the edge of Tring in the south-west to Cambridge and Peterborough in the north-east.

6.5 The 'Milton Keynes Landscape Character Assessment' (2016) provides a landscape character assessment of the Borough. The site lies within the following Landscape Character Areas:

- 2d Ouzel North Urban River Valley;
- 3a North Crawley Clay Plateau Farmland with tributaries; and
- 4a Broughton to Tickford Clay Lowland Farmland.

6.6 In addition, the 'Milton Keynes Landscape Sensitivity Study to Residential Development in the Borough of Milton Keynes and Adjoining Areas' (2016) was prepared as part of the evidence base to inform the current local plan. The assessment is based upon assumed residential development at a density of 35dph and at a scale of 2.5 storeys.

6.7 The site lies within the western edge of 'Land Area 5 Moulsoe Plateau'; and the north western edge of 'Land Area 6 Salford Claylands'.

6.8 Land Area 5 Moulsoe Plateau is categorised as having Medium Sensitivity:

*'There are likely to be opportunities to accommodate residential development without a significant adverse change to the landscape character. The more open landscape on the lower slopes of the Ouzel Valley, in proximity to the A509 London Road and North Crawley Road are less sensitive to residential development.*

*The higher rolling plateau around Moulsoe is a quiet rural area which is generally remote and inaccessible, except for the good network of PRowS. The rolling landscape with its woodland pattern including ancient woodland at Moulsoe Old Wood has high recreational value and is vulnerable to change.*

*Maintain the character of the village of Moulsoe. Conserve the pattern of woodlands including Moulsoe Old Wood and the existing landscape framework.'*

6.9 Land Area 6 Salford Claylands is categorised as having Low Sensitivity:

*'Residential development could be accommodated without affecting key characteristics and/or values in this landscape. The landscape area adjoins the M1 between junction 13 and 14 and the ongoing development south of the motorway has an urbanising impact on the area.*

*The flat topography and relatively poor landscape structure offer little enclosure. Integrate new development with a strong landscape structure to shield long distant views from the higher ground on Brickhill escarpment and the plateau to the north. Reinforce existing hedgerows to provide a strong landscape pattern. Conserve and reintroduce woodlands.*

### **Designations**

- 6.10 The site is not subject to any landscape designations.
- 6.11 Moulsoe Farmhouse, located within the site and on the east side of London Road, is a Grade II listed building which has been converted to a Holiday Inn Hotel.
- 6.12 Public footpaths cross the eastern and western parts of the site connecting to a network of Public Rights of Way to the east and north. Existing connections southwards are limited, albeit the eastern footpath on the site passes under the M1 linking to the Willen Lake and Ouzel Valley linear park.

### **Site Landscape**

- 6.13 A landscape survey of the site and surrounding area was undertaken by fabrik in September and October 2014. The landscape survey was revisited in July and August 2020 to reflect changes in land use, landscape features and vegetation over the intervening period.

### **Topography**

- 6.14 The River Ouzel meanders from north to south, crossing the site. The valley of the River Ouzel lies below 60 metres Above Ordnance Datum (AOD). West of this, the land appears broadly flat, although in reality it is very gently undulating and rises to the west.
- 6.15 The eastern valley side rises rapidly towards two ridgelines, orientated north-south and east-west and joining to the east. A tributary running east towards the Ouzel separates these areas of high ground, which rise to over 80-85 m AOD. A further minor valley running south from the tributary also separates the area of high ground on which Moulsoe village sits, from the north south ridge immediately east of the site. The eastern edge of the Site broadly extends to these ridgelines, extending over the north-south ridgeline to 65-70m AOD.

### **Land Use**

- 6.16 The majority of the site is allocated for around 5,000 new homes, 105 ha. of employment land, a comprehensive transport network and supporting social and green infrastructure. The eastern edge of the Site together with additional land required for highways and access lies outside of the allocation.
- 6.17 It is surrounded and crossed by major and local roads that provides local connectivity as well as strategic links. Settlement to the north-west and south-east include extensive areas of employment / commercial uses, including large scale sheds. The site, and to a greater extent the land to the north and east of it, are predominantly of a rural character, with scattered settlement.
- 6.18 The site is predominantly farmed land, divided into fields of irregular shape and size, with boundaries mostly well defined by dense hedgerow/tree lines. Riparian vegetation includes woodland to the north and plantation trees to the south and an outdoor informal racing track. The more wooded areas lie outside of the site boundary.

### **Existing Visibility of the Site**

- 6.19 The fabrik LVIA Key Views and Methodology document (see appendix 2) identifies key views from local, middle and distant receptors.
- 6.20 The generally high level of vegetation within and around the site, combined with the relatively low-lying landform and enclosing ridgelines, limits the availability of views within and across the majority of the site area. Nevertheless, breaks in the vegetation or elevated sections of roads and bridges, allow some long and open views across the fields within and immediately surrounding the site.
- 6.21 Partial and open views of the site are also available from the buildings and public rights of way, within and in close proximity to it. These includes open views of the Site's eastern edge, which extends over the north-south ridgeline. These views are seen from adjacent stretches of public footpath and facing properties on the edge of Moulsoe Village.
- 6.22 There are also some views across parts of the site from the high ground on which Moulsoe village lies (under 1km to the east) with limited glimpses, or the potential to perceive the location of the site in views, from high ground around 2.5km to the north-east; and from a high point within Campbell Park (Grade II Registered Park and Garden) around 3km to the south-west.

## **Methodological Approach**

### **Methodology**

- 6.23 The proposed methodology is set out in full within the fabrik LVIA Key Views and Methodology document appended to this scoping report.
- 6.24 The assessment of landscape and visual impacts will be undertaken in accordance with the Guidelines for Landscape and Visual Assessment (GLVIA), Third Edition (Landscape Institute, 2013) and Landscape Character Assessment Guidance for England and Scotland (Natural England, 2002).
- 6.25 Conclusions on effects, whether adverse or beneficial, are drawn from the separate judgements on the sensitivity of the receptors and the magnitude of the effects. For this assessment the following descriptive thresholds will be used with regard to effects:
- Major: Significant change to the landscape elements, key characteristic features and perceptual qualities; Major change to a static open or partial view;
  - Moderate: Sudden change to the landscape elements, key characteristic features and perceptual qualities. Moderate or major change to static or kinetic, partial view;
  - Minor: Some change to the townscape elements, Key characteristic features and perceptual qualities; minor change to a static or kinetic partial or glimpsed view;
  - Negligible: Where the proposals would have no discernible deterioration or improvement in the existing baseline situation in terms of landscape elements or view;
  - Neutral or no change: where the proposals would result in no change overall (resulting in no net beneficial or adverse effect).
- 6.26 Effects assessed as being lower than moderate are considered to be an insignificant effect relative to EA regulations.

## **Consultation**

- 6.27 As part of this scoping process, MKC are being consulted on the location of proposed photo viewpoints and VVM locations (Appendix 2), that will form the basis of the visual impact assessment.

## **Anticipated Effects**

- 6.28 There will be a number of landscape and visual receptors which could potentially be affected by proposed development on the site. Those identified to date are highlighted below. Further receptors may be identified as part of the ongoing assessment work.

### **Landscape Impact**

- The existing green field nature of the site;
- Vegetation (trees and hedgerows);
- Landscape features (notably the River Ouzel); and
- Key contributory elements of landscape character.
- The landscape setting to heritage assets is also to be considered.

### **Visual Impact**

- 6.29 The Plan at Appendix 2 identifies the locations of proposed photo viewpoints, that will form the basis of the visual impact assessment. Visual receptors potentially include:
- Users of Public Rights of Way (PROW) including those within the site and any others with potential views towards the proposed development;
  - Users of Public Parks;
  - Users of roads including those within the site and any others with potential views towards the proposed development;
  - Residents of dwellings close to and east of the site; and
  - Workers in nearby employment areas.

### **Potential Mitigation**

- 6.30 The development would be designed to relate to the landscape and visual constraints and opportunities identified for the site and local area. It would also respond to the landform of the site and topography of the wider landscape in order to limit the potential landscape and visual effects.
- 6.31 As with development on any greenfield site, the proposals are likely to cause a degree of adverse impact, when assessed in accordance with the methodology of Guidance for Landscape and Visual Impact Assessment. However, a range of landscape mitigation measures would be delivered as part of the proposed development that respond in an appropriate manner to any adverse effects identified, seeking to avoid, reduce, minimise and mitigate for these effects, but also, wherever possible, delivering the objectives set out in the landscape character assessment (namely the inclusion of extensions to linear parks for informal recreation and the creations of new woodland blocks and copses). The measures would be considered in combination with other proposals relating to the siting, layout, height and design of the buildings and access arrangements in order to ensure the scheme can be effectively assimilated into the landscape and future townscape setting.

## Summary

- 6.32 In summary, whilst there will be inevitable landscape and visual impacts, a range of landscape mitigation measures would deliver objectives set out in the landscape character assessment for the local area. This would include retention and significant areas of new planting, which would play an important role in the visual softening and screening of the development, whilst also contributing to an overall improvement in the visual appearance of this part of the settlement. The scheme shall also provide high quality open spaces and corridors through the development that would form an extension to the wider Milton Keynes green infrastructure network delivering a number of key policy aspirations for the council. These measures shall be refined through the iterative EIA process of assessment and design.

## 7.0 Ecology

- 7.1 This section has been prepared by Hankinson Duckett Associates (HDA).
- 7.2 A full Ecological Impact Assessment will be provided within the Environmental Assessment in accordance with CIEEM's 2016 '*Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd edition*'. This section of the scoping report describes the existing ecological features and resources as they are understood at present and identifies potential ecological impacts that, in the absence of impact avoidance and mitigation measures, may occur as a result of the proposed development of the site. In advance of a full assessment, this section seeks to identify potential ecological receptors identified at the site and the possible implications of development.
- 7.3 This section is based on the findings of suite of specific studies, which encompassed the majority of the application site, conducted between 2008 and 2020. These included a Phase 1 habitat survey, a hedgerow survey, a Phase 2 botanical survey, an ecological desk study, and protected species surveys for bats, dormice, water vole, otter, breeding and wintering birds, reptiles, great crested newts and invertebrates. Copies of the reports of survey prepared to date are included as Appendices 3 to 12 of this scoping report.
- 7.4 The scoping boundary has been altered since the initial surveys were carried out and in consequence several of the specialist surveys are currently being expanded to include previously unsurveyed areas in support of the current application. This assessment of the likely impact of the proposed development has been informed by the results of the initial studies and the interim findings of the expanded surveys currently underway. Full survey reports for the entire application area will be provided as appendices to the Ecological Impact Assessment in the ES.

### Current Conditions

- 7.5 The table below provides a summary of the field surveys completed at the site to date and the strategy for updating the surveys, where necessary, in support of the current application. A brief summary of the initial findings of the surveys is given however, where stated, these surveys are still ongoing and interim results should be treated as provisional.

Table 7.1 Summary of Ecological Studies Conducted at the Site

Date of survey	Ongoing survey work	Initial findings of surveys
<b>Ecological desk study</b>		
Most recently updated in February 2020.	None proposed.	No statutory designated sites such as Special Areas of Conservation (SACs), Special Protection Areas (SPAs), National Nature Reserves (NNRs) or Sites of Special Scientific Interest (SSSIs) are located within 10km of the site, and no Natural England Impact Risk Zones (IRZs) relate to the site. No Local Nature Reserves (LNRs) are located within 5km of the site. Three non-statutory nature conservation designations pertain to the site, all of which relate to 'Milton Keynes Wildlife Corridors' (MKWCs) associated with the M1 motorway along the southern site boundary and the River Ouzel and Broughton Brook which flow northward through the western and central areas of the site. Two Local Wildlife Sites (LWSs) are located within 2km of the site including Willen Lake LWS located 400m to

Date of survey	Ongoing survey work	Initial findings of surveys
		<p>the south of the site, and Tongwell Lake LWS located 850m to the south-west. Both comprise wetland and marginal habitats and support notable bird populations. Thirteen Biological Notification Sites (BNSs) and ten areas of ancient woodland are located within 2km of the site, although none lie within or adjacent to the site itself.</p> <p>The only desk study records of protected and notable species provided for the site itself relate to Badger. Other records of species occurring in the vicinity of the site include bats, Otter, Water Vole, Badger, birds, Great Crested Newt, reptiles, invertebrates and plants.</p>
<b>Phase 1 habitat survey</b>		
<p>Most recently updated across majority of site between July and December 2019.</p>	<p>Survey to be extended to previously unsurveyed areas within the new scoping boundary. Findings of surveys subject to ongoing review during other site work.</p>	<p>The habitats of highest nature conservation interest within the site include the River Ouzel and Broughton Brook river corridors and the network of hedgerows, woodlands, treelines, ditches, scrub and scattered trees located on field boundaries across the site. Also of interest are a series of relatively species-rich neutral grassland meadows along the western bank of the River Ouzel.</p> <p>Other habitats within the site, including the extensive arable land and grazed grassland fields that dominate the site and a series of small ponds have nature conservation value at no more than a local level in their own right.</p>
<b>Hedgerow survey</b>		
<p>Carried out across the majority of the site during 2011.</p>	<p>Survey being extended to previously unsurveyed areas within the new scoping boundary during summer 2020.</p>	<p>The network of hedgerows across the site is characterised by dense and managed species-poor hedgerows on field boundaries intermixed with occasional older species-rich hedgerows and lines of trees. Ground flora associated with the hedgerows primarily comprises species-poor ruderal and grassland vegetation.</p> <p>Forty-five of the hedgerows within the scoping boundary surveyed to date have been assessed as being 'important' under either the Paragraphs 1-5 Wildlife and Landscape criteria or the Paragraphs 6-8 Historical and Archaeological criteria. These are widespread across farmed areas of the site.</p>
<b>Phase 2 botanical survey</b>		
<p>Conducted on semi-improved neutral grassland along the western bank of the River Ouzel.</p>	<p>Survey may be extended to any habitats of interest in the previously unsurveyed areas of the site pending results of the Phase 1 habitat survey.</p>	<p>The grassland subject to survey is relatively species rich in comparison to that occurring elsewhere in the site however it does not qualify for consideration as a BAP Priority Habitat or a 2006 NERC Act Habitat of Principal Importance. It is however comparable to NVC MG4 type grassland which is typical of low lying floodplain semi-natural grassland the area.</p> <p>No protected or notable plant species have been recorded from habitats within the site.</p>

Date of survey	Ongoing survey work	Initial findings of surveys
<b>Phase 1 and 2 bat surveys</b>		
Bat surveys most recently updated over the majority of the site between July 2018 and September 2019.	Surveys being extended to previously unsurveyed areas within the new scoping boundary during summer 2020.	Phase 1 bat scoping surveys and Phase 2 bat roost and bat activity surveys identified low-status bat roosts for low numbers of common and widespread bat species within five trees and four buildings within the site. The results of the activity surveys suggest that the site comprises a significant proportion of foraging habitat for moderate numbers of Common and Soprano Pipistrelle bats and provides more occasional foraging habitat for low numbers of at least eight other species/species groups including Noctule, <i>Myotis</i> sp., Brown Long-eared bat, Serotine, Barbastelle, Nathusius' Pipistrelle, Leisler's bat and Greater Horseshoe.
<b>Dormouse survey</b>		
Dormouse nest tube survey conducted over majority of the site between May and October 2012.	None proposed.	No Dormice or evidence of Dormice was recorded during the survey despite the presence of suitable habitat.
<b>Otter survey</b>		
Otter survey of watercourses within the site most recently completed in September 2018 and April 2019.	Survey being extended to watercourses within the previously unsurveyed areas of the scoping boundary during spring/ summer 2020.	The survey results suggest that Otter are routinely using the section of the River Ouzel within the site for foraging and movement as part of a larger territory. It is likely that other watercourses within the site are also used by Otters on an occasional basis although no evidence of this has been detected to date.
<b>Water Vole survey</b>		
Water Vole survey of watercourses within the site most recently completed in September 2018 and April 2019.	Survey being extended to watercourses within the previously unsurveyed areas of the scoping boundary during spring/ summer 2020.	No Water Voles have been recorded on watercourses within the site and this species is considered absent from the site despite the presence of suitable habitat.
<b>Badger survey</b>		
Badger survey conducted over majority of site between April and December 2019.	Survey being extended to previously unsurveyed areas of the site during spring 2020.	Twelve outlying setts have been recorded within the site, only two of which are considered to be currently active. A relatively low level of Badger activity has been observed at the site given its size, reflective of the fact that the arable land dominating much of the site provides only limited quality foraging opportunities for Badgers.

Date of survey	Ongoing survey work	Initial findings of surveys
<b>Breeding and wintering bird surveys</b>		
<p>Wintering bird surveys conducted over majority of site between November 2018 and March 2019.</p> <p>Breeding bird surveys conducted over majority of site between April and July 2019.</p>	<p>Breeding bird survey being extended to previously unsurveyed areas of the site during spring/ summer 2020.</p>	<p>Thirty-nine bird species are considered to be breeding at the site and 55 species were recorded using the site during the winter surveys. The site is not considered to meet sufficient criteria to qualify as a candidate SPA, SSSI or LWS on its bird assemblage however the site does support a number of breeding and wintering bird species of nature conservation interest. These include:</p> <p><u>Wintering species:</u></p> <ul style="list-style-type: none"> <li>- Red Kite and Kingfisher (listed on Annex 1 of the EU Birds Directive and Schedule 1 of Wildlife and Countryside Act (WCA)).</li> <li>- Fieldfare, Redwing and Greylag Goose (listed on Schedule 1 of WCA).</li> <li>- Lapwing, Woodcock, Grey Partridge, Skylark, Starling, Fieldfare, Song Thrush, Redwing, Mistle Thrush, House Sparrow, Linnet and Yellowhammer (BoCC red list species).</li> <li>- Mute Swan, Greylag Goose, Mallard, Snipe, Black-headed Gull, Stock Dove, Kingfisher, Kestrel, Willow Warbler, Dunnock, Bullfinch and Reed Bunting (BoCC amber list species).</li> </ul> <p><u>Breeding species:</u></p> <ul style="list-style-type: none"> <li>- Red Kite [not nesting on site] (listed on Annex 1 of the EU Birds Directive and Schedule 1 of WCA).</li> <li>- Barn Owl (listed on Schedule 1 of WCA).</li> <li>- Lapwing, Skylark, Starling, Song Thrush, House Sparrow, Yellow Wagtail, Linnet and Yellowhammer (BoCC red list species).</li> <li>- Mute Swan, Mallard, Dunnock, Bullfinch and Reed Bunting (BoCC amber list species).</li> </ul>
<b>Reptile survey</b>		
<p>Reptile survey most recently updated over the majority of the site between August and October 2018.</p>	<p>Survey being extended to previously unsurveyed areas of the site during spring/ summer 2020.</p>	<p>Very low populations of Grass Snake and Slow Worm were recorded at the site, associated with hedgerow bases on field margins in the southern area of the site. It is conceivable however that these species also occur in very low numbers in other areas of suitable habitat across the site such as woodland edges, pond/ watercourse margins, and within rough habitats on field margins.</p>
<b>Great Crested Newt survey</b>		
<p>Great Crested Newt Habitat Suitability Index (HSI) assessments, eDNA surveys and population estimate surveys</p>	<p>Surveys being extended to ponds in the vicinity of the previously unsurveyed areas of the site during spring 2020.</p>	<p>No Great Crested Newts have been recorded from waterbodies within the site however small to moderate populations of Great Crested Newts were recorded from 10 off-site waterbodies, the closest being 20m from the western part of the site within the Pineham Nature Reserve.</p> <p>It is likely that some Great Crested Newts from a population associated with the Pineham Nature Reserve use the western areas of the site during terrestrial</p>

Date of survey	Ongoing survey work	Initial findings of surveys
conducted on ponds within 300m of the majority of the site between April 2018 and June 2019.		phases however the site is unlikely to form a key area of terrestrial habitat for this population.
<b>Invertebrate survey</b>		
Terrestrial and aquatic invertebrate habitat assessment and sampling surveys conducted in key habitats across the site between July 2018 and June 2019.	None proposed.	The vast majority of habitats at the Site, notably the arable fields and pasture, are of low invertebrate habitat potential. The site does however support a diverse invertebrate fauna including over 400 terrestrial and aquatic species, 19 of which have recognised conservation status. Key habitats for invertebrates within the site include an area of woodland in the north of the site, mature trees within hedgerows across the site and riparian bankside habitat along the River Ouzel.

7.6 The presence of invasive species listed under Schedule 9 of the Wildlife and Countryside Act 1981 was, and will continue to be, recorded as incidental information during the surveys described above.

7.7 In addition to confirmation on the scope of the survey work listed above as part of the EIA Scoping process, where it is stated that surveys will not be updated as part of the current application, it is also requested that the MKC confirm support for this approach.

### Methodological Approach

7.8 The methodologies for each of the field surveys completed or ongoing at the site in support of the current application are summarised below. Full details of the methodology for each specialist ecological survey undertaken to date are given in the reports of survey provided in Appendices 3 to 12.

- Extended Phase 1 habitat survey: Carried out in accordance with the JNCC (2016) methodology.
- Phase 2 botanical surveys: Takes the form of a walkover of the grassland fields following the approach given in Natural England's Technical Information Note TIN110 for assessment of whether grassland is a Biodiversity Action Plan (BAP) Priority Habitat (or Habitat of Principal Importance under the 2006 NERC Act). Grassland community also broadly assessed against National Vegetation Community (NVC) assemblages.
- Hedgerow survey: The hedgerows crossing and bordering the site are assessed against the 'Ecology and Landscape' and 'Historical and Archaeological' Criteria set out in the 1997 hedgerow Regulations.
- Bat Surveys: Includes a Phase 1 bat scoping survey and Phase 2 bat surveys comprising emergence surveys, activity surveys and/or tree climbing inspections to determine the presence/absence of bats in trees and buildings containing potential roost sites affected by the development proposals, and the use of habitats across the site by foraging and

commuting bats. The bat survey work is carried out in accordance with the Bat Conservation Trust's 2016 guidelines.

- Dormouse survey: Comprises a nest tube survey of suitable areas of habitat, carried out in accordance with the standard methodology set out by Chanin and Woods (2003).
- Water Vole and Otter surveys: Involves the comprehensive and systematic recording of all recognised Water Vole and Otter field signs, following the standard methodology described in the Water Vole Conservation Handbook (Dean et al, 2016) and the methodology described in the Otter Survey of England 1991-1994 (Strachan & Jefferies, 1996).
- Badger survey: Comprises a walkover survey to identify Badger setts and evidence of Badger activity, such as hairs, footprints, pathways, dung pits and feeding signs. Setts are mapped and classified according to the criteria used in the National Badger Surveys.
- Breeding and wintering bird surveys: Comprises a territory mapping exercise broadly following that outlined by Bibby, Burgess, Hill & Mustoe (2000) carried out over five visits between November and March (wintering) and five visits between April and July (breeding). On each visit a route is followed that allows all parts of the site and immediately adjacent habitat to be surveyed. All aural or visual bird encounters are noted.
- Reptile Survey: Involves installing artificial refugia in areas of habitat identified as potentially suitable for reptiles at a density of 5-10/ha to attract any reptiles present. The survey consists of a walkover of the site checking the artificial refugia to identify the species present and their distribution on the site. A visual search of the site is also undertaken on these visits. Following installation of the artificial refugia, the site is visited six times during suitable temperature and weather conditions.
- Great Crested Newts: The locations of waterbodies within a 300m radius of the site are identified from aerial photographs and maps. A Habitat Suitability Index (HSI) assessment is conducted on all accessible waterbodies within the survey area in line with the recognised methodology developed by Oldham *et al.* (2000). Following this, all waterbodies with suitability to support Great Crested Newts are subject to eDNA sampling following the recognised methodology established by Biggs *et al.* (2014), with samples sent off for laboratory analysis. Where samples test positive for Great Crested Newt DNA, these waterbodies are subject to six-visit population estimate surveys using a combination of qualifying survey methodologies between April and June in line with the Great Crested Newt Mitigation Guidelines (English Nature, 2001).
- Invertebrate Survey: Comprises a habitat potential assessment and subsequent targeted survey of terrestrial and aquatic invertebrates spanning spring, summer and autumn. The targeted terrestrial survey includes a range of survey techniques (pan traps, pitfall traps, window traps, sweep netting, beating and grubbing) to gather samples in the field. Samples are then sorted and identified to enable a preliminary evaluation of the importance of the site for invertebrates. Two ponds within the site were surveyed and macroinvertebrate data were collated and analysed using the Predictive SYstem for Multimetrics (PSYM) tool to allow an assessment to be made of whether the ponds may qualify as a Habitat of Principal Importance. Aquatic macroinvertebrate sampling of defined reaches of the River Ouzel and Broughton Brook allows identification of macroinvertebrate families using these watercourses and assessment of their biological water quality, based on metrics applied to macroinvertebrate families.

7.9 The findings of the above work will be presented in the Ecology Chapter of the ES. The ES Ecology Chapter will identify and value any features of ecological importance on the site and their sensitivity to change. Features will be valued in accordance with CIEEM's 2016 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal,

2nd edition'. Receptors are assessed within a defined geographical context based on the distribution and status of the receptor within this geographical area. The geographical scale at which an impact on the receptor is significant can then be determined.

- 7.10 Potential effects of the proposed development on ecological features will then be assessed. Where significant effects on features of ecological value are predicted, appropriate measures will be specified to avoid or mitigate those effects. Any residual effects on features of ecological value will be described and their significance identified, which will be a product of the value of the feature and the magnitude of the effect. Ecological enhancement measures will be detailed in line with local and national planning policy.
- 7.11 In advance of a full assessment, the following sections seek to identify potential ecological receptors identified at the site based on the studies carried out to date and the possible implications of development.

### **Anticipated Effects**

- 7.12 The anticipated effects of the proposed development summarised below are based on the survey work to hand, the emerging masterplan and current knowledge of the programme of construction within the development site. It has been assumed that access routes and compound areas will be within the development site and where possible will use proposed development areas or existing areas of negligible nature conservation interest.

### **Designated Sites**

- 7.13 There are no internationally or nationally designated areas (SACs, SPAs & SSSIs) within 10km of the site and no Local Nature Reserves within 2km of the site. It is considered highly unlikely therefore that the proposed development would adversely affect any statutorily designated sites in the local area or require Appropriate Assessment under the 2019 Conservation of Habitats and Species (EU Exit) (Amendment) Regulations.
- 7.14 Three non-statutory designated Milton Keynes Wildlife Corridors are located within the site in association with the River Ouzel, Broughton Brook and the M1 corridor. In the absence of avoidance or mitigation measures negative effects on these areas from the proposed development may arise from direct loss, damage and fragmentation of habitats within and supporting these areas and indirect effects of air and water-borne pollution, lighting, noise, human disturbance and effects on the quantity/continuity of flow within the watercourses. Development of the site also provides opportunity for positive effects on these areas through enhancement and management of associated habitats and creation of complementary supporting habitats. The proposed development may therefore result in both positive and negative effects on these receptors which are significant at a District level.

### **Habitats**

- 7.15 Other than the wildlife corridors discussed above, the habitats of highest value associated with the site are the network of hedgerows, ditches, woodland, scrub and tree lines occurring on field boundaries which combine to provide potential habitat for a range of species and contribute to a substantial network of semi-natural habitats facilitating the movement of wildlife across the site and surrounding area. Potential effects on these habitats from the proposed development include direct loss, damage and fragmentation, or indirect effects from human disturbance, air and water pollution and increased noise and lighting. In the absence of avoidance or mitigation measures these effects have the potential to significantly affect these receptors at up to a District level.

7.16 The remainder of habitats within the footprint of the proposed development, including species-rich and species-poor grasslands, arable land and ponds, are of no more than local interest in their own right and are not significant in an EIA context. Notwithstanding this, measures to protect and enhance retained areas of these habitats should be included in the scheme where appropriate.

### **Legally Protected Species**

7.17 Legally protected species are considered as follows:

- **Bats:** The emerging development proposals indicate that the low status bat roosts associated with buildings B2, B3, B27 and B33 will be lost or adversely affected by the proposed development which, in the absence of avoidance measures, could affect roosting bats at a Local level. The emerging proposals indicate however that it will be possible to retain all the tree roosts recorded within the site. In the absence of mitigation the proposed development also has potential to affect foraging and commuting bats through direct loss of grasslands, trees, scrub, ditch and hedgerow habitats which may result in a decline in the availability of foraging and commuting habitat and impacts of lighting on retained areas of foraging habitat and commuting routes. These effects may be significant at a District Level and are therefore scoped into the EIA.
- **Otters:** The River Ouzel, and likely also the Broughton Brook, form the focus of Otter habitat within the site. In the absence of mitigation effects on Otters as a result of the proposed development would be associated with loss or deterioration of habitats resulting from the potential effects on these watercourses described above. Although the site is likely to form only a small area of a larger Otter territory in the unlikely event that the habitat is rendered unsuitable for Otters and connectivity severed then effects could be significant in a Local context.
- **Water Vole:** Water Voles are currently considered absent from the site and no significant effects on this species are expected as a result of the proposed development.
- **Badgers:** The proposed development may result in the loss of two active Badger setts that have been identified at the site as well as other disused setts. These setts are however both low-status non-breeding outlying setts. Outlying setts are generally used on an occasional/transitory basis and by definition alternatives should exist in the wider area. Any unavoidable loss of the setts is therefore unlikely to be significant to the local Badger population. Effects of a loss of foraging habitat where built development takes place of existing grassland and woodland habitats are also unlikely to be significant as habitats of similar and higher quality than those existing within the site are abundant in the wider area.
- **Breeding and Wintering Birds:** The site is considered to be of interest for birds at a District level. The proposed development would result in the loss of open farmland habitats and this would inevitably affect current populations of species of conservation interest associated with these habitats, including Yellow Wagtail, Skylark, Lapwing and Yellowhammer. In the absence of mitigation, effects on bird populations in combination across the site therefore have the potential to be significant in an EIA context.
- **Reptiles:** Much of the area of habitat in which reptiles have been recorded will be affected by the proposed development. In the absence of mitigation, a proportion of the habitat supporting reptiles would be lost, and this may result in loss of habitat available and killing and injury of any reptiles present. Reptile numbers at the site are however very low and it is highly unlikely that significant effects on this group would arise as a result of the proposed development.

- Great Crested Newts: The proposed development has potential to result in loss of terrestrial habitat where it falls within 250m of the off-site breeding ponds. Numbers of terrestrial phase Great Crested Newts using the site are however likely to be low and it is highly unlikely that significant effects on this group would arise as a result of the proposed development.
- Invertebrates: The proposed development will focus on areas of the site comprising arable farmland and species-poor grassland of low invertebrate interest. In the event that substantial areas of woodland, mature trees, hedgerows and riparian habitat are lost or affected by the proposed development (see 'Habitats' section above) then this has potential to result in a significant effect on invertebrates.
- Plants: No protected or notable plant species have been recorded from the site and it is highly unlikely that significant effects on individual plant species would arise as a result of the proposed development.

7.18 Where effects on habitats and protected species are not expected to be significant in an EIA context, the proposed development nevertheless has the potential to impact these receptors at a Local level and where appropriate these receptors will therefore be considered further in the ES in view of their inherent ecological interest and/or nature conservation legislation and planning policy and guidance.

## **Potential Mitigation**

7.19 The potential mitigation measures discussed below are in outline and are indicative of the potential constraints. The relevance or success of any mitigation measures will depend on the outcome of further ecological survey and assessment and the mitigation recommendations may change in scope.

### **Designated Sites and Habitats**

7.20 It is recommended that development proposals maintain a sufficient stand-off from the MKWCs associated with the M1 motorway, River Ouzel and Broughton Brook and other retained habitats at the site including hedgerows, ditches, woodland, scrub and trees in order to avoid impacts on rooting zones and their function as corridors for the movement of wildlife. Consideration should also be given to indirect impacts potentially arising from adjacent development such as lighting and disturbance. It is recommended that habitats sensitive to disturbance are afforded a wider buffer than less sensitive areas, and where lighting has potential to impact adjacent habitat the use of low-level and hooded lighting should be considered. All lighting proposals for the site should be reviewed at an appropriate stage by a suitably qualified ecologist.

7.21 Where it is unavoidable that habitat of nature conservation interest is lost to development, consideration should be given to its replacement elsewhere within the site. Where this is not possible, loss should be compensated through provision of alternative habitats of comparable nature conservation interest or higher. Creation/inclusion of the following habitats should be considered within the proposed scheme: species-rich meadow grasslands; rough tussocky grassland; species-rich hedgerows; species-rich scrub; woodland and tree lines; orchards; and wetlands including ponds, ephemeral pools, ditches, swales and reedbeds.

7.22 Provision of replacement areas of habitat should also give consideration to the maintenance of opportunities for wildlife movement within and adjacent to the site. All new planting should, where appropriate, use native species, typical of the local area. Planting stock should be of local provenance wherever possible.

7.23 All new and retained habitats of nature conservation interest should be subject to long-term management to maximise their value to wildlife.

- 7.24 To avoid impacts on water quality any works in close proximity to the streams and rivers associated with the site should follow the Environment Agency Pollution Prevention Guidance, available from <https://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>.

### **Legally Protected Species**

- 7.25 Legally protected species are considered as follows:

- Bats:
  - a Development proposals should aim to avoid effects on confirmed bat roosts however where effects on these features are unavoidable, a Natural England derogation licence should be obtained in order to permit development works affecting bats;
  - b Opportunities for roosting bats should be maintained through the provision of replacement and additional new roosting opportunities in buildings and trees at suitable locations across the site. These should include a selection of bat boxes and internal cavities/voids within buildings;
  - c Measures to maintain existing identified bat commuting routes should be included within the proposals including retention of hedgerows, treelines, woodland edges and watercourse corridors and the use of sensitive lighting in these areas; and
  - d Loss of foraging habitat should be compensated through the habitat creation and enhancement measures listed above, maximising the value of these habitats for invertebrate prey.
- Otters and Water Voles:
  - e Opportunities for Otter and Water Vole should be maintained through minimisation and sensitive design of crossing points, with culverting of banks avoided;
  - f Buffer strips of at least 8m in width should be retained between retained watercourses and any developed areas and any new road bridges to be constructed over the River Ouzel or Broughton Brook should follow the *Nature Conservation Advice in Relation to Otters* outlined in the *Design Manual for Roads and Bridges* (The Highways Agency, 1999);
  - g Landscape design should include habitats suitable for Otter through retention and establishment of undisturbed areas of scrub and woodland habitats alongside watercourses and retention of features within watercourses such as fallen trees or logs; and
  - h Watercourse corridors should be managed to maintain a good level and diversity of aquatic and marginal vegetation which will benefit invertebrate and fish species and continue to provide a food source for Water Voles and Otters.
- Badgers:
  - i Development proposals should aim to avoid any active Badger setts however in the event it is not possible to retain an active sett a Natural England licence should be obtained in order to close and/or damage/destroy the sett(s) prior to works commencing; and
  - j The landscape scheme for the site should seek to maximise opportunities for foraging Badgers through maintenance of corridors between any retained Badger sett and areas of foraging habitat in the wider area, and inclusion of high quality Badger foraging habitats such as tree and scrub planting, rough and meadow grasslands and use of fruit and nut providing species within planting schemes.

- Breeding and Wintering Birds:
  - k Any vegetation clearance/building demolition with potential to affect nesting birds should be undertaken outside of the bird nesting season;
  - l In order to mitigate the impact of the development on farmland birds, open grassland and scrub edge habitats should be provided where possible within the development site. Provision of 'Skylark plots' within retained arable land in the vicinity of the site may also be required as off-site compensation;
  - m Measures to increase the value of newly created and retained habitats for birds at the site should include the creation and enhancement of retained linear habitats and woodland, scrub, trees, wet grassland, watercourses and ponds; and
  - n New opportunities for nesting birds should be provided across the development site through installation of a variety of bird boxes suitable for a range of bird species on buildings and trees.
- Reptiles:
  - o A full reptile translocation exercise is not proposed in view of the small number and limited distribution of reptiles recorded at the site. Instead, it is recommended that where it is not possible to retain habitat in which reptiles have been recorded, a controlled approach to vegetation clearance is carried out in these areas in order to displace any reptiles present into retained areas of contiguous habitat; and
  - p Development proposals should maintain and where possible enhance opportunities for reptiles at the site through the retention, enhancement and creation of reptile habitats such as rough and meadow grassland, scrub and wetlands as part of the landscape strategy.
- Great Crested Newts:
  - q For site clearance and construction works within 250m of the identified off-site waterbodies supporting Great Crested Newts it is anticipated that, unless otherwise agreed with Natural England, it will be necessary to secure a licence from Natural England to permit the works and the works to be carried out following a full trapping and translocation exercise, or under an agreed District licence; and
  - r Opportunities for Great Crested Newts should be maintained and enhanced within the proposed development through creation and management of new wetland features and terrestrial habitats such as scrub, hedgerows, rough and meadow grassland and provision of features such as log piles and purpose-built hibernacula.
- Invertebrates
  - s The proposed development should aim to retain and enhance the identified key habitats for invertebrates within the site including woodland, mature trees within hedgerows and riparian bankside habitat along the River Ouzel; and
  - t The development provides opportunity to enhance and create new habitats of value for invertebrates across the site such as species-rich rough and meadow grassland, new woodland, hedgerows, scattered trees, scrub and wetlands.

## Summary

7.26

In the absence of avoidance and mitigation measures, the proposed development has the potential to result in adverse impacts on a range of habitats and notable and/or legally protected species including bats, Badgers, Otters, breeding birds, reptiles, Great Crested Newts and invertebrates.

- 7.27 Measures for the avoidance, mitigation and compensation of potential impacts on legally protected species and notable habitats, and for the enhancement of the site for biodiversity, are outlined above and will be further described in the ES Ecology Chapter.
- 7.28 In conclusion, subject to the implementation of the recommended measures to mitigate impacts on protected species and realisation of the opportunities that development of the site presents in terms of habitat creation and enhancement, the proposed development is unlikely to have a significant overall impact on the ecology of the local area.
- 7.29 A full Ecological Impact Assessment for the proposed development will nonetheless be a requirement of the ES. This will require a full description of the measures to be incorporated into the scheme for the avoidance of significant impacts on the site's ecology and measures to maximise ecological gain through development of the site.

## 8.0 Air Quality

8.1 An air quality assessment will be undertaken to consider the potential effect of the construction and operational phases of the Proposed Development on local air quality, in addition to considering the effect of local pollutant sources on air quality at the Application Site itself.

8.2 This section of the EIA Scoping Report sets out the potential local air quality impacts of the Proposed Development during the construction and operational stages. The potential development constraints posed by existing emissions sources in the area around the Application Site have also been considered.

### Current Conditions

8.3 A review of the available information concerning current air quality conditions within 2km of the Application Site (Figure 8-1) has been undertaken with reference to:

- Milton Keynes Council (MKE) 2019 Air Quality Annual Status Report (ASR)<sup>3</sup>;
- WSP nitrogen dioxide (NO<sub>2</sub>) diffusion tube survey<sup>4</sup>;
- Defra Pollution Climate Mapping Model data<sup>5,6</sup>; and
- Anglia Water odour modelling report for Cotton Valley Waste Water Treatment Works (WwTW)<sup>7</sup>.

### Local Air Quality

8.4 Under Part IV of the Environment Act 1995, MKC is responsible for Local Air Quality Management (LAQM) within the district. This involves monitoring local air quality and annual reporting to the Department for Environment, Food and Rural Affairs (Defra) on compliance with the air quality objectives, which are set out in The Air Quality (England) Regulations 2000 (as amended 2002). Where pollutant concentrations are found to exceed one or more objective then MKC is required to declare an Air Quality Management Area (AQMA) and implement an Air Quality Action Plan to bring about improvement. The relevant air quality standards (set as objectives by the Regulations) are included in Table 8.1.

Table 8.1 Air Quality Standards which are set as Objectives and Limit Values

Pollutant	Concentration in micrograms per cubic metre (µg/m <sup>3</sup> )	Measured as	Maximum number of exceedances allowed
Nitrogen dioxide (NO <sub>2</sub> )	40	Annual mean	-
	200	1-hour mean	18
Particulate matter less than 10 micrometres in diameter (PM <sub>10</sub> )	40	Annual mean	-
	50	24-hour mean	35

<sup>3</sup> Milton Keynes Council (2019) *Air Quality Annual Status Report (ASR)* [online]. Available at: <https://www.milton-keynes.gov.uk/environmental-health-and-trading-standards/pollution/local-air-quality-management> [Accessed June 2020].

<sup>4</sup> WSP (2019) *Milton Keynes East Nitrogen Dioxide Diffusion Tube Monitoring Report*. London: WSP

<sup>5</sup> UK AIR (2020) *2020 NO<sub>2</sub> and PM projections data (2018 reference year)* [online]. Available at: <https://uk-air.defra.gov.uk/library/no2ten/2020-no2-pm-projections-from-2018-data> [Accessed June 2020].

<sup>6</sup> UK AIR (2018) *Ambient Air Quality Map* [online]. Available at: <https://uk-air.defra.gov.uk/data/gis-mapping/> [Accessed June 2020].

<sup>7</sup> Anglian Water (2020) *Pre-Planning Assessment Cotton Valley WRC dispersion modelling summary 18<sup>th</sup> February 2020*.

Pollutant	Concentration in micrograms per cubic metre ( $\mu\text{g}/\text{m}^3$ )	Measured as	Maximum number of exceedances allowed
Particulate matter less than 2.5 micrometres in diameter ( $\text{PM}_{2.5}$ )	25	Annual mean	-

- 8.5 In 2008, MKC declared an AQMA due to exceedances of the objective for annual mean  $\text{NO}_2$  concentrations. The Olney AQMA is located approximately 7.6km north of the Application Site at Bridge Street/High Street, Olney. No other locations requiring an AQMA have been identified by MKC, which suggests that air quality within the rest of the district is likely to be relatively good.
- 8.6 MKC undertakes monitoring of annual mean  $\text{NO}_2$  concentrations at 11 locations within 2km of the Application Site. Details of this monitoring and the annual mean  $\text{NO}_2$  concentrations since 2015 are given in Figure 8.2 and the sites are shown in Figure 8.1. Generally, this monitoring is undertaken at locations where there is nearby relevant exposure, including residential premises, schools and hospitals. The most recent year for which monitoring data are available is 2018.
- 8.7 For the period between 2015 and 2018 inclusive, the MKC monitoring data show that there were no exceedances of the air quality standard of  $40\mu\text{g}/\text{m}^3$  at any location within 2km of the Application Site. The maximum annual mean  $\text{NO}_2$  concentration for 2018 was  $30\mu\text{g}/\text{m}^3$  site 'J1 J2' on the High Street in Newport Pagnell. No clear upward or downward trend in annual mean  $\text{NO}_2$  concentrations is apparent from the data.
- 8.8 A major influence on local air quality in the vicinity of the Application Site will be emissions from the road network, in-particular the A422, A509 London Road and the M1 motorway.
- 8.9 The concentration for 2018 at the nearest MKC site to the M1 ('K1 K2' on Greenlands Close in Newport Pagnell) was  $22.2\mu\text{g}/\text{m}^3$ . The site is located approximately 65m to the east of the M1 southbound carriageway, which is raised above Greenlands Close on a bridge. Greenlands Close is a quiet cul-de-sac within a residential area. There is tall vegetation (including mature trees) between the motorway and the monitoring site. These locational factors probably explain why annual mean  $\text{NO}_2$  concentrations have not been substantially higher at this location

Figure 8.1 Location of MKC monitoring locations

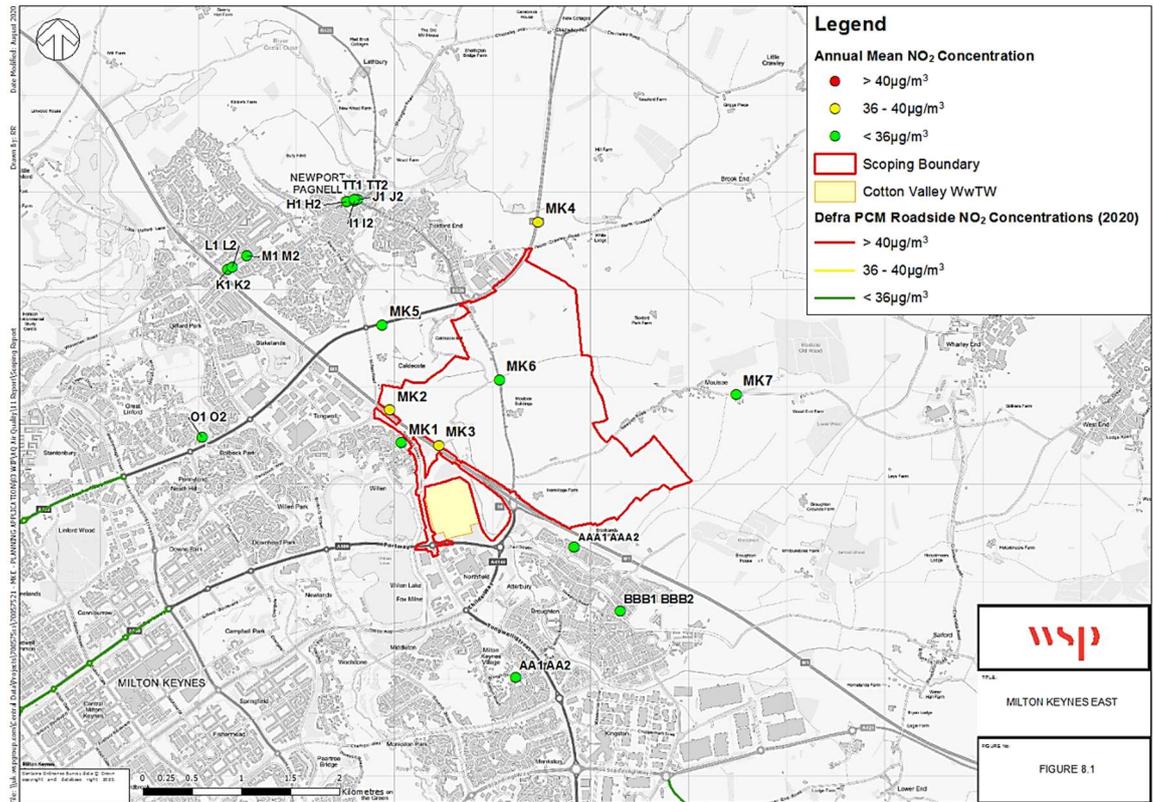


Table 8.2 MKC LAQM Monitoring of Annual Mean NO<sub>2</sub> Concentrations within 2km of the Application Site

Site ID	Location	Site Type	X	Y	Approx. Distance from Site	Annual mean NO <sub>2</sub> concentration (µg/m <sup>3</sup> )				
						2015	2016	2017	2018	2019
H1 H2	76 High Street, Newport Pagnell	Roadside	487514	243901	1.6km north	22.8	25.5	26.6	23.8	N/Av
I1 I2	63 High Street, Newport Pagnell	Kerbside	487588	243912	1.5km north	27.7	30.6	29.5	26.7	N/Av
J1 J2	57 High Street, Newport Pagnell (The Plough PH)	Kerbside	487620	243922	1.5km north	30.1	31.4	31.1	30.0	N/Av
K1 K2	16-17 Greenlands Close, Newport Pagnell	Suburban	486296	243208	2.0km north west	25.6	23.4	24.8	22.2	N/Av
L1 L2	5-7 Greenlands Close, Newport Pagnell	Suburban	486345	243230	2.0km north west	22.3	21.8	24.4	20.7	N/Av
M1 M2	42-44 Walnut Close, Newport Pagnell	Suburban	486495	243345	1.9km north west	18.0	18.1	19.2	16.9	N/Av
O1 O2	64 Nicholas Mead, Great Linford	Urban Background	486039	241484	1.8km west	15.1	17.4	17.1	15.2	N/Av
AA1 AA2	Brook Farm, Broughton Road, Middleton	Suburban	489237	239016	1.5km south	13.3	15.9	14.9	14.4	N/Av
TT1 TT2	62 High Street	Roadside	487589	243923	1.5km north	27.6	27.1	27.5	26.8	N/Av

Site ID	Location	Site Type	X	Y	Approx. Distance from Site	Annual mean NO <sub>2</sub> concentration (µg/m <sup>3</sup> )				
						2015	2016	2017	2018	2019
AAA1 AAA2	4 Mary Rose, Brooklands	Suburban	489835	240351	0.2km south	No data	No data	No data	19.4	N/Av
BBB1 BBB2	267 Fen Street, Brooklands	Roadside	490299	239695	1.0km south	No data	No data	No data	19.8	N/Av

Notes: Data were obtained from the MKC 2019 Annual Status Report<sup>Error! Bookmark not defined.</sup>; Concentrations are given in micrograms per cubic metre (µg/m<sup>3</sup>); N/Av indicates that monitoring data not available at the time of writing

8.10 In 2019, WSP undertook a NO<sub>2</sub> diffusion tube survey to establish baseline conditions in the vicinity of the Application Site and identify any potential development constraints. Prior to the survey, in April 2019, WSP consulted MKC's Environmental Health Department regarding the locations of monitoring sites, which are shown in Figure 8-1.

8.11 Diffusion tube monitoring was carried out at seven locations in and around the Application Site boundary for six months for the period between the 14<sup>th</sup> May to the 29<sup>th</sup> October 2019. Details are given in Table 8.3.

Table 8.3 WSP NO<sub>2</sub> Diffusion Tube Survey Results

Site ID	X	Y	Location relative to Application Site	Estimated 2018 Annual Mean NO <sub>2</sub> Concentration (µg/m <sup>3</sup> )
MK1	488072	241428	35m south of M1 at Carteret Close	20.8
MK2	487986	241715	At the Application Site boundary adjacent to M1 southbound	38.4
MK3	488152	241600	At the Application Site boundary adjacent to M1 southbound	38.0
MK4	489459	243653	0.3km north, at roadside on A509 southbound	38.0
MK5	487989	242659	0.7km west, at the Application Site boundary at roadside on the A422	27.6
MK6	489082	242101	Within Application Site boundary, near A509 London Road	26.5
MK7	491458	241934	0.9km north east on Cranfield Road, Moulsoe	14.4

8.12 The results in Table 8.3 show that the annual mean NO<sub>2</sub> concentrations at all locations were below the annual mean air quality standard of 40µg/m<sup>3</sup>. With reference to Defra's LAQM technical guidance<sup>8</sup>, based on the annual mean concentrations it is unlikely that the 1-hour mean NO<sub>2</sub> objective was exceeded<sup>9</sup> at any of the sites.

8.13 Defra reports annually on compliance with European Union limit values for air quality as set by the Air Quality Standards Regulations 2010 (as amended 2016). The limit values are numerically the same as the objectives (Table 8.1) that are reported on by MKC. In reporting, Defra uses data taken from national air quality monitoring sites and its Pollution Climate Mapping model, which includes forecast roadside concentrations of pollutants for a sample of the national road network. The nearest road links that are included in this sample are

<sup>8</sup> Defra (2018) *Part IV of the Environment Act 1995 Environment (Northern Ireland) Order 2002 Part III Local Air Quality Management Technical Guidance (TG16)* [online]. Available at: <https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf> [Accessed June 2020].

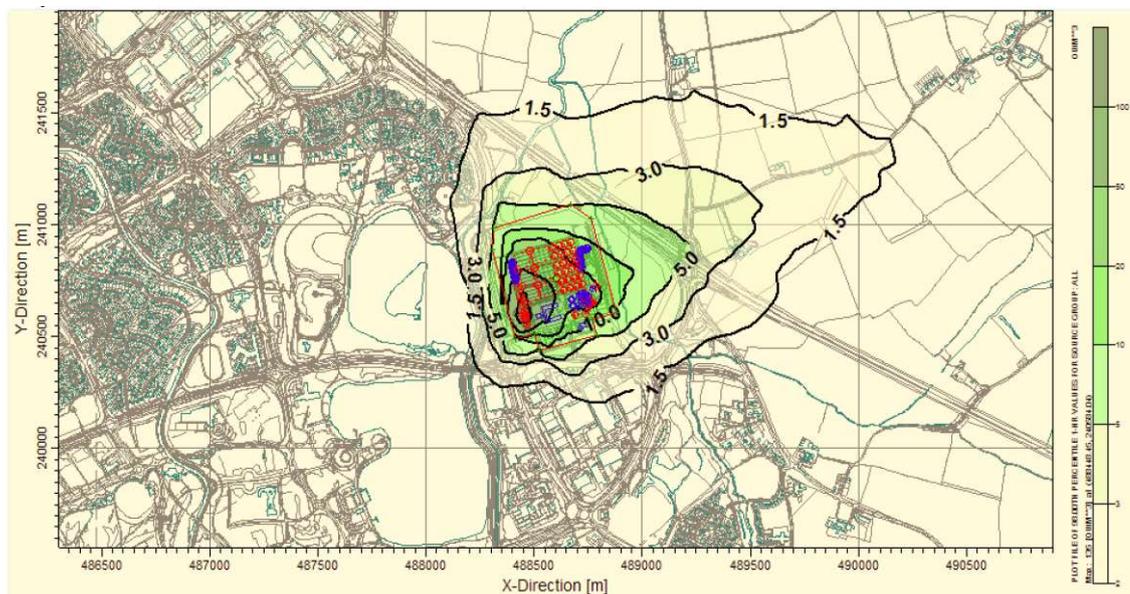
<sup>9</sup> The guidance advises that it is unlikely that the 1-hour mean objective will have been exceeded if the annual mean NO<sub>2</sub> concentration is less than 60µg/m<sup>3</sup>.

highlighted in Figure 8-1. The modelled roadside concentrations of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> for these road links are compliant with their respective limit values (Table 8.1).

**Odour**

8.14 Adjacent to the Application Site, and approximately 77m south of the M1, is the Cotton Valley WwTW. In February 2020 Anglian Water undertook a Pre-Planning Assessment<sup>7</sup> of the WwTW to reflect current expectations of the future process capacity of the site and changes to the on-site processes that altered the current and future odour potential. The Pre-Planning Assessment contains the results of dispersion modelling of odorous emissions. Figure 8-2 below was extracted from the Pre-Planning assessment and shows the dispersion results for 2016 which was identified as having the largest dispersion range and is therefore the worst-case scenario.

Figure 8.2 Cotton Valley WwTW Pre-Planning Assessment Dispersion Results for 2016 (worst case scenario)



8.15 Table 8.4 below is taken from guidance published by the Institute of Air Quality Management (IAQM) for the assessment of odour for planning purposes<sup>10</sup> and provides odour effect descriptors that can be used to assess the potential effect of different odour concentrations from a ‘most offensive’ odour source on nearby receptors.

Table 8.4 Proposed odour effect descriptors for impacts predicted by modelling – ‘Most Offensive’ odours

Odour Exposure Level C <sub>98</sub> , OUE/m <sup>3</sup>	Receptor Sensitivity		
	Low	Medium	High
≥ 10	Moderate	Substantial	Substantial
5 -< 10	Moderate	Moderate	Substantial
3 -< 5	Slight	Moderate	Moderate
1.5 -< 3	Negligible	Slight	Moderate
0.5 -< 1.5	Negligible	Negligible	Slight
<0.5	Negligible	Negligible	Negligible

C<sub>98</sub>, OUE/m<sup>3</sup> is the 98<sup>th</sup> percentile of hourly mean odour unit concentrations in cubic metres.

<sup>10</sup> IAQM (2018) *Guidance on the assessment of odour for planning version 1.1* [online]. Available at: <http://www.iaqm.co.uk/text/guidance/odour-guidance-2014.pdf> [Accessed June 2020].

- 8.16 Odour complaints data have been requested from MKC and will be reviewed when made available.
- 8.17 Within the 50 $\mu$ /m<sup>3</sup> contour, which encroaches on the southern Application Site boundary, any odour could have a substantial effect on high sensitivity receptors leading to nuisance and thereby increasing the potential for complaints. Based on the odour contours **Error! Bookmark not defined.** shown in Figure 8-2 it is anticipated that odour is a potential constraint to the location of high sensitivity residential receptors within 1.50 $\mu$ /m<sup>3</sup> contour as a worst-case.

### **Land South of Caldecote Farm, Willen Road, Newport Pagnell**

- 8.18 In April 2013 the land south of Caldecote Farm, Willen Road was permitted<sup>11</sup> for the “*extraction of sand and gravel, temporary siting of plant and machinery and restoration to agriculture using imported material (inert infill) and in situ overburden and soils.*” This quarry is located adjacent to the north-west boundary of the Application Site and according to IAQM mineral planning guidance<sup>12</sup>, adverse dust impacts may occur within 250m of a sand and gravel quarry. Adverse impacts beyond 250m are uncommon.
- 8.19 Condition 26 of this permit required that a Dust Management Scheme, for the control and mitigation of dust, was submitted and approved prior to any development taking place. The Dust Management Scheme is required to be sufficient to “*protect the amenities of the locality from the effects of any dust arising from the development.*”
- 8.20 The Dust Management Scheme<sup>13</sup> specifies that the screening plant to be operated is a Finlay Logwasher which is further described as wet plant. Extracted stone will be cleaned and the sand will hold at least 5% moisture regardless of the meteorological conditions. These circumstances, the presence of lagoons on-site, along with application of the measures detailed within the Dust Management Scheme, make it highly unlikely that fugitive dust impacts, as a result of the operation of the quarry, will be anything other than negligible.

### **Identification of Sensitive Receptors**

- 8.21 Sensitive receptors can broadly be categorised as:
- Human receptors - including residential premises, schools and hospitals, where members of the public are likely to be present for much of the time and the air quality objectives apply; and
  - Ecological receptors within designated habitat sites where there are known sensitivities to changes in dust deposition (from construction sources) and/or nutrient nitrogen inputs (from combustion sources).
- 8.22 Specific sensitive receptors have not been identified at this stage. In undertaking the air quality assessment for the EIA, representative receptors will be identified in relation to the air quality impacts that are included within the assessment scope.
- 8.23 To identify sensitive receptors, Environmental Protection and IAQM air quality assessment scoping criteria will be applied to define the study areas for the assessment of construction stage

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<sup>11</sup> Milton Keynes Council (2013) *Town and Country Planning Act 1990 (As Amended) Town and Country Planning (General Development Procedure) Order 1995 (As Amended) Planning Permission Granted.*

<sup>12</sup> IAQM (2016) *Guidance on the Assessment of Mineral Dust Impacts for Planning* [online]. Available at: [https://iaqm.co.uk/text/guidance/mineralsguidance\\_2016.pdf](https://iaqm.co.uk/text/guidance/mineralsguidance_2016.pdf) [Accessed August 2020].

<sup>13</sup> Dust Management Scheme – Planning Condition 26 (2013) Application Number 13/01189/DISCON

impacts<sup>14</sup> and operational stage impacts<sup>15</sup>. Receptors that are not located within the study areas would experience only negligible impacts and can be discounted from the assessment.

## **Methodological Approach**

- 8.24 The EIA will consider the potential impacts of the Proposed Development on air quality during its construction and operational stages.

### **Construction Stage Methodology**

- 8.25 The qualitative assessment of the effects of the construction phase on local air quality, in terms of dust or particulate matter generation, will be based on the IAQM Construction Dust Guidance<sup>14</sup>. The approach involves:
- 8.26 The identification of emission sources and construction activities and the estimate of their potential emission magnitude;
- 8.27 The identification of sensitive receptors for air quality impacts and the assessment of the sensitivity of the area to dust and particulate matter emissions; and
- 8.28 The estimation of the risk of impacts, considering the proximity of emission sources to the receptors and their magnitude.
- 8.29 The determined risk level will then be used to define appropriate and proportionate best practice mitigation measures where necessary. The guidance recommends that the assessment of significant effects is only made after application of mitigation.

### **Operational Stage Methodology**

#### **Operational Traffic Emissions**

- 8.30 The assessment of the impacts of emissions from road traffic associated with the Proposed Development on concentrations of NO<sub>2</sub> and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) will be based on dispersion modelling using ADMS-Roads. The quantitative assessment will assess the likely exposure of existing and future occupants to concentrations of these pollutants.
- 8.31 Emissions from road transport will be generated using Defra's Emissions Factors Toolkit (EFT) v10.0<sup>16</sup> and will consider the pollutants PM<sub>10</sub>, PM<sub>2.5</sub> and NO<sub>x</sub> (and its conversion to NO<sub>2</sub>). Impacts will be assessed against the relevant air quality standards for the protection of human health and sites designated for nature conservation (NO<sub>x</sub> only), and, in the case of ecological impacts, if relevant, non-statutory standards such as critical loads for nitrogen deposition.
- 8.32 The approach set out in the joint Environmental Protection UK and IAQM Land-Use Planning guidance will be used to describe the air quality effects of the operation of the Proposed Development. The guidance recommends that the degree of an impact is described by expressing the magnitude of incremental change in pollutant concentrations as a proportion of the relevant assessment threshold and examining its change in the context of the total concentration.

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<sup>14</sup> IAQM (2016) *Guidance on the assessment of dust from demolition and construction* [online], Available at: <http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf> [Accessed June 2020].

<sup>15</sup> EPUK / IAQM (2017) *Land-Use Planning & Development Control: Planning For Air Quality* [online]. Available at: <https://iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf> [Accessed June 2020].

<sup>16</sup> Defra (2020) *Emissions Factors Toolkit* [online]. Available at: <https://iaqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html> [Accessed August 2020].

- 8.33 Air quality impacts over sites designated habitat sites will be reported within the ES Air Quality Chapter where necessary. However, the assessment of potentially significant effects will be made in the Ecology Chapter.

### **Energy Centre Emissions**

- 8.34 It is not known at this stage if a centralised energy generation plan will be included as part of the development. If this is provided, a quantitative assessment will be undertaken of the impact of emissions to air from the proposed centralised energy generation plant on local air quality using the dispersion model ADMS 5.2 and one year of meteorological data.

### **Odour**

- 8.35 A qualitative assessment will be undertaken to determine the potential for odorous emissions from the Cotton Valley WwTW to be detected at the Proposed Development.
- 8.36 In addition to the effect of odour from the Cotton Valley WwTW, there needs to be consideration of the potential for odour from any new processes that would be introduced by the Proposed Development to cause nuisance at high sensitivity receptors. The Proposed Development will include A3 land-uses (i.e. restaurants / cafes) that may result in nuisance odour emissions from commercial kitchens. Defra's Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems (2005)<sup>17</sup> sets out best practice guidance "*for the design and operation of commercial kitchen ventilation systems and the control of grease, odour and noise emissions.*"
- 8.37 This guidance has since been withdrawn however it still contains information considered to be relevant. With the appropriate application of mitigation measures described within this guidance it is considered highly unlikely that odour impact as a result of A3 land uses will be anything other than negligible and therefore will not be considered further within this assessment.

### **Anticipated Effects**

- 8.38 During the construction stage, dust and particulate matter effects beyond 350m from the site boundary and 500m beyond the site entrance are expected to be insignificant and can be scoped out of the EIA.
- 8.39 Vehicle emissions associated with the construction and operational stage will not have a significant effect on air quality at sensitive receptors beyond 200m from affected roads, and therefore can be scoped out of the EIA.
- 8.40 The following likely effects due to the Proposed Development have been identified as requiring consideration within the EIA and subsequent ES:
- 8.41 Increase in dust and PM<sub>10</sub> concentrations due to on-site activities undertaken during the construction stage of the Proposed Development;
- 8.42 Increase in air pollutants (NO<sub>2</sub> and particulate matter PM<sub>10</sub>) generated from construction plant and vehicle exhaust emissions during the construction phase of the Proposed Development;
- 8.43 Change in pollutant concentrations (notably NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>) due to exhaust emissions from road traffic generated during the operational phase of the Proposed Development;

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<sup>17</sup> Defra (2005) *Guidance on the Control of Odour and Noise from Commercial Kitchen Exhaust Systems* [online]. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/645289/pb10527-kitchen-exhaust-0105.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/645289/pb10527-kitchen-exhaust-0105.pdf) [Accessed June 2020].

- 8.44 Change in pollutant concentrations (notably NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub>) from proposed on-site energy generating/heating plant during the operational phase of the Proposed Development; and
- 8.45 Potential cumulative impacts from any committed developments in the vicinity of the Application Site on local air quality (including dust, PM<sub>10</sub>, NO<sub>2</sub> and PM<sub>2.5</sub>).

### **Potential Mitigation**

- 8.46 The nature and type of mitigation measures required will be dependent on the findings of the assessment.
- 8.47 The mitigation measures that are proposed will include best practice measures that need to be applied on site during construction activities to minimise the generation and dispersion of dust and PM<sub>10</sub> during this phase of the development.
- 8.48 For the operational phase, mitigation measures could include measures to reduce traffic movements generated by the Proposed Development and ensuring that the flues associated with any energy generation plant are of sufficient height to allow for adequate dispersal of emissions.

### **Summary**

- 8.49 A desk-study of baseline conditions indicates that air quality within the locality of the Proposed Development is generally good as, over the four-year period from 2015 to 2018 inclusive, there were no exceedances of the NO<sub>2</sub> annual mean air quality standard of 40µg/m<sup>3</sup> at local authority sites within 2km of the Proposed Development site boundary. Site-specific monitoring conducted by WSP indicates that air quality in the vicinity of the M1 represents a potential constraint to the Masterplan.
- 8.50 Odour emissions associated with the nearby Cotton Valley WwTW also represent a potential constraint to the Masterplan. Odours could have a substantial effect on any high sensitivity receptors located at the Proposed Development's southern boundary leading to nuisance and thereby increasing the potential for complaints. A qualitative assessment will be undertaken to determine the potential for odorous emissions from the Cotton Valley WwTW to be detected at the Proposed Development.
- 8.51 A qualitative assessment of the effects of the construction phase will be undertaken in line with IAQM Construction Dust Guidance **Error! Bookmark not defined.** The level of risk determined from this assessment will be used to establish the level of mitigation required where necessary.
- 8.52 For the operation stage of the Proposed Development, dispersion modelling will be used to assess the impact of emissions from traffic associated with the Proposed Development using the road network surrounding the site, on concentrations of NO<sub>2</sub> and particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>).
- 8.53 In addition, dispersion modelling will be used to quantitatively assess the impact of emissions to air from any significant proposed energy generation plant on local air quality.

## 9.0 Noise

- 9.1 This chapter has been prepared by WSP to set out the proposed methodology for an assessment of the noise and vibration effects of the Proposed Development on existing sensitive receptors, during both the construction and operational post-completion stages. This also includes for the proposed realignment works to Tongwell Street and new strategic north-south link road over the M1.
- 9.2 Also provided is the methodology for an assessment of impacts from the noise and vibration environment on the suitability of the site for residential and educational use.

### Current Conditions

#### Existing Noise Sources

- 9.3 A desktop review of the site and the dominant sources potentially affecting the existing noise climate has been undertaken. The dominant noise source likely to affect the site is road traffic on the M1, along the south-western boundary of the site. Preliminary design input to the masterplan has been provided with regard to road traffic noise from the M1.
- 9.4 Additional noise sources in proximity to the site are anticipated to be as follows:
- road traffic noise from London Road (A509) which passes through the site;
  - road traffic noise from H3 Monks Way (A422), adjacent to the north-western boundary of the site;
  - road traffic noise from Willen Road, which passes through the site, toward the west;
  - operational activity from the commercial units (B1 and B8 use) within Interchange Park, to the north of the site, most notably HGV movements associated with the depot at Nampak Plastics; and
  - noise from car park movements and servicing activity (vehicles associated with waste removal and incoming goods) and any fixed mechanical plant associated with the Holiday Inn Milton Keynes M1 East
- 9.5 Willen Road Quarry, located towards the western end of the site, is understood to fall within the boundary of another application site and consequently, it is anticipated to cease operations in advance of the associated development being taken forward. The timeframe in which this is likely to happen cannot be determined at this point and it is possible that the quarry remains operational as the Site is being developed. Therefore, the quarry should be considered an existing and future noise source.
- 9.6 It is understood that the motocross site located towards the southern boundary of the site is no longer operational and, as such, will not be considered as part of the assessment.
- 9.7 There are a number of commercial units located in Tongwell Industrial Estate to the south-west of M1, of which a number appear to fall within the B8 use class. Whilst noise from such units would typically warrant consideration in proximity to proposed residential development, it is anticipated that road traffic noise from the intervening M1 and the distance between the industrial estate and the south-western site boundary (approximately 120m as a minimum) would be such that potential noise impacts would be minimal.
- 9.8 It is anticipated that the location of Alpheus Environmental wastewater treatment works approximately 150m south of the M1 is such that impacts from operational noise from the plant (e.g. Hydraulic pumps, generators, pipework and exhaust fans) would be minimal.

## **Sensitive Receptors**

- 9.9 A preliminary review indicates that existing sensitive receptors to be considered as part of the noise and vibration assessment include:
- 1 dwellings at the south eastern extremity of Newport Pagnell, particularly along Tongwell Lane, approximately 110m west of the site;
  - 2 dwellings located toward the southern end of Tickford Street (B526), the nearest of which is located approximately 130m north of the site;
  - 3 Holiday Inn Milton Keynes M1 East, which is located along the A509;
  - 4 dwellings in the recent Brooklands development, north of Brooklands Meadows Park, particularly those nearest to the site on Ivernia Avenue and Maritime Way, located approximately 110m south of the site across the M1 highway;
  - 5 dwellings at the north and north-eastern extremity of Willen, particularly those on Dolben Court, Ketton Close, Chillery Leys and Carteret Close. The nearest of these dwellings is located approximately 30m south of Tongwell Street;
  - 6 dwellings within the traveller's settlement located east of Willen Road and adjacent to the western site boundary;
  - 7 six dwellings located on Glenfield, along with Caldecote Farm, adjacent to the south, all of which are approximately 270m north-west of the site boundary;
  - 8 Moat Cottage, approximately 270m north-west of the site boundary;
  - 9 Caldecote Cottage, approximately 300m north-west of the site boundary;
  - 10 Unnamed, located adjacent to the quarry and approximately 220m north-west of the site boundary;
  - 11 Caldecote Mill, located approximately 70m south of A422 and approximately 140m west of the site boundary;
  - 12 seven dwellings located at Pym's Stables at the northern end of A509, in proximity to Tickford roundabout, adjacent to the northern site boundary;
  - 13 19 and 21 London Road, in proximity to Tickford roundabout, adjacent to the northern site boundary;
  - 14 dwellings located on North Crawley Road, to the east of Interchange Park, the nearest of which is approximately 290m north east of the site;
  - 15 dwellings located on Newport Road at the westernmost extremity of Moulsoe Village, the nearest of which is approximately 110m north-east of the site boundary; and
  - 16 St Marys Church, located on Newport Road and approximately 246m east of the site boundary.

## **Baseline Noise Conditions**

- 9.10 In advance of any methods being undertaken to establish the existing baseline conditions, WSP will seek consultation with MKC to agree the appropriate approach. In order to establish the baseline noise climate, particularly given the current circumstances with COVID-19 and the possibility of further restrictions, it is predicted that noise levels across the site and surrounding area by generating a 3D acoustic model with road traffic noise modelled using pre-COVID-19 road traffic data from 2019.
- 9.11 This is supported by undertaking noise measurements which would serve two purposes:

- 1 To obtain measurements of the commercial and industrial noise sources (i.e. Interchange Park and the Holiday Inn)
  - 2 To obtain background noise levels at existing receptors near to the site and also for proposed receptors within the site
- 9.12 Should further restrictions associated with COVID-19 be imposed such that conditions on and around the site not be considered representative of the long-term noise environment at the time of the survey, the acoustic model will be informed by traffic data and measured noise data from previous planning applications for neighbouring or nearby development will be sought, in accordance with the advice set out in “*Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments*”<sup>18</sup>.
- 9.13 For operational activity from nearby commercial and industrial premises, noise data will be sought for activities which are considered typical of these sites and reasonable assumptions will be made regarding their operation, in order to model noise levels which may be considered representative at both locations.

### **Insignificant Effects**

- 9.14 It is considered that any additional heavy vehicle traffic as a result of the construction of the Proposed Development will be temporary and is unlikely to significantly affect the road traffic noise levels, given the heavy flow on the M1. Furthermore, it is anticipated that vehicles will access the site directly from the M1 or the adjacent major road network, rather than the more lightly trafficked local roads where the effects would be more pronounced. Measures will be identified in the ES chapter for inclusion in a Construction Environmental Management Plan (CEMP), to minimise any adverse effects. Consequently, construction road traffic noise is scoped out of the noise and vibration assessment.
- 9.15 Any fixed external plant items and operational noise associated with commercial elements of the Proposed Development will be subject to noise emission limits, determined in line with the background sound levels and the guidance contained within BS 4142: 2014 + A1:2019 *Methods for Rating and Assessing Industrial and Commercial Sound*. Based on the guidance in BS 4142, noise emission limits will be set to equal the typical background sound level<sup>19</sup> or at an alternative criterion agreed with MKC. Consequently, no significant effects are anticipated providing plant is appropriately specified, procured, configured and, if necessary, mitigated. It is anticipated the inclusion of a condition stating that relevant noise emission limits are met<sup>20</sup>, would be required.

## **Methodological Approach**

### **Construction Noise and Vibration**

- 9.16 The effects of construction noise and vibration from the development of the site and supporting road infrastructure, on existing sensitive receptors, will be assessed based on guidance contained within British Standard (BS) 5228:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites (Part 1: Noise and Part 2: Vibration).

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<sup>18</sup> Association of Noise Consultants and the Institute of Acoustics (2020), *Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments*

<sup>19</sup> In line with the guidance in BS 4142, plant noise emission limits will be set to equal the background sound level. BS 4142 states that “*where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context*”.

<sup>20</sup> As stated in paragraph 9.10, noise measurements undertaken on site at this time are likely to be unrepresentative of the long-term noise environment. Therefore, a condition is anticipated that would require a baseline noise survey to be undertaken post-planning (when the noise climate has returned to more typical and representative environment) and subsequently for plant noise emission limits to be met,.

9.17 Construction noise levels will be predicted at nearby existing sensitive receptors based on a typical construction plant list for a development of this size and nature, and following the methodology set out in Annex F of BS 5228-1.

9.18 The following scale of effects is proposed for construction noise. However, this may be amended based on the anticipated ambient noise level at nearby sensitive receptors.

Table 9.1 Scale of Effect - Construction Noise

Level of noise solely from construction works (façade levels)	Magnitude of impact	Significance of effect
≤65 dB L <sub>Aeq,T</sub> (T – the time period over the core working day)	Negligible	Negligible
66 dB to 70 dB L <sub>Aeq,T</sub> (T – the time period over the core working day)	Small adverse	Minor
71 dB to 75 dB L <sub>Aeq,T</sub> (T – the time period over the core working day)	Medium adverse	Moderate
≥76 dB L <sub>Aeq,T</sub> (T – the time period over the core working day)	Large adverse	Major

9.19 As for construction noise, construction vibration levels will be predicted at nearby existing sensitive receptors based on a typical construction plant list for a development of this size and nature, and following the methodology set out in BS 5228-2.

9.20 The following scale of effects is proposed for construction vibration.

Table 9.2 Scale of Effect - Construction Vibration

Peak particle velocity (PPV) mm/s (temporary vibration)	Magnitude of impact	Significance of effect
≤0.3	Negligible	Negligible
0.4 – 0.9	Small adverse	Minor
1.0 – 4.9	Medium adverse	Moderate
≥5.0	Large adverse	Major

9.21 The focus of the construction assessment will be on the identification of any significant effects, and consequently any mitigation measures that will need to be included in a Construction Environmental Management Plan (CEMP).

9.22 The assessment will also consider the policy requirements within Defra's Noise Policy Statement for England, through identifying the number of noise sensitive receptors with noise levels above the SOAEL in the various scenarios. The SOAEL is the Significant Observed Adverse Effect Level and is defined as the level above which significant adverse effects on health and quality of life occur.

### Operational Road Traffic Noise

9.23 The change in noise levels at the existing sensitive receptors resulting from additional traffic flows associated with the Proposed Development (including the proposed realignment of Tongwell Street and the new strategic north-south link road over the M1) will be predicted based on traffic data provided by the project's transport consultant, and in line with guidance contained within the Department of Transport and Welsh Office memorandum Calculation of Road Traffic Noise (1988). The magnitude of impact will then be assessed in general accordance with the guidance contained in the Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 LA111 Noise and Vibration (2020), using, in particular, the magnitude of noise impact classifications contained in that document.

9.24 A number of assessment year scenarios and comparison will be undertaken (in accordance with the DMRB guidelines) to assess the potential effects of traffic related noise from the completed

and operational Proposed Development in the short-term and long-term. These are detailed below:

- Comparison 1: Year of Opening without the Proposed Development vs Year of Opening with the Proposed Development
- Comparison 2: Year of Opening without the Proposed Development vs Design Year (Year of Opening plus 15 years) with the Proposed Development.

9.25 The first comparison above assesses the short-term change in traffic related noise as a result of the Proposed Development, and the second comparison assesses the long-term change in traffic related noise as a result of the Proposed Development.

9.26 The following scale of effects is proposed for operational road traffic noise. The significance of effect may be adjusted depending on the acoustic context, including the absolute noise level and likely perception of change by a resident, as described in LA111.

Table 9.3 Scale of Effect - Operational Road Traffic Noise

Short-term change in noise level, dB(A)	Long-term change in noise level, dB(A)	Magnitude of impact	Significance of effect
0 to +0.9	0 to +2.9	Negligible	Negligible
+1.0 to +2.9	+3.0 to +4.9	Small adverse	Minor
+3.0 to +4.9	+5.0 to +9.9	Medium adverse	Moderate
≥+5.0	≥+10.0	Large adverse	Major

9.27 The assessment will also consider the policy requirements within Defra's Noise Policy Statement for England, through identifying the number of noise sensitive receptors with noise levels above the SOAEL in the various scenarios. The SOAEL is the Significant Observed Adverse Effect Level and is defined as the level above which significant adverse effects on health and quality of life occur.

### Site Suitability Assessment

9.28 Consideration will be given, in outline, to the impact that the environmental noise climate might have on the noise sensitive aspects of the Proposed Development. This will include the existing noise sources which have been identified earlier in this chapter.

9.29 The current masterplan indicates that the site is likely to include the following noise sensitive land uses:

- residential (private dwellings, extra care housing);
- educational (primary school, secondary school); and
- a community hub
- amenity space

9.30 Consideration will need to be given to the interfacing of these land uses, to minimise any potential noise impacts on the noise sensitive aspects of the Proposed Development.

9.31 The suitability of the site will be assessed in accordance with relevant policy documents, standards and guidance, including:

- Department for Communities and Local Government 'National Planning Policy Framework' (NPPF) (2019);
- Defra 'Noise Policy Statement for England' (NPSE) (2010);

- Ministry of Housing, Communities and Local Government ‘Planning Practice Guidance’, (2018);
- BS 8233:2014 ‘Guidance on sound insulation and noise reduction for buildings’;
- World Health Organisation ‘Guidelines for Community Noise’ (1999);
- Professional Practice Guidance (ProPG) on ‘Planning and Noise: New Residential Development’ (2017);
- Building Bulletin 93: 2015 ‘Acoustic design of schools: performance standards’;
- Association of Noise Consultants (2015) ‘Acoustics of schools: a design guide’; and
- Plan:MK 2016 – 2031 (adopted March 2019)

9.32 The aim of this assessment would be to ensure that a suitable internal and external noise climate is achieved for future residents and users of the Proposed Development. Note, however, that at this stage, the assessment of the suitability of the site for the proposed sensitive uses will be based on parameter plans rather than detailed plans and consequently, the assessment will be outline, only.

### Anticipated Effects

9.33 This appraisal considers the effects of the Proposed Development on the existing environment, but also the likely impacts of the existing and likely future environment on the Proposed Development and the elements of the Proposed Development on each other (the latter two are sometimes referred to as ‘site suitability’).

9.34 An assessment of site suitability will be undertaken in line with relevant guidance. However, a scale of effect and significance will not be applied to this assessment. The purpose of the assessment will be to determine whether the target internal and external noise criteria can be achieved based on the predicted external noise levels, and, consequently, whether the site is suitable for its intended use.

### Effects of the Proposed Development on the Existing Environment

9.35 The table below presents a summary of impacts that have the potential to result in significant effects in terms of noise and vibration.

Table 9.4 Summary of Likely Significant Effects

Impact	Stage	Receptor	Comments
Construction noise	Construction	Existing sensitive receptors	As the construction plant working to prepare the ground and construct the Proposed Development (including the works associated with the realigned Tongwell Street, the new strategic north-south link road over the M1 and all other new highways within the Proposed Development) would be in the vicinity of existing sensitive receptors, there is the potential for significant adverse effects.
Construction vibration	Construction	Existing sensitive receptors	As the construction plant working to prepare the ground and construct the Proposed Development (including the works associated with the realigned Tongwell Street, the new strategic north-south link road over the M1 and all other new highways within the Proposed Development) would be in the vicinity of existing

Impact	Stage	Receptor	Comments
			sensitive receptors, there is the potential for significant adverse effects.
Development-generated road traffic noise	Operational	Existing sensitive receptors	There is the potential for a change in road traffic noise at existing sensitive receptors as a result of development-generated traffic using the local road network (including the realigned Tongwell Street, the new strategic north-south link road over the M1 and all other new highways within the Proposed Development).

### Impacts of the Existing and Future Environment on the Proposed Development

9.36

The table below presents impacts that have the potential to result in significant effects in terms of noise and vibration.

Table 9.5 Summary of Anticipated Impacts

Impact	Stage	Receptor	Comments
Noise from traffic on the surrounding road network	Operational	Proposed sensitive receptors (private dwellings, extra care homes, schools)	There is the potential for noise levels from the road network which surrounds and passes through the site, particularly, the M1, A422 and A509 to result in impacts at the residential elements of the Proposed Development during the day and night-time periods and educational elements during the daytime.
Noise from operational activity at Interchange Park	Operational		There is the potential for impacts from noise from operational activity within the Interchange Business Park, located to the north of the site. Depending on the nature of operations, impacts may be anticipated during the daytime and night-time.
Noise from plant and operational activity associated with the Holiday Inn	Operational		Should sensitive receptors be located in proximity to the Holiday Inn, there exists the potential for noise impacts from the operation of fixed plant associated with the hotel, particularly during the night-time at residential receptors

### Impacts of Elements within the Proposed Development

9.37

The table below presents impacts that have the potential to result in significant effects in terms of noise and vibration.

Table 9.6 Elements within the Proposed Development - Summary of anticipated impacts

Impact	Stage	Receptor	Comments
Noise from operational activity within the employment sector	Operational	Proposed sensitive receptors (private dwellings, extra care homes, schools)	Depending on the final location of elements within the Proposed Development and the use class of the employment land, there is the potential for impacts from noise generated by operational activity at residential and educational receptors. This will be assessed qualitatively, setting out good design principles to avoid potential impacts at interfaces between different elements within the proposed development.

- 9.38 In addition to the above, consideration of impacts from noise and vibration during the construction phase at receptors within the Proposed Development, may be warranted. This will be subject to the phasing of the scheme and the proximity of construction works to receptors within the Proposed Development which are then occupied.
- 9.39 As noted previously, noise from fixed mechanical plant associated with, for example, the schools, employment uses and the community Hub, can be controlled through the setting of appropriate noise limits, based upon the existing background noise levels at the nearest receptors. Consequently, no significant adverse effects are anticipated to arise from fixed mechanical plant associated with the Proposed Development.

## **Potential Mitigation**

### **Construction Phase**

- 9.40 Mitigation measures, including the adoption of Best Practicable Means as defined in the Control of Pollution Act 1974, will be identified within the noise and vibration chapter to minimise adverse impacts on nearby existing and future sensitive receptors. These mitigation measures would be incorporated into a CEMP.

### **Operational Phase**

- 9.41 In the first instance, consideration should be given to the factors that influence the level of noise at source, for example vehicle speed and road surface. Of course, only Highways England can influence these factors on the M1, but they should not be over-looked for other local authority maintained roads in the area.
- 9.42 Other generic mitigation measures that may be considered in the design of the MKE site are described briefly below:
- 9.43 The location of buildings on site. The primary control factor is distance – the greater the distance from the source, the lower the noise level. The type of intervening ground cover (acoustically absorbent or reflecting) and the height of the receptor will also influence the received noise level.
- 9.44 Screening. Barriers or screens can reduce noise. They can take the form of an existing feature (for example a cutting), a purpose-designed feature (for example, a solid boundary fence or an earth bund or a combination of the two) or a purpose-designed building (for example, a linear barrier block). Preliminary input to the masterplan as to the potential location and dimension of a barrier along the M1 has been provided.
- 9.45 Building form and orientation. Limiting the view of the source by building orientation can reduce the received noise level. Measures include turning a building through 90° to be perpendicular to the road and staggered terraced housing can be arranged to shield noise-sensitive windows. The buildings themselves can also be used to screen associated external amenity areas (i.e. by locating gardens behind the buildings).
- 9.46 Internal planning. Single aspect designs can be employed whereby noise sensitive rooms face into the development, with the outward facing façade either being windowless or incorporating windows to non-noise sensitive rooms.
- 9.47 Building envelope. The final line of defence against external noise is the building envelope and in particular the glazing unit and ventilation package.

## Summary

- 9.48 This Chapter sets out the proposed methodology for an assessment of the noise and vibration effects of the Proposed Development on existing sensitive receptors, during both the construction and operational post-completion stages. This also includes for the proposed realignment works to Tongwell Street, the new strategic north-south link road over the M1 and other new roads.
- 9.49 Also provided is the methodology for an assessment of impacts from the existing and likely future noise and vibration environment on the suitability of the site for residential and educational use.
- 9.50 In order to establish the baseline noise climate, particularly given the current circumstances with COVID-19 and the possibility of further restrictions, we would predict noise levels across the site and surrounding area by generating a 3D acoustic model with road traffic noise modelled using pre-COVID-19 road traffic data from 2019. We would support this by undertaking noise measurements of commercial and industrial noise sources and measurements of the background noise levels at the nearest noise sensitive receptors around the site, or at locations which are considered representative.
- 9.51 Should further restrictions associated with COVID-19 be imposed, possible alternative approaches to quantifying the baseline noise climate include the use of traffic data, supplied by the transport consultant to quantify noise from the surrounding road network, and noise data from nearby commercial and industrial premises may be sought from previous planning applications which account for those sites, or will be approximated using noise data from like sources.
- 9.52 Assessment of noise and vibration during the construction phase, of road traffic noise during the operational phase, and of the suitability of the site for residential and educational use are put forward for further assessment as part of the Environmental Impact Assessment. However, and assessment of the road traffic noise during the construction phase is considered to be outside of requirements.
- 9.53 For the assessment of noise impacts from fixed mechanical plant and other commercial aspects of the Proposed Development, appropriate noise limits will be set, based upon the existing background noise levels at nearby receptors. Note that to obtain background noise levels, it may be necessary to conduct measurements at a later stage.

## 10.0 **Ground Conditions and Soils**

10.1 The ES chapter on Ground Conditions and Soils will assess the Proposed Development in relation to potential effects on soil, geology and groundwater, as well as determining the potential effects of the ground / groundwater conditions on sensitive receptors, which may be exposed to such effects during the construction and operational phases. The assessment will be undertaken in accordance with current industry best practice including the provisions of CLR11: Model Procedures for the Management of Land Contamination (Environment Agency / Defra, 2004) and will likely be scoped into the ES.

### **Current Conditions**

10.2 Historical maps indicate that the Site has largely remained undeveloped and has been used as agricultural land since the earliest historical mapping. On-site development has been limited to farms and occasional residential dwellings. The section of the M1 motorway passing through the south western extent of the site was constructed by 1959.

10.3 Based on available published geological maps the Site superficial deposits underlying the Site comprise Alluvium, Oadby Member (Diamicton), Glaciofluvial Deposits, Felmersham Member (Sand and Gravels) and Head deposits. There are also areas of the site where no superficial deposits may be present underlying the topsoil. Bedrock geology comprises Kellaways Formation (Sandstone), Peterborough Member (Mudstone) and Stewartby Member (Mudstone). Localised areas of Made Ground associated with previous site use are likely to be present.

10.4 The Alluvium and Oadby Member are classified as Secondary Undifferentiated Aquifers, the Felmersham Member is classified as a Secondary A Aquifer. The Kellaways Formation is also classified as a Secondary A Aquifer.

10.5 The River Ouzel runs through the Site with several smaller drains and tributaries draining into it across the Site. The River Ouzel flows into Willen Lake located to the southwest of the Site.

10.6 According to the Zetica website the Site is in an area where there is a Low risk from unexploded ordnance (UXO).

10.7 The assessment will include the impacts on the following receptors:

- Construction workers;
- Controlled waters (groundwater, surface water);
- Future site users (including occupiers, visitors and maintenance workers);
- Off-site receptors in the immediate vicinity (nearby residents and members of public); and
- Underground services infrastructure.

10.8 The tables below present a summary of the scoping process, identifying which likely environmental effects, with respect to Ground Conditions and Soils, will be assessed in the ES.

### **Methodological Approach**

10.9 Potential land contamination will be assessed with due regard to the NPPF, Part 2A, best practice guidance from land contamination risk management set out in CLR11 and in R&D 66. Potential sources and receptors will be identified following ground investigation, in order to quantitatively assess the possibility for land to be contaminated, thereby enabling an evaluation of the potential for pathways to exist between them to form complete contaminant linkages

under baseline conditions, during construction and during the operational phase of the Proposed Development. The likely significance of the risk for each plausible linkage will then be assessed and compared to determine beneficial and adverse effects of the Proposed Development against baseline conditions.

- 10.10 The assessment of potential effects as a result of the Proposed Development will take into account both construction and operational phases. The construction phase includes enabling works, any demolition, earthworks and construction activities. The significance level attributed to each effect will be assessed based on the magnitude of change from the construction and operation of the Proposed Development compared to the baseline conditions and the sensitivity of the affected receptors.
- 10.11 The significance criteria have been derived in general accordance with R&D 66. The guidance was specifically developed to assess risks from land contamination for housing, but its principles are more widely applicable to other land uses. Each contaminant linkage has been assessed according to the probability and severity of likely impact.
- 10.12 The significance level attributed to each effect will be assessed based on the magnitude of change due to the Proposed Development and the sensitivity of the affected receptor/receiving environment to change. Magnitude of change and the sensitivity of the affected receptor/receiving environment are both assessed on a scale of high, medium, low and negligible.
- 10.13 Table 10.1 indicates the general approach taken in assessing the sensitivity of identified receptors as part of this assessment. Negligible sensitivity has been removed, as it is deemed irrelevant as no receptor (in terms of Ground Conditions and Soils) is classed as negligible.

Table 10.1 Classification of Sensitivity

Sensitivity	Criteria	Examples
High	Attribute has a high quality and / or rarity on local scale	Construction and maintenance workers (where extensive earthworks, and demolition of buildings are proposed); Groundwater aquifers currently used, or likely to be suitable for use as public potable supplies (e.g. Principal Aquifers, Source Protection Zone for a potable groundwater supply), such as the Principal Aquifer; and Controlled water bodies with national or international ecological designations.
Medium	Attribute has a medium quality and / or rarity on local scale	Construction workers (where limited earthworks, are proposed); Groundwater aquifer providing abstraction water for agricultural or industrial use (groundwater); Commercial landscaping or open space areas; and Buildings, including services and foundations.
Low	Attribute has a low quality and / or rarity on local scale.	Construction and maintenance workers (Minimal disturbance of ground); Unproductive strata (groundwater) such as Made Ground; No local surface water features; and Infrastructure (roads, bridges, railways).

- 10.14 Significance criteria have been developed based on professional judgement and relevant experience. They are determined using the matrix based on magnitude of change and the sensitivity of the receptor, with the likely duration of the effect and likelihood of the effect occurring also considered when assessing each effect.
- 10.15 The sensitivities which may affect a potential receptor have been assigned based on professional judgement and experience. Factors that may affect the sensitivity of the likely receptor include:
  - Age, weight, sex, duration on-site and distance from the Site. (Human receptors).
  - Distance from the Site and resource potential. (Controlled Waters receptors).

10.16 The criterion for determining magnitude of change/effect is detailed in **Table 10.2**.

Table 10.2 Classification of Magnitude of Effect

Magnitude of Effect	Example Criteria
<b>High</b>	Change in soil quality or ground gas regime for a large area (>20ha) of land, sufficient to alter land use (e.g. remediation of 20ha of industrial land sufficient to enable mixed residential / commercial use). Change in groundwater conditions sufficient to change aquifer use (e.g. contamination that prevents abstraction for potable supplies, or remediation of impacted aquifer sufficient to enable potable abstractions). Generation of large volumes of non-inert waste materials for disposal off-site to landfill.
<b>Medium</b>	Change in soil quality or ground gas regime for a moderate area of land (<20ha) to a degree sufficient to alter land use in localised portions of the Site or to a degree requiring a change in management / mitigation measures for Site use. Change in groundwater conditions that may be sufficient to change local groundwater regime and potential aquifer uses (e.g. localised contaminant impact, localised change in groundwater levels).
<b>Low</b>	Measurable but relatively small scale change in an area of contaminated land or ground gas regime, but insufficient to alter end land use. Change in groundwater conditions that are insufficient to change status or potential use of the water body.
<b>Negligible</b>	Very limited mass of contamination mobilised – just detectable. Very limited change in area of agricultural land. Very limited barely discernible change to groundwater regime.

10.17 Table 10.3 describes the terms that have been used to define the significance of the effects identified.

Table 10.3 Defining Significance of Effects Criteria

Criteria	Description
<b>Major Negative</b>	High risk site classification – acute or severe chronic effects to human health and / or animal / plant populations predicted. Effect on a potable groundwater or surface water resource of regional importance e.g. Principal Aquifer, public water reservoir or inner protection zone of a public supply borehole
<b>Moderate Negative</b>	Medium risk site classification and proven (or likely significant) pollutant linkages with human health and / or animal / plant populations, with harm from long-term exposure. Effect on a potable groundwater or surface water resource at a local level e.g. effect on an outer groundwater Source Protection Zone. Temporary alteration to the regional hydrological or hydrogeological regime or permanent alteration to the local regime.
<b>Minor Negative</b>	Medium risk site classification and potential pollutant linkages with human health and / or animal / plant populations identified. Reversible, localised reduction in the quality of groundwater or surface water resources used for commercial or industrial abstractions, Secondary Aquifer, etc.
<b>Negligible/Neutral</b>	Low risk site classification – no appreciable effect on human, animal or plant health, potable groundwater or surface water resources.
<b>Minor Positive</b>	Risks to human, animal or plant health are reduced to acceptable levels. Local scale improvement to the quality of groundwater or surface water resources used for commercial or industrial abstraction.
<b>Moderate Positive</b>	Significant reduction in risks to human, animal or plant health, to acceptable levels. Significant local improvement to the quality of potable groundwater or

Criteria	Description
	surface water resources. Significant improvement to the quality of groundwater or surface water resources used for public water supply.
<b>Substantial Positive</b>	Major reduction in risks to human, animal or plant health. Significant regional scale improvement to the quality of potable groundwater or surface water resources

## Anticipated Effects

### Construction Stage

- 10.18 For the purposes of this scoping report it is assumed that the Proposed Development will consist of residential properties across five blocks, commercial space, public amenity space and associated infrastructure. Potential significant effects during the Construction Phase include:
- Potential effect on construction workers from pre-existing contamination within the underlying soils (if present);
  - Potential effect on adjacent sensitive site users from potential contamination within the underlying soils during construction activities; and
  - Potential effect on Controlled Waters during construction activities.
- 10.19 There is the potential for effects on construction workers as well as adjacent site users and human health. The risks can be further quantified following a Preliminary Risk Assessment and ground investigation works which will highlight the potential need for mitigation and remediation. Potential remediation can be undertaken before or during construction depending on the findings. Potential risks from UXO at the site will be assessed within the Preliminary Risk Assessment which will form an Appendix of the ES.
- 10.20 The Ground Conditions and Soils Chapter will assess potential effects from chemical contamination on Controlled Waters. Potential effects relating to physical contamination (i.e. sediment) and changes to groundwater recharge and flow will be considered within the Water Resources and Flooding Chapter.

## Insignificant Effects

### Operational Stage

- 10.21 It is anticipated that any contaminants found during the construction phase will be remediated in line with the proposed uses. It is assumed that clean cover layers (and any imported material), if required, will be validated for depth and chemical quality prior to occupation. This negates the requirement for consideration of potential impacts to future Site users, adjacent site users and plants during the operational phase of the proposed development. Therefore, the potential exposure of future Site users, adjacent site users, plants and potable water supply to contamination during the operational phase will be insignificant and will not be assessed within the Ground Conditions Chapter.
- 10.22 It is assumed that any potential affects arising from ground gas (including radon and volatile vapours) will be appropriately mitigated prior to the completion of the construction phase. Therefore, the potential for the presence of ground gas to pose an increased risk to future site users (explosive and asphyxiant) during the operational phase is considered to be insignificant and will not be assessed within the Ground Conditions and Soils chapter.

## Potential Mitigation

- 10.23 The Ground Conditions and Soil chapter of the ES will identify appropriate mitigation measures to reduce/remove potential effects associated with the construction and operation of the Proposed Development.
- 10.24 A ground investigation will be undertaken, prior to the start of the construction phase. The ground investigation will assess the presence or absence of contamination. The ground investigation will consider contamination within shallow soils and groundwater, if encountered. Should contamination be encountered during the ground investigation, required remediation and / or mitigation identified will be undertaken.
- 10.25 Prior to the ground investigation a detailed UXO desk study will be undertaken (if required) to assess the risk from UXOs and to confirm the appropriate mitigation measures required during ground investigation and construction works.
- 10.26 Potential mitigation of contamination may be achieved through appropriate management as identified through ground investigation, chemical analysis, remediation, construction controls and design.

## Summary

- 10.27 In summary, sensitive receptors have been identified which may be impacted by the Construction Phase of the Proposed Development and require further assessment. These sensitive receptors include, construction workers, third party neighbours and Controlled Waters.

## 11.0 **Historic Built Environment**

- 11.1 The purpose of this chapter of the ES will be to assess the potential effects of the proposed development on the Historic Built Environment.
- 11.2 A Built Heritage Baseline Assessment will identify built heritage assets within the Site and its vicinity, describe their importance (referred to as 'heritage significance' in historic environment policy and guidance, but described within this report as 'importance' to align with EIA terminology) and consider potential effects of the proposed development on that importance.
- 11.3 It is considered that the Historic Built Environment should be scoped in to the EIA.
- 11.4 The author of the Chapter will be Senior Associate Director Victoria Brocksopp BA (Hons), MA with oversight from Operational Director, Head of Archaeology and Heritage, Duncan Hawkins BA (Hons), MSc, FSA, MCIfA, from RPS.

### **Current Conditions**

- 11.5 The site is not protected by any built heritage designations. It entirely surrounds, but does not include within its boundary, one Grade II listed building, Moulsoe Buildings Farmhouse.
- 11.6 A study area has been drawn with a 500m radius around the site scoping boundary, extending further to the north east to include all listed buildings within village of Moulsoe (as requested further to pre-application discussions with Milton Keynes Borough Council, virtual meeting on 27 August 2020). This study area includes twenty-one listed buildings (three Grade I and eighteen Grade II) and two conservation areas: Willen Conservation Area and Broughton Conservation Area. Although lying beyond the study area, the Grade II Campbell Park Registered Park and Garden has been included as part of the assessment, recognising the long-distance views towards the site from this location.
- 11.7 Of the identified heritage assets eight listed buildings and the two conservation areas are located to the south of the M1, subsumed within later built form. The M1 comprises a major physical and visual barrier with the site, located to the north of the thoroughfare.
- 11.8 The thirteen remaining listed buildings and two non-designated heritage assets are contained within the village of Moulsoe, located on a raised point in the landscape to the north east of the site, including the Grade I listed Church of Mary. There are long distance views across parts of the site, which comprises a semi-rural landscape of agricultural fields, with views of the M1 and the urban expanse of Milton Keynes beyond.

### **Methodological Approach**

- 11.9 A Built Heritage Baseline report will be undertaken to assess the significance of identified built heritage assets, along with any contribution made by their respective settings or the site. This report will form an appendix to the ES Chapter.
- 11.10 The Built Heritage Assessment will:
- Identify relevant designated and non-designated heritage assets within an area of up to 500m surrounding the site and within the village of Moulsoe, the importance or setting of which may be affected by the proposed development, through desk-based analysis and field study;
  - Describe the importance of the identified heritage assets, and any contribution made by their setting to that importance; and,

- Provide an assessment of the potential effects of the proposed development upon the importance and setting of the heritage assets.

11.11 The assessment will be undertaken with reference to the following legislation, policy and guidance pertaining to development and the built historic environment:

- Planning (Listed Buildings and Conservation Areas) Act 1990;
- National Planning Policy Framework, February 2019;
- Planning Practice Guidance, live on-line resource;
- Historic Environment Good Practice Advice in Planning Note 2 (GPA2): Managing Significance in Decision-Taking in the Historic Environment, March 2015;
- Historic Environment Good Practice Advice in Planning Note 3 (GPA3): The Setting of Heritage Assets, Second Edition December 2017;
- British Standard 7913:2003 Guide to the Conservation of Historic Buildings;
- Milton Keynes Local Plan 2001-2011 Adopted December 2005;
- Draft Plan:MK and Schedule of Main Modifications (February 2019);
- Milton Keynes East Development Framework Supplementary Planning Document 2020; and,
- Broughton Conservation Area Review (October 2019) and Willen Conservation Area Review (March 2020).

## **Anticipated Effects**

- 11.12 In assessing potential effects of the proposed development the principal consideration is whether the proposals could cause harm to the importance of any heritage assets through changes to their respective settings. The NPPF defines ‘setting’ as the surroundings in which an asset is experienced. It further makes clear that ‘elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or be neutral’.
- 11.13 The relevant legislation stems from s.66 of the 1990 Act which states that in considering whether to grant planning permission for development which affects a listed building or its setting, the decision maker shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses. Whilst there is no statutory duty in primary legislation to have regard to the setting of conservation areas there is nevertheless a clear requirement under the NPPF to give great weight to the conservation of heritage assets and their settings.
- 11.14 Consideration will be given to visual effects arising from the proposed development, as well as the potential for additional noise, vibration or odour. Other effects on setting, such as historic or cultural associations, will also be considered.
- 11.15 The setting of Moulsoe Buildings Farmhouse (Grade II) (Holiday Inn), surrounded by the site but outside its boundary, is likely to alter as a result of the proposed development but with appropriate mitigation measures in place it is considered that the effects would not be regarded as significant in EIA terms.
- 11.16 Listed buildings and non-designated heritage assets to the north east of the Site at Moulsoe may experience long distance views across the site, including the Grade I listed Church of St Mary, but with appropriate mitigation measures in place it is considered that the effects would not be regarded as significant in EIA terms.

- 11.17 The Grade II Campbell Park Registered Park and Garden lies some distance from the site to the south west. From this location there are some distant views towards the Site. It is considered that with appropriate mitigation measures in place the effects of development would not be regarded as significant in EIA terms.
- 11.18 Those listed buildings and conservation areas located to the south of the M1 are unlikely to experience effects arising from the proposed development, owing to the distance from the site and intervening built environment, including the motorway and modern townscape. As such, these heritage assets would be scoped out of an ES Chapter, although a reasoned justification for this would be provided within the Built Heritage Baseline Assessment.

## **Potential Mitigation**

- 11.19 The degree to which the proposed development affects the settings of the identified heritage assets will be dependent upon an appropriate landscaping strategy, to preserve a sense of the existing semi-rural character. To achieve this the landscaping strategy will draw upon an understanding of the local historic landscape to inform the proposals.

## **Summary**

- 11.20 The site is not protected by any built heritage designations. It surrounds but does not include within its boundary one Grade II listed building. Within a 500m radius of the scoping boundary, enlarged to include the village of Mousloe entirely, there are twenty-one listed buildings (three Grade I and eighteen Grade II) and two conservation areas. There are two buildings regarded as non-designated heritage assets. Further to the south west is Campbell Park, a Grade II Registered Park and Garden, which is included within the assessment due to the long distance views available from this location towards the site.
- 11.21 A Built Heritage Baseline Assessment will identify built heritage assets within the site and its vicinity, describe their importance and consider potential effects of the proposed development on that importance
- 11.22 In assessing potential effects of the proposed development the principal consideration is whether the proposals could cause harm to the importance of any heritage assets through changes to their respective settings. S.66 of the Planning (Listed Buildings and Conservation Areas) Act 1990 states that in considering whether to grant planning permission for development which affects a listed building or its setting, the decision maker shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses. Whilst there is no statutory duty in primary legislation to have regard to the setting of conservation areas there is nevertheless a clear requirement under the NPPF to give great weight to the conservation of heritage assets and their settings.
- 11.23 The degree to which the proposed development affects the settings of the identified heritage assets will be dependent upon an appropriate landscaping strategy, to preserve a sense of the existing semi-rural character.

## 12.0 **Archaeology**

12.1 The purpose of this chapter of the ES will be to assess the potential effects of the proposed development on Archaeology.

12.2 An Archaeological desk based assessment together with a geophysical survey and fieldwalking and metal detecting survey will identify archaeological assets within the Site and its vicinity, describe their importance (referred to as ‘heritage significance’ in historic environment policy and guidance, but described within this report as ‘importance’ to align with EIA terminology) and consider potential effects of the proposed development on that importance.

12.3 It is considered that this topic should be scoped in to the EIA.

12.4 The author of the Chapter will be Duncan Hawkins, BA (Hons), MSc, FSA, MCIfA Operational Director, Head of Archaeology and Heritage of RPS.

### **Current Conditions**

12.5 An archaeological desk based assessment and geophysical survey have already been undertaken.

12.6 The desk based assessment and geophysical survey have identified a number of archaeological assets within the site, including a possibly early Medieval fortification, 2 substantial late Prehistoric and Roman settlements and a possible deserted Medieval village, potentially with earlier origins. Elsewhere there is evidence for a number of former farmsteads, past agricultural activity and findspots of archaeological material.

12.7 The early Medieval fortification is potentially of national importance, and preservation in situ is likely to be a requirement of any planning consent.

### **Methodological Approach**

12.8 An archaeological desk based assessment and geophysical survey have been undertaken, in accordance with best practice to inform the development proposals and these will form an appendix to the ES Chapter.

12.9 Building on the results of the desk based assessment and geophysical survey a programme of archaeological fieldwalking and metal detector survey will be undertaken to further inform the development proposals and ES chapter.

12.10 The archaeological studies and surveys will be undertaken with reference to the following legislation, policy and guidance pertaining to the historic environment:

- National Planning Policy Framework, February 2019;
- Planning Practice Guidance, live on-line resource;
- Historic Environment Good Practice Advice in Planning Note 2 (GPA2): Managing Significance in Decision-Taking in the Historic Environment, March 2015;
- Historic Environment Good Practice Advice in Planning Note 3 (GPA3): The Setting of Heritage Assets, Second Edition December 2017;
- Milton Keynes Local Plan 2001-2011 Adopted December 2005;
- Draft Plan:MK and Schedule of Main Modifications (February 2019); and
- Milton Keynes East Development Framework Supplementary Planning Document 2020.

## **Anticipated Effects**

- 12.11 The proposed development is of a scale that could have a significant and widespread archaeological impact. The results of the archaeological studies to date indicate that the majority of archaeological remains identified are of local to regional importance. In the case of these archaeological remains, programmes of archaeological mitigation will be needed to offset the impact of development groundworks. With regard the potential early Medieval fortification the development will be designed to preserve this in situ.

## **Potential Mitigation**

- 12.12 Where preservation in situ of the archaeological remains is neither practical nor desirable, programmes of archaeological investigation, recording, post excavation and publication will be required in advance of development groundworks, so as to mitigate and offset the impact of development. With regard the potential early Medieval fortification, design measures and a long term management plan will be required to preserve this in situ.

## **Summary**

- 12.13 Archaeological studies to date have identified archaeological remains of local, regional and potentially national importance. Further studies initially comprising fieldworking and a metal detecting survey would enhance this picture.
- 12.14 Programmes of archaeological mitigation and preservation by design will be required to offset the impact of the proposed development on any archaeological remains, in accordance with the NPPF and local policies.

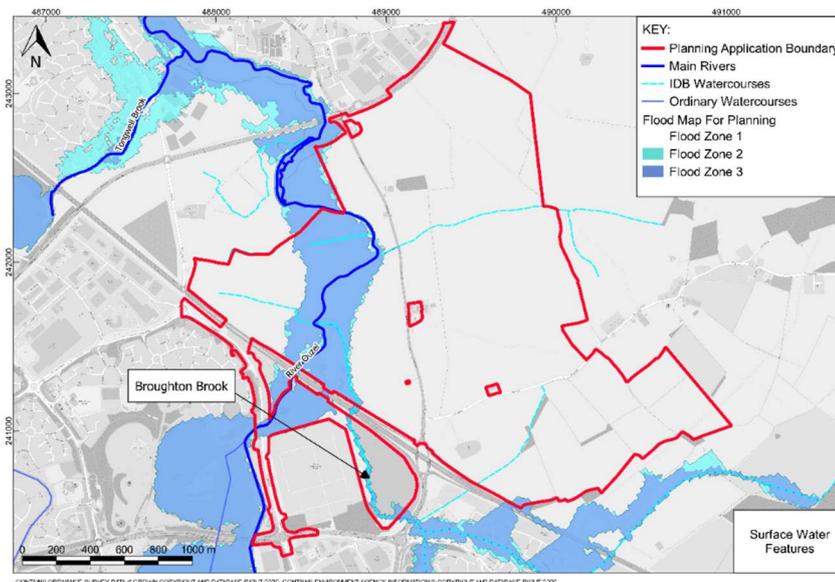
## 13.0 Water Environment and Drainage

- 13.1 This section provides a preliminary scoping assessment of the potential effects on the water environment caused by the construction and operation of the proposed development. This scoping assessment identifies the baseline situation with respect to the existing surface water and groundwater features, and the receptors which may be impacted by the Scheme, as defined in Section 13.27.
- 13.2 Possible significant effects on the surface water and groundwater bodies within the Study Area (as defined in Section 13.34) have been identified, as well as possible changes in flood risk as a result of the Scheme
- 13.3 At this scoping stage, the significance of the possible effects of the Scheme has not been assessed; the magnitude and significance of these effects will be identified as part of the ES at the next stage of assessment and will be in broad accordance with the parameters set out in the Design Manual for Roads and Bridges – Road Drainage and the Water Environment LA 113. Insignificant effects have been identified and scoped out from further assessment.
- 13.4 This section also identifies mitigation measures that will need to be developed further at later stages of the assessment and the proposed methodology for the next stage of the assessment.

### Current Conditions

- 13.5 The current conditions at the site have been informed by a desk study using available information such as Environment Agency flood mapping and by a site visit carried out by WSP staff in January 2020.
- 13.6 A review and update of the Environment Agency’s hydraulic modelling for the area is being undertaken to understand the fluvial flood risk in the area.
- 13.7 Several surface water features are located within or in proximity to the site, including watercourses, ponds and culverts. The locations of these surface water features are shown in Figure 13.1.

Figure 13.1 Surface Water Features



Note: site boundary shown for indicative purposes only

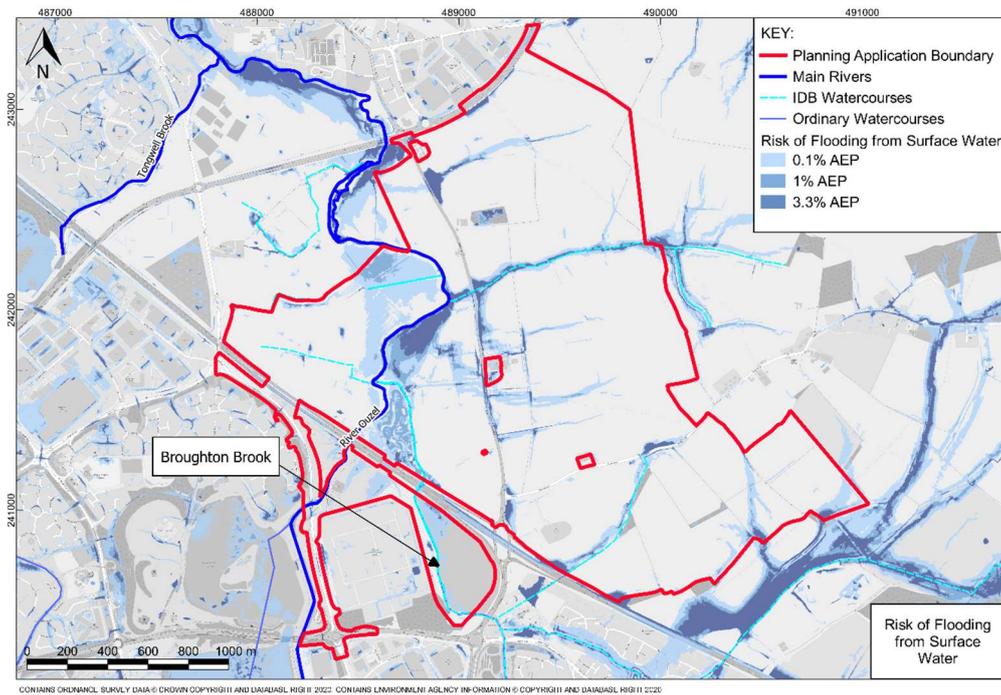
- 13.8 The River Ouzel rises in the Chiltern Hills southeast of the proposed development near the village of Dagnall. The river flows northeast through the settlements of Leighton Buzzard and Bletchley before turning to flow north through Milton Keynes and under junction 14 of the M1 motorway just west of the site. Downstream of the site the Ouzel flows north towards its confluence with the River Great Ouse in Newport Pagnell.
- 13.9 In its reaches by the site the River Ouzel is classified as a Main River and therefore its associated flood risk is overseen by the Environment Agency. There are a number of flood alleviation ponds within Milton Keynes (the nearest of which is Willen Lake) which are managed by Anglian Water which impact the flows conveyed by the River Ouzel. The impacts of which are accounted for within the Environment Agency's hydraulic model.
- 13.10 The Environment Agency's Catchment Data Explorer<sup>21</sup> shows the current ecological status of the River Ouzel upstream Caldecote Mill (GB105033037971) to be Moderate, whilst the current chemical status of the river is Good. The River Ouzel upstream of Caldecote Mill is designated as a heavily modified watercourse.
- 13.11 The Broughton Brook is a tributary of the River Ouzel that rises southeast of the proposed development on the outskirts of Woburn. The Broughton Brook flows north through Husborne Crawley towards Junction 13 of the M1 before turning to flow west along the M1 where it joins the River Ouzel just north of Junction 14.
- 13.12 The Environment Agency's Catchment Data Explorer shows the current ecological status of the Broughton Brook (GB105033037930) to be Poor, whilst the current chemical status of the river is Good. The Broughton Brook is designated as a heavily modified watercourse and in its reaches past the site the Broughton Brook is a designated watercourses which is managed by the Buckingham and River Ouzel Internal Drainage Board (IDB).
- 13.13 Aside from the Broughton Brook, several smaller IDB managed watercourses and drains are present within the site boundary and the surrounding area. All of these watercourses / drains are tributaries of the River Ouzel, apart from the watercourse within the southeast of the site which flows into the Broughton Brook.
- 13.14 The flood risk and flowpaths along these IDB watercourses can be seen from the Environment Agency's Risk of Flooding from Surface Water Map<sup>22</sup> as shown in Figure 13.2.

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<sup>21</sup> Environment Agency (2020) Catchment Data Explorer: <http://environment.data.gov.uk/catchment-planning>

<sup>22</sup> Environment Agency (2020) Risk of Flooding from Surface Water Map <https://flood-warning-information.service.gov.uk/long-term-flood-risk>

Figure 13.2 Risk of Flooding from Surface Water

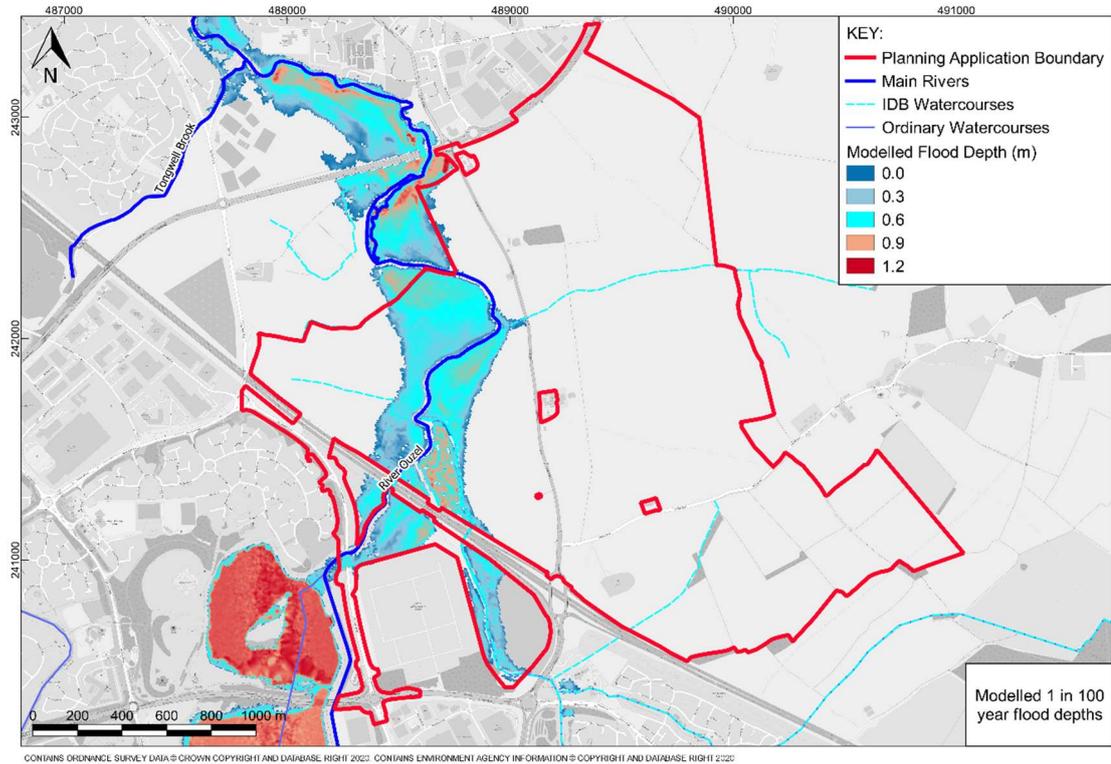


Note: Site boundary shown for indicative purposes only

- 13.15 In addition to flow paths along these IDB watercourses, there are a number of smaller preferential flowpaths within the site boundary from east to west, from agricultural land towards the A509 which is the main road running through the site. These preferential flow paths likely correspond to field drains, which may impact the flow direction, as they would not be accounted for within the Environment Agency’s modelling.
- 13.16 The flood risk associated with the field drains that are not designated IDB watercourses is overseen by the Lead Local Flood Authority (LLFA), Milton Keynes Council (MKC).
- 13.17 The unnamed watercourses identified above have not been classified under the WFD and are therefore considered part of the relevant designated catchments.
- 13.18 With respect to fluvial flooding, the Environment Agency’s Flood Map for Planning<sup>23</sup> shows land adjacent to the Broughton Brook and the River Ouzel within the site boundary to be within Flood Zones 2 and 3 (as shown in Figure 13.1). Flood Zone 3 is defined as land having a greater than 1 in 100 (1.0% AEP) annual probability of fluvial flooding, with Flood Zone 2 defined as land having between a 1 in 1000 (0.1% AEP) and a 1 in 100 (1.0% AEP) annual probability of fluvial flooding.
- 13.19 WSP have undertaken hydraulic modelling of the River Ouzel and Broughton Brook to refine the modelling undertaken by the Environment Agency as a part of 2011 Upper Great Ouse Flood Hazard Mapping Study.
- 13.20 Figure 13.3 shows the modelled baseline 1 in 100 year flood depths which indicates that flood depths of approximately 0.6m are expected across the floodplain of the River Ouzel, with isolated areas adjacent to the northwest site boundary predicted to experience flood depths of approximately 1m.

<sup>23</sup> Environment Agency (2020) Flood Map for Planning: <https://flood-map-for-planning.service.gov.uk/>

Figure 13.3 Modelled 1 in 100 year flood depths



Note: site boundary shown for indicative purposes only

- 13.21 Neither the River Ouzel nor the Boughton Brook are tidally influenced and given the inland location of the site there is no risk of tidal flooding.
- 13.22 Regarding surface water flooding, as shown in Figure 13.2 there are a number of surface water flow paths across the site and for the most part these surface water flowpaths coincide with watercourses and field drains. Areas of surface water flood risk not associated with the ordinary watercourses and fluvial floodplain will be considered in the flood risk assessment and drainage strategy.
- 13.23 The site is also considered to be at risk of flooding from reservoirs and is located approximately 0.5km downstream from Willen Lake. The Environment Agency’s Flood Risk from Reservoirs Map<sup>24</sup> shows the site to be within the maximum extent of flooding should Willen Lake fail.
- 13.24 There is no risk of flooding from canals to the site and the risk of groundwater flooding is considered to be low.
- 13.25 The impacts resulting from the Scheme on the Water Environment on the following sensitive receptors will be assessed within this chapter of the ES:
  - On site surface water features including the River Ouzel, the Boughton Brook, IDB Watercourses and field drains;
  - Underlying aquifers (Secondary A Aquifer in the bedrock geology; Secondary A and Secondary A and Secondary Undifferentiated Aquifers in the superficial geology). Including the impacts on the mineral extraction works east of the River Ouzel; and
  - The impact of reservoir flooding.

<sup>24</sup> Environment Agency (2020) Risk of Flooding from Reservoirs Map <https://flood-warning-information.service.gov.uk/long-term-flood-risk>

## Methodological Approach

- 13.26 As part of this scoping assessment possible significant effects have been identified. At this scoping stage, the significance of the possible effects of the Scheme has not been assessed; the magnitude and significance of these effects will be identified as part of the ES at the next stage of the assessment. This will be in broad accordance with the parameters set out in the Design Manual for Roads and Bridges – Road Drainage and the Water Environment LA 113
- 13.27 As this stage, the baseline, receptors and possible significant effects have been identified in relation to the general Study Area.
- 13.28 As part of the ES chapter at the next stage of the assessment, the most up to date policy and legislation will be reviewed (i.e. Environment Agency, National Policy, LLFA and Local Policy) to establish the policy requirements for the Scheme. Alongside the baseline information, this will inform the water environment Study Area that will be assessed at the next stage of the assessment. At this stage the Study Area is considered likely to be the Site and any hydraulically connected water features within a 1km buffer which could be impacted as a result of the Scheme.
- 13.29 Hydraulic modelling will be carried out to quantitatively assess how the proposed scheme may impact flood risk.
- 13.30 An operational phase surface water drainage strategy will be developed to show how the surface water runoff could be managed across the site. This will include restricting the surface water flows from the new impermeable areas to QBAR for all events up to and including the 1 in 100 plus climate change event.
- 13.31 The assessment will also consider the anticipated temporary drainage solution which will be implemented during the construction phase of the Proposed Scheme. The assessment will be completed in line with the National Planning Policy Framework (NPPF) and local policy. This will be undertaken in conjunction with the Flood Risk Assessment and Surface Water Drainage Strategy.
- 13.32 A Water Framework Directive (WFD) scoping assessment will be undertaken to assess the impact of the development on the receiving water bodies Water Framework Directive (WFD) status.
- 13.33 All water sensitive receptors will be identified, and their current condition established. Short, medium and long term impacts on each receptor from construction and operation of the development will be predicted and the significance of impacts both before and after mitigation should be assessed.

## Anticipated Effects

- 13.34 This scoping report has identified the following possible significant effects:

### Construction Phase

- Changes in the risk of surface water and fluvial flooding at the site and their effects on potential receptors (i.e. construction workers);
- Changes in groundwater flows during flood events as a result of the highway embankment that may impact the river terrace gravels groundwater regime;
- Changes in the risk of surface water flooding on the surrounding areas and their effects on potential receptors (i.e. residents and users); and
- Change to the quality (i.e. physical & chemical contamination) of surface water discharged to the public drainage network.

## Operational Phase

- Changes in risk of fluvial and surface water flooding at the Site and their effects on potential receptors (i.e. residents and users);
- Changes in risk of fluvial and surface water flooding on the surrounding area and their effects on potential receptors (i.e. residents and users);
- Changes in groundwater flows during flood events as a result of the highway embankment that may impact the river terrace gravels groundwater regime;
- Changes to the drainage regime – quantity and quality of surface water discharged to the public drainage network.
- Insignificant effects which have been scoped out from further assessment are as follows:
- The Study Area is not located within or adjacent to a groundwater Source Protection Zone<sup>25</sup>. As such, no significant effects on public drinking water supplies are anticipated and will not be considered further within the ES;
- The surface water runoff from the parts of the site for which development is proposed will not impact the groundwater regime in the area, given that these parts of the site are on impermeable clays; and
- The site is not within an area that could be affected by tidal flooding and therefore this will not be considered further in the ES.

## Potential Mitigation

- 13.35 Potential significant effects have been identified (see section above) that will require further assessment and development of mitigation measures at the next stage of the assessment.
- 13.36 With respect to the construction phase, the development has the potential to impact upon fluvial and surface water flood risk and could lead to physical (e.g. sediments) and chemical contamination (e.g. soluble pollutants) of surface and groundwater features.
- 13.37 The above sources of risk have not been scoped out at this stage of the assessment and the following mitigation measures will be explored at the later stages of the assessment:
- Construction Environmental Management Plan (CEMP) to be adopted during the construction phase to prevent pollutants entering the drainage system or discharging directly to ground.
  - Temporary drainage solution for construction phase to be developed at later stage to include pollution prevention devices.
- 13.38 With respect to the operation phase, the development has the potential to lead to changes in fluvial and surface water flood risk and changes to the surface water and groundwater flows.
- The above sources of risk have not been scoped out at this stage of the assessment and the following mitigation measures will be explored at the later stages of the assessment:
  - Flood Risk Assessment (to include hydraulic modelling) – to identify any possible changes in flood risk and required mitigation as well as consider increased risk due to climate change;
  - Surface Water Drainage Strategy – where possible, will use source control features to limit the surface water runoff generate by the development and will avoid the use of combined sewers in order to reduce the potential for sewer flooding, will limit all surface water

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<sup>25</sup> Environment Agency (2020) Groundwater Source Protection Zones: <http://apps.environment-agency.gov.uk/wiyby/37833.aspx>

discharges to ordinary watercourses to QBAR and will identify any possible changes in drainage and required mitigation;

- A Scoping Water Framework Directive Assessment to identify possible impacts to the designated waterbodies and how these could be mitigated during detailed design.
- The following impacts have been identified as insignificant and have therefore been scoped out from further assessment:
- The site is not at risk from tidal flooding and therefore this will not be considered further within the ES;
- The Study Area is not located within or adjacent to a groundwater Source Protection Zone<sup>26</sup>. As such, no significant effects on public drinking water supplies are anticipated and will not be considered further within the ES; and
- The surface water runoff from the parts of the site for which development is proposed will not impact the groundwater regime in the area, given that these parts of the site are on impermeable clays.

## Summary

- 13.39 This scoping report has identified possible significant impacts of the development on the water environment with respect to both the construction and operation phases.
- 13.40 The baseline conditions and receptors have been identified, along with the sources of risk and potential pathways which could lead to significant effects.
- 13.41 At this scoping stage, the magnitude of significance of potential impacts has not been quantified. This will be undertaken at the next stage of assessment and will be in broad accordance with the parameters set out in the Design Manual for Roads and Bridges – Road Drainage and the Water Environment LA 113.
- 13.42 At this stage of the assessment, mitigation measures have been identified which will need to be further explored in the next stage of the assessment. Mitigation measures are likely to include a CEMP and temporary and permanent surface water drainage solution, a Flood Risk Assessment and Drainage Strategy, and a Scoping Water Framework Directive Assessment.
- 13.43 The water environment cannot be considered in isolation and reference to related chapters will be used within the ES chapter:
- Effects in relation to existing contamination will be reported within a chapter covering Ground Conditions and Soils; and
  - Effects on ecological receptors (including designated sites, habitats and protected / notable species) will be reported within a chapter covering Ecology.

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<sup>26</sup> Environment Agency (2020) Groundwater Source Protection Zones: <http://apps.environment-agency.gov.uk/wiyby/37833.aspx>

## 14.0 **Socio-Economics**

- 14.1 The purpose of this chapter of the ES will be to assess the potentially significant socio-economic effects of the proposed development.
- 14.2 The chapter would consider potential socio-economic effects during the construction and operational phases of the proposed development, with effects assessed in the context of policy and literature relevant to socio-economic assessments and a baseline of existing and future socio-economic conditions.
- 14.3 Considering the scale and nature of the proposed development, scoping in a socio-economic assessment is advised. The proposed development has the potential to generate a variety of potentially significant socio-economic effects including through additional employment and housing.
- 14.4 The chapter would be authored by Ciaran Gunne-Jones and James Tindale of Lichfields, who are experienced in the preparation of socio-economic assessments for a range of development projects across the UK.

### **Current Conditions**

- 14.5 No work has been undertaken to date to identify the existing baseline characteristics of the area surrounding the site of the proposed development. This analysis would be undertaken during preparation of the full ES chapter.

### **Methodological Approach**

- 14.6 The proposed scope of works to support the proposed development would comprise a full socio-economics EIA chapter, rather than a standalone report to accompany the application. The chapter would comprise sub-sections that review policy and literature relevant to the assessment of socio-economic effects; set out impact areas and the methodology for defining the scale and significance of effects and what consultation has been undertaken; analyse the existing and future baseline socio-economic conditions in the impact areas selected for assessment; assess the socio-economic effects of the proposed development during construction and operation, and consider the socio-economic effects of the proposed development in the context of potential mitigation measures to reach a set of final residual effects. Further details on how each section would be undertaken are presented below.

### **Planning Policy and Literature Review**

- 14.7 The planning policy and literature review would look at documents from the national, regional and local contexts. Considering the location of the proposed development, the most relevant documents would likely originate from the UK Government and Milton Keynes Borough Council and include the following:
- National Planning Policy Framework (2019);
  - National Planning Practice Guidance (2020);
  - Plan:MK 2016-2031 (2019); and
  - Milton Keynes East Development Framework Supplementary Planning Document (SPD) (2020).

## **Assessment Methodology and Impact Areas**

- 14.8 This sub-section would firstly outline the impact areas which are the zones where the socio-economic effects of the proposed development would be felt the most strongly. These would be confirmed in the ES chapter; however, it is likely a local impact area consisting of lower-level geographies (e.g. local super output areas (LSOAs)) and Milton Keynes Borough as a wider impact area would be considered in the chapter.
- 14.9 The evaluation of the effects of the proposed development will be based on an assessment of the magnitude of the impact and the importance of identified receptors. The scale of effects will be identified on a matrix basis from major adverse through to major beneficial, representing the scale of an effect beyond the baseline position. Where possible, the scale of each effect will be quantified concerning current conditions; however, as there is no standardised format for assessing socio-economics effects, some of the assessment would be based on professional judgement. Effects of a moderate or major scale will be considered as significant, with effects of negligible or minor scale being non-significant.

## **Existing and Future Baseline Conditions**

- 14.10 The baseline section would consider the existing and future baseline conditions of different impact areas surrounding the proposed development. It is expected the baseline section would at a minimum consider the following baseline conditions:
- Demographic characteristics such as population age structure, qualifications, economic activity and unemployment;
  - Economic characteristics such as the sectoral structure of the economy and commuting patterns;
  - Housing market conditions such as the existing supply, recent delivery of homes and projected future demand;
  - Supply of the following items of social infrastructure:
    - (a) Early years care;
    - (b) Primary education;
    - (c) Secondary education;
    - (d) Primary healthcare (e.g. GP surgeries and dental practices) and secondary healthcare;
    - (e) Community halls;
    - (f) Leisure and recreation facilities;
    - (g) Open space; and
    - (h) Playspace.
- 14.11 Information about these conditions would be drawn from multiple sources including the Office for National Statistics (ONS) Annual Population Survey, 2011 Census and Business Register and Employment Survey; Department for Education (DfE) Schools Census; NHS General Practice Workforce dataset; and Active Places Power sports facility information portal. It is also expected information would be drawn from certain documents in the Council's evidence base such as the Milton Keynes Open Space Assessment (2017).

## **Assessment of Socio-Economic Effects**

- 14.12 The socio-economic assessment would consider at a minimum the following potentially significant effects of the proposed development on receptors within surrounding impact areas:

- Direct, indirect and induced employment generated during the construction phase;
- Direct, indirect and induced employment generated during the operational phase;
- Effect of the proposed development on the local labour market;
- Effect of the proposed development on the population;
- Effect of the proposed development on housing;
- Effect of the proposed development on social infrastructure including the following typologies:
  - a Early years care;
  - b Primary education;
  - c Secondary education;
  - d Primary and secondary healthcare;
  - e Community halls;
  - f Leisure and recreation facilities;
  - g Open space; and
  - h Playspace.

14.13 These effects would be assessed using assumptions and information from industry recognised guides and sources such as the Homes and Communities Agency (HCA) Employment Density Guide (2015), HCA Calculating Cost Per Job Best Practice Note (2015) and UK Government GDP Deflator (2020). The assessment would confirm what significant and non-significant socio-economic effects the proposed development could have before non-embedded mitigation measures are considered.

### **Residual Effects**

14.14 This section of the chapter would consider what non-embedded measures could be applied to mitigate significant adverse effects and enhance significant beneficial effects. After this process, the confirmed residual effects of the proposed development would be presented in a final summary table at the end of the chapter.

### **Anticipated Effects**

14.15 Considering the scale and nature of the proposed development, it is anticipated the following potentially significant socio-economic effects could be generated without detailed consideration of baseline conditions, embedded mitigation measures and further mitigation measures:

- Direct, indirect and induced employment generated during the construction phase;
- Direct, indirect and induced employment generated during the operational phase;
- Effect of the proposed development on the local labour market;
- Effect of the proposed development on the population; and
- Effect of the proposed development on housing.

14.16 The proposed development could also have significant effects on certain types of social infrastructure; however, a detailed understanding of baseline conditions is required before this can be fully understood.

## **Potential Mitigation**

- 14.17 No potential mitigation measures have been considered at this stage. Potential measures would be considered in full while preparing the full ES chapter.

## **Summary**

- 14.18 It is considered appropriate to scope in socio-economics as a full ES chapter rather than as a standalone report to support the application. The chapter would consider multiple types of socio-economic effects in the context of literature, planning policy and baseline conditions, with anticipated potentially significant effects linked to employment generated during construction and operation, the labour market, change in population and new housing.

## 15.0 **Climate Change and Resilience**

15.1 This purpose of this chapter of the ES will be to assess the likely significant effects of the Proposed Development in terms of climate change. The chapter will assess two distinct elements:

- The assessment of greenhouse gas emissions expected to be generated by the Proposed Development during both construction and operation, and the effect on global climate.
- Climate change adaptation.

15.2 The above is in line with the Institute of Environmental Management and Assessment (IEMA), which states that as one of the most challenging environmental issues, the effects of GHG emissions are integral to the understanding of the Proposed Development's impact.

### **Current Conditions**

15.3 It is noted that the existing site is currently predominantly greenfield land. Current baseline represents any existing GHG emissions from the project boundary site prior to construction and operation. It is not always possible to report on current baseline emissions, particularly with projects situated in areas with very limited physical development similar to Milton Keynes East; in this instance there would be zero GHG emissions to report.

### **Methodological Approach**

15.4 In line with IEMA, Greenhouse Gas Emissions will be assessed through a review of baseline conditions. The baseline will be in the form of GHG emissions within the boundary of the project but without the Proposed Development.

15.5 Future baseline will include both operational and in use GHG emissions (i.e. direct and indirect emissions). The operational GHG emissions will include how the future baseline may change due to UK grid decarbonisation projection scenarios.

15.6 Climate change resilience and future adaptation will be included; however, this will also be considered within the individual technical chapters. Where an individual topic has scoped out climate change in the assessment, this should be explicitly stated within the appropriate chapter. The climate change adaptation will take into account hazard identification, hazard assessment, risk estimation and evaluation and risk management.

15.7 The assessment will use qualitative and quantitative data, where available. The assessment will be entirely desk based; this is considered an acceptable form of assessment.

### **Anticipated Effects**

15.8 IEMA principles on climate change mitigation identify climate change as one of the defining environmental policy drivers of the future and that action to address GHG emissions is essential. As the existing site is undeveloped, and predominantly greenfield land then there will undoubtedly be an increase in GHG emissions, so it is good practice to include this within the EIA.

### **Potential Mitigation**

15.9 IEMA Assessing Greenhouse Gas Emissions and Evaluating their Significance (2017) guide will be followed. This approach to assessment and mitigation is considered appropriate.

## **Summary**

- 15.10 This technical chapter will provide an assessment of GHG Future Emissions arising from the Proposed Development and climate change adaptation measures that can be implemented into the design of the Proposed Development.

## 16.0 **Waste**

- 16.1 The focus of the topic will be the generation of waste from the construction phase of the Proposed Development, as well as from its operation and the associated increased demand on local waste treatment and disposal facilities.
- 16.2 It is proposed that Waste will be scoped in to the EIA, with the Chapter covering construction and operational waste generation and management.
- 16.3 The Waste Chapter of the EIA will be authored by WSP UK Limited.

### **Current Conditions**

- 16.4 The Site currently comprises arable field parcels with boundary hedgerows, therefore, waste arisings would mainly comprise organic materials which is assumed would either be composted or used as a soil-improver on-site, with other waste materials being sent off-site for treatment and/or disposal.

### **Methodological Approach**

- 16.5 A review of national legislation, regional and local waste policies will be undertaken initially, to determine and confirm the requirements expected for waste and recycling provision. This will also include a review of any waste planning guidance specific to Milton Keynes Council, such as the Waste Operational Procedures document (July 2018).
- 16.6 An assessment of the main expected waste types generated during the construction phase will be undertaken using available information. Opportunities for preventing, reducing, reusing and recycling waste materials, together with an assessment of suitable routes for the disposal of any residual construction waste streams, will be identified.
- 16.7 Future land uses at the Site are expected to generate both household and commercial waste. The likely types and quantities of wastes generated from the operational phase of the Proposed Development will be estimated. This will involve the identification of suitable 'benchmark data' for the prediction of waste arisings from these sources. Measures will be recommended to ensure that the waste management proposals for the Site will meet, and where possible exceed, applicable recycling targets.
- 16.8 The current spare capacities of local waste treatment and disposal facilities is commercially sensitive information and therefore not publicly available on the Environment Agency's registers. The magnitude of change from the Proposed Development will take into account the estimated volumes of waste generated, the nature of the material, (e.g. whether it is hazardous, non-hazardous etc.), the ease of handling and the implications for treatment and disposal (e.g. whether facilities are easily available or whether treatment or disposal capacity is restricted).
- 16.9 The criteria for assessing local waste treatment and disposal facilities will be as follows:
- High: The waste generated comprises large volumes of hazardous, non-hazardous or inert waste and local waste facilities are severely restricted (i.e. there are less than three facilities in the study area).
  - Medium: The waste generated comprises medium volumes of hazardous, non-hazardous or inert waste and local waste facilities are restricted (i.e. there are less than 10 facilities in the study area).

- Low: The waste generated comprises small volumes of hazardous waste, or medium volumes of non-hazardous waste or inert waste and local waste facilities are less restricted (i.e. there are more than 10 facilities but less than 20 facilities in the study area).
- Negligible: The waste generated comprises no or negligible volumes of hazardous waste, or minor volumes of non-hazardous or inert waste and local waste facilities are unrestricted (i.e. there are more than 20 facilities in the study area).

16.10 The magnitude of change to local waste treatment and disposal facilities will be assessed according to the following criteria:

- Large: The Proposed Scheme generates more than 50,000 tonnes of waste per annum
- Medium: The Proposed Scheme generates more than 5,000 tonnes but less than 50,000 tonnes of waste per annum
- Small: The Proposed Scheme generates more than 500 tonnes but less than 5,000 tonnes of waste per annum
- Negligible: The Proposed Scheme generates less than 500 tonnes of waste per annum

16.11 No consultation activities have been undertaken in support of the preparation of the EIA Scoping Report.

## **Anticipated Effects**

16.12 The likely impacts arising in respect of the development from a waste perspective are an increase in waste generation from construction waste and operational waste and the subsequent increase in demand for receptors - local waste treatment and disposal facilities. It is considered that these could be significant and the assessment of construction waste and operational waste generation should be included in the EIA process.

## **Potential Mitigation**

16.13 The potential mitigation measures pertaining to waste that would be expected on a Proposed Development of this scale and nature include the following:

- Remediation Strategy setting out the approach for the management and reuse of soils during construction. The implementation of this strategy would be controlled through a Materials Management Plan developed in accordance with the CL:AIRE Definition of Waste: Development Industry Code of Practice (or equivalent);
- Implementation of good practice measures in terms of on-site storage will assist in reducing unnecessary wastage of construction materials;
- All construction works would be undertaken in accordance with the Considerate Constructors Scheme. Waste management is a key area of focus;
- Each residential dwelling would incorporate appropriate internal and external waste storage to encourage the separation of recycling and food waste at source; and
- Non-residential buildings would be provided with appropriate internal and external waste storage areas with dedicated containers for recycling.

## **Summary**

16.14 It is proposed that Waste will be scoped in to the EIA, with the Chapter covering construction and operational waste generation and management. The sensitive receptors would be local waste treatment and disposal facilities, where it is expected that the vast majority of waste from the Proposed Development would be managed.

## 17.0 **Other Matters for Consideration**

17.1 The following matters have also been considered and are considered capable of being scoped out of the EIA

### **Energy and Utilities**

17.2 It is considered that this topic can be scoped out of the EIA. A separate Energy Statement will be submitted in support of the planning application that addresses local and national planning policy. The strategy has not been finalised at this stage, however detailed energy strategy work is being carried out to provide options and specifications to be considered. An Engineering Services consultant is separately appointed to provide advice regarding the utilities.

17.3 Current work to date includes outlining the relevant planning policies and targets relating to energy; providing a summary of current practice, guidance and regulatory framework from present to 2050+; providing key considerations and the potential measures to achieving these and any opportunities and costs.

17.4 Fabric energy efficiency strategies have been outlined that would be required to meet current and future expected policy requirements. Greenhouse Gas Emissions associated with the energy strategy will be considered as part of the Climate Change and Resilience assessment that it is proposed to scope in to the EIA.

17.5 In terms of potable water supply and foul water treatment the demands associated with the Scheme would be provided within the current permits and headroom capacity associated with the Anglian Water infrastructure. These headroom allowances, incorporating the likely Scheme demands are evidenced in the Milton Keynes Water Cycle Study (WCS) 2017 . In terms of potable water the WCS outlines that including the preferred plan for resource management within the Anglian Water supply area, there would be adequate water resources to cater for growth over the plan period. Whilst in terms of waste water treatment this would occur at Cotton Valley, where it is consider that there is flow capacity available for the planned growth with some capacity available beyond the plan period. There may need to be some treatment process upgrades using conventional treatment technology to ensure compliance with legislative water quality targets. Whilst there may be a requirement for local reinforcement of the potable and foul infrastructure in and around the site, at this stage this is not considered to be significant and would be undertaken in accordance with Anglian Water's normal best working practises.

17.6 On this basis, it is deemed appropriate that Utilities and Energy are scoped out of the EIA.

### **Health**

17.7 The proposed development is either bordered by large roadways such as the A422 and M1, industrial and warehouse parks (e.g. Interchange Park and Fox Milne) or incorporates large existing roads (e.g. Tongwell Street) that have been there for some time. The site within the red line boundary includes a large area of agricultural land, a limited number of associated farm buildings, existing roadways and junctions and Cotton Valley waste treatment plant.

17.8 It is considered that the surrounding land uses would not act as sensitive receptors that would experience significant adverse health effects from the proposed development or change the significance of potential existing health effects on land uses near to existing infrastructure (e.g. Tongwell Street) within the red line boundary. Nor would the proposed development induce new significant adverse health effects within the red line boundary considering the existing land uses are highly insensitive (e.g. agricultural land) or small in number (e.g. associated farm

buildings) or change the significance of any potential adverse health effects linked to existing on-site activity.

- 17.9 Potential health implications linked to the proposed development would also be dealt with in other chapters of the ES including noise, air quality, water resources and waste. A robust assessment of the effect of the proposed development on health infrastructure and other local facilities (e.g. GPs, dentists and schools) would be included within the socio-economics ES chapter.
- 17.10 There may be beneficial health effects resulting from the development of high-quality residential properties and a multitude of open spaces. There will also be beneficial effects on the population due to the increase in employment during the construction and operational phases of the proposed development.
- 17.11 The increased population may result in minor adverse effects to the local population concerning access to public health services and pressure on vulnerable groups as the introduction of additional residential properties may increase the number of users of the public health services. However, these effects are not expected to be significant, and where required new infrastructure would be provided in the development through funding from the recent successful Housing Infrastructure Fund bid (e.g. new schools) or planning contributions if necessary.
- 17.12 On this basis, it is considered that the likely effects on human health will be adequately assessed within other applicable areas of the ES and therefore it is not deemed necessary to provide a standalone chapter.

## **Agriculture**

- 17.13 Most of the proposed development Site is or has been most recently in use for agriculture and farming. This use will be lost through the development of the Site.
- 17.14 Local planning authorities are required to take into account the presence of best and most versatile agricultural land (defined as land in grades 1, 2 and 3a of the Agricultural Land Classification ('ALC')) alongside other sustainability considerations when determining planning applications. For this ES, the Site is identified as having areas of grades 3a and 3b, and in part, some areas of non-agricultural land (which includes farm steadings, buildings, watercourses, tracks and roadways). Initial assessments of the areas of the Site that will be subject to development suggest that the agricultural use is not considered of particular value or sensitivity.
- 17.15 Given this context, it is not considered that the development will give rise to significant effects in respect of agriculture that require consideration as part of the EIA. Soil condition will be addressed in the ground conditions assessment that it proposed to be scoped in to the EIA.

## **Risk of Accidents and Disasters**

- 17.16 There are no known matters which may give rise to significant impacts on the environment in association with the possibility of major accidents and disasters. Risks associated with those matters proposed to be included as part of the EIA will be considered where relevant (e.g. transport and water environment).

## **Daylight, Sunlight and Overshadowing**

- 17.17 The majority of the existing Site comprises flat, arable land subdivided into large irregular fields by hedgerows and ditches, and existing properties inset and surrounding the Site are limited to a small number of residential properties with those to the north and north-east on the opposite side of major routes.

- 17.18 The scale of the proposed development and maximum heights of buildings are relatively modest and it is not considered that there is any likelihood of significant adverse impacts in terms of daylight and overshadowing on existing properties.
- 17.19 The Design and Access Statement will include consideration of daylight and sunlight issues associated with the proposed homes within the site.
- 17.20 Given the above reasons, and the scale of the proposed development, it is not envisaged that the development will give rise to any significant adverse daylight and sunlight effects and therefore it is considered that daylight, sunlight and overshadowing can be scoped out of the EIA.

## **Wind Environment**

- 17.21 The Site is currently open and devoid of any large structures. The change in massing, height and orientation of buildings associated with the development would be expected to influence the ground level wind speeds and direction on and adjacent to the Site from the existing conditions, however due to the open nature of the surroundings, it is not considered that the proposed development would alter the wind environment in the surrounding area to such an extent that it would give rise to significant environmental effects.
- 17.22 For these reasons, it is considered that wind environment with respect to impacts on pedestrian safety and comfort, and impacts on the stability of the proposed buildings, can be scoped out of the EIA.

## 18.0 **General Approach and Form of the Environmental Statement**

- 18.1 The EIA will be prepared in accordance with the requirements of the 2017 EIA Regulations and with reference to best practice including that published by the IEMA. All information required or reasonably required to identify the significant environmental effects of the development, as defined by Schedule 4 of the Regulations will be provided as part of the ES.
- 18.2 The assessment will also include a consideration of relevant policy and legislation of relevance as well as considering comments received by consultees during the pre-submission period.
- 18.3 Each technical assessment will follow a consistent approach and format and including:-
- 1 Brief review of relevant policy and legislative context;
  - 2 Confirmation of the detailed topic specific assessment methodology, consultation undertaken and confirmation on how the assessment relates to the standard significance criteria adopted for the EIA (see below);
  - 3 Consideration of Baseline Conditions including an identification of sources of information, site history, current environmental conditions and future trends/anticipated changes to current conditions that could be anticipated without the scheme;
  - 4 Identification of the potential effects including a summary of those resources/receptors likely to be affected, the sensitivity of those receptors to accommodate change; the degree of change resulting from the proposal; the change of events or pathways linking cause to effect and a prediction of the significance of effects in terms of nature, extent and magnitude including whether it is direct/indirect, short/long term, permanent/temporary, beneficial/adverse;
  - 5 The scope for incorporating mitigation measures to avoid, reduce, remedy or compensate for any identified effects and the need for any monitoring measures; and
  - 6 Identification of any effects remaining after mitigation.
- 18.4 The effects of individual environmental matters will be transcribed against a common list of significance criteria for the EIA which will comprise:-
- 1 Major<sup>27</sup> beneficial
  - 2 Moderate<sup>28</sup> beneficial
  - 3 Minor<sup>29</sup> beneficial
  - 4 Neutral/negligible
  - 5 Minor adverse
  - 6 Moderate adverse
  - 7 Major adverse
- 18.5 The ES will include a clear description of the likely significant environmental effects on the environment including direct/indirect effects, secondary, cumulative, short/medium/long term, permanent/temporary and beneficial/adverse effects arising from the development.

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<sup>27</sup> Substantial – considerable effects (by extent, duration or magnitude) or of more than local significance or breaching identified standards or policy

<sup>28</sup> Moderate – limited effects which may be considered significant

<sup>29</sup> Minor – slight, very short or highly localised effects

## Structure and format of ES

18.6 Based on the information provided in this Scoping Report, the technical aspects that are considered to be those to be 'scoped in' to the EIA are as follows:-

- Transportation;
- Landscape and Views
- Ecology;
- Air Quality;
- Noise;
- Ground Conditions and Soils;
- Historic Built Environment;
- Archaeology;
- Water Environment and Drainage;
- Socio-Economics;
- Climate Change and Resilience; and
- Waste.

18.7 The ES will also include the following as appendices to the main technical aspect assessments:-

- 1 Transport:
  - a Transport Assessment (including Plans for any off-site highway works)
  - b Travel plan
  - c Parking assessment
  - d Construction traffic management plan
  - e Vehicle tracking plans
  - f Public rights of way strategy
- 2 Landscape and visual:
  - a Landscape visual impact assessment
  - b Landscape strategy
  - c Lighting assessment
- 3 Ecology:
  - a Ecology assessment
  - b Ecological survey
  - c Biodiversity Impact Assessment Metric
  - d Tree/arboricultural assessment
- 4 Noise and vibration survey and assessment
- 5 Air quality assessment
- 6 Historic environment:
  - a Built heritage assessment/statement
  - b Archaeological assessment

- 7 Water environment:
  - a Flood Risk Assessment including flood modelling
  - b Drainage strategy
- 8 Ground conditions:
  - a Phase 1 survey
  - b Earthworks strategy
  - c Topographical survey
  - d Unexploded Ordnance (UXO) desktop survey
- 9 Socio-economic assessment
- 10 Waste management assessment (including site waste management plan)

## **The Team**

- 18.8 The 2017 EIA Regulations requires that the EIA be prepared by competent experts. It is confirmed that the team undertaking the assessment work will have the relevant experience and competency to carry out the technical assessment work. The ES will include a statement on confirming how the requirements of the Regulations have been met.
- 18.9 The EIA will be co-ordinated by Lichfields with technical inputs to the EIA being provided by:-
- WSP;
  - fabrik;
  - Lichfields;
  - Hodkinson;
  - Hankinson Duckett Associates; and
  - RPS.
- 18.10 The credentials of each technical author to the EIA will be described in the ES. Lichfields is accredited with an IEMA EIA 'Quality Mark' which is a scheme ensuring that EIA carried out by registrants achieves excellence.

## **Associated Application**

- 18.11 Notwithstanding the authority's view on the scope of the EIA, the application submission will also provide a range of information including:
- 1 Planning application forms
  - 2 Notices and certificates
  - 3 Parameter plans for outline element approval
  - 4 Detailed plans for full element approval (i.e. highways plans)
  - 5 Design and Access Statement
    - a Illustrative masterplan(s) – not for approval
    - b Open Space Assessment
  - 6 Planning Statement including:
    - a Town Centres/Retail Impact Assessment

- b Housing Statement
- 7 Statement of Community Involvement
- 8 Sustainability Assessment/Statement
- 9 Utilities and Energy Statement
- 10 S106 Heads of Terms

## 19.0 **Abbreviations**

- 1 MKC - Milton Keynes Council
- 2 EIA - Environmental Impact Assessment
- 3 MKE - Milton Keynes East (the development)
- 4 ES - Environmental Statement
- 5 EU - European Union
- 6 SHMA - Strategic Housing Market Assessment
- 7 OAN - Objectively Assessed Need
- 8 SHLAA – Strategic Housing Land Availability Assessment
- 9 CMK - Central Milton Keynes
- 10 CaMKOx – Cambridge Milton Keynes Oxford growth arc
- 11 SPD – Supplementary Planning Document
- 12 EA - Environment Agency
- 13 FE – form entry
- 14 AOD – above ordnance datum
- 15 TA - Transport Assessment
- 16 TTN - Transportation Technical Notes
- 17 PTS - Public Transport Strategy
- 18 FTP - Framework Travel Plan
- 19 CLP - Construction Logistics Plan
- 20 NPPF - National Planning Policy Framework
- 21 PPG - Planning Practice Guidance
- 22 IEMA – Institute of Environmental Management and Assessment
- 23 LTP – Local Transport Plan
- 24 NMU - Non-motorised user
- 25 HIF - Highway Infrastructure Fund
- 26 SRN - Strategic Road Network
- 27 PRN - Primary Road Network
- 28 MMM - multi-modal model
- 29 DMRB - Design Manual for Roads and Bridges
- 30 WCH - walkers, cyclists and horse riders
- 31 PIA - personal injury accidents
- 32 CEMP - Construction Environmental Management Plan
- 33 LVIA – Landscape and visual impact assessment
- 34 GLVIA – Guidelines for Landscape and visual impact assessment
- 35 PROW - Public Rights of Way

- 36 CIEEM – Chartered Institute of Ecological and Environmental Management
- 37 SAC - Special Areas of Conservation
- 38 SPA - Special Protection Area
- 39 NNR - National Nature Reserve
- 40 SSSI - Sites of Special Scientific Interest
- 41 IRZ - Impact Risk Zones
- 42 LNR - Local Nature Reserves
- 43 MKWC - Milton Keynes Wildlife Corridor
- 44 LWS - Local Wildlife Site
- 45 BNS - Biological Notification Site
- 46 BAP – Biodiversity Action Plan
- 47 NERC - Natural Environment and Rural Communities Act
- 48 WCA - Wildlife and Countryside Act
- 49 BoCC – birds of conservation concern
- 50 HIS - Habitat Suitability Index
- 51 NVC - National Vegetation Community
- 52 PSYM - Predictive SYstem for Multimetrics
- 53 NO<sub>2</sub> – Nitrogen Dioxide
- 54 WWTW - Waste Water Treatment Works
- 55 LAQM - Local Air Quality Management
- 56 AQMA - Air Quality Management Area
- 57 µg/m<sup>3</sup> – micrograms per cubic metre
- 58 PM<sub>10</sub> - Particulate matter less than 10 micrometres in diameter
- 59 PM<sub>2.5</sub> - Particulate matter less than 2.5 micrometres in diameter
- 60 IAQM - Institute of Air Quality Management
- 61 EFT - Emissions Factors Toolkit
- 62 NO<sub>x</sub> – nitrogen oxides
- 63 BS - British Standard
- 64 SOAEL - Significant Observed Adverse Effect Level
- 65 dB(A) – average decibels
- 66 UXO - unexploded ordnance
- 67 IDB - Internal Drainage Board
- 68 LLFA - Lead Local Flood Authority
- 69 WFD - Water Framework Directive
- 70 LSO - local super output areas
- 71 ONS -Office for National Statistics
- 72 DfE - Department for Education

- 73 HCA - Homes and Communities Agency
- 74 GHG – greenhouse gas emissions
- 75 ALC - Agricultural Land Classification

# **Appendix 1 Plan Identifying Scoping Boundary**



# **Appendix 2 LVIA Key Views and Methodology document**

# MILTON KEYNES EAST STRATEGIC URBAN EXTENSION

LVIA KEY VIEWS AND METHODOLOGY  
SEPTEMBER 2020



# ISSUE SHEET

**JOB NAME:** MILTON KEYNES  
EAST  
**JOB NUMBER:** D2065  
**CLIENT:** BERKELEY GROUP

REVISION	DATE	REVISION DETAILS	PREPARED BY	CHECKED BY	APPROVED BY
ISSUE	26.06.20	LVIA KEY VIEWS AND METHODOLOGY	LC	LS	LS
ISSUE	23.09.20	RED LINE & VIEW LOCATIONS AMENDED	NT	LS	LS



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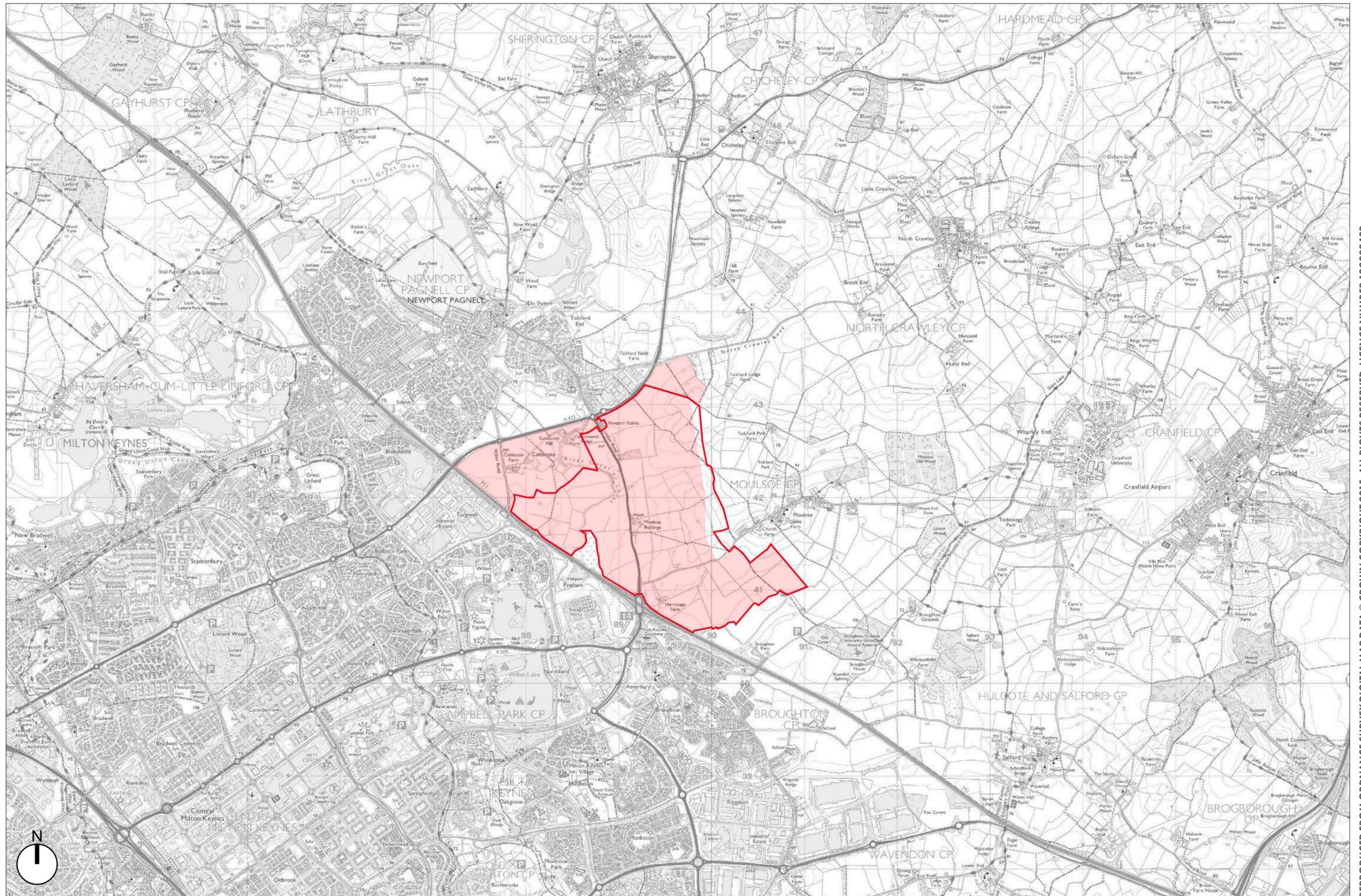


FIGURE 1.1 – EXTRACT FROM ORDNANCE SURVEY PLAN SHOWING THE LOCATION OF THE STRATEGIC URBAN EXTENSION (FABRIK, 2020)

# 1.0 INTRODUCTION

fabrik Chartered Landscape Architects have been appointed by Berkeley Group to carry out a Landscape and Visual Impact Assessment (LVIA) ES Chapter of the Site to the east of the M1, which forms the majority of the allocated Strategic Urban Extension (SUE), and the surrounding area, in order to consider the likely physical and visual impacts arising as a result of the proposed development. The LVIA will consider the guidance set out within Milton Keynes East Strategic Urban Extension Development Framework, adopted by Milton Keynes Council as a Supplementary Planning Document (SPD) in March 2020.

The location of the Site is shown on the plan opposite. The red line area extends to approximately 400 hectares.

The key views from local, middle and distant receptors are identified in this document, considering the visual envelope, the different groups of people, places affected, the likely nature of the view and potential effects on visual amenity.

The proposed methodology for the LVIA is based on the 'Guidelines for Landscape and Visual Impact Assessment' (third edition) by the Landscape Institute and the Institute of Environmental Management and Assessment (Routledge, 2013). A full methodology is set out at Appendix 1. s

## LEGEND

-  SITE BOUNDARY
-  ALLOCATION BOUNDARY

## 2.0 KEY VIEWS

### 2.1 INTRODUCTION

The extent to which the Site is visible from the surrounding landscape is based on grading of degrees of visibility. It is determined from a visual inspection of the SUE and its context from roads, public rights of way and properties.

Seasonal change in existing evergreen and deciduous plant material will affect the available views. Typically views will be different through the seasons with a greater sense of enclosure in the summer months when deciduous trees are in leaf.

Figure 2.1 illustrates the Zone of Theoretical Visual Influence relative to an 8km radius from the centre of the Site. Figure 2.2 includes the key views into the Site identified within Milton Keynes East Strategic Urban Extension Development Framework Supplementary Planning Document (Milton Keynes Council, March 2020).

Figure 2.3 shows the key views of the Site from the immediate environs. Figure 2.4 illustrates the middle and distant key views.

The photographs will be taken in line with the Landscape Institute's Technical Guidance Note 6/19 Visual Representation of Development Proposals (Landscape Institute, 2019), using a Full Frame Sensor Digital Single Lens Reflex Camera, with a 50mm Focal Lens Length.

#### LEGEND

 ZVI SITE BOUNDARY (2014)

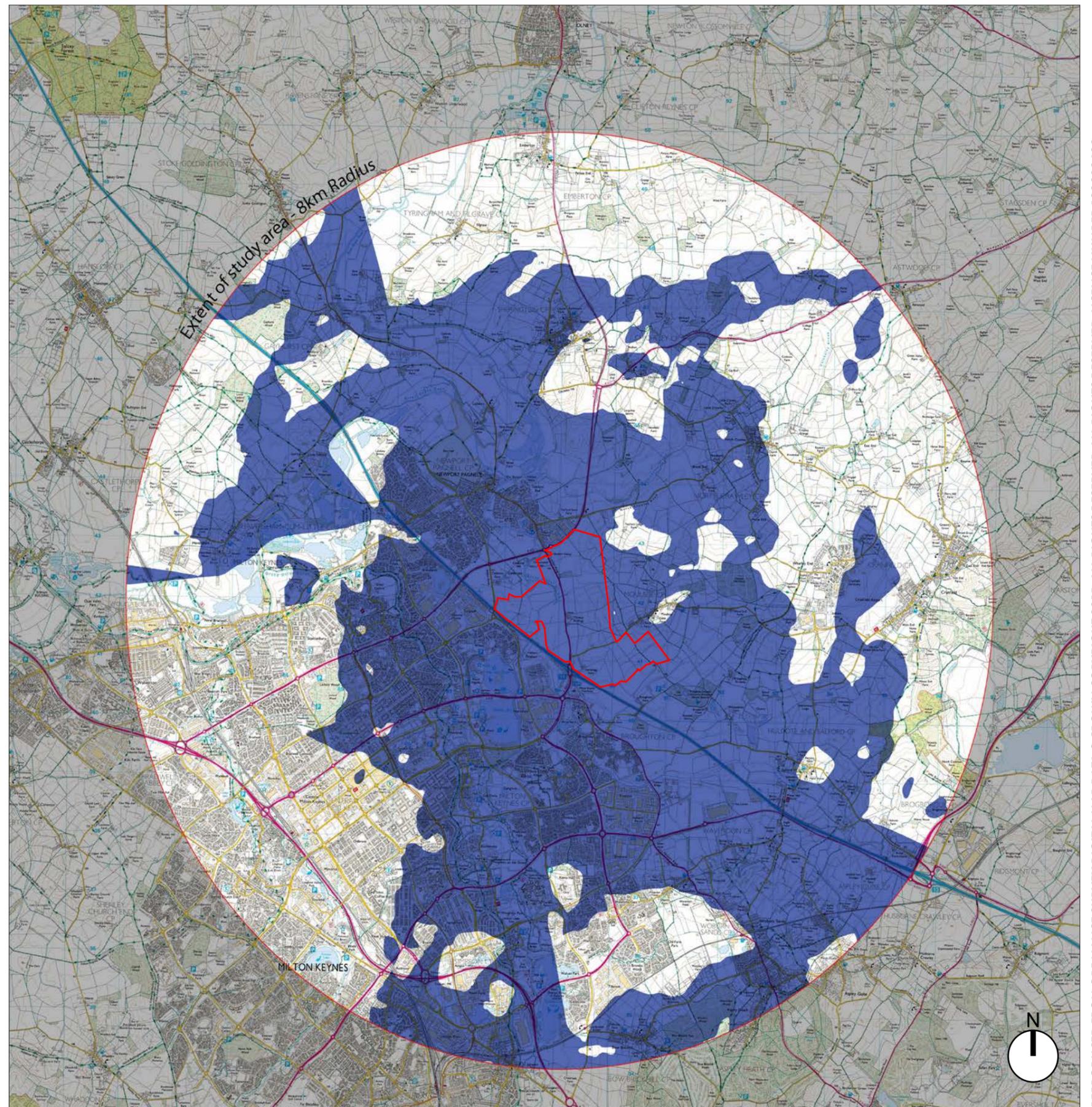


FIGURE 2.1 – PLAN SHOWING ZONE OF THEORETICAL VISUAL INFLUENCE (MUNRO STUDIOS, 2014)

## 2.0 KEY VIEWS

### 2.2 POLICY CONTEXT

The Milton Keynes East Strategic Development Framework SPD (Milton Keynes Council, 2020) provides the following summary of topography and key views:

- 'The land is relatively flat to the west of London Road (A509).
- In the eastern part of the site, the land rises up from London Road and the M1 towards Moulsoe.
- There are limited views into the site from the M1 and A422/A509. Views into the site along the southern edge are provided from bridges crossing the M1.
- Views into the site along the eastern edge of the site are provided from Moulsoe, and the public rights of way which lie just outside of the site boundary.
- There are long distance views from within the site of the Greensand Ridge to the south, CMK, and the clay plateau to the north. There are shorter distance views from the elevated southeastern parts of the site to Brooklands and Magna Park'.

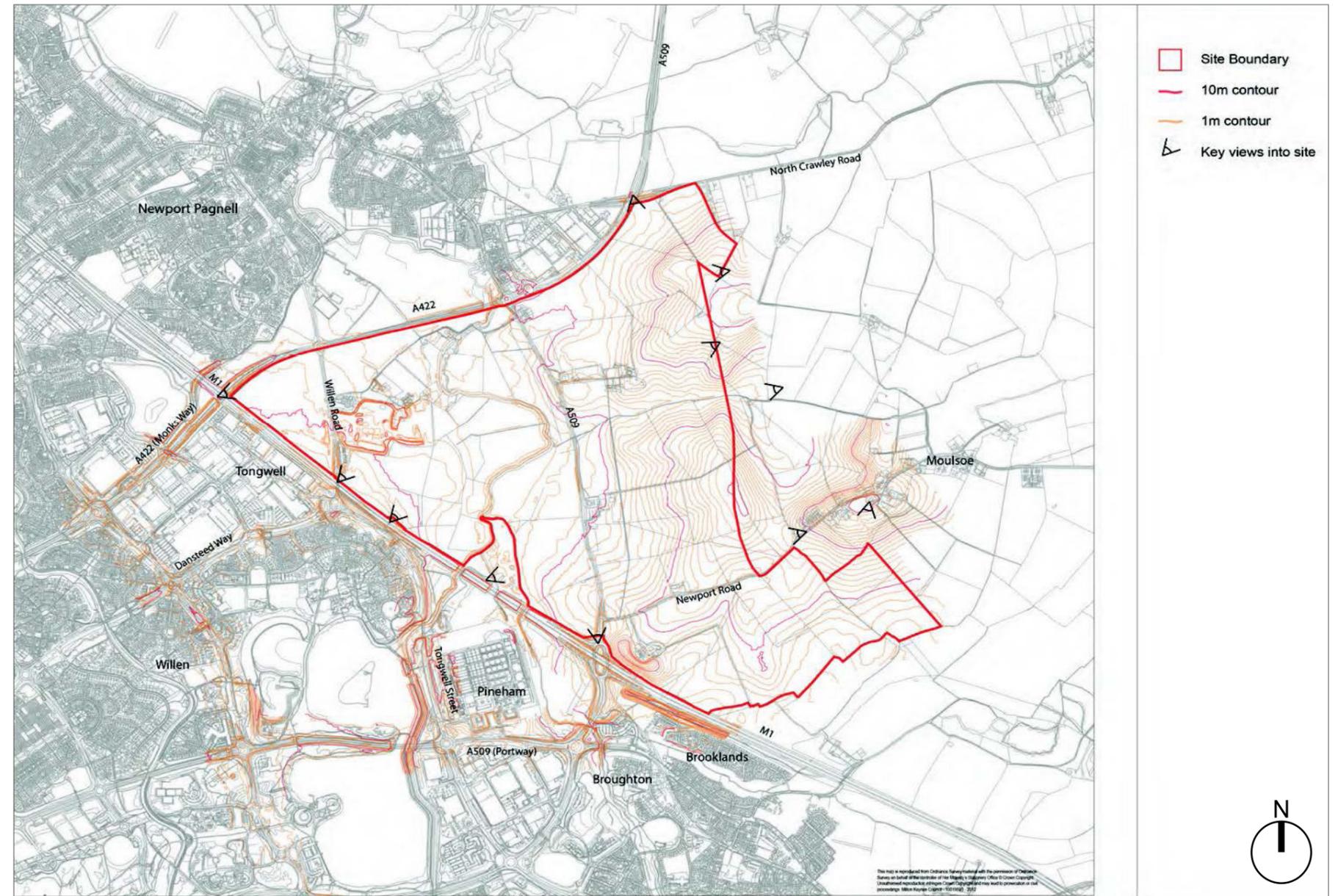


FIGURE 2.2 – PLAN SHOWING KEY VIEWS WITHIN MILTON KEYNES EAST STRATEGIC URBAN EXTENSION SPD (MILTON KEYNES COUNCIL, 2020)

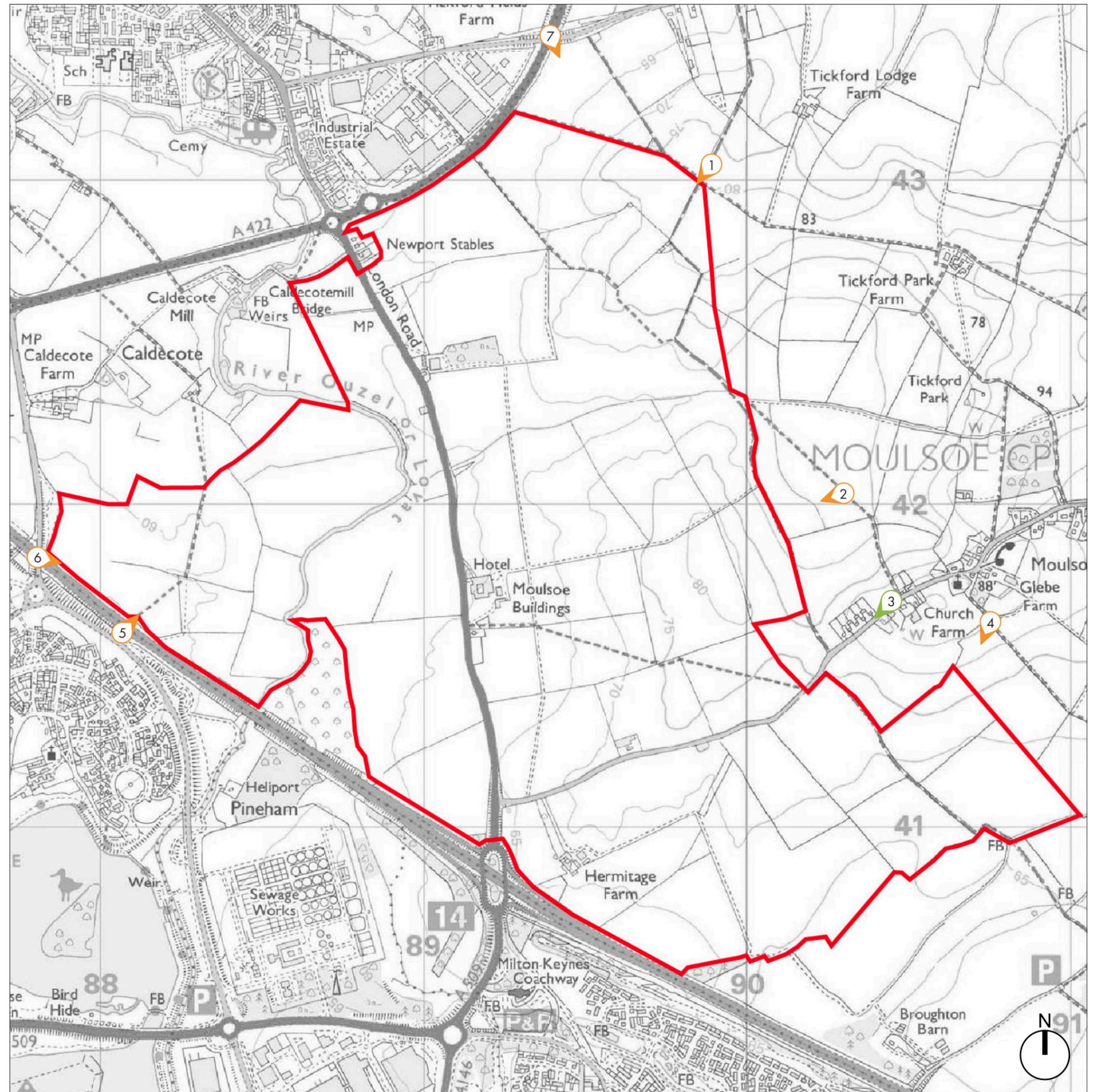
## 6.0 KEY VIEWS

### 2.3 REPRESENTATIVE KEY VIEWS

The range of representative key views include those identified by Milton Keynes Council within the Milton Keynes East Development Framework SPD (2020), relevant to this part of the Strategic Urban Extension. The Site's landform and the topography in the surrounding area, along with the intervening layers of existing vegetation, including tree belts and copses, are predicted to truncate views towards the Site from much of the wider landscape and built up area. The Site is predicted to be apparent from the footpaths to the north east and the south east, along with Cambell Park. Local roads are typically lined with hedgerows, many of which are intact, that are anticipated to either obscure views, or to provide partial views of the Site, set within the context of the existing settlement of Milton Keynes.

#### LEGEND

- SITE BOUNDARY
- ① LOCATION OF PHOTOGRAPHIC VIEWPOINT – OPEN VIEW (AN OPEN VIEW OF THE WHOLE OF THE SITE OR OPEN VIEW OF PART OF THE SITE).
- ② LOCATION OF PHOTOGRAPHIC VIEWPOINT – PARTIAL VIEW (A VIEW OF THE SITE WHICH FORMS A SMALL PART OF THE WIDER PANORAMA, OR WHERE VIEWS ARE FILTERED BETWEEN INTERVENING BUILT FORM OR VEGETATION).
- ③ LOCATION OF PHOTOGRAPHIC VIEWPOINT – TRUNCATED VIEW (VIEWS OF THE SITE ARE OBSCURED BY THE INTERVENING BUILT FORM AND / OR VEGETATION, OR IS DIFFICULT TO PERCEIVE).

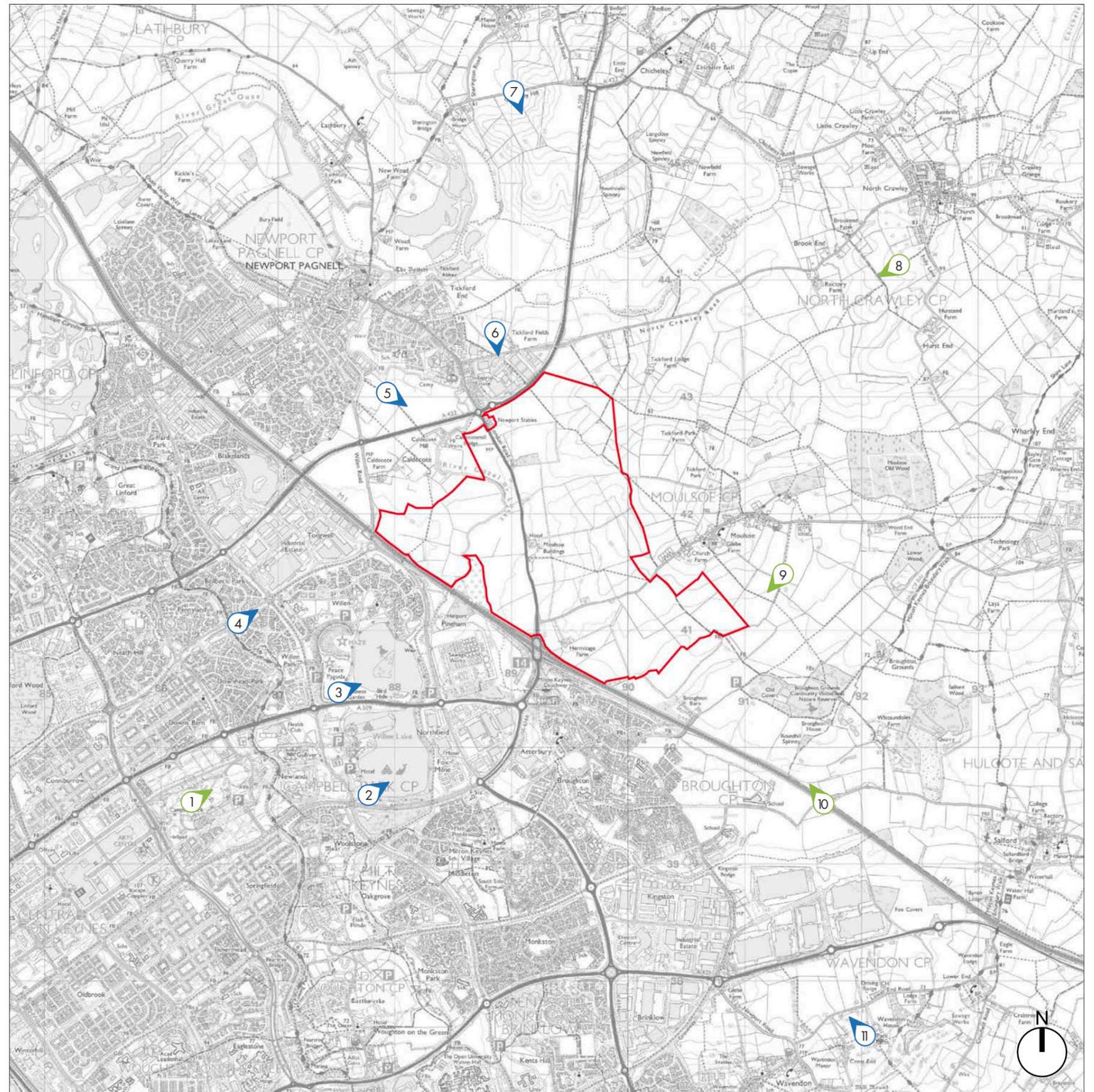


LOCATION PLAN SHOWING VISUAL SUMMARY FROM LOCAL DISTANCE RECEPTORS (FABRIK, 2020)

REPRODUCED FROM ORDNANCE SURVEY DIGITAL MAP DATA © CROWN COPYRIGHT 2015. ALL RIGHTS RESERVED.

LEGEND

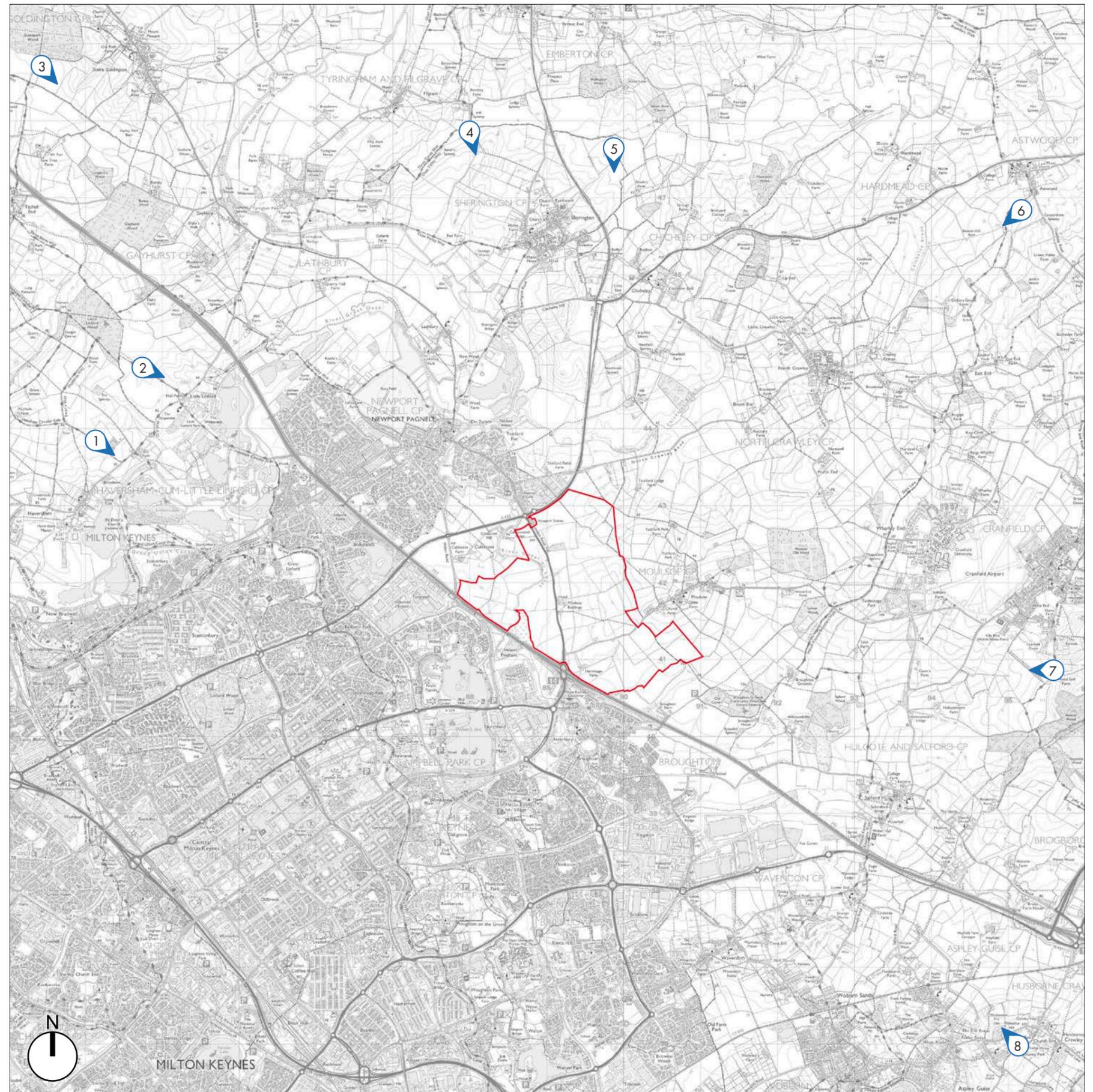
-  SITE BOUNDARY
-  LOCATION OF PHOTOGRAPHIC VIEWPOINT – OPEN VIEW (AN OPEN VIEW OF THE WHOLE OF THE SITE OR OPEN VIEW OF PART OF THE SITE).
-  LOCATION OF PHOTOGRAPHIC VIEWPOINT – PARTIAL VIEW (A VIEW OF THE SITE WHICH FORMS A SMALL PART OF THE WIDER PANORAMA, OR WHERE VIEWS ARE FILTERED BETWEEN INTERVENING BUILT FORM OR VEGETATION).
-  LOCATION OF PHOTOGRAPHIC VIEWPOINT – TRUNCATED VIEW (VIEWS OF THE SITE ARE OBTAINED BY THE INTERVENING BUILT FORM AND / OR VEGETATION, OR IS DIFFICULT TO PERCEIVE).



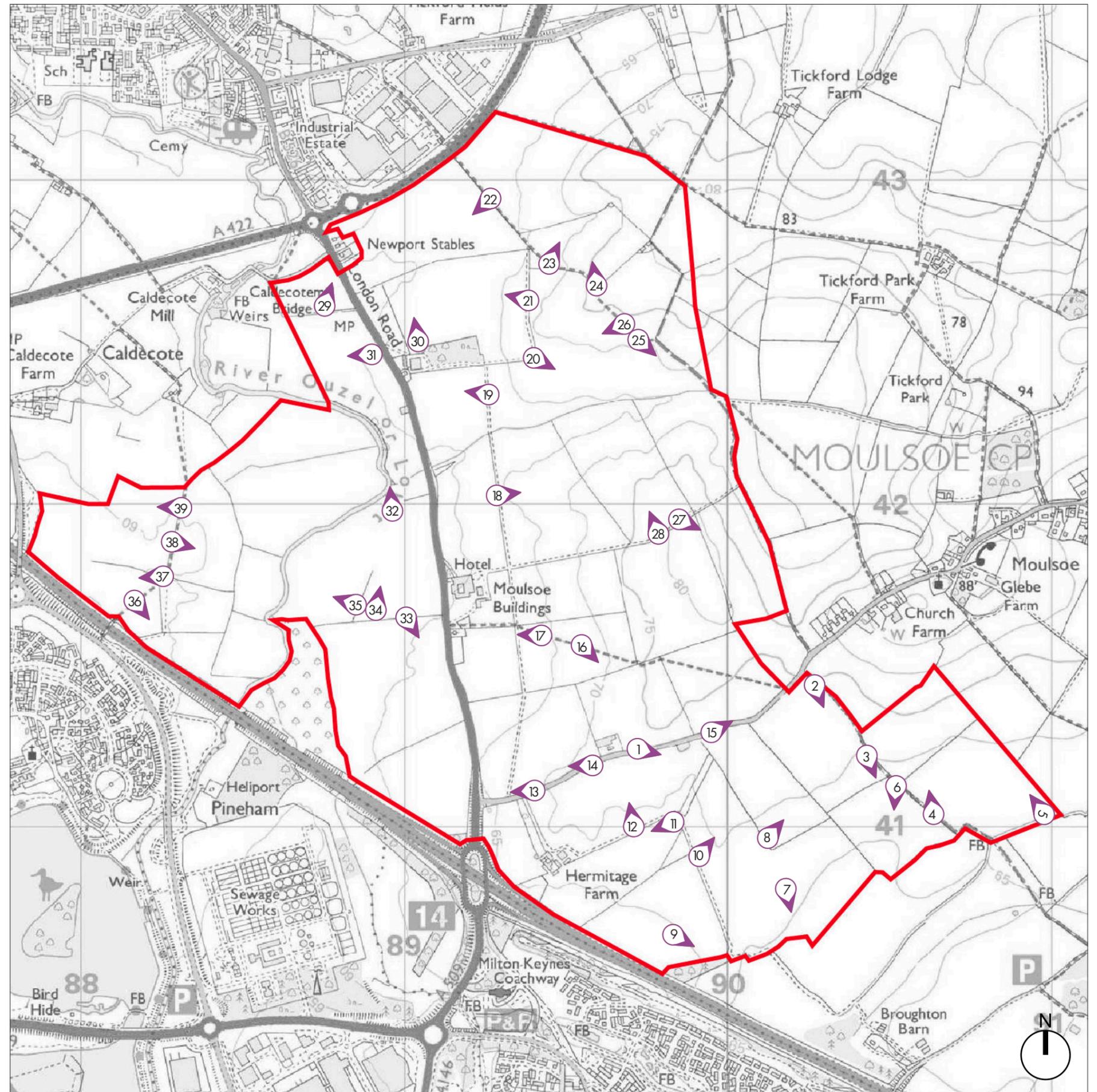
LOCATION PLAN SHOWING VISUAL SUMMARY FROM LOCAL DISTANCE RECEPTORS (FABRIK, 2020)

LEGEND

-  **SITE BOUNDARY**
-  **LOCATION OF PHOTOGRAPHIC VIEWPOINT – OPEN VIEW (AN OPEN VIEW OF THE WHOLE OF THE SITE OR OPEN VIEW OF PART OF THE SITE).**
-  **LOCATION OF PHOTOGRAPHIC VIEWPOINT – PARTIAL VIEW (A VIEW OF THE SITE WHICH FORMS A SMALL PART OF THE WIDER PANORAMA, OR WHERE VIEWS ARE FILTERED BETWEEN INTERVENING BUILT FORM OR VEGETATION).**
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LOCATION PLAN SHOWING VISUAL SUMMARY FROM LOCAL DISTANCE RECEPTORS (FABRIK, 2020)



LEGEND

- SITE BOUNDARY
- ① VIEWPOINT LOCATION

PLAN ILLUSTRATING INTERNAL SITE PHOTOGRAPH LOCATION POINTS (FABRIK, 2020)

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# APPENDIX 1

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## FABRIK LVIA METHODOLOGY

## A1.1 INTRODUCTION

The methodology employed in carrying out an LVIA of the Site, is drawn from the Landscape Institute and the Institute of Environmental Management and Assessment's "Guidelines for Landscape and Visual Impact Assessment" (GLVIA3) Third Edition (Routledge 2013). The method adopted is proportionate to the proposals.

The term landscape is defined as an area perceived by people, whose character is the result of the action and interaction of nature and / or human factors. It results from the way that different components of our environment – both natural and cultural / historical interact together and are perceived by us. The term does not mean just special, valued or designated landscapes and it does not only apply to the countryside. The definition of landscape can be classified as:

- All types of rural landscape, from high mountains and wild countryside to urban fringe farmland (rural landscapes);
- Marine and coastal landscapes (seascapes); and
- The landscape of villages, towns and cities (townscapes).

An LVIA provides a description of the baseline conditions and sets out how the study area and site appears, or would appear, prior to the proposed development. The baseline assessment is then used to predict the landscape and visual impacts arising from the proposed development. The assessment of impact is carried out as part of the iterative design process in order to build in mitigation measures to reduce the impacts as much as possible. The impact assessment will identify and assess effects during the stages of the proposed development (and in the case of this site... the initial site enabling and construction stages and then at the operational phases).

The photography and preparation of any Visually Verified Montages (VVMs) will be prepared in accordance with Technical Guidance Note 06/19 on Visual Representation of Development Proposals (Landscape Institute, 17 September 2019).

## A1.2 SUMMARY OVERVIEW OF LVIA METHODOLOGY

Landscape and visual assessments are separate, although linked, procedures. For example, often the assemblage of landscape elements contributes to informing the Zone of Theoretical Visibility and the degree of visibility from the range of visual receptors.

The baseline assessment describes:

- Each of the landscape elements which then collectively inform landscape character for the site and its context;
- The character, amenity and degree of openness of the view from a range of visual receptors (either transient, serial or static views);
- The current and future baseline scenarios; and
- The value of each of the landscape and visual receptors.

Landscape effects derive from either direct or in-direct changes to the physical landscape which may give rise to changes to the individual landscape components. This in turn effects the landscape character and potentially changes how the landscape is experienced and valued.

Visual effects relate to the changes that arise in the composition, character and amenity of the view as a result of changes to the landscape elements.

The assessment of effects therefore systematically:

- Combines the value of the receptor with the susceptibility to the proposed change to determine the sensitivity of the receptor;
  - Combines the size, scale, geographic extent, duration of the proposals and its reversibility in order to understand the magnitude of the proposal;
  - Combines the sensitivity of the each of the receptors and the magnitude of effect to determine the significance of the effect;
  - Presents the landscape and visual effects in a factual logical, well-reasoned and objective fashion;
  - Indicates the measures proposed over and above those designed into the scheme to prevent/avoid, reduce, offset, remedy, compensate for the effects (mitigation measures) or which provide an overall landscape and visual enhancement;
  - Sets out any assumptions considered throughout the assessment of effects; and
  - Sets out residual effects.
- Effects may be positive (beneficial) or negative (adverse) direct or indirect, residual, permanent or temporary short, medium or long term. They can also arise at different scales (national, regional, local or site level) and have different levels of significance (major, moderate, low, negligible or neutral / no change). Residual effects are those at year 15 considering any additional mitigation measures in place over and above those designed in to the scheme.

The combination of the above factors influences the professional judgement and opinion on the significance of the landscape and visual effects.

Cumulative effects of all other known development will also be considered (following agreement with the LPA of those developments to be considered).

The following sections set out in more detail the assessment process employed.

## A1.3 ESTABLISHING THE LANDSCAPE BASELINE

### Desk and Field Studies

The initial step is to identify the existing landscape and visual resource in the vicinity of the proposed development – the baseline landscape and visual conditions. The purpose of baseline study is to record and analyse the existing landscape, in terms of its constituent elements, features, characteristics, geographic extent, historical and cultural associations, condition, the way the landscape is experienced and the value / importance of that particular landscape. The baseline assessment will also identify any potential changes likely to occur in the local landscape or townscape which will change the characteristics of either the site or its setting.

A desk study is carried out to establish the physical components of the local landscape and to broadly identify the boundaries of the study area. Ordnance survey (OS) maps and digital data are used to identify local features relating to topography/ drainage pattern, land cover, vegetation, built developments/settlement pattern, transport corridors/definitive public rights of way and any historic or prominent landscape features, which together combine to create a series of key characteristics and character areas. Vertical aerial photography and Google streetview will be used to supplement OS information. At this stage, any special designated landscapes (such

as Areas of Outstanding Natural Beauty, National Parks, Green Belt, Conservation Areas, Listed Buildings, Areas of Special Character); heritage or ecological assets are identified. A review of information available in terms of any published historic landscape characterisation together with any other landscape / capacity / urban fringe and visual related studies is carried out at this stage. In addition, a desk study of any unbuilt commitments will be incorporated.

Landscape character assessment is the tool for classifying the landscape into distinct character areas or types, which share common features and characteristics. There is a well established methodology developed in the UK by the Countryside Agency and Scottish Natural Heritage in 2002, which has been superseded in England by guidance published by Natural England in 2014. The national and regional level character assessments are often available in published documents. However the local / district or site levels may need to be set out based on a combination of desk studies and field survey work. The character assessment will also identify environmental and landscape opportunities, recent changes, future trends and forces for change where they may be important in relation to the proposal, especially considering how the landscape appears, or would appear prior to the commencement of development. The condition of the landscape, i.e. the physical state of an individual area of landscape, will be described as factually as possible. The assessment of landscape importance includes reference to policy or designations as an indicator of recognised value, including specific features or characteristics that justify the designation of the area. The value of that landscape by different stakeholders or user groups may also influence the baseline assessment.

If published local / site level landscape character assessments are not available, the landscape is to be classified into distinctive character areas and / or types, based on variations in landform, land cover, vegetation / settlement pattern, field pattern, enclosure, condition, value. The classification will take into account any National, County/District and Parish level landscape character assessments.

These desk based studies are then used as a basis for verification in the field. The field based assessment also considers the perceptual qualities of the landscape, including tranquillity.

Judgements on the value of both the landscape and visual receptor are made at the baseline stage.

### Landscape Value

Value is concerned with the relative value or importance that is attached to different landscapes. The baseline assessment considers any environmental, historical and cultural aspects, physical and visual components together with any statutory and non-statutory designations and takes into account other values to society, which may be expressed by the local community or consultees. The tables set out on the following page are a starting point for consideration in the field. The landscape designations are to be considered in terms of their 'meaning' to today's context. The following table sets out the criteria and definitions used in the baseline assessment to determine landscape value (in addition to condition / quality). Wherever possible information and opinions on landscape value is to be sought through discussions with consultees, stakeholders and user groups.

TABLE A1.1 – LANDSCAPE VALUE CRITERIA

CRITERIA
<p><b>HIGH LANDSCAPE VALUE</b></p> <ul style="list-style-type: none"> <li>• An exceptional landscape with outstanding perceptual qualities and sense of place (is wild and tranquil). An area that is wholly intact, natural and has high scenic qualities. It contains rare elements and features;</li> <li>• Lies wholly within a designated landscape where localised character and scenic value is distinct. The landscape may include World Heritage Sites, National Parks, Areas of Outstanding Natural Beauty or Heritage Coast or key elements/features that are representative; together with any non-statutory designations. Alternatively, the landscape may be un-designated but is valued as it comprises all of the key elements that are wholly representative of published landscape character assessments and which, for example, identify nationally or locally significant natural, historical, artistic or cultural connections which assist in informing the identify of a local area (such as 'Constable Country' or 'Jurassic Coast'). Specific components of the landscape, or a specific tract of land may be valued at the local level as identified through Neighbourhood Plans or engagement with local stakeholders;</li> <li>• An area that is valued for its recreational activity;</li> <li>• Includes key or protected views;</li> <li>• Areas designated and protected for archaeogological, historical, cultural, geological or biological interest and conservation;</li> <li>• A landscape that contains particular characteristics or elements particularly important to the character of the area, or where the typical character of the area is represented in individual areas;</li> <li>• Very good or good condition overall with appropriate management for land use and land cover, or with some scope to improve certain elements;</li> <li>• Open spaces which have won awards for design or quality;</li> <li>• No or limited detracting features.</li> </ul>
<p><b>MEDIUM LANDSCAPE VALUE</b></p> <ul style="list-style-type: none"> <li>• An ordinary landscape and with some perceptual qualities. Includes some intact natural areas and attributes, in part scenic or where scenic qualities are degraded and demonstrates a degree of wildness and tranquillity.</li> <li>• The area lies wholly or partially in a designated landscape. The landscape may include local designations such as Special Landscape Areas, Areas of Great Landscape Value, Strategic or Local Gaps; or un-designated but value expressed through regional or local natural, historical and / or cultural associations; or through demonstrable use by the local community for recreation (such as local green spaces, village greens or allotments); together with any non-statutory designations. Alternatively, the landscape may be valued as it demonstrates some locally distinctive landscape elements identified in landscape character assessment;</li> <li>• An area that is moderately valued for its recreation activity where the experience of the landscape plays a small part;</li> <li>• Areas locally designated and protected for archaeogological, historical, cultural, geological or biological interest and conservation;</li> <li>• Distinguishable landscape structure, with some characteristic patterns and elements moderately important to the character of the area;</li> <li>• Typical, commonplace farmed landscape with limited variety or distinctiveness;</li> <li>• Open spaces or other features identified on a local list;</li> <li>• Good - ordinary condition, with some high quality elements and scope to improve management;</li> <li>• Scope to improve management;</li> <li>• Some detracting features.</li> </ul>
<p><b>LOW LANDSCAPE VALUE</b></p> <ul style="list-style-type: none"> <li>• A poor landscape with limited perceptual qualities (limited natural attributes, sense of wildness and tranquillity);</li> <li>• Generally un-designated. Certain individual landscape elements or features identified in landscape character assessments may be worthy of conservation or a landscape that would benefit from restoration or enhancement (such as local parks and open spaces). Alternatively, the landscape may be valued through the landscape character assessment approach where some key qualities are defined;</li> <li>• An area where the landscape plays a limited role in the experience of recreation activities;</li> <li>• Monotonous, weak, uniform or degraded landscape which has lost most of it's natural features and where the landcover are often masked by land use;</li> <li>• Lack of management and intervention has resulted in degradation;</li> <li>• Ordinary - poor condition with lack of management and intervention has resulted in degradation;</li> <li>• Frequent dominant detracting features;</li> <li>• Disturbed or derelict land requires treatment.</li> </ul>

## A1.4 ESTABLISHING IN THE VISUAL BASELINE

### Desk and Field Studies

The visual baseline will establish the area in which the site and the proposed development may be visible, the different groups of people who may experience the views, the places where they will be affected and the nature, character and amenity of those views.

The area of study for the visual assessment is determined through identifying the area from which the existing site and proposal may be visible (the Zone of Theoretical Visibility or ZTV). The baseline ZTV of the site is determined through either manual topographical analysis (a combination of desk and field based analysis which are considered appropriate for Landscape and Visual Appraisals and projects below the EIA threshold) or digital mapping based on bare earth modelling, (which do not take account of features such as vegetation or built form) constructing a map showing the area where the proposal may theoretically be visible. The extent of the mapping will depend on the type of proposal. The actual extent of visibility is checked in the field (both in the summer and winter months if the project timescales allow) to record the screening effect of buildings, walls, fences, trees, hedgerows and banks not identified in the initial bare ground mapping stage and to provide an accurate baseline assessment of visibility. Viewpoints within the ZTV should also be identified during the desk assessment, and the viewpoints used for photographs selected to demonstrate the relative visibility of the site (and any existing development on it and its relationship with the surrounding landscape and built forms). The selection of a range of key viewpoints will be based on the following criteria for determination in the field:

- The requirement to provide an even spread of representative, specific, illustrative or static / kinetic / sequential / transient viewpoints within the ZTV and around all sides of the Site;
- From locations which represent a range of near, middle and long distance views (although the most distant views may be discounted in the impact assessment if it is judged that visibility will be extremely limited);
- Views from sensitive receptors within designated, historic or cultural landscapes or heritage assets (such as from within World Heritage Sites; adjacent to Listed Buildings - and co-ordinated with the heritage consultant - National Parks, Areas of Outstanding Natural Beauty or Registered Parks and Gardens) key tourist locations and public vantage points (such as viewpoints identified on OS maps);

### Desk and Field Studies Continued

- The inclusion of strategic / important / designed views and vistas identified in published documents;
- The selection of viewpoints considering cumulative views of the proposed development in conjunction with other developments (as agreed between the parties).  
Views from the following are to be included in the visual assessment:
- Individual private dwellings. These are to be collated as representative viewpoints as it may not be practical to visit all properties that might be affected;
- Key public buildings, where relevant (i.e. libraries, hospitals, churches, community halls etc);
- Transient views from public viewpoints (i.e. from roads, railway lines and Public

- Rights of Way - including tourist or scenic routes and associated viewpoints);
- Areas of publicly accessible green space (i.e. public open space, open access land, recreation grounds, country parks, visitor attractions, tourist destinations or scenic viewpoints); and
- Places of employment, are to be included in the assessment where relevant.

The final selection of the key viewpoints for inclusion in the LVIA will be based proportionately in relation to the scale and nature of the development proposals and likely significant effects and in agreement with the LPA.

The visual assessment records:

- The character and amenity of the view, including topographic, geological and drainage features, woodland, tree and hedgerow cover, land use, field boundaries, artefacts, access and rights of way, direction of view and potential seasonal screening effects and any skyline elements or features.
- The type of view, whether oblique or direct; panoramic or vistas.
- The extent of visibility of the range of receptors is based on a grading of degrees of visibility, from a visual inspection of the site and surrounding area. There will be a continuity of degree of visibility ranging from no view of the site (truncated) to fully open views. Views are recorded, even if views are truncated of the existing site, as the proposed development may be visible in these views. To indicate the degree of visibility of the site from any location, three categories are used:
  - Open View:**  
An open, unobstructed and clear view of a significant proportion of the ground plane of the site; or its boundary elements; or a clear view of part of the site and its component elements in close proximity.
  - Partial View:**  
A view of part of the site, a filtered or glimpsed view of the site, or a distant view where the site is perceived as a small part of the wider view;
  - Truncated View:**  
No view of the site or the site is difficult to perceive.

Following the field survey (which should cover ideally both winter and summer views) the extent to which the site is visible from the surrounding area will be mapped. A Photographic Viewpoint Plan will be prepared to illustrate the representative, specific and illustrative views into / towards and within the Site (if publicly accessible) and the degree of visibility of the site noted. This Plan will be included in a Key Views document for agreement with the Local Planning Authority and any other statutory consultees as part of the consultation process. The visual assessment will include a series of annotated photographs, the location and extent of the site within the view together with identifying the character and amenity of the view, alongside any specific elements or important component features such as landform, buildings or vegetation or detracting features which interrupt, filter or otherwise influence views. The photograph will also be annotated with the Value attributed to the receptor or group of receptors.

By the end of this stage of the combined landscape and visual site study, it will be possible to advise, in landscape and visual terms, on any specific mitigation measures required in terms of the developments preferred siting, layout and design.

### Value of Visual Receptors

Judgements on the value attached to the views experienced are based on the following criteria.

TABLE A1.2 – VALUE ATTACHED TO VIEWS

VALUE	CRITERIA
<b>HIGH</b>	Views from and to landscapes / viewpoints of national importance, or highly popular visitor attractions where the view forms a significant role in the visual experience, and / or has nationally recognised cultural associations. This may include residential receptors in Listed Buildings where the primary elevation of the dwelling is orientated to take advantage of a particular view (for example across a Registered Park and Garden or National Park).
<b>MEDIUM</b>	Views from and to landscapes / viewpoints of regional / district importance or moderately popular visitor attractions where the view forms part of the experience, and / or has local cultural associations. This may include residential receptors where the primary elevation of the dwelling is orientated to take advantage of a particular view.
<b>LOW</b>	Views from and to landscapes / viewpoints with no designation, not particularly important and with minimal or no cultural associations. This may include views from the rear elevation of residential properties.

## A1.5 PREDICTING & DESCRIBING THE LANDSCAPE & VISUAL EFFECTS

An assessment of visual effect deals with the change on the character and amenity arising from the proposal on the range of visual receptors.

The assessment of effects aims to:

- Identify systematically and separately the likely landscape and visual effects of the proposed development;
- Identify the components and elements of the landscape that are likely to be affected by the proposed development;
- Identify interactions between the landscape receptors and the different components of the development at all its different stages (e.g. enabling, construction, operation, restoration etc);
- Indicate the secondary mitigation measures over and above those already designed into the scheme proposed to avoid, reduce, remedy or compensate for these effects;
- Estimate the magnitude of the effects as accurately as possible and considering this in relation to the sensitivity of the receptor; and
- Provide an assessment of the significance of these effects in a logical and well-reasoned fashion.

Having established the value of the landscape and visual receptor, the effects are then considered in relation to the magnitude of change, which includes the size / scale, geographical extent of the areas influenced and the duration, permanence and reversibility.

Wherever possible tables or matrices will be used, linked with the scheme proposals (i.e. parameter plans or detailed plans) so that the landscape and visual effects are recorded and quantified in a systematic and logical manner. Consideration is given to the impacts during site enabling, construction and then again at the completion of development at Year 1 and again at Year 15 / at maturity (to represent short, medium and long term effects) so that the residual effects of the development after mitigation are identified. Assumptions or limitations to the assessment will also be set out.

Effects will include the direct and/or indirect impacts of the development on individual landscape elements / features as well as the effect upon the general landscape character and visual receptors.

### Landscape Susceptibility

Landscape susceptibility is evaluated by its ability to accommodate the proposed change (i.e. the degree to which the landscape is able to accommodate the proposed change without undue consequences for the maintenance of the baseline situation and / or the achievement of landscape planning policies and strategies) as set out in Table A1.3.

As part of the assessment of the landscape character and its component parts, conclusions will be drawn as to the overall susceptibility of the landscape / landscape elements and visual environment to the type of development proposed. Existing landscape capacity assessments may form a starting point for the refinement of the assessment of landscape susceptibility at the local and site level.

TABLE A1.3 – LANDSCAPE SUSCEPTIBILITY CRITERIA

SUSCEPTIBILITY	CRITERIA
<b>HIGH</b>	A landscape or townscape particularly susceptible to the proposed change, which would result in significant negative or positive effects on landscape character, value, features or individual elements.
<b>MEDIUM</b>	A landscape or townscape capable of accepting some of the proposed change with some negative or positive effects on landscape character, value, features or elements.
<b>LOW</b>	A landscape or townscape capable of accommodating the proposed change without significant negative or positive effects on landscape character, value, features or elements.

**Landscape Sensitivity**

The assessment of landscape sensitivity is then combined through a judgement on the value attributed to that landscape receptor / component and the susceptibility of the landscape receptor to the proposed change using the following matrix.

TABLE A1.4 - LANDSCAPE SENSITIVITY

		LANDSCAPE RECEPTOR SUSCEPTIBILITY		
		HIGH	MEDIUM	LOW
LANDSCAPE VALUE	HIGH	HIGH	HIGH - MEDIUM	MEDIUM
	MEDIUM	HIGH - MEDIUM	MEDIUM	MEDIUM - LOW
	LOW	MEDIUM	MEDIUM - LOW	LOW - NEGLIGIBLE

**Visual Susceptibility**

The susceptibility of the different types of visual receptors to the changes proposed is based on the occupation of the activity of the viewer at a given location; and the extent to which the persons attention or interest may be focussed on a view, considering the visual character and amenity experienced at a given view. The criteria used to assess the susceptibility of a visual receptor is set out below.

TABLE A1.5 – VISUAL SUSCEPTIBILITY CRITERIA

Susceptibility	Criteria
<b>HIGH</b>	<p>People particularly susceptible to the proposed change because they have a particular interest in the view, and/ or with prolonged viewing opportunity of the site / proposed development, such as:</p> <ul style="list-style-type: none"> <li>Residents with direct/clear/open views of the site;</li> <li>Those using Public Rights of Way, Access land, Commons or outdoor recreation facilities, where views are an important contributor to the experience;</li> <li>Those with views from designated landscapes and heritage assets, or views described in literature, where the views of the surroundings are an important contributor to the experience;</li> <li>Those using described/published scenic routes where views contribute to the enjoyment and quality of the journey;</li> <li>Those with clear views of areas within or around the site, that contribute to landscape setting, and/or which are enjoyed by the community.</li> </ul>

Susceptibility	Criteria
<b>MEDIUM</b>	<p>People partially susceptible to the proposed change because they have a moderate interest in the view, and/or with some viewing opportunity of the site / proposed development, such as:</p> <ul style="list-style-type: none"> <li>Those with an oblique or limited view toward the site, which may include some residents;</li> <li>Those travelling through the landscape on roads or Public Rights of Way, or through Access land/Commons where views are partly constrained, or where views only partly contribute to the experience;</li> <li>Those using outdoor recreation facilities, where views are incidental or not important to their enjoyment of that activity.</li> <li>Those using roads that are not described/not published scenic routes, but where the appreciation of the view partly contributes to the enjoyment and quality of that journey. Those travelling by train or other transport modes;</li> <li>Those with partial views of areas within or around the site, that contribute to landscape setting, and/or which are enjoyed by the community.</li> </ul>
<b>LOW</b>	<p>People with limited susceptibility to the proposed change because they have momentary, or little interest in the view and their surroundings, and/or because they have little viewing opportunity of the site / proposed development, such as:</p> <ul style="list-style-type: none"> <li>Those with very oblique, limited or distant views of the site, which may include some residents;</li> <li>Those travelling through the landscape on roads or Public Rights of Way, or through Access land/Commons where views are largely constrained (for example within or alongside a woodland); or where views make a limited contribution to the experience;</li> <li>People engaged in outdoor sport, whose attention is focused on their activity;</li> <li>People at their work place, whose attention is focused on their employment;</li> <li>Travellers where the view is fleeting (for example, due to the speed of the road, or boundary vegetation) or where views are incidental to the experience of the journey;</li> <li>Long distance views where the site and proposed development form a small part of the wider panorama.</li> </ul>

### Visual Sensitivity

The sensitivity of visual receptor is based on the professional judgement combining the value and susceptibility to change on that visual receptor.

TABLE A1.6 - VISUAL SENSITIVITY

		VISUAL RECEPTOR SUSCEPTIBILITY		
		HIGH	MEDIUM	LOW
VALUE OF VISUAL RECEPTOR	HIGH	HIGH	HIGH - MEDIUM	MEDIUM
	MEDIUM	HIGH - MEDIUM	MEDIUM	LOW
	LOW	MEDIUM	LOW	LOW - NEGLIGIBLE

### A1.6 MAGNITUDE OF LANDSCAPE & VISUAL EFFECTS

Magnitude is to be determined relative to the size, scale, geographic extent, duration, permanence and reversibility of the individual project through the application of professional judgement and opinion.

Typically, the following are used:

**Size and Scale:** relates to the combination of the following (and are linked to the descriptions set out under table A1.8):

- the extent of existing landscape elements that will be lost (to proportion of the total extent that is lost) and the contribution that the element has to landscape character;
- the degree to which aesthetic or perceptual aspects of the landscape are altered;
- whether the effect changes the key characteristics of the landscape (addition or removal of features and elements)
- the size and scale of change in the view (with respect to the loss or addition of features in the view) and changes to the composition, including the proportion of the view occupied by the proposed development;
- the degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristic terms of form, scale, mass, line, height, colour and texture;
- the nature of the view of the proposed development, in terms of relative amount of time over which it will be experienced and whether views will be open, partial, glimpsed.

**Geographic Extent:** In relation to landscape effects, this is to consider the geographic area over which the landscape effects will be felt relative to the proposal; effects limited to the site level; effects on the immediate setting; effects relating to the scale of the landscape type or character area (district, regional or national level); effects on a larger scale such as influencing several landscape character areas.

In relation to visual receptors, the geographic extent is to reflect the angle of the view; the distance of the viewpoint; the extent of the area over which the changes would be visible.

#### Duration, Permanence and Reversibility:

These are separate but linked considerations. Construction impacts are likely to be short term and temporary, but see the start of a permanent change. Operational effects are likely to be long term, permanent and irreversible. The impacts relating to the proposals are categorised as follows:

- Short term - 1 to 2 years
- Medium term - 5 to 15 years
- Long term - more than 15 years

### A1.7 SIGNIFICANCE OF EFFECTS

The two principal criteria determining the significance of effects are the sensitivity of the receptor and in relation to the magnitude of effect. A higher level of significance is generally attached to the magnitude of change on a sensitive receptor; for example, a low magnitude of change on highly sensitive receptor can be of greater significance than very high magnitude of change on low sensitivity receptor. Therefore, whilst the table opposite sets out a starting point for the assessment, it is important that a balanced and well reasoned professional judgement of these two criteria is provided with an explanation.

In order to develop thresholds of significance, both the sensitivity of receptors and the magnitude of change must be classified for both landscape receptors and visual receptors as set out in the tables below. Where landscape effects are judged to be adverse, additional mitigation or compensatory measures are to be considered. The significant landscape effects remaining after mitigation are then to be summarised as the residual effects.

Effects will be described clearly and objectively, and the extent and duration of any negative / positive effects quantified, using four categories of effects, indicating a gradation from high to low.

TABLE A1.7 - COMBINATION OF SENSITIVITY AND MAGNITUDE OF EFFECTS TO DETERMINE SIGNIFICANCE OF EFFECT

MAGNITUDE	LANDSCAPE AND VISUAL RECEPTOR SENSITIVITY		
	HIGH	MEDIUM	LOW
HIGH	MAJOR	MODERATE - MAJOR	MODERATE
MEDIUM	MODERATE - MAJOR	MODERATE	MODERATE MINOR
LOW	MODERATE	MODERATE MINOR	MINOR
NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
NEUTRAL	NEUTRAL	NEUTRAL	NEUTRAL

The effects set out below the red line are not significant in EIA terms.

The degree of effect is graded on the following scale in relation to the significance criteria above.

TABLE A1.8 - MAGNITUDE OF LANDSCAPE & VISUAL EFFECTS

MAGNITUDE ELEMENTS				
SIZE / SCALE	GEOGRAPHIC EXTENT	DURATION AND PERMANENCE	REVERSIBILITY	OVERALL MAGNITUDE OF CHANGE
Significant change to the landscape elements, key characteristic features and perceptual qualities; Significant change to a open or partial view (static or transient). A major change overall.	Proposal effects wider setting a district or regional level; effects the site level or immediate setting to the site; effects a single or several landscape character areas.  Middle distance or close range; direct or oblique views; readily noticeable perceived change.	Permanent or Temporary (Long, medium or short term)	Irreversible or Reversible	<b>High - Medium</b>
Some change to the landscape elements, key characteristic features and perceptual qualities; Moderate or significant change to static or transient, partial view. A moderate change overall.	Site or immediate setting to the site; effects a single or several landscape character areas.  Middle distance views; direct or oblique views; partially obscured views; moderately perceived change.	Permanent or Temporary (Long, medium or short term)	Irreversible or Reversible	<b>Medium - Low</b>
Small change to the landscape elements, key characteristic features and perceptual qualities; Small change to a static or transient partial or glimpsed view. A minor change overall.	Site, immediate setting to the site, or wider setting; covering a single landscape character area.  Distant views; very oblique; small perceived change.	Permanent or Temporary (Long, medium or short term)	Irreversible or Reversible	<b>Low</b>
Small, imperceptible change. Negligible.	All of the above	Permanent or Temporary (Long, medium or short term)	Irreversible or Reversible	<b>Negligible</b>

If there is no change to the landscape or visual receptor then the overall magnitude of change will be Neutral.

TABLE A1.9 - SIGNIFICANCE OF LANDSCAPE AND VISUAL EFFECTS

EFFECT SIGNIFICANCE	CRITERIA
MAJOR	<p>Significant change to the landscape elements, key characteristic features and perceptual qualities; Major change to a static open or partial view.</p> <p><b>Negative:</b> Where the proposals would cause the total or significant loss of or alteration to key mature landscape elements and characteristic features; or introduce elements considered uncharacteristic of the area; a major deterioration in the character and amenity of the view in terms of perceptual qualities and where the proposals would result in a significant deterioration or dominant element to close or medium distance views, or more notable change in more distant views, considering the character and amenity of the view from a range of visual receptors.</p> <p><b>Positive:</b> Where the proposals would result in a significant enhancement to the key mature landscape elements or characteristic features; or introduce new elements considered wholly characteristic of the area; a significant improvement in the character and amenity of the close or middle distance view in terms of perceptual qualities for the range of visual receptors and range of distances.</p>
MODERATE	<p>Some change to the landscape elements, key characteristic features and perceptual qualities. Moderate or major change to static or kinetic, partial view.</p> <p><b>Negative:</b> Where the proposals would cause the partial loss or moderate alteration of some of the key landscape elements and characteristic features; introduce elements considered part uncharacteristic of the area; and a barely perceived deterioration in the character and amenity of the view from the range of visual receptors and a range of distances.</p> <p><b>Positive:</b> Where the proposals would cause a moderate enhancement to the key landscape elements or characteristic features; or introduce elements considered in part characteristic of the area; results in a noticeable improvement in the character and amenity of the existing view from a range of visual receptors and range of distances.</p>

MINOR	<p>Some change to the townscape elements, key characteristic features and perceptual qualities; Minor change to a static or kinetic partial or glimpsed view.</p> <p><b>Negative:</b> Where the proposals would cause a minor loss of or slight alteration to some landscape elements or characteristic features; introduce elements considered in part uncharacteristic of the area; and a barely perceptible deterioration in the character and amenity of the view from the range of visual receptors and range of distances.</p> <p><b>Positive:</b> Where the proposals would result in a minor enhancement, alteration or improvement of some elements or characteristic features; introduce elements considered characteristic; and cause a barely perceptible improvement in the character and amenity of the existing view for the range of receptors and range of distances.</p>
NEGLIGIBLE	Where the proposals would have no discernible deterioration or improvement in the existing baseline situation in terms of landscape elements or view.
NEUTRAL OR NO CHANGE	Where the proposals would result in no change overall (resulting in no net beneficial or adverse effect).

Effects assessed as being lower than moderate are considered to be a insignificant effect (relative to the EIA regulations).

## A1.8 EFFECTS DURING SITE ENABLING & CONSTRUCTION

It is recognised that project characteristics and hence sources of effects, will vary through time. The initial effects arise from the site enabling and construction works. Sources of landscape and visual effects may include:

- The location of the site access and haulage routes;
- The origin and nature of materials stockpiles, stripping of material and cut and fill operations / disposal and construction compounds;
- The construction equipment and plant (and colour);
- The provision of utilities, including lighting and any temporary facilities;
- The scale, location and nature of any temporary parking areas and on-site accommodation;
- The removal of vegetation to facilitate site access and establish the development platforms;
- The measures for the temporary protection of existing features (such as vegetation, trees, ponds, etc) and any temporary screening (such as hoarding lines); and
- The programme of work and phasing of construction.

## A1.9 EFFECTS DURING OPERATION (AT YEAR 1 & YEAR 15 OR 20)

At the operational stage, the sources of landscape and visual effects may include:

- The location, scale, height, mass and design of buildings in terms of elevational treatment; structures and processes, including any other features;
- Details of service arrangements such as storage areas or infrastructure elements and utilities and haulage routes;
- Access arrangements and traffic movements;
- Lighting;
- Car parking;
- The noise and movement of vehicles in terms of perceived effects on tranquillity;
- Visible plumes from chimneys;
- Signage and boundary treatments;
- Outdoor activities that may be visible;
- The operational landscape, including landform, structure planting, green infrastructure and hard landscape features;
- Land management operations and objectives; and
- The enhancement or restoration of any landscape resource of particular view.

## A1.10 MITIGATION AND COMPENSATORY MEASURES

The purpose of mitigation is to avoid, reduce and where possible, remedy or offset, any significant (major to moderate) negative (adverse) effects on the landscape and visual receptors arising from the proposed development. Mitigation is thus not solely concerned with "damage limitation", but may also consider measures that could compensate for unavoidable residual effects. Mitigation measures may be considered under three categories:

- Primary measures that intrinsically comprise part of the development design through an iterative process;
- Standard construction and operational management practices for avoiding and reducing environmental effects; and
- Secondary (or residual) measures designed to specifically address the remaining effects after the primary and standard construction practices have been incorporated.

## A1.11 RESIDUAL EFFECTS

The residual effects of the proposed development are to be assessed. Residual effects consider any additional mitigation measures required to address specific landscape and visual sensitivities in place over and above the primary mitigation measures proposed and those already included and designed in to the scheme. The process of assessing residual effects is the same as assessing the primary effects.

## A1.12 CUMULATIVE EFFECTS

Cumulative effects are defined as effects which result from additional changes to the landscape and visual receptors by the proposed development in conjunction with other developments (associated with or separate to it) or actions that occurred in the past, present or likely to occur in the foreseeable future.

The scope of the developments to be included in the cumulative assessment are to be agreed with the LPA by the planning consultant and developer. Prescribed approaches to the assessment, in terms of the baseline environment and defining the study area, are to be relative to the developments identified to be assessed and are to be agreed with the LPA at the outset.

Cumulative effects arise from the intervisibility of a range of developments and/or from the combined effects of individual components of the proposed development occurring in the different locations over a period of time. The separate effects of such individual components or developments may not be significant, but together they may create an unacceptable degree of adverse effect on landscape and visual receptors.

Whilst the assessment of effects are to be assessed on the same basis as set out previously in this methodology, visual effects occur by combined visibility which occurs where the observer is able to see two or more developments from one viewpoint and / or, where sequential effects which occur when the observer has to move to another viewpoint to see different developments.



# **Appendix 3 Bat Survey Report**

**MILTON KEYNES EAST**  
**BAT SURVEY REPORT**

**Prepared for St James**

**by**

**Hankinson Duckett Associates**

**HDA ref: 2090.52**

**February 2020**

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# 1 INTRODUCTION

## 1.1 Site location and summary description

1.1.1 This report describes the results of a suite of bat surveys of approximately 362ha of land at Newport Pagnell, Buckinghamshire, hereinafter referred to as 'the site'. The site centre is located by National Grid Reference SP 893 415. The study was commissioned by St James over several phases in July 2018, August 2018 and August 2019.

1.1.2 The site is located to the south of Newport Pagnell, on the north-eastern edge of Milton Keynes, Buckinghamshire. The site is dominated by agricultural land comprising intensively managed arable and grazed grassland fields with associated farmyards, agricultural buildings and residential farmhouses. Field boundaries generally consist of hedgerows, treelines and fencing with occasional ponds and parcels of woodland, and the River Ouzel flows from south to north through the western part of the site. The site is bordered to the north by a construction site for residential development and the A422 beyond which lies the town of Newport Pagnell; to the east by arable farmland; to the west by the Pineham Nature Reserve and the M1 Motorway beyond which lies the town of Milton Keynes; and to the south by arable farmland.

1.1.3 The location and boundary of the site are shown in *Appendix A*. Detailed descriptions of the habitats within the site are given in the Ecological Appraisal (HDA, 2020).

## 1.2 Legislative context

1.2.1 All UK bat species are 'European Protected Species' (EPS) protected under the 2019 Conservation of Habitats and Species (Amendment) (EU Exit) Regulations. In relation to an EPS, the 2019 Regulations make it an offence to:

- Deliberately capture, injure or kill any wild animal of an EPS;
- Deliberately disturb wild animals of any such species, in particular any disturbance which is likely to: (i) impair their ability to survive, to breed or reproduce, or to rear or nurture their young; or to hibernate or migrate; (ii) affect significantly the local distribution or abundance of the species to which they belong;
- Damage or destroy a breeding site or resting place of such an animal; and/or
- To (a) be in possession of, or to control; (b) to transport any live or dead animal or any part of an animal; (c) to sell or exchange or (d) offer for sale or exchange any live or dead animal or part of an animal of an EPS.

1.2.2 In addition, all UK bats are protected under the 1981 Wildlife and Countryside Act (as amended). All species are listed on Schedule 5 of the Act and are subject to the provisions of Sections 9.4b and 9.4c, which make it an offence to:

- Intentionally or recklessly disturb a bat while it is occupying a structure or place which it uses for shelter or protection; and/or
- Intentionally or recklessly obstruct access to any structure or place used for shelter or protection by a bat.

1.2.3 If works are planned that are likely to constitute an offence under the current legislation, an application for a derogation licence should be made to Natural England.

1.2.4 Seven species of bat (Barbastelle, Bechstein's, Noctule, Soprano Pipistrelle, Brown Long-eared, Greater Horseshoe and Lesser Horseshoe) are also identified as Species of Principal Importance under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act. Section 40 of the Act, together with planning policy and guidance, require planning authorities to regard these species as a material consideration in the planning process.

### **1.3 Development proposals**

1.3.1 Proposals for the site include mixed use development with associated landscaping and infrastructure.

### **1.4 Scope and purpose of the report**

1.4.1 An extended Phase 1 habitat survey (HDA, 2020) and previous site work identified habitats suitable for use by roosting, foraging and commuting bats within the site. In addition, records provided by the Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) during a desk study identified the presence of bats in the surrounding area, including records of Natterer's bats immediately adjacent to the northern site boundary dating from 1992.

1.4.2 In recognition of the proposed development of the site, the potential for the site to be used by bats, and within the legislative context set out in *Section 1.2*, bat surveys were undertaken to determine use of the site by bats and to identify any need for licensing or mitigation. Specifically, the aims of the study were:

- i. To identify potential bat roosts in buildings and trees within the site, where potentially affected by the proposed development;
- ii. To determine the presence/likely absence of bats within potential roosts affected by the proposed works and identify species and numbers;
- iii. To determine levels of bat foraging and commuting activity within habitat potentially affected by the proposed development;
- iv. To determine the requirement, if any, for licensing in respect of bats; and
- v. To identify appropriate mitigation and/or enhancement measures to ensure that the development avoids adverse impacts on bats and, where possible, provides enhancements to support the long-term favourable conservation status of bats in accordance with nature conservation legislation, planning policy and the 2006 NERC Act.

## **2 METHODOLOGY**

### **2.1 Introduction**

2.1.1 The methodology followed in relation to all bat survey work undertaken at the site is consistent with current legislation and good practice guidelines set out by the Bat Conservation Trust (BCT, 2016). The following sections detail the suite of surveys undertaken to inform the proposed development and the results of these surveys are provided in *Section 3*.

### **2.2 Phase 1 bat scoping survey**

2.2.1 The site was initially subject to a Phase 1 bat scoping survey by Hayley Snowdon and Shannon Davies of Hankinson Duckett Associates on the 23<sup>rd</sup>, 24<sup>th</sup> and 27<sup>th</sup> July 2018. All buildings and trees within the site were assessed for their potential to support roosting bats and classified according to their potential.

#### *Phase 1 building survey*

2.2.2 All buildings within the site were inspected externally from ground level using binoculars and a powerful torch to identify and investigate any potential entry and exit points such as missing roof tiles, loose fascias and lifted lead flashing, and to look for evidence of entry/exit in the form of staining, discolouration and/or scratch marks.

2.2.3 Internally, buildings were searched exhaustively where possible, to look for evidence of current or former occupation by bats. A powerful torch was used to investigate any accessible cavities, crevices and recesses in each building.

2.2.4 In view of the findings of the internal/external inspections, the potential of the buildings to support roosting bats ('confirmed roost', 'high', 'moderate', 'low' or 'negligible') was assessed in accordance with current best practice guidelines (BCT, 2016). Assessment of bat roosting potential requires consideration of a number of criteria, including the design and construction of the building or structure, the size and location of potential features and access points, the position of the building or structure, aspect, geographical location, surrounding land use and adjacent landscape linkages.

#### *Phase 1 tree survey*

2.2.5 All trees within the site were inspected from ground-level with the aid of binoculars and a powerful torch to identify potential features suitable for use by roosting bats. Potential features include splits, cracks and cavities, peeling bark, woodpecker holes, broken branches and a covering of ivy where this is of a sufficient age to provide a suitable microclimate between the tree and ivy stem(s).

2.2.6 In accordance with current best practice guidelines (BCT, 2016), trees were placed into one of five categories. Categorisation was based on the nature, size, location and quality of features present in each tree:

- Negligible suitability - Trees with no or negligible features for roosting bats;
- Low suitability - Trees of sufficient size and age to contain potential roost features but with none seen from the ground or features seen with only very limited roosting potential;
- Moderate suitability - Trees with one or more potential roost sites that could be used by bats but are unlikely to support roost types of high conservation status;
- High suitability - Trees with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time; or
- Known or confirmed bat roost.

## 2.3 Phase 2 roost surveys

2.3.1 Phase 2 roost surveys, comprising a series of climbed tree inspections and emergence/re-entry surveys, were conducted wherever buildings and trees potentially affected by the proposed development had been identified as having potential to support roosting bats.

### *Climbed inspections of trees*

2.3.2 Where possible, climbed inspections of trees were conducted to investigate all features potentially suitable for use by roosting bats. Inspections were conducted by an experienced licensed bat worker and certified tree climber and an assistant.

2.3.3 Each feature was searched both externally and internally for evidence of current or previous occupation by bats in the form of bats, droppings, staining, feeding signs, and/or remains of bats. A powerful torch and an LED-illuminated fibrescope with high-visibility digital LCD display were used to investigate any cavities, crevices, knot holes, cracked or peeling bark in each tree.

2.3.4 Climbed inspections were conducted by Dan Gordon-Lee and Sanford Hankin between 14<sup>th</sup>-17<sup>th</sup> July 2019. Full details of climbed inspections are provided, along with the results of these inspections, in *Section 3*.

### *Emergence/re-entry surveys of buildings and trees*

2.3.5 Phase 2 dusk emergence and dawn re-entry surveys of trees (where not suitable for climbing inspections) and buildings were carried out where these had potential to support roosting bats and were potentially affected by the emerging proposals. Emergence/re-entry surveys were conducted to determine presence/probable absence and, where

present, identify species and numbers. The level of survey effort conducted was determined with reference to the identified bat roosting potential of the building or tree in accordance with best practice guidelines (BCT, 2016).

2.3.6 Surveyors with electronic bat detectors<sup>1</sup> were positioned around each feature to record bats emerging from or entering the building/tree. Surveyors were positioned to provide adequate coverage of all potential emergence points on each feature surveyed. Dusk emergence surveys generally began 15 minutes before sunset, ending approximately 1.5 hours after sunset. Dawn re-entry surveys generally began approximately 1.5 hours before sunrise and ended 15 minutes after sunrise. Records were made of any emergences and entries, and incidental records were also made of bat commuting and foraging activity in the vicinity of each surveyor.

2.3.7 In line with current best practise guidelines (BCT, 2016), Phase 2 bat roost surveys were not conducted on trees which were assessed as having low potential to support roosting bats. Further surveys of these low potential trees are not required, at this stage, in support of a planning application. However, in the event that retention of a tree identified as having low potential to support roosting bats is not possible, the appropriate approach to works is given in *Section 5* below.

2.3.8 Details of the dates and times of Phase 2 emergence/re-entry surveys, along with weather conditions and sunset/sunrise times, are provided in *Table 1* below.

**Table 1:** Details of Phase 2 roost surveys

Building/ Tree ref	Date / Time	Sunset / Sunrise	Conditions
<b>B2 / B3</b>	Dusk 03/07/2019 21:11 – 22:56	21:26	0% cloud cover, Beaufort Scale = 1, dry, 15-18°C
	Dusk 04/09/2019 19:24 – 21:14	19:44	100% cloud cover, Beaufort Scale = 1, light showers between 19:30 and 19:45, 15°C
	Dawn 17/09/2019 05:08 – 06:53	06:38	50-70% cloud cover, Beaufort Scale = 0, dry, 9-13°C
<b>B20</b>	Dusk 27/06/2019 21:12 – 22:57	21:27	100% cloud cover, Beaufort Scale = 0, dry, 12-14°C
	Dawn 16/07/2019 03:31 – 05:16	05:01	30% cloud cover, Beaufort Scale = 0, dry, 8-9°C
<b>B22</b>	Dawn 27/06/2019 03:14– 04:59	04:44	100% cloud cover, Beaufort Scale = 2, dry, 12-13°C
<b>B27 / B28</b>	Dusk 27/06/2019 21:12 – 22:57	21:27	100% cloud cover, Beaufort Scale = 0, dry, 12-14°C
	Dawn 16/07/2019 03:31 – 05:16	05:01	30% cloud cover, Beaufort Scale = 0, dry, 8-9°C

<sup>1</sup> Pettersson D240x heterodyne and time-expansion detector with MP3 recorder, Anabat Walkabout, Anabat Express and Anabat SD1/SD2 with 'Analook' recording software.

Building/ Tree ref	Date / Time	Sunset / Sunrise	Conditions
	Dusk 16/09/2019 19:01 – 20:46	19:16	90% cloud cover, Beaufort Scale = 0, dry, 14°C
<b>B33</b>	Dawn 28/06/2019 03:15 – 05:00	03:30	100% cloud cover, Beaufort Scale = 4, dry, 10-12°C
	Dusk 15/07/2019 21:02 – 22:47	21:17	<5% cloud cover, Beaufort Scale = 0, dry, 13-15°C
	Dusk 29/07/2019 20:44 – 22:29	20:59	70% cloud cover, Beaufort Scale = 1, dry, 22°C
<b>G1 / 8 / 9</b>	Dusk 25/06/2019 21:13 – 22:58	21:28	100% cloud cover, Beaufort Scale = 0–1, dry, 15-17°C
	Dawn 09/07/2019 03:23 – 05:08	04:53	100% cloud cover, Beaufort Scale = 2, light drizzle between 04:45 and 04:50, 14°C
	Dusk 16/09/2019 19:01 – 20:46	19:16	90% cloud cover, Beaufort Scale = 0, dry, 14°C
<b>11</b>	Dusk 25/06/2019 21:13 – 22:58	21:28	100% cloud cover, Beaufort Scale = 0–1, dry, 15-17°C
	Dawn 09/07/2019 03:23 – 05:08	04:53	100% cloud cover, Beaufort Scale = 2, light drizzle between 04:45 and 04:50, 14°C
<b>16</b>	Dusk 26/06/2019 21:13 – 22:58	21:28	100% cloud cover, Beaufort Scale = 2–3, dry, 13-14°C
	Dawn 16/07/2019 03:31 – 05:16	05:01	30% cloud cover, Beaufort Scale = 0, dry, 8-9°C
<b>17 / 18</b>	Dusk 26/06/2019 21:13 – 22:58	21:28	100% cloud cover, Beaufort Scale = 2–3, dry, 13-14°C
	Dusk 09/07/2019 21:07 – 22:52	21:22	100% cloud cover, Beaufort Scale = 0, dry, 17-20°C
	Dawn 30/07/2019 03:49 – 05:36	05:21	1% cloud cover, Beaufort Scale = 0, dry, 16°C
<b>19 / 20</b>	Dusk 26/06/2019 21:13 – 22:58	21:28	100% cloud cover, Beaufort Scale = 2–3, dry, 13-14°C
	Dawn 10/07/2019 03:24 – 05:09	04:54	95% cloud cover, Beaufort Scale = 0–1, dry, 16-17°C
<b>21 / 23 / 24</b>	Dusk 27/06/2019 21:12 – 22:57	21:27	100% cloud cover, Beaufort Scale = 0, dry, 12-14°C
	Dusk 22/07/2019 20:56 – 22:39	21:09	2% cloud cover, Beaufort Scale = 1, dry, 20-25°C
<b>22</b>	Dusk 27/06/2019 21:12 – 22:57	21:27	100% cloud cover, Beaufort Scale = 0, dry, 12-14°C
	Dawn 23/07/2019 03:41 – 05:26	05:11	30% cloud cover, Beaufort Scale = 0, dry, 16°C
<b>25</b>	Dusk 26/06/2019 21:13 – 22:58	21:28	100% cloud cover, Beaufort Scale = 2–3, dry, 13-14°C
	Dawn 10/07/2019 03:24 – 05:09	04:54	95% cloud cover, Beaufort Scale = 0-1, dry, 16-17°C
	Dawn 30/07/2019 03:49 – 05:36	05:21	1% cloud cover, Beaufort Scale = 0, dry, 16°C
<b>50</b>	Dusk 24/06/2019 21:13 – 22:58	21:28	90% cloud cover, Beaufort Scale = 0, very light rain between 22:45 and 22:55, 19-22°C

Building/ Tree ref	Date / Time	Sunset / Sunrise	Conditions
	Dusk 09/07/2019 21:07 – 22:52	21:22	100% cloud cover, Beaufort Scale = 0, dry, 17-19°C
53 / 95	Dusk 24/06/2019 21:13 – 22:58	21:28	90% cloud cover, Beaufort Scale = 0, very light rain between 22:45 and 22:50, 19-22°C
	Dusk 08/07/2019 21:08 – 22:53	21:23	100% cloud cover, Beaufort Scale = 4, dry, 14-17°C
58	Dusk 24/06/2019 21:13 – 22:58	21:28	90% cloud cover, Beaufort Scale = 0, very light rain between 22:45 and 22:50, 19-22°C
	Dawn 10/07/2019 03:24 – 05:09	04:54	95% cloud cover, Beaufort Scale = 0–1, dry, 15- 17°C
60	Dawn 05/09/2019 04:50 – 06:35	06:20	80% cloud cover, Beaufort Scale = 3-4, dry, 10- 12°C
	Dawn 17/09/2019 05:08 – 06:53	06:38	50-70% cloud cover, Beaufort Scale = 0, dry, 10- 13°C
	Dusk 25/09/2019 18:40 – 21:25	18:55	80% cloud cover, Beaufort Scale = 2, short showers between 18:40 and 19:15, 16°C
72	Dusk 27/06/2019 21:12 – 22:57	21:27	100% cloud cover, Beaufort Scale = 0, dry, 12-14°C
	Dusk 22/07/2019 20:56 – 22:39	21:09	2% cloud cover, Beaufort Scale = 1, dry, 20-25°C
76 / 81 / 85	Dusk 17/06/2019 21:11 – 22:56	21:26	50% cloud cover, Beaufort Scale = 0–1, dry, 16- 17°C
	Dusk 08/07/2019 21:08 – 22:53	21:23	100% cloud cover, Beaufort Scale = 4, dry, 14-17°C
79	Dawn 05/09/2019 04:50 – 06:35	06:20	80% cloud cover, Beaufort Scale = 3-4, dry, 10- 12°C
	Dusk 25/09/2019 18:40 – 21:25	18:55	80% cloud cover, Beaufort Scale = 2, short showers between 18:40 and 19:15, 16°C
96	Dusk 24/06/2019 21:13 – 22:58	21:28	90% cloud cover, Beaufort Scale = 0, very light rain between 22:45 and 22:50, 19-22°C
	Dusk 08/07/2019 21:08 – 22:53	21:23	100% cloud cover, Beaufort Scale = 4, dry, 14-17°C
	Dawn 23/07/2019 03:41 – 05:26	05:11	30% cloud cover, Beaufort Scale = 0, dry, 16°C
99	Dusk 24/06/2019 21:13 – 22:58	21:28	90% cloud cover, Beaufort Scale = 0, very light rain between 22:45 and 22:50, 19-22°C
	Dusk 09/07/2019 21:07 – 22:52	21:22	100% cloud cover, Beaufort Scale = 0, dry, 17-19°C
	Dawn 23/07/2019 03:41 – 05:26	05:11	30% cloud cover, Beaufort Scale = 0, dry, 16°C

## 2.4 Phase 2 bat activity survey

### *Bat activity transects*

2.4.1 In order to provide an assessment of the importance of the site for foraging and commuting bats, dusk activity surveys were undertaken between July and September 2018 and April and June 2019. Due to the size of the site, the site was divided into six survey area transects. The six survey area transect locations are shown in *Appendix C*.

2.4.2 Transect 1 located in the west of the site in association with the River Ouzel corridor, comprises higher quality habitat for foraging and commuting bats and was subsequently surveyed on six occasions. The remainder of the transects were surveyed on three occasions.

2.4.3 Surveyors carrying hand-held bat detectors walked the transects, with listening stops at regular intervals for periods of up to 5 minutes. Visual observations of bats and bat call registrations were noted, recording time, location, activity and, where known, species. Recordings of foraging and/or commuting activity made using digital devices were subsequently analysed to determine the identity of any unconfirmed species recorded during the surveys. Times and dates of surveys are given in *Table 2* below, along with weather conditions.

**Table 2:** Details of bat activity surveys

Date	Sunset	Time	Weather conditions
26/07/2018 (Transects 1-6)	21:03	21:00-23:35	10-25% cloud cover, Beaufort Scale = 1-2, dry, 22-27°C
13/08/2018 (Transect 1 only)	20:24	20:24-22:45	0% cloud cover, Beaufort Scale = 1, dry, 17-18°C
04/09/2018 (Transects 1-6)	19:38	19:38 – 22:10	100% cloud cover, Beaufort Scale = 0-1, dry, 16°C
15/04/2019 (Transect 1 only)	20:00	20:00 – 22:05	60% cloud cover, Beaufort Scale = 1, dry, 7-8°C
29/05/2019 (Transects 1-6)	21:08	21:05 – 23:15	100% cloud cover, Beaufort Scale = 0-1, occasional light drizzle, 14°C
17/06/2019 (Transect 1 only)	21:26	21:30 – 23:30	50% cloud cover, Beaufort Scale = 0-1, dry, 16-17°C

#### *Automated surveys*

2.4.4 Automated surveys were carried out as a supplement to the activity transect surveys and to gain further information on the species and frequency of bat activity at the site. A programmable electronic bat detector<sup>2</sup> was positioned in suitable habitat and left in place on six occasions for Transect 1 and three occasions for Transects 2-6 between July and September 2018 and April and June 2019. The detectors were programmed to record all bat activity. Details of the times and dates of automated bat detector deployment are provided in *Table 3* below and the location of each detector deployed is shown in *Appendix C*.

<sup>2</sup> Anabat SD2 with remote microphone and 'Analook' software

**Table 3:** Details of automated bat detector deployment

Location	Deployment and collection date	Sunset/Sunrise	Night Temp. Max./Min. (°C)
1-6A *	26/07/2018 – 27/07/2018	21:02 – 05:16	30 / 19
	27/07/2018 – 28/07/2018	21:01 – 05:18	22 / 18
	28/07/2018 – 29/07/2018	20:59 – 05:19	17 / 16
	29/07/2018 – 30/07/2018	20:58 – 05:21	20 / 17
	30/07/2018 – 31/07/2018	20:56 – 05:22	21 / 16
	31/07/2018 – 01/08/2018	20:54 – 05:23	22 / 13
1B	13/08/2018 – 14/08/2018	20:31 – 05:44	19 / 12
	14/08/2018 – 15/08/2018	20:29 – 05:46	21 / 15
	15/08/2018 – 16/08/2018	20:27 – 05:48	21 / 16
	16/08/2018 - 17/08/2018	20:25 – 05:49	21 / 8
	17/08/2018 – 18/08/2018	20:23 – 05:51	18 / 16
	18/08/2018 – 19/08/2018	20:20 – 05:53	20 / 17
	19/08/2018 – 20/08/2018	20:18 – 05:54	22 / 17
1C & 2-6B **	04/09/2018 – 05/09/2018	19:43 – 06:20	22 / 13
	05/09/2018 – 06/09/2018	19:41 – 06:22	19 / 10
	06/09/2018 – 07/09/2018	19:38 – 06:24	14 / 8
	07/09/2018 – 08/09/2018	19:36 – 06:25	15 / 10
	08/09/2018 – 09/09/2018	19:34 – 06:27	18 / 15
	09/09/2018 – 10/09/2018	19:32 – 06:28	19 / 14
1D	15/04/2019 – 16/04/2019	20:00 – 06:04	11 / 4
	16/04/2019 – 17/04/2019	20:00 – 06:03	11 / 6
	17/04/2019 – 18/04/2019	20:03 – 06:00	12 / 6
	18/04/2019 – 19/04/2019	20:05 – 05:58	16 / 6
	19/04/2019 – 20/04/2019	20:07 – 05:56	18 / 4

Location	Deployment and collection date	Sunset/Sunrise	Night Temp. Max./Min. (°C)
	20/04/2019 – 21/04/2019	20:07 – 05:55	17 / 4
1E, 5C & 6C	29/05/2019 – 30/05/2019	21:09 – 04:50	16 / 14
	30/05/2019 – 31/05/2019	21:10 – 04:49	18 / 14
	31/05/2019 – 01/06/2019	21:12 – 04:48	18 / 13
	01/06/2019 – 02/06/2019	21:11 – 04:47	22 / 17
	02/06/2019 – 03/06/2019	21:14 – 04:47	16 / 10
	3C ***	03/06/2019 – 04/06/2019	21:15 – 04:46
04/06/2019 – 05/06/2019		21:16 – 04:45	15 / 11
05/06/2019 – 06/06/2019		21:17 – 04:45	15 / 7
06/06/2019 – 07/06/2019		21:18 – 04:44	15 / 10
07/06/2019 – 08/06/2019		21:19 – 04:44	13 / 11
08/06/2019 – 09/06/2019		21:20 – 04:43	13 / 8
1F & 4C***	17/06/2019 – 18/06/2019	21:25 – 04:41	18 / 10
	18/06/2019 – 19/06/2019	21:26 – 04:41	15 / 8
	19/06/2019 – 20/06/2019	21:26 – 04:41	17 / 13
	20/06/2019 – 21/06/2019	21:26 – 04:42	16 / 9
	21/06/2019 – 22/06/2019	21:27 – 04:42	16 / 7
	22/06/2019 – 23/06/2019	21:27 – 04:42	17 / 9
	23/06/2019 – 24/06/2019	21:27 – 04:42	18 / 14
2C***	27/06/2019 – 28/06/2019	21:27 – 04:44	25 / 23
	28/06/2019 – 29/06/2019	21:27 – 04:45	19 / 13
	29/06/2019 – 30/06/2019	21:27 – 04:45	27 / 12
	30/06/2019 – 01/07/2019	21:25 – 04:47	17 / 13

\* The automated detectors at Locations 1-6A were deployed for 6 nights however, due to battery failure the automatic detector at Location 1A recorded for 4 nights and the automatic detectors at Locations 2A, 4A, 5A and 6A recorded for 5 nights.

\*\* The automated detectors at Locations 1C and 2-6B were deployed for 6 nights however, due to battery failure the automatic detector at Location 1C recorded for 4 nights and the automatic detectors at Locations 3B, 4B and 5B recorded for 5 nights.

*\*\*\* Due to equipment failure the automated bat detectors located at Locations 2C, 3C and 4C were redeployed at a later date. In addition, the automatic detector at Location 4C recorded for 5 nights and the automatic detector at Location 2C recorded for 4 nights.*

2.4.3 The results of the dedicated bat activity and automated surveys are further supported by additional incidental records of bat activity made during the dusk emergence and dawn re-entry surveys of the trees and buildings within the site. Together, these surveys allow a robust assessment of bat foraging and commuting activity throughout the site.

## **2.5 Limitations of surveys**

2.5.1 B33 (Hermitage Farm) comprises a collection of off-site buildings, albeit encompassed by the site, for which access was not granted during either the Phase 1 scoping survey or emergence/re-entry surveys. This collection of buildings were subsequently surveyed as a group and bat roosts associated with Hermitage Farm may have been missed. This limitation is discussed further in *Section 5.2.26* below.

2.5.2 During the Phase 1 bat survey permission was not granted to access some of the buildings for internal inspections. These buildings were however subject to detailed external inspections and in such instances a precautionary approach was taken during assessment of the building's potential to support roosting bats.

2.5.3 Two trees (Trees 60 and 79) were subject to climbing surveys during which no evidence of bats was recorded, however they could not be inspected exhaustively. These trees were subsequently subject to emergence/re-entry surveys, however due to late instruction the emergence/re-entry surveys were carried out in September which is at the end of the bat active season. However, in view of the combination of surveys carried out it is considered unlikely that a significant bat roost (i.e. a maternity roost) was present within either of these trees at the time of survey.

2.5.4 Due to equipment failure the automatic detectors deployed at Locations 1A, 1C and 2C recorded for less than the requisite five nights. However, this was not considered a significant limitation however as recordings were made on four out of the requisite five nights, the automated detector surveys were supplemented by bat activity transect surveys, and greater recording effort than that required under current guidelines was made from adjacent areas of contiguous habitat.

2.5.5 All other surveys followed current best practice guidelines (BCT, 2016) and were conducted at an appropriate time of year, under favourable weather conditions and with an appropriate level of survey effort both in terms of the number of surveyors used and number of survey visits undertaken. Although periods of light drizzle were experienced on one of the activity surveys and 12 of the bat emergence/re-entry surveys this was not found to have affected levels of bat activity and is not considered a constraint to the

findings of the surveys. The surveys are therefore considered sufficient to allow a robust assessment of the likely effects of the proposed development on bats and to inform the recommendations provided in *Section 5* of this report.

### 3 RESULTS

#### 3.1 Phase 1 bat scoping survey

##### *Buildings*

3.2.1 All buildings within the site were inspected during the Phase 1 bat scoping survey. The results of the Phase 1 building survey are summarised in *Table 4* below and the locations of the buildings are shown in *Appendix A*. Photograph references relate to the photographs provided in *Appendix E*.

**Table 4:** Results of Phase 1 bat scoping building survey

Building	Description	Findings	Bat roost potential
B1 (Photo 1)	Single-storey cowshed constructed of wooden beams with corrugated metal walls and a pitched corrugated metal roof.	<p><b>External:</b> The building is open sided on the southern elevation and has missing wall panels on the eastern elevation. No suitable features for roosting bats were recorded.</p> <p><b>Internal:</b> The building is single skinned and light internally.</p> <p><b>No evidence of bats recorded.</b></p>	Negligible
B2 (Photos 2 and 3)	Two-storey house of brick construction with a painted pebbledash render and a pitched slate roof with a tiled ridge. A porch with a flat felt roof is located on the eastern elevation. A brick chimney is also present.	<p><b>External:</b> Potential bat roosting opportunities include a possible gap behind the bargeboard on the southern elevation and possible gaps at the edge of the roof on the eastern and western elevations.</p> <p><b>Internal:</b> Internal survey not possible due to access constraints</p> <p><b>No evidence of bats recorded.</b></p>	Low
B3 (Photo 4)	Single-storey garage with brick and breezeblock walls and a pitched slate tile and corrugated metal roof with tiled ridge.	<p><b>External:</b> Potential bat roosting opportunities include small gaps under the ridge tiles and a gap between the wooden boarding and brickwork on the southern elevation.</p> <p><b>Internal:</b> Full internal survey was not possible due to access constraints, however the main area of the garage is well lit due to the building being open-sided.</p> <p><b>No evidence of bats recorded.</b></p>	Low

Building	Description	Findings	Bat roost potential
<p><b>B4</b> (Photo 5)</p>	<p>Wooden shed with pitched corrugated plastic and bitumen roof. An overhang is present on the eastern elevation.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> Internal survey was not possible due to access constraints.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B5</b> (Photo 6)</p>	<p>Single-storey stable with single skin brick walls and a sloping, corrugated asbestos roof.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> The building was relatively well-lit internally and the roof of the building is partly lined within rotting wooden boarding.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B6</b> (Photo 7)</p>	<p>Single-storey office building with breezeblock walls and a sloping felt roof.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> The building is well-lit with no loft void present. No opportunities for roosting bats recorded.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B7</b> (Photo 8)</p>	<p>Single-storey open-sided barn with a timber frame and corrugated metal walls and roof.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> The building is well-lit and open on three sides.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B8</b> (Photo 9)</p>	<p>Large single-storey barn constructed of concrete blocks and corrugated metal walls with a pitched corrugated metal roof.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> The building is single-skinned.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>

Building	Description	Findings	Bat roost potential
<p><b>B9</b> (Photo 10)</p>	<p>Single-storey barn comprising a steel frame with corrugated metal and asbestos walls and a pitched asbestos roof.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> The building is single-skinned.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B10</b> (Photo 11)</p>	<p>Single-storey barn with metal frame and corrugated metal walls and roof.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> The building is single-skinned.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B11 (Off-site)</b> (Photo 12)</p>	<p>A two-storey hotel with brick walls and a pitched slate tiled roof. A chimney and vents are present on the roof.</p>	<p><b>External:</b> Potential bat roosting opportunities include lifted tiles, lifted metal flashing, loose brickwork and open vents.</p> <p><b>Internal:</b> Internal survey not possible due to access constraints</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Moderate</b></p>
<p><b>B12</b> (Photo 13)</p>	<p>Polytunnel constructed of wooden and metal posts with a corrugated metal base and plastic sheeting.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> The building is single-skinned and light internally.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B13 and B14</b> (Photo 14)</p>	<p>Two static caravans.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> Internal survey not possible due to access constraints.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>

Building	Description	Findings	Bat roost potential
<p><b>B15, B16 and B17</b></p> <p>(Photos 15 &amp; 16)</p>	<p>Three flat roofed, metal shipping containers.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> Internal survey not possible due to access constraints.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B18</b></p> <p>(Photo 17)</p>	<p>Flat roofed, metal shipping container.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> Internal survey not possible due to access constraints.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B19</b></p> <p>(Photo 18)</p>	<p>Greenhouse constructed of a metal frame with glass walls and pitched glass roof.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> The building is single-skinned and light internally.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B20</b></p> <p>(Photos 19 &amp; 20)</p>	<p>Two-storey semi-detached cottages of brick construction with painted render and a pitched tiled roof with tiled ridge. An extension with a sloping tiled roof is present on the eastern elevation. Further features on the house include 3 chimneys and a porch on the western elevation.</p>	<p><b>External:</b> Potential bat roosting opportunities include gaps under the ridge tiles, a gap at the edge of the roof and lifted tiles on the porch.</p> <p><b>Internal:</b> Internal survey not possible due to access constraints.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Moderate</b></p>
<p><b>B21</b></p> <p>(Photo 21)</p>	<p>Single-storey shed with brick walls and a sloping corrugated metal roof. The building is overgrown with vegetation.</p>	<p><b>External:</b> Potential bat access opportunities include a gap above the window on the eastern elevation and a gap below the roof on the northern elevation. These features were however considered unsuitable for roosting bats.</p> <p><b>Internal:</b> No suitable features for roosting bats recorded.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>

Building	Description	Findings	Bat roost potential
<p><b>B22</b> (Photo 22)</p>	<p>A series of 3 internally connected barns each with a pitched, corrugated metal or asbestos tiled roof. The barns are constructed of breezeblocks, brick, and corrugated metal. Single skinned wooden weatherboarding is located on some elevations.</p>	<p><b>External:</b> Potential bat access opportunities include large openings in the walls, and open doorways and windows. The edge of the roof on the northern elevation has partially collapsed with slightly lifted tiles.</p> <p><b>Internal:</b> Timber beams that could not be exhaustively searched are present within the building.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Low</b></p>
<p><b>B23</b> (Photo 23)</p>	<p>Open-sided barn with a timber frame and a gently sloping corrugated metal roof.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> The building is well-lit and open on all sides.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B24</b> (Photo 23)</p>	<p>Elevated metal grain store.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> Internal survey not possible due to access constraints.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B25</b> (Photo 24)</p>	<p>Metal shipping container with flat, corrugated metal roof.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> Internal survey not possible due to access constraints.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B26</b> (Photo 25)</p>	<p>Metal tank in state of disrepair.</p>	<p><b>External:</b> Holes present allowing bats access internally however the tank is constructed of single-skinned metal which is likely to fluctuate in temperature and the smooth metal surface will not allow much purchase for bats.</p> <p><b>Internal:</b> Internal survey not possible due to access constraints.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>

Building	Description	Findings	Bat roost potential
<p><b>B27</b> (Photos 26 &amp; 27)</p>	<p>Barn constructed of a timber frame with wooden weatherboard walls and a pitched tiled roof.</p>	<p><b>External:</b> Potential bat roosting opportunities include gaps under weatherboarding and a gap under a ridge tile.</p> <p><b>Internal:</b> Full internal survey not possible due to access constraints. The central area of the barn is dark and enclosed with a number of bat access points.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Moderate</b></p>
<p><b>B28</b> (Photo 28)</p>	<p>Car port with double-skinned wooden walls and a sloping corrugated metal roof. The building is open-sided on the southern elevation.</p>	<p><b>External:</b> Potential bat roosting opportunities include a gap between the walls on eastern elevation. The structure is overgrown with vegetation.</p> <p><b>Internal:</b> No suitable features for roosting bats recorded.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Low</b></p>
<p><b>B29</b> (Photo 29)</p>	<p>Barn constructed of wooden weatherboarding with a pitched metal roof.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> No suitable features for roosting bats recorded.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B30 and B31</b> (Photos 29 &amp; 30)</p>	<p>Two barns constructed of brick, corrugated metal and asbestos walls with arched corrugated iron roofs. A wooden lean-to is present on the northern elevation.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> The buildings are single-skinned. No suitable features for roosting bats recorded.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>
<p><b>B32</b> (Photo 31)</p>	<p>Flat roofed, metal shipping container.</p>	<p><b>External:</b> No suitable features for roosting bats recorded.</p> <p><b>Internal:</b> Internal survey not possible due to access constraints.</p> <p><b>No evidence of bats recorded.</b></p>	<p><b>Negligible</b></p>

Building	Description	Findings	Bat roost potential
<b>B33 (off-site)</b> (Photo 32)	A collection of buildings at Hermitage Farm, including a brick built farmhouse with pitched slate tiled roof and chimneys, outbuildings with brick walls and slate tiled roofs, a number of brick barns with pitched metal or corrugated asbestos rooves, metal barns, open-sided barns and shipping containers.	<b>External:</b> Full external survey not possible due to access constraints. The farmhouse and outbuildings have a number of lifted roof tiles.  <b>Internal:</b> Internal survey not possible due to access constraints  <b>No evidence of bats recorded.</b>	<b>Probable Negligible to High</b>
<b>B34 (off-site)</b> (Photo 33)	Furniture warehouse constructed of brick walls and corrugated metal and asbestos sheeting with a pitched asbestos roof.	<b>External:</b> No suitable features for roosting bats recorded.  <b>Internal:</b> Internal survey not possible due to access constraints  <b>No evidence of bats recorded.</b>	<b>Negligible</b>

### Trees

3.2.2 All trees identified as having potential to support roosting bats within the site are described in *Table 5* below and their locations are given in *Appendix A*.

**Table 5:** Results of Phase I bat scoping tree survey

Tree ref	Species	Description of Features	BCT Category
1	Oak	Scar on trunk and lifted bark on northern aspect at 1-2m. Tree is covered in Ivy and of sufficient size and age to contain additional roosting features not visible from the ground.	Low
2	Ash	Hollow stem with multiple cavities on eastern aspect at 1-5m. Small knot hole with possible depth on eastern aspect at 6-7m.	Moderate
3	Oak	Tree is covered in Ivy and of sufficient size and age to contain roosting features not visible from the ground.	Low
4	Ash	Large upward facing knot hole in branch on southern aspect at 6-7m.	Low
5	Oak	Two broken branches with splits and an upward facing trunk cavity on southern aspect at 7m. Branch knot hole with possible depth on southern aspect at 8m.	Low
6	Oak	Hollow branch with cavities on south-eastern aspect at 6-7m. The tree is sufficient size and age which may contain additional roosting features not visible from the ground.	Low
7	Ash	Small knot hole in branch on southern aspect at 6-7m. Cavity at the end of a branch with possible depth on northern aspect at 10m.	Low

Tree ref	Species	Description of Features	BCT Category
8	Willow	Hollow branch with cavity on southern aspect at 3m. Hollow trunk with possible branch cavity on south-eastern aspect at 8m.	Moderate
9	Ash	Main crown missing resulting in upward facing cavity at 10m+. Hollow trunk with large cavity on western aspect at 2m. Occluded wood and branch cavity on south-western aspect at 4m and 6-7m.	High
10	Oak	Dead cracked branches on northern and southern aspects between 5-8m.	Low
11	Ash	Upward facing cavity on northern aspect. Two woodpecker holes on trunk on south-eastern aspect at 4-5m. Dead branches with basal cavity on southern aspect.	Moderate
12	Oak	Deadwood in crown and lifted bark on trunk on southern aspect.	Low
13	Ash	Knot hole on branch on eastern aspect at 6m.	Low
14	Oak	Two very narrow cracked branches on eastern aspect at 8 and 10m+. Branch cavity and occluded wood with possible depth on western aspect at 6m and northern aspect at 8m, respectively.	Low
15	Ash	Occluded wood along trunk scar on northern aspect at 2m.	Low
16	Ash	Woodpecker holes on western aspect at 10m+, on south-western aspect at 7m and on north-eastern aspect at 7-8m. Upward facing branch cavity on northern aspect.	Moderate
17	Ash	Upward facing knot hole on branch and missing crown with large cavity on western aspect at 10m+. Knot hole with possible depth on western aspect at 6m. Woodpecker holes on trunk on northern aspect at 9m and eastern aspect at 7m.	High
18	Ash	Large number of trunk cavities on eastern aspect.	High
19	Ash	Woodpecker hole and trunk cavity on western aspect at 8-9m. Small knot hole with possible depth on southern aspect at 8m.	Moderate
20	Ash	Cavity at base of branch on southern aspect at 7m. Knot hole in branch on eastern aspect.	Moderate
21	Ash	Two woodpecker holes into hollow trunk on south-eastern aspect at 4-5m. Cracked and occluded wood on south-eastern aspect at 1-4m.	Moderate
22	Ash	Possible trunk cavity and occluded wood on south-eastern aspect at 3-5m. Knot hole on northern aspect.	Moderate
23	Ash	Crown of tree missing with rotting wood present. Trunk cavities on eastern aspect at 9m and north-western aspect at 4-5m.	Moderate

<b>Tree ref</b>	<b>Species</b>	<b>Description of Features</b>	<b>BCT Category</b>
24	Ash	Trunk hollow with cavity on north-western aspect at 8m.	<b>Moderate</b>
25	Ash	Woodpecker hole in trunk on southern aspect at 8m. Large trunk cavity and woodpecker hole in branch on southern aspect at 10m+. Cavities and woodpecker hole on north-eastern aspect at 10m.	<b>High</b>
26	Ash	Missing crown.	<b>Low</b>
27 (off-site)	Oak	Tree is covered in Ivy and of sufficient size and age to contain roosting features not visible from the ground.	<b>Low</b>
28	Ash	Woodpecker hole on underside of branch on northern aspect at 6m. Hollowing at base of trunk on southern aspect at 1-2m.	<b>Moderate</b>
29	Ash	Trunk cavities on north-eastern aspect at 6m and eastern aspect at 8m. Woodpecker hole in trunk on southern aspect at 7m.	<b>High</b>
30	Willow	Partly dead with lifted wood on all aspects at 1-7m.	<b>Low</b>
31	Oak	Knot hole with possible depth at 9m on southern aspect.	<b>Low</b>
32	Oak	Trunk cavity on eastern aspect.	<b>Moderate</b>
33	Ash	Woodpecker hole at 5m on southern aspect and large knot hole with possible depth at 5m on western aspect.	<b>Moderate</b>
34	Oak	Crack in trunk on northern aspect and lifted bark on all aspects.	<b>Low</b>
35	Oak	Ivy plating.	<b>Low</b>
36	Oak stump	The tree is covered in Ivy and of sufficient size and age to contain roosting features not visible from the ground.	<b>Low</b>
37	Oak	Two Woodpecker holes and two knot holes of possible depth on western aspect. Dead branches with cracks and splits on northern, eastern and southern aspects.	<b>Moderate</b>
38	Oak	Mature tree with a number of dead branches with rotting wood and shallow cavities.	<b>Low</b>
39	Oak	Possible cavity at end of branch on northern aspect at over 10m.	<b>Low</b>
40	Oak	Branch cavity on southern elevation at 9m, dead branch with lifted bark and cracks on western aspect at 8m and several further branches with deadwood and shallow cavities.	<b>Moderate</b>
41	Willow	Three woodpecker holes present on western and eastern aspects.	<b>Moderate</b>
42	Willow	Split branch on southern aspect.	<b>Low</b>
43	Willow	The crown of the tree has been lost with a number of further fallen branches. Cracks and splits with no apparent depth are present on trunk.	<b>Low</b>
44	Ash	Hollowing and rotting trunk with a potential cavity on eastern aspect, trunk cavity at base of branch, small woodpecker hole on northern aspect and knot hole at end of branch on western aspect.	<b>High</b>

<b>Tree ref</b>	<b>Species</b>	<b>Description of Features</b>	<b>BCT Category</b>
45	Willow	Crack at base of branch with possible cavity on southern aspect.	Low
46	Willow	Broken and fallen limbs on all aspects. The tree is covered in Ivy and of sufficient size and age to contain additional roosting features not visible from the ground.	Low
47	Willow	Possible narrow trunk cavity on northern aspect.	Low
48	Ash	Upward facing trunk cavity with possible depth on north-eastern aspect.	Low
49	Oak	An upward facing woodpecker hole on branch on eastern aspect.	Low
50	Ash	Upward facing branch cavities on western, eastern and northern aspects. Two woodpecker holes on eastern aspect.	Moderate
51	Ash	Dead trunk with possible upward facing cavity.	Low
52	Ash	The tree is missing its crown and is likely open at the top, as such it is likely that the internal areas of the tree are exposed. Cracked wood, a woodpecker hole and upward facing cavity are present.	Low
53	Ash	Three woodpecker holes with possible depth on northern aspect, crack in trunk on northern aspect and possible branch cavity on eastern aspect.	Moderate
54	Willow	Tree is missing part of its crown, is covered in Ivy and of sufficient size and age to contain roosting features not visible from the ground.	Low
55	Ash	Trunk is damaged and split in places, however the features were not considered very suitable for roosting bats.	Low
56	Willow	Cracked trunk with possible depth on southern aspect.	Low
57	Ash	The tree is covered in Ivy and of sufficient size and age to contain roosting features not visible from the ground.	Low
58	Ash	Two woodpecker holes present on northern aspect, trunk cavity on eastern aspect and possible trunk cavity on southern aspect.	Moderate
59	Ash	Very small trunk cavity on northern aspect.	Low
60	Ash	Missing crown with possible opening at top of trunk. Woodpecker hole in trunk on eastern aspect, large trunk cavity on northern aspect and small trunk cavity on southern aspect.	High
61	Ash	Woodpecker hole in broken branch on southern aspect and possible cavity and occluded wood in branch on western aspect.	Moderate
62	Ash	Hollowing at base of trunk.	Low
63	Ash	Four knot holes with possible depth on northern and southern aspects.	Low
64	Ash	Woodpecker holes on eastern and southern aspects. Knot hole present on northern aspect.	Moderate
65	Ash	Knot holes with possible depth present on northern and north-western aspects.	Low
66	Ash	Knot hole with possible depth on western aspect.	Low

<b>Tree ref</b>	<b>Species</b>	<b>Description of Features</b>	<b>BCT Category</b>
67	Dead	Trunk cavities present on western and southern aspects. Fallen branch on northern aspect has left cavity in trunk. Lifted bark is present on all aspects.	High
68	Oak	Dead branches in crown with possible features that could not be viewed from the ground.	Low
69	Oak	Mature tree with Ivy cladding and a number of dead branches in crown. Splits in branches on south-eastern aspect and lifted bark on eastern aspect.	Moderate
70	Oak	Woodpecker hole on western aspect at 8m.	Moderate
71	Dead	Trunk cavity and knot hole on northern aspect, hollow branch with cavity on south-eastern aspect and lifted bark present on all aspects.	High
72	Black Poplar	Hollowing of trunk on northern aspect and knot hole with possible depth on western aspect.	Moderate
73	Oak	Branch cavity on western aspect and split branch on northern aspect.	Low
74	Oak	Trunk cavity on southern aspect and split branch with upward facing knot hole on northern aspect.	Moderate
75	Ash	The tree is covered in Ivy and of sufficient size and age to contain roosting features not visible from the ground.	Low
76	Ash	Hollowing of trunk on eastern aspect.	Moderate
77	Ash	Two knot holes of possible depth, split branch with possible cavity and branch cavity with depth on southern aspect and branch cavity on northern aspect.	High
78	Ash	Small trunk cavity on north-eastern aspect.	Low
79	Ash	Occluded wood with possible depth on southern aspect, woodpecker hole on northern aspect and possible trunk cavity into hollow trunk on western aspect.	Moderate
80	Willow	Split trunk with possible cavities on southern aspect.	Low
81	Dead	Two woodpecker holes on eastern aspect.	Moderate
82	Poplar	Split trunk on north-western aspect of limited bat roost potential.	Low
83	Poplar	Woodpecker hole.	Moderate
84	Willow	Cracked branch with possible cavity on eastern aspect.	Low
85	Willow	Woodpecker hole on northern aspect. Views of the southern and western aspects were restricted and further features could be present.	Moderate
86	Oak	The tree is covered in Ivy and of sufficient size and age to contain roosting features not visible from the ground.	Low
87	Oak	The tree is covered in Ivy and of sufficient size and age to contain roosting features not visible from the ground.	Low
88	Ash	Knot hole and branch cavity with possible depth on northern aspect.	Low
89	Ash	The tree is covered in Ivy and of sufficient size and age to contain roosting features not visible from the ground.	Low
90	Dead tree	The tree is covered in Ivy and of sufficient size and age to contain roosting features not visible from the ground.	Low
91	Oak	Occluded wood on southern aspect.	Low

<b>Tree ref</b>	<b>Species</b>	<b>Description of Features</b>	<b>BCT Category</b>
92	Willow	The tree is covered in Ivy and of sufficient size and age to contain roosting features not visible from the ground.	Low
93	Willow	The tree is covered in Ivy and of sufficient size and age to contain roosting features not visible from the ground.	Low
94	Willow	Lifted bark with possible cavities.	Low
95	Ash	Hollow trunk on eastern aspect and branch cavity on north-eastern aspect.	Moderate
96	Ash	Hollow trunk and trunk cavity on northern aspect.	High
97	Ash	Woodpecker hole, three knot holes, trunk cavity with possible depth and a branch cavity on eastern aspect. Occluded wood and upward facing knot hole on western aspect.	Moderate
98	Ash	Two woodpecker holes on south-eastern aspect and cavity at end of branch on eastern aspect.	Moderate
99	Ash	Trunk cavity, lifted bark and cavity at base of branch on eastern aspect, trunk cavity on north-eastern aspect and hollow trunk on southern aspect.	High
100	Ash	Three woodpecker holes on southern aspect.	Moderate
101	Ash	Hollow branch with woodpecker hole on eastern aspect. The branch is open to the elements reducing its potential to support roosting bats.	Low
102	Elm	Three woodpecker holes on northern aspect.	Moderate
103	Sycamore	Knot hole with possible depth on north-western aspect.	Low
104	Ash	Four woodpecker holes, branch cavity and knot hole in branch on western aspect.	High
G1	Woodland	Woodland comprising mature Oak trees with Ash, Hawthorn and Willow. The majority of the trees have negligible potential to support roosting bats with occasional moderate and high potential trees.	Negligible to High
G2	Woodland	Small area of woodland comprising Poplar, Ash, Oak and Sycamore. The majority of trees are of negligible potential with a small number of low potential trees.	Negligible to Low
G3	Woodland	Woodland comprising Poplar, Ash, Oak and Sycamore. The majority of trees are of negligible potential with 1 high potential White Poplar, 1 moderate potential Ash, 1 moderate potential Sycamore and 1 moderate potential Black Poplar.	Negligible to High

3.2.3 All other trees within and immediately adjacent to the site were assessed as having negligible potential to support roosting bats.

### 3.3 Phase 2 roost surveys

3.3.1 The results of the Phase 1 bat scoping surveys were used to determine the requirement for Phase 2 bat roost survey work of buildings and trees where these had the potential to be affected by emerging development proposals. The Phase 2 bat roost surveys took the form of climbing inspections of trees and emergence/re-entry surveys of buildings and trees (where not safe to climb).

- 3.3.2 In accordance with best practice guidelines (BCT, 2016), high potential trees and buildings were subject to three emergence/re-entry surveys, moderate potential trees and buildings were subject to two emergence/re-entry surveys and low potential buildings were subject to one emergence/re-entry survey. Where survey findings from B2, B3 and B27 indicated that a bat roost may be present, additional surveys were carried out. Details of the dates and times of Phase 2 emergence/re-entry surveys, along with weather conditions and sunset/sunrise times, are provided in *Table 1* above.
- 3.3.3 In accordance with the guidelines low potential trees potentially affected by the proposed development were not subject to Phase 2 roost surveys at this stage however, in the event that retention of a tree identified as having low potential to support roosting bats is not possible, the appropriate approach to works is given in *Section 5* below.
- 3.3.4 All other buildings and trees within the site with the potential to be affected by the development proposals were identified as having 'negligible' potential to support roosting bats and therefore no further survey of these buildings and trees was required in line with current guidance (BCT, 2016).
- 3.3.5 *Table 6* provides a summary of the results of the Phase 2 bat roost surveys of buildings and trees. Key findings of the Phase 1 survey are also summarised where relevant. Locations of identified emergence/re-entry points described in the table are shown on the 'Bat Roost Survey Summary Plan' in *Appendix A*, further information on the emergence/re-entry locations within B2, B3 and B27 are shown in *Appendix B*, and photographs of the buildings are provided in *Appendix E*.

**Table 6:** Results of Phase 2 roost surveys

Tree/ building ref	Phase 2 survey type	Date / Type	Results	Updated Roost Status
<b>B2</b>	Emergence/ re-entry survey	Dusk 03/07/2019	<b>Emergence 1 x Common Pipistrelle</b> from under bargeboard on southern elevation.	<b>Confirmed roost</b>  Transitional/occasional roost supporting one Common Pipistrelle.
		Dusk 04/09/2019	<b>Emergence 1 x Common Pipistrelle</b> from under bargeboard on southern elevation.	
		Dawn 17/09/2019	No emergences / re-entries.	
<b>B3</b>	Emergence/ re-entry survey	Dusk 03/07/2019	<b>Emergence 1 x Common Pipistrelle</b> from under bargeboard on southern elevation.	<b>Confirmed roost</b>  Transitional/occasional roost supporting one Common Pipistrelle.
		Dusk 04/09/2019	No emergences / re-entries.	
		Dawn 17/09/2019	No emergences / re-entries.	
<b>B20</b>	Emergence/ re-entry survey	Dusk 27/06/2019	No emergences / re-entries.	<b>Moderate</b>
		Dawn 16/07/2019	No emergences / re-entries.	
<b>B22</b>	Emergence/ re-entry survey	Dawn 27/06/2019	No emergences / re-entries.	<b>Low</b>
<b>B27</b>	Emergence/ re-entry survey	Dusk 27/06/2019	<b>Emergence of 1 x Common Pipistrelle</b> from missing ridge tile on eastern elevation.	<b>Confirmed roost</b>  Transitional/occasional roost supporting one Common Pipistrelle.
		Dawn 16/07/2019	No emergences / re-entries.	
		Dusk 16/09/2019	No emergences / re-entries.	
<b>B28</b>	Emergence/ re-entry survey	Dusk 27/06/2019	No emergences / re-entries.	<b>Low</b>
		Dawn 16/07/2019	No emergences / re-entries.	
		Dusk 16/09/2019	No emergences / re-entries.	

Tree/ building ref	Phase 2 survey type	Date / Type	Results	Updated Roost Status
<b>B33</b>	Emergence/ re-entry survey  (Buildings within B33 subject to survey as group from surrounding area due to access constraints)	Dawn 28/06/2019	No emergences / re-entries.	<b>Probable roost</b>  Transitional/occasional roost supporting one silent unidentified bat.  * <b>Additional bat roosts may have been present within B33 which were not recorded due to access constraints.</b>
		Dusk 15/07/2019	No emergences / re-entries.	
		Dusk 29/07/2019	<b>Probable emergence of 1 x silent bat</b> from north-western elevation of southern-most building within B33 (Hermitage Farm).	
<b>G1</b>	Emergence/ re-entry survey	Dusk 25/06/2019	No emergences / re-entries.	<b>Probable roost</b>  Transitional/occasional roost supporting one silent unidentified bat.
		Dawn 09/07/2019	No emergences / re-entries.	
		Dusk 16/09/2019	<b>Probable emergence of 1 x silent bat</b> from woodland.	
<b>2</b>	Climbing inspection	14-17 <sup>th</sup> July 2019	Long split to main stem between ground level and 5m height, terminating in a small knot hole at 5m height. (i) Lower section near ground level exhaustively inspected with no bats or evidence of use - low potential due to height; (ii) Enclosed middle section beneath occluded wood inspected and found to be highly suitable for bat roost use, but for the presence of bees higher up in the feature. No evidence of bat use. (iii) Uppermost small knot hole feature not inspected as was in use as an active entrance for a honey bee nest. Low potential due to presence of bees.	<b>High</b>
<b>8</b>	Emergence/ re-entry survey	Dusk 25/06/2019	No emergences / re-entries.	<b>Moderate</b>
		Dawn 09/07/2019	No emergences / re-entries.	
		Dusk 16/09/2019	No emergences / re-entries.	

Tree/ building ref	Phase 2 survey type	Date / Type	Results	Updated Roost Status
9	Climbing inspection	14-17 <sup>th</sup> July 2019	Bent over Ash tree beneath large Oak on corner of woodland, with hazard beam split in main stem and occluding cavity on lower main stem. (i) Lower main stem cavity insufficiently deep to be suitable for roost use. (ii) Feature above first branch junction blind and unsuitable for use by roosting bats. (iii) Hazard beam split a good Potential Roost Feature (PRF), but with cobwebbed ends and no evidence of current or former use. (iv) Cavity on underside also suitable for use, but with no evidence of occupation.	<b>High</b>
		Dusk 25/06/2019	No emergences / re-entries.	
		Dawn 09/07/2019	No emergences / re-entries.	
		Dusk 16/09/2019	No emergences / re-entries.	
11	Emergence/ re-entry survey	Dusk 25/06/2019	No emergences / re-entries.	<b>Moderate</b>
		Dawn 09/07/2019	No emergences / re-entries.	
16	Emergence/ re-entry survey	Dusk 26/06/2019	No emergences / re-entries.	<b>Moderate</b>
		Dawn 16/07/2019	No emergences / re-entries.	
17	Emergence/ re-entry survey	Dusk 26/06/2019	No emergences / re-entries.	<b>Confirmed roost</b>  Transitional/occasional roost supporting up to two silent unidentified bats.
		Dusk 09/07/2019	No emergences / re-entries.	
		Dawn 30/07/2019	<b>Re-entry of 2 x silent bats</b> into small hole in branch on western aspect.	
18	Emergence/ re-entry survey	Dusk 26/06/2019	No emergences / re-entries.	<b>Confirmed roost</b>  Transitional/occasional roost

Tree/ building ref	Phase 2 survey type	Date / Type	Results	Updated Roost Status
		Dusk 09/07/2019	<b>Emergence of 1 x Common Pipistrelle</b> from western aspect of tree.	supporting up to one Common Pipistrelle (the silent bat is also likely to be a Common Pipistrelle in view of timing of re-entry, character of the bat recorded and the location at which it was seen to re-enter).
		Dawn 30/07/2019	<b>Re-entry of 1 x silent bat</b> into western aspect of tree.	
19	Emergence/ re-entry survey	Dusk 26/06/2019	No emergences / re-entries.	<b>Moderate</b>
		Dawn 10/07/2019	No emergences / re-entries.	
20	Emergence/ re-entry survey	Dusk 26/06/2019	No emergences / re-entries.	<b>Moderate</b>
		Dawn 10/07/2019	No emergences / re-entries.	
21	Emergence/ re-entry survey	Dusk 27/06/2019	No emergences / re-entries.	<b>Moderate</b>
		Dusk 22/07/2019	No emergences / re-entries.	
22	Emergence/ re-entry survey	Dusk 27/06/2019	No emergences / re-entries.	<b>Moderate</b>
		Dawn 23/07/2019	No emergences / re-entries.	
23	Emergence/ re-entry survey	Dusk 27/06/2019	No emergences / re-entries.	<b>Moderate</b>
		Dusk 22/07/2019	No emergences / re-entries.	
24	Emergence/ re-entry survey	Dusk 27/06/2019	No emergences / re-entries.	<b>Moderate</b>
		Dusk 22/07/2019	No emergences / re-entries.	

Tree/ building ref	Phase 2 survey type	Date / Type	Results	Updated Roost Status
25	Emergence/ re-entry survey	Dusk 26/06/2019	<b>Emergence of 1 x Common Pipistrelle</b> from hole in tree trunk.	<b>Confirmed roost</b>  Transitional/occasional roost supporting one Common Pipistrelle.
		Dawn 10/07/2019	No emergences / re-entries.	
		Dawn 30/07/2019	No emergences / re-entries.	
32	Climbing inspection	14-17 <sup>th</sup> July 2019	Oak tree in field boundary with a long partially occluded stem split between 2 and 4 metres on the east side of the tree. Two excellent cavities associated with this feature. (i) Narrow, dry 25cm long cavity at mid-point of feature, where occlusion has closed over the stem scar. Clean and highly suitable for roost use, but evidence would not persist due to nature of feature. (ii) Entrance hole at uppermost point of stem split leads to a cavity extending upwards 30cm forming an excellent potential roost feature, clean and dry, but with no evidence of occupation.	<b>High</b>
33	Climbing inspection	14-17 <sup>th</sup> July 2019	Hedgerow Ash to north of Tree 32. (i) Small woodpecker hole in central uppermost crown open to the top and unsuitable for roost use. (ii) Upper cavities on branch ends in northern crown all blind or otherwise unsuitable for roost use. (iii) Lowest knot pocket on lower north-north-west-facing branch with surrounding occlusion wood - 10cm deep and dry, with some potential for summer roost use by single crevice-dwelling bats, but no evidence of occupation. (iv) Other features all blind or otherwise unsuitable for roost use but may develop over time.	<b>Moderate</b>
50	Emergence/ re-entry survey	Dusk 24/06/2019	No emergences / re-entries.	<b>Moderate</b>
		Dusk 09/07/2019	No emergences / re-entries.	
53	Emergence/ re-entry survey	Dusk 24/06/2019	No emergences / re-entries.	<b>Moderate</b>
		Dusk 08/07/2019	No emergences / re-entries.	
58	Emergence/ re-entry survey	Dusk 24/06/2019	No emergences / re-entries.	<b>Moderate</b>

Tree/ building ref	Phase 2 survey type	Date / Type	Results	Updated Roost Status
		Dawn 10/07/2019	No emergences / re-entries.	
60	Climbing inspection	14-17 <sup>th</sup> July 2019	Hedgerow Ash with missing crown and massive stem cavity. (i) Upper crown - missing leader and major decay in upper crown all open and upward facing or otherwise unsuitable for bat roost use. (ii) Woodpecker hole enters large main stem cavity which is open and with limited roost potential due to an absence of small, temperature regulated niches. (iii) Platform cavity on west side of stem found to be upward facing and unsuitable for roost use. (iv) Extensive main stem cavity running downwards from around 4m height into deep basal decay below ground level - could not be exhaustively inspected, especially at base of tree around internal buttress roots. Some roost potential but no evidence of use.	High
			Dawn 05/09/2019	
	Emergence/ re-entry survey	Dawn 17/09/2019	No emergences / re-entries.	
		Dusk 25/09/2019	No emergences / re-entries.	
61	Climbing inspection	14-17 <sup>th</sup> July 2019	Hedgerow Ash with extensive <i>Inonotus</i> decay in upper crown. (i) Missing upper crown and associated features - blind shallow, upward-facing or otherwise unsuitable for roost use at the time of inspection. (ii) Two features on west side in upper crown - occluded knot hole blind, branch scar to the south shallow and open - both unsuitable for roost use. (iii) South-facing woodpecker hole on west branch 20cm deep dry cavity with a flat base with fresh moss and other passerine nest material from this year - no evidence of bat use. (iv) All stem features facing south-east on the main stem blind or otherwise unsuitable. (v) Branch tear over track on south-east side at mid-height - blind and unsuitable.	Low
64	Climbing inspection	14-17 <sup>th</sup> July 2019	All cavities found to be too small for use. Tree unsuitable for use by roosting bats.	Negligible
72	Emergence/ re-entry survey	Dusk 27/06/2019	No emergences / re-entries.	Moderate

Tree/ building ref	Phase 2 survey type	Date / Type	Results	Updated Roost Status
		Dusk 22/07/2019	No emergences / re-entries.	
74	Climbing inspection	14-17 <sup>th</sup> July 2019	Westernmost of two large Oak trees in field boundary. (i) 75cm long branch stub with longitudinal splits on main stem at mid height - all features shallow, open or otherwise unsuitable for roost use at the time of inspection. (ii) Lower feature facing south-east - 10cm deep pocket in branch stub with some potential for use but no evidence. (iii) Large south-facing cavity with evidence of use by Jackdaw or other similar nesting birds this season. Extends west into main branch above - dry but very dusty and full of frass and cobwebs in upper reaches – a good potential roost feature but with no evidence of use.	High
76	Emergence/ re-entry survey	Dusk 17/06/2019	No emergences / re-entries.	Moderate
		Dusk 08/07/2019	No emergences / re-entries.	
77	Climbing inspection	14-17 <sup>th</sup> July 2019	Tall straight-stemmed Ash on northern field boundary. (i) Upper cavity not visible from ground level - open to one side, but with a distinct roof - two Collared Dove eggs within, but some moderate bat roost potential. (ii) Upward-facing north limb cavity in upper crown - 3ft deep and open at end, heavily used by Jackdaw, but with some roost potential. (iii) Knot hole on west limb connects to a cavity on the upper side of the branch - interior full of frass and decayed wood - potentially suitable but usage very unlikely given interior condition. (iv) Long slit on underside of north-east limb in mid-crown - 40cm deep with sticks and a Collared Dove egg present. (v) 15cm deep small cobwebbed east-facing cavity on northern limb - suitable but no evidence of usage. (vi) Knot hole over field on south-east side - blind and unsuitable. (vii) Small pocket on south-east main stem at 3.5m height - excellent small roost feature for single crevice-dwelling bat - no evidence of occupation.	High

Tree/ building ref	Phase 2 survey type	Date / Type	Results	Updated Roost Status
79	Climbing inspection	14-17 <sup>th</sup> July 2019	Hollow-stemmed Ash on northern field boundary to west of Tree 77. (i) Upper features all found to be open, blind, upward-facing or otherwise unsuitable for roost use. (ii) Knot holes in upper tree fully occluded or blind and unsuitable for roost use. (iii) Main stem cavity - owl pellets and white staining present - a large complex trunk cavity which also extends upwards some distance into a western leader. No evidence of bat use after a thorough and detailed inspection, but the nature of the feature meant that an exhaustive inspection could not be achieved.	Moderate
	Emergence/ re-entry survey	Dawn 05/09/2019	No emergences / re-entries.	
		Dusk 25/09/2019	No emergences / re-entries.	
81	Emergence/ re-entry survey	Dusk 17/06/2019	No emergences / re-entries.	Moderate
		Dusk 08/07/2019	No emergences / re-entries.	
83	Climbing inspection	14-17 <sup>th</sup> July 2019	Tree within plantation with a shooting seat currently attached to the lower trunk. (i) Woodpecker hole on main stem at c.8m height above shooting seat - extends downwards 15cm to dry base - evidence of use by nesting birds. No evidence of use by bats, but potentially suitable in absence of birds.	Moderate
85	Emergence/ re-entry survey	Dusk 17/06/2019	No emergences / re-entries.	Moderate
		Dusk 08/07/2019	No emergences / re-entries.	
95	Emergence/ re-entry survey	Dusk 24/06/2019	No emergences / re-entries.	Moderate
		Dusk 08/07/2019	No emergences / re-entries.	
96	Emergence/ re-entry survey	Dusk 24/06/2019	No emergences / re-entries.	High
		Dusk 08/07/2019	No emergences / re-entries.	

Tree/ building ref	Phase 2 survey type	Date / Type	Results	Updated Roost Status
		Dawn 23/07/2019	No emergences / re-entries.	
97	Climbing inspection	14-17 <sup>th</sup> July 2019	Tree midway along east side of small copse, overhanging field. (i) Small knot hole on eastern limb overhanging field - 15cm deep and dry, with good potential for roost use but no evidence. (ii) Adjacent wider branch-end rot pocket - 10cm deep and more open - some limited potential. (iii) Small knot hole on south-east side - extends 15cm, clean and dry but used by earwigs. Moderate potential. (iv) Woodpecker hole in upper tree clean, dry and suitable for roosting bats but with no evidence of occupation. (v) Dead leader with pockmarked surface on west side of tree – open and currently unsuitable for roost use. (vi) West-facing knot hole above main stem division - upward facing, open and unsuitable for roost use.	High
98	Climbing inspection	14-17 <sup>th</sup> July 2019	Ash in hedgerow field boundary. (i) Uppermost cavity with vertical 60cm long split down south-east side - extends upwards from open section for 20cm but quite open and draughty. Cobwebs and loose material in upper reaches. No bats or evidence of use. (ii) Frass and funnel web spiders web below open section of same feature - limited potential and no evidence of use. (iii) Crack open and cobwebbed below this, with ash leaves indicative of use by Grey Squirrel in base. (iv) Woodpecker hole below these features occupied by a very aggressive Grey Squirrel. Potentially suitable for roost use in absence of Squirrels.	Moderate
99	Emergence/ re-entry survey	Dusk 24/06/2019	No emergences / re-entries.	High
		Dusk 09/07/2019	No emergences / re-entries.	
		Dawn 23/07/2019	No emergences / re-entries.	

Tree/ building ref	Phase 2 survey type	Date / Type	Results	Updated Roost Status
100	Climbing inspection	14-17 <sup>th</sup> July 2019	Ash in field boundary hedgerow. (i) Main leader hollow to south-west of hedge line. Woodpecker holes on north side of leader give access to a deep cavity extending 60cm down the hollow main stem. Suitable for roost use but no evidence of occupation. (ii) Obvious woodpecker hole on south side of tree at 3.5m extends downwards to join internally with a second access point 40cm below the woodpecker hole to the east. Dry cavity but with extensive frass and cobwebs, indicating no recent roost use. (iii) Upward-pointing cavity at site of branch tear on south-east side of main stem at 2m height - extends north-west into a dry interior but with only low roost potential.	Moderate
102	Climbing inspection	14-17 <sup>th</sup> July 2019	No roost potential - three woodpecker holes all found to be blind, shallow or otherwise unsuitable	Negligible
104	Climbing inspection	14-17 <sup>th</sup> July 2019	Ash above hedgerow field boundary. (i) Upper crown and leaders missing – potential roost features all found to be upward-pointing, blind, shallow or otherwise currently unsuitable for use by roosting bats. (ii) East-central leader in upper crown - some small bark splits and small voids with moderate roost potential for single summer-roosting bats, but no evidence of use. (iii) Branch end feature in lower crown found to be blind and unsuitable for roost use. (iv) Knot hole - shallow and heavily cobwebbed with low roost potential.	Moderate
G3	Emergence/ re-entry survey	Dusk 22/07/2019	During emergence survey of Tree 72, <b>emergence of 2 x Noctules</b> recorded from G3.	<b>Confirmed roost</b>  Confirmed roost present within the copse supporting two Noctule bats.

3.3.6 In addition to the trees/buildings subject to Phase 2 surveys, 1 confirmed roost was incidentally recorded within a woodland copse (G3 – see above) and 4 ‘high’ potential trees (29, 44, 67, 71), 6 ‘moderate’ potential trees (28, 37, 40, 41, 69, 70) and 56 ‘low’ potential trees (G2, 1, 3-7, 10, 12-15, 26, 27, 30, 31, 34-36, 38, 39, 42, 43, 46-49, 51, 52, 54-57, 59, 62, 63, 65, 66, 68, 73, 75, 78, 80, 82, 84, 86-89, 90-94, 101, 103) were identified within the site during the Phase 1 scoping survey. In line with current best practice guidelines (BCT, 2016), further surveys of these trees are not required, at this stage, in support of a planning application due to: (i) their retention within the scheme; (ii) their location beyond the site boundary; and/or (iii) their low potential to support roosting bats. However, in the event that the future retention of any of these trees is not possible, the appropriate approach to works is given in *Section 5* below.

3.3.7 All other trees and buildings within the site were identified as having ‘negligible’ potential to support roosting bats.

### **3.4 Phase 2 activity transect surveys**

3.4.1 Details of the date and time of bat activity transect surveys, along with weather conditions and sunset/sunrise times, are provided in *Table 2*. The areas covered during each survey visit included all site boundaries, hedgerows and woodland copses within each transect area.

3.4.2 A visual summary of bat foraging and commuting activity recorded during the surveys has been provided in *Appendix D*. In total, at least six species were recorded during the transect surveys: Common Pipistrelle, Soprano Pipistrelle, Noctule, Serotine, Brown Long-eared bat and *Myotis* sp. bats. A summary of each species/species group recorded, their activity and an estimation of numbers using the site during any one survey is provided in *Table 7* below.

**Table 7:** Summary of bat activity during transect surveys

Species	Activity summary	Approx. number recorded*
Common Pipistrelle	<p>Common Pipistrelle was the most frequently recorded species during the activity surveys. The majority of Common Pipistrelle activity was associated with the River Ouzel, Pineham Nature Reserve (located off-site) and hedgerows in the west of the site, a small woodland copse in the north of the site and a small woodland copse and mature treeline in the centre of the site. Common Pipistrelles were also recorded on a less frequent basis using hedgerows and woodland bordering the grassland and arable fields in the remainder of the site.</p> <p>It is expected that up to 21 Common Pipistrelle bats could have been using the site at any one time for foraging and commuting.</p>	21
Soprano Pipistrelle	<p>Soprano Pipistrelle was the second most frequently recorded species during the activity surveys. Soprano Pipistrelle activity was scattered across the site, associated with the River Ouzel, Pineham Nature Reserve (located off-site) and hedgerows in the west of the site and woodland copses in the north of the site. Soprano Pipistrelles were also recorded on a less frequent basis using hedgerows and woodland bordering the grassland and arable fields in the remainder of the site.</p> <p>It is expected that up to 10 Soprano Pipistrelle bats could have been using the site at any one time for foraging and commuting.</p>	10
Noctule	<p>Noctule was the third most frequently recorded species during the activity survey. The majority of Noctule activity was associated with the River Ouzel, Pineham Nature Reserve (located off-site) and hedgerows in the west of the site. Noctules were also recorded on a less frequent basis using hedgerows and woodland bordering the grassland and arable fields in the remainder of the site.</p> <p>It is expected that up to 8 Noctules could have been using the site at any one time for foraging and commuting.</p>	8
<i>Myotis</i> sp.	<p>The majority of <i>Myotis</i> species of bat were recorded along hedgerows in the south-east of the site. <i>Myotis</i> species of bat were also recorded on a less frequent basis using hedgerows bordering the grassland and arable fields in the west of the site.</p> <p>It is expected that up to 3 <i>Myotis</i> species of bat could have been using the site at any one time for foraging and commuting.</p>	3
Brown Long-eared bat	<p>Brown Long-eared bats were recorded on two occasions associated with areas of mixed plantation woodland in the south-east of the site.</p> <p>It is likely that no more than 1 Brown Long-eared bat was using the site at any one time during the survey and that the site forms part of a much larger foraging range for individuals of this species.</p> <p>It should be noted however that Brown Long-eared bat calls are very quiet which means that they are less easily recorded by bat detectors. It is therefore possible that higher (but not substantially higher) numbers of Brown Long-eared bats may have been using the site than were recorded.</p>	1(+)
Serotine	<p>Serotine was recorded on one occasion in association with a hedgerow bordered by grassland fields in the west of the site.</p> <p>It is likely that the site was used by no more than 1 Serotine bat at any one time and that the site forms part of a much larger foraging range for a low number of individuals of this species.</p>	1

\* This is an approximation of the number of bats of any one species estimated to have been using the site during any one visit.

- 3.4.3 The majority of activity recorded within and adjacent to the site during the transect surveys related to Common Pipistrelle bats, with up to 21 Common Pipistrelle bats considered to be using the site at any one time. The majority of Common Pipistrelle activity was recorded along the River Ouzel, the off-site Pineham Nature Reserve and connected hedgerows in the west of the site, a small woodland copse in the north of the site and a small woodland copse and mature treeline in the centre of the site. Common Pipistrelle was however also recorded less frequently using the hedgerows and woodland copses bordered by grassland and arable fields in the remainder of the site.
- 3.4.4 Soprano Pipistrelle was the second most frequently recorded species during the transect surveys, with up to 10 Soprano Pipistrelle bats considered to be using the site at any one time. The majority of Soprano Pipistrelle activity was associated with the River Ouzel, the off-site Pineham Nature Reserve and hedgerows in the west of the site and woodland copses in the north of the site. Soprano Pipistrelles were also recorded on a less frequent basis using hedgerows and woodland bordering the grassland and arable fields in the remainder of the site.
- 3.4.5 Noctule was the third most frequently recorded species during the transect surveys, with up to 8 Noctule bats considered to be using the site at any one time. The majority of Noctule activity was associated with the River Ouzel, the off-site Pineham Nature Reserve and hedgerows in the west of the site. Noctule were also recorded on a less frequent basis using hedgerows and woodland bordering the grassland and arable fields in the remainder of the site.
- 3.4.6 *Myotis* sp., Brown Long-eared bat and Serotine bats were all recorded on an occasional or individual basis. Activity relating to these species/species group consisted of brief passes by single bats foraging or commuting along hedgerows and woodland edges crossing and bordering the site.

### **3.5 Phase 2 automated activity surveys**

- 3.5.1 The dates during which the automated detector was deployed, along with sunset/sunrise times and temperatures are provided in *Table 3*. The locations in which the automated bat detector was placed during each deployment are shown on the plan in *Appendix C*.
- 3.5.2 The automated detector was placed in 21 separate locations to give an indication of the species using different areas of the site and relative levels of activity throughout the night. A summary of bat activity recorded during the automated surveys in each location is provided below in *Table 8*. In total, ten species or species groups were recorded during the automated surveys; Common Pipistrelle, Soprano Pipistrelle, Nathusius' Pipistrelle, Noctule, Serotine, Leisler's, Brown Long-eared bat, *Myotis* sp., Greater Horseshoe and Barbastelle bats.

**Table 8:** Summary of bat activity recorded by the automated detector

Location	Activity summary
1A	<p>The automated detector at Location 1A recorded bat activity along a seasonally wet ditch with areas of dense scrub bordered by arable fields located within Transect 1 in the west of the site.</p> <p>A total of 16 bat passes were recorded over 3 nights; an average of 5 bat recordings per night. On one night however no bat recordings were recorded, possibly due to unfavourable weather conditions. Removing this night from the calculations increases the average number of bat recordings per night to 8.</p> <p>Noctule was the most frequently recorded species at Location 1A (56.3% of the bat recordings), with occasional foraging activity recorded during one night. Common Pipistrelle was the second most frequently recorded species at Location 1A (43.8% of the bat recordings), with occasional foraging activity recorded during most nights.</p>
1B	<p>The automated detector at Location 1B recorded bat activity along the River Ouzel where it is bordered by grassland fields between Transects 1 and 4 in the west of the site.</p> <p>A total of 281 bat passes were recorded over 7 nights; an average of 40 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 1B (50.2% of the bat recordings), with occasional to regular foraging activity recorded during every night. Soprano Pipistrelle was the second most frequently recorded species at Location 1B (25.3% of the bat recordings), with occasional foraging activity recorded during every night.</p> <p>Occasional passes by Leisler's, Noctule, <i>Myotis</i> sp., Brown Long-eared bat, Barbastelle and Serotine bats were also recorded (9.6%, 9.3%, 3.6%, 1.1%, 0.7% and 0.4% of passes respectively).</p>
1C	<p>The automated detector at Location 1C recorded bat activity along a defunct hedgerow bordered by grassland and arable fields and the western end of a seasonally wet drain located within Transect 1 in the west of the site.</p> <p>A total of 134 bat passes were recorded over 4 nights; an average of 34 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 1C (44.0% of the bat recordings), with occasional to regular foraging activity recorded during every night. Soprano Pipistrelle was the second most frequently recorded species at Location 1C (30.6% of recordings), with occasional foraging activity recorded during every night.</p> <p>Occasional passes by Noctule, <i>Myotis</i> sp., Leisler's, Nathusius' Pipistrelle, Barbastelle, Serotine and Brown Long-eared bats were also recorded (11.2%, 5.2%, 4.5%, 1.5%, 1.5%, 0.7% and 0.7% of passes respectively).</p>

Location	Activity summary
1D	<p>The automated detector at Location 1D recorded bat activity along a defunct hedgerow and dry ditch bordered by grassland and arable fields located within Transect 1 in the west of the site.</p> <p>A total of 86 bat passes were recorded over 6 nights; an average of 14 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 1D (64.0% of the bat recordings), with occasional foraging activity recorded during every night. Soprano Pipistrelle and Noctule were the second and third most frequently recorded species at Location 1D (16.3% and 12.8% of the bat recordings, respectively), with occasional foraging activity recorded during most nights.</p> <p>Occasional passes by <i>Myotis</i> sp., Nathusius' Pipistrelle and Brown Long-eared bats were also recorded (4.7%, 1.2% and 1.2% of passes respectively).</p>
1E	<p>The automated detector at Location 1E recorded bat activity along a hedgerow bordered by grassland and arable fields located within Transect 1 in the west of the site.</p> <p>A total of 311 bat passes were recorded over 5 nights; an average of 62 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 1E (48.2% of the bat recordings), with occasional foraging activity recorded during every night. Soprano Pipistrelle and Noctule were the second and third most frequently recorded species at Location 1E (32.5% and 18.3% of the bat recordings, respectively), with occasional foraging activity recorded during most nights.</p> <p>Individual passes by <i>Myotis</i> sp., Brown Long-eared bat and Serotine bat were also recorded (0.3%, 0.3% and 0.3% of passes respectively).</p>
1F	<p>The automated detector at Location 1F recorded bat activity along a hedgerow and ditch bordered by grassland fields located within Transect 1 in the west of the site.</p> <p>A total of 920 bat passes were recorded over 7 nights; an average of 131 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 1F (64.7% of the bat recordings), with occasional to regular foraging activity recorded during every night. Soprano Pipistrelle and Noctule were the second and third most frequently recorded species at Location 1F (17.4% and 11.4% of the bat recordings, respectively), with occasional to regular foraging activity recorded during every night.</p> <p>Occasional passes by <i>Myotis</i> sp., Brown Long-eared bat, Nathusius' Pipistrelle and Serotine bats were also recorded (4.7%, 1.2%, 0.5% and 0.1% of passes respectively).</p>

Location	Activity summary
2A	<p>The automated detector at Location 2A recorded bat activity along an intact hedgerow and dry ditch bordered by arable fields located within Transect 2 in the north-west of the site.</p> <p>A total of 7272 bat passes were recorded over 5 nights; an average of 1454 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 2A (91.7% of the bat recordings), with occasional to regular foraging activity recorded during every night. Soprano Pipistrelle and <i>Myotis</i> sp. were the second and third most frequently recorded species at Location 2A (6.0% and 2.1% of the bat recordings, respectively), with occasional foraging activity recorded during most nights.</p> <p>Occasional passes by Noctule, Brown Long-eared bats and Greater Horseshoe bats were also recorded (0.2%, 0.1% and 0.03% of passes respectively).</p>
2B	<p>The automated detector at Location 2B recorded bat activity along a defunct hedgerow bordered by deciduous woodland and an arable field located within Transect 2 in the north of the site.</p> <p>A total of 135 bat passes were recorded over 6 nights; an average of 23 bat recordings per night.</p> <p>Soprano Pipistrelle was the most frequently recorded species at Location 2B (65.2% of the bat recordings), with occasional to regular foraging activity recorded during every night. Common Pipistrelle and Noctule were the second and third most frequently recorded species at Location 2B (20.7% and 10.4% of the bat recordings, respectively), with occasional foraging activity recorded during most nights.</p> <p>Occasional passes by <i>Myotis</i> sp. and Brown Long-eared bats were also recorded (3.0% and 0.7% of passes respectively).</p>
2C	<p>The automated detector at Location 2C recorded bat activity along an intact hedgerow and dry ditch bordered by arable fields located within Transect 2 in the north of the site.</p> <p>A total of 293 bat passes were recorded over 4 nights; an average of 73 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 2C (66.9% of the bat recordings), with occasional to regular foraging activity recorded during every night. Soprano Pipistrelle was the second most frequently recorded species at Location 2C (31.1% of the bat recordings), with occasional foraging activity recorded during most nights.</p> <p>Occasional passes by Noctule and Brown Long-eared bats were also recorded (1.7% and 0.3% of passes respectively).</p>

Location	Activity summary
3A	<p>The automated detector at Location 3A recorded bat activity along an intact hedgerow and dry ditch bordered by arable fields located within Transect 3 in the centre of the site.</p> <p>A total of 84 bat passes were recorded over 6 nights; an average of 14 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 3A (71.4% of the bat recordings), with occasional to regular foraging activity recorded during every night. Noctule was the second most frequently recorded species at Location 3A (22.6% of the bat recordings), with occasional foraging activity recorded during most nights.</p> <p>Occasional passes by Soprano Pipistrelle, Brown Long-eared bat and Leisler's bat were also recorded (3.6%, 1.2% and 1.2% of passes respectively).</p>
3B	<p>The automated detector at Location 3B recorded bat activity within an area of woodland bordered by an arable field located on the boundary between Transects 2 and 3 in the north of the site.</p> <p>A total of 321 bat passes were recorded over 5 nights; an average of 64 bat recordings per night.</p> <p>Noctule was the most frequently recorded species at Location 3B (36.1% of the bat recordings), with occasional to regular foraging activity recorded during most nights. Soprano Pipistrelle and Common Pipistrelle were the second and third most frequently recorded species at Location 3B (28.3% and 27.1% of the bat recordings, respectively), with occasional foraging activity recorded during every night.</p> <p>Occasional passes by Barbastelle, <i>Myotis</i> sp. and Brown Long-eared bat were also recorded (6.5%, 1.2% and 0.6% of passes respectively).</p>
3C	<p>The automated detector at Location 3C recorded bat activity along a brook and intact hedgerow bordered by arable fields located within Transect 3 in the centre of the site.</p> <p>A total of 272 bat passes were recorded over 6 nights; an average of 45 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 3C (78.3% of the bat recordings), with occasional to regular foraging activity recorded during every night.</p> <p>Occasional passes by Soprano Pipistrelle, Noctule, <i>Myotis</i> sp., Leisler's bat, Brown Long-eared bat, Nathusius' Pipistrelle and Greater Horseshoe were also recorded (11.0%, 5.5%, 1.8%, 1.8%, 0.7%, 0.4% and 0.4% of passes respectively).</p>

Location	Activity summary
4A	<p>The automated detector at Location 4A recorded bat activity along a hedgerow and dry ditch bordered by arable fields located within Transect 4 in the south-west of the site.</p> <p>A total of 1375 bat passes were recorded over 5 nights; an average of 275 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 4A (53.7% of the bat recordings), with occasional to regular foraging activity recorded during every night. Soprano Pipistrelle and <i>Myotis</i> sp. of bat were the second and third most frequently recorded species/species group at Location 4A (27.9% and 17.2% of the bat recordings, respectively), with occasional to regular foraging activity recorded during every night.</p> <p>Occasional passes by Noctule and Nathusius' Pipistrelle were also recorded (1.1% and 0.1% of passes respectively).</p>
4B	<p>The automated detector at Location 4B recorded bat activity along an intact hedgerow and dry ditch bordered by arable fields located on the boundary between Transect 4 and 6 in the south-east of the site.</p> <p>A total of 622 bat passes were recorded over 5 nights; an average of 124 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 4B (76.5% of the bat recordings), with occasional to regular foraging activity recorded during every night. Soprano Pipistrelle was the second most frequently recorded species at Location 4B (16.4% of the bat recordings), with occasional foraging activity recorded during most nights.</p> <p>Occasional passes by <i>Myotis</i> sp., Noctule, Leisler's bat, Brown Long-eared bat and Nathusius' Pipistrelle were also recorded (4.8%, 1.8%, 0.2% and 0.2% of passes respectively).</p>
4C	<p>The automated detector at Location 4C recorded bat activity along an intact hedgerow and dry ditch bordered by arable fields located within Transect 4 in the centre of the site.</p> <p>A total of 128 bat passes were recorded over 5 nights; an average of 26 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 4C (75.0% of the bat recordings), with occasional to regular foraging activity recorded during every night.</p> <p>Occasional passes by Soprano Pipistrelle, <i>Myotis</i> sp., Noctule and Brown Long-eared bats were also recorded (14.8%, 7.0%, 2.3% and 0.8% of passes respectively).</p>

Location	Activity summary
5A	<p>The automated detector at Location 5A recorded bat activity within an area of woodland bordered by amenity grassland located within Transect 5 in the south-east of the site.</p> <p>A total of 566 bat passes were recorded over 5 nights; an average of 113 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 5A (88.0% of the bat recordings), with occasional to regular foraging activity recorded during every night.</p> <p>Occasional passes by Soprano Pipistrelle, Noctule and <i>Myotis</i> sp. bats were also recorded (8.8%, 1.6% and 1.6% of passes respectively).</p>
5B	<p>The automated detector at Location 5B recorded bat activity along an intact hedgerow and dry ditch bordered by arable fields located within Transect 5 in the south of the site.</p> <p>A total of 636 bat passes were recorded over 5 nights; an average of 127 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 5B (67.5% of the bat recordings), with occasional to regular foraging activity recorded during every night. Soprano Pipistrelle was the second most frequently recorded species at Location 5B (27.4% of the bat recordings), with occasional to regular foraging activity recorded during every night.</p> <p>Occasional passes by <i>Myotis</i> sp., Noctule and Brown Long-eared bats were also recorded (3.5%, 1.4% and 0.3% of passes respectively).</p>
5C	<p>The automated detector at Location 5C recorded bat activity along an intact hedgerow and dry ditch bordered by arable fields located within Transect 5 in the south of the site.</p> <p>A total of 188 bat passes were recorded over 5 nights; an average of 38 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 5C (71.8% of the bat recordings), with occasional to regular foraging activity recorded during every night. Noctule was the second most frequently recorded species at Location 5C (16.0% of the bat recordings), with occasional foraging activity recorded during most nights.</p> <p>Occasional passes by Soprano Pipistrelle, <i>Myotis</i> sp., Barbastelle, Brown Long-eared bat and Leisler's bat were also recorded (5.3%, 2.7%, 2.1%, 1.6% and 0.5% of passes respectively).</p>

Location	Activity summary
6A	<p>The automated detector at Location 6A recorded bat activity along an intact hedgerow and dry ditch bordered by arable fields located within Transect 6 in the south-east of the site.</p> <p>A total of 131 bat passes were recorded over 5 nights; an average of 26 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 6A (78.6% of the bat recordings), with occasional to regular foraging activity recorded during every night. Noctule was the second most frequently recorded species at Location 6A (17.6% of the bat recordings), with occasional foraging activity recorded during most nights.</p> <p>Occasional passes by Soprano Pipistrelle were also recorded (3.8% of passes).</p>
6B	<p>The automated detector at Location 6B recorded bat activity within an area of mixed woodland bordered by arable fields located on the boundary of Transects 5 and 6 in the south-east of the site.</p> <p>A total of 347 bat passes were recorded over 6 nights; an average of 58 bat recordings per night.</p> <p>Soprano Pipistrelle was the most frequently recorded species at Location 6B (43.5% of the bat recordings), with occasional to regular foraging activity recorded during every night. Common Pipistrelle was the second most frequently recorded species at Location 6B (35.7% of the bat recordings), with occasional to regular foraging activity recorded during every night.</p> <p>Occasional passes by Noctule, Brown Long-eared bat, <i>Myotis</i> sp. and Barbastelle bats were also recorded (10.4%, 6.6%, 2.6%, and 1.2% of passes respectively).</p>
6C	<p>The automated detector at Location 6C recorded bat activity along an intact hedgerow and dry ditch bordered by Newport Road and arable fields located within Transect 6 in the south-east of the site.</p> <p>A total of 73 bat passes were recorded over 5 nights; an average of 15 bat recordings per night.</p> <p>Common Pipistrelle was the most frequently recorded species at Location 6C (53.4% of the bat recordings), with occasional foraging activity recorded during most nights. Noctule was the second most frequently recorded species at Location 6C (28.8% of the bat recordings), with occasional foraging activity recorded during most nights.</p> <p>Occasional passes by <i>Myotis</i> sp., Soprano Pipistrelle, Leisler's bat, Brown Long-eared bat and Serotine bat were also recorded (9.6%, 2.7%, 2.7%, 1.4% and 1.4% of passes respectively).</p>

### 3.5.3

In summary:

- The static detectors recorded Common Pipistrelle and Noctule at all locations the remote detectors were deployed;
- Soprano Pipistrelle was recorded at all locations except Location 1A;
- *Myotis* sp. was recorded at all locations except Locations 1A, 2C, 3A and 6A;

- Brown Long-eared bat was recorded at all locations except Locations 1A, 4A, 5A and 6A;
- Leisler's bat was recorded at Locations 1B, 1C, 1E, 3A, 3C, 4B, 5C and 6C;
- Nathusius' Pipistrelle was recorded at Locations 1C, 1D, 1F, 3C, 4A and 4B;
- Barbastelle was recorded at Locations 1B, 1C, 3B, 5C and 6B.
- Serotine was recorded at Locations 1B, 1C, 1F and 6C; and
- Greater Horseshoe bat was recorded at Locations 2A and 3C.

3.5.4 The greatest number of bat recordings was recorded at Location 2A and the highest diversity of bat species was recorded at Location 1C. The fewest number of bat recordings per night and lowest diversity of bat species was recorded at Location 1A. Common Pipistrelle was the most frequently recorded species relating to 76.8% of all bat passes recorded, with all locations being used by foraging bats of this species on at least an occasional basis on each night. Soprano Pipistrelle, followed by *Myotis* sp., Noctule and Brown Long-eared bats, were the next most recorded bat species (14.3%, 5.1%, 5.1% and 0.4% of all bat recordings, respectively), with similar patterns of activity to the Common Pipistrelle bats however at much lower numbers. Leisler's bat, accounting for 0.4% of all bat recordings, was predominately recorded at Locations 1B, 1C and 3C associated with detectors deployed in close proximity to waterbodies. Barbastelle bat, accounting for 0.2% of all bat recordings, was predominately recorded at Location 3B and to a lesser extent Locations 5C and 6B which are associated with (or in the case of Location 5C in close proximity to) areas of woodland. Nathusius' Pipistrelle recordings, accounting for 0.1% of all bat recordings, were scattered across the site. Only three recordings each of Serotine and Greater Horseshoe bats were made across the site during the automated detector survey.

## 4 SUMMARY AND IMPACT ASSESSMENT

### 4.1 Bat roosting habitat

4.1.1 Confirmed and probable bat roosts were recorded within B2, B3, B27, B33 and Trees 17, 18, 25, G1 and G3. Emergence and re-entry locations on buildings are illustrated on the plans in *Appendix B* and photographs of the buildings are provided in *Appendix B* and *E*. In summary:

- **B2:** A confirmed roost for a single Common Pipistrelle was recorded under the bargeboard on the southern elevation of B2 on the first and second surveys. No bats were recorded roosting within the building on the third survey visit. The roost associated with this building is likely to be a low-status non-breeding roost for one Common Pipistrelle used on an occasional/transitory basis.
- **B3:** A confirmed roost for a single Common Pipistrelle was recorded under the bargeboard on the southern elevation of B3 on the first survey. No bats were recorded roosting within the building on the second or third survey visits. The

roost associated with this building is likely to be a low-status non-breeding roost for one Common Pipistrelle used on an occasional/transitory basis.

- **B27:** A confirmed roost for a single Common Pipistrelle was recorded under a missing ridge tile on the eastern elevation of B27 on the first survey. No bats were recorded roosting within the building on the second or third survey visits. The roost associated with this building is likely to be a low-status non-breeding roost for one Common Pipistrelle used on an occasional/transitory basis.
- **B33:** A probable roost for a silent bat of indeterminate species, was recorded from the north-western elevation of the southern-most building within the B33 complex on the third survey. No bats were recorded roosting within the building complex on the first or second survey visits. The surveys indicate that this building supports a low-status non-breeding roost for one bat, however due to the access limitations associated with the B33 complex (discussed in *Section 2.5.1* above), this assessment is subject to re-evaluation once the further surveys recommended in *Section 5.2.26* below have been carried out.
- **Tree 17:** A confirmed roost for two silent bats of indeterminate species, which were recorded emerging from a small hole in a branch on the western aspect on the third survey visit. No bats were recorded roosting within the tree on the first or second survey visits. The roost associated with this tree is likely to be a low-status non-breeding roost for two bats of indeterminate species used on an occasional/transitory basis.
- **Tree 18:** A confirmed roost for one Common Pipistrelle was recorded emerging from the western aspect of the tree on the second survey visit. In addition, on the third survey visit a silent bat was recorded re-entering the same feature. No bats were recorded roosting within the tree on the first survey visit. Due to the size, behaviour and observations made during other surveys, it is likely that the silent bat was also a Common Pipistrelle. The roost associated with this tree is likely to be a low-status non-breeding roost for one Common Pipistrelle used on an occasional/transitory basis.
- **Tree 25:** A confirmed roost for one Common Pipistrelle, which was recorded emerging from a hole in the trunk of the tree on the first survey visit. No bats were recorded roosting within the tree on the second or third survey visits. The roost associated with this tree is likely to be a low-status non-breeding roost for one Common Pipistrelle used on an occasional/transitory basis.
- **G1:** A probable roost for one silent bat of indeterminate species was recorded emerging from the tree group on the third survey visit. No bats were recorded roosting within the tree group on the first or second survey visits. The roost associated with this tree group is likely to be a low-status non-breeding roost for one silent bat of indeterminate species used on an occasional/transitory basis.

- **G3:** A confirmed roost for two Noctule bats was incidentally recorded within this tree group.

4.1.2 The survey results therefore indicate that:

- B2, B3, B27, Tree 18 and Tree 25 support confirmed occasional/transitory roosts for individual Common Pipistrelle bats;
- G1 supports a probable occasional/transitory roost for an individual bat of indeterminate species;
- Tree 17 supports a confirmed occasional/transitory roost for two bats of indeterminate species;
- G3 supports at least two Noctules; and
- B33 supports at least one bat of indeterminate species.

4.1.3 The low numbers of bats recorded roosting within the buildings and trees indicates that these are small low-status non-breeding roosts which may be used by male or non-breeding female bats.

4.1.4 Notwithstanding the low status of the bat roosts recorded, in the event that planning permission is granted for development of the site, it is recommended that B2, B3, B27, B33 and Trees 17, 18, 25, G1 and G3 should, if possible, be retained. It is understood that it may be possible to retain Trees 17, 18, 25, G1 and G3, however B2, B3, B27 and B33 are expected to be demolished. It will not be possible to retain the identified roosts associated with these buildings and therefore proposals have the potential to conflict with the nature conservation legislation afforded to bats (set out in *Section 1.2*). Works to the above buildings with potential to affect roosting bats should therefore be carried out under a full European Protected Species Mitigation (EPSM) licence<sup>3</sup>. The licence application would need to be supported by a detailed method statement setting out measures by which individual bats would be protected during construction works and opportunities for roosting bats would be maintained thereby ensuring the continued favourable conservation status of the local bat population. Suitable measures by which this can be achieved are provided in *Section 5* below.

## **4.2 Foraging and commuting activity**

4.2.1 At least ten species of bat were recorded using the site for foraging and commuting, with varying levels of activity observed throughout the surveys. The plan in *Appendix D* provides an overview of bat activity recorded during the surveys.

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<sup>3</sup> The 'Low Impact Licence' approach only covers small numbers of roost sites which is not the case in this instance.

- 4.2.2 The majority of activity recorded related to Common Pipistrelle bats, with up to 21 Common Pipistrelle bats considered to be using the site at any one time during the activity transect survey. The majority of Common Pipistrelle activity was recorded along the River Ouzel, the off-site Pineham Nature Reserve and connected hedgerows in the west of the site, a small woodland copse in the north of the site and a small woodland copse and mature treeline in the centre of the site. Common Pipistrelle was however also recorded less frequently using the hedgerows and woodland copses bordered by grassland and arable fields in the remainder of the site. Common Pipistrelle is a common and widespread bat species in Britain, with an estimated British population of 3,040,000 individuals (Mathews *et. al.*, 2018). The site therefore supports only a very small proportion of the British population of this species.
- 4.2.3 Soprano Pipistrelle was the second most frequently recorded species during the transect surveys, with up to 10 Soprano Pipistrelle bats considered to be using the site at any one time during the activity transect survey. The majority of Soprano Pipistrelle activity was associated with the River Ouzel, the off-site Pineham Nature Reserve and hedgerows in the west of the site and woodland copses in the north of the site. Soprano Pipistrelles were also recorded on a less frequent basis using hedgerows and woodland bordering the grassland and arable fields in the remainder of the site. Soprano Pipistrelle is a common and widespread bat species in the Britain, with an estimated British population of 4,670,000 individuals (Mathews *et. al.*, 2018). The site therefore supports only a very small proportion of the British population of this species.
- 4.2.4 Noctule was the third most frequently recorded species during the transect surveys, with up to 8 Noctule bats considered to be using the site at any one time during the activity transect survey. The majority of Noctule activity was associated with the River Ouzel, the Pineham Nature Reserve and hedgerows in the west of the site. Noctule were also recorded on a less frequent basis using hedgerows and woodland bordering the grassland and arable fields in the remainder of the site. Noctule is a common and widespread bat species in England, with an estimated England's population of 565,000 individuals (Mathews *et.al.*, 2018). The site therefore supports only a very small proportion of England's population of this species.
- 4.2.5 *Myotis* sp., Brown Long-eared bat, Serotine, Barbastelle, Nathusius' Pipistrelle, Leisler's bat and Greater Horseshoe bats were also recorded from similar habitat on a less frequent basis. Of these species, the rarest are considered to be Barbastelle and Nathusius' Pipistrelle which are listed as 'Vulnerable' in Great Britain on the IUCN Red list and Leisler's bat which is listed as 'Near Threatened' in Great Britain on the IUCN Red list<sup>4</sup>. In addition, although Greater Horseshoe bat is listed as being of 'Least Concern' in

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<sup>4</sup> Accurate population estimates currently unavailable for these species (Mathews *et al.*, 2018).

Great Britain on the IUCN Red List it has a restricted range within Britain with the site being located on the northernmost edge of its range, and this species has a relatively small population in Britain comprising an estimated 12,900 individuals (Matthews *et al*, 2018). The survey findings indicate the presence of individual non-breeding bats of these species using the site as part of a wider foraging territory on an occasional basis.

4.2.6 Despite the relatively high number of species recorded and the overall number of bats expected to have been present within the site at any one time during the transect survey, overall the level of bat activity recorded was generally considered to be low to moderate, relative to the size of the site, and similar foraging and commuting opportunities are relatively widespread in the wider area. As a whole the site is therefore considered to be of no more than low district interest for foraging bats. This interest largely relates to habitats associated with the River Ouzel, the off-site Pineham Nature Reserve and associated woodland copse and network of hedgerows, particularly within the west of the site.

4.2.7 In addition to implementing measures to mitigate any negative effects on roosting bats, in accordance with nature conservation legislation, development proposals should therefore also seek to maintain and enhance opportunities for foraging and commuting bats within the site and its surrounds in accordance with planning policy and the 2006 NERC Act. These measures are further discussed in *Section 5* below.

## **5 RECOMMENDATIONS**

5.1 This section identifies measures to be implemented during development of the site in order to avoid, mitigate and compensate potential impacts on bats, and to maintain the favourable conservation status of the local bat population. In addition, recommendations for enhancement of the site for roosting and foraging bats are included in accordance with 2019 NPPF and the 2006 NERC Act.

### **5.2 Roosting bats**

#### *Buildings*

5.2.1 The low numbers of bats recorded roosting within the buildings indicates that these are all small low-status non-breeding roosts which may be used by male or non-breeding female bats.

5.2.2 Current knowledge suggests that proposed development of the site will result in the loss of, or damage or disturbance to the roost sites identified in B2, B3, B27 and B33<sup>5</sup>. A

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<sup>5</sup> The survey data for off-site B33 is currently considered to be indicative due to the access constraints associated with this building group. Although this off-site building is located outside the site boundary, it has potential to be isolated by the proposed development and is therefore considered in this section. The assessment of roosting

European Protected Species (EPS) licence would therefore need to be obtained from Natural England prior to the commencement of any works affecting buildings containing bat roost sites. The licence would need to be accompanied by a detailed method statement describing how the favourable conservation status of bats at the site will be maintained, including information on how loss of roost sites will be compensated and timing of works to minimise impacts on bats. Mitigation would centre on:

- Creation of appropriately designed and sited new roosting opportunities for bats, proportionate to those being lost; and
- Implementation of works affecting roost sites at a time of year when bats are least susceptible to disturbance/likely to be present, employing sensitive working practices.

5.2.3 Measures by which this can be achieved are given below. These should be implemented unless otherwise agreed with the local planning authority and/or Natural England.

#### ***Replacement of roost sites***

5.2.4 A strategy for mitigating the loss of the existing roost sites resulting from the proposed development works is described below. This should be reviewed at an appropriate stage in light of detailed design and/or the findings of updated surveys, if appropriate.

#### Short-term roost replacement and enhancement: tree-mounted bat boxes

5.2.5 The bat roosts identified above will be lost as a result of the demolition of B2, B3 and B27 and it will not be possible to retain the identified bat roosts during development works. The roost in B33 also has potential to be affected through isolation by surrounding development. However, Common Pipistrelle bats are known to roost in both trees and bat boxes (University of Bristol, 2010), with records of bat boxes having been used for successful breeding. It would therefore be possible to provide suitable replacement opportunities during the construction phase prior to new roosting opportunities being created within the new buildings.

5.2.6 To provide replacement opportunities for bats associated with the identified roost sites prior to construction commencing, bat boxes should be installed on suitable retained trees within the site in the vicinity of the existing roosts to be lost. Initial replacement roost mitigation for each of the roosts to be lost should comprise:

- 2x Schwegler 1FF box<sup>6</sup>; and
- 2x Schwegler 2F box<sup>7</sup>.

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bats and associated mitigation given for B33 within this report should be re-assessed following the additional surveys recommended in *Section 5.2.26* below.

<sup>6</sup> In a study conducted by the Vincent Wildlife Trust (Colin Morris, pers. comm.), Schwegler 1FF bat boxes were identified as the box design that attracts the most species of bat, as well as being the most favoured by rare species such as Bechstein's Bat.

<sup>7</sup> In the same study, Schwegler 2F bat boxes were identified as the box design most likely to contain bats.

5.2.7 The bat boxes identified above should be located on retained trees within areas away from the proposed construction works affecting each building. The precise positions of the boxes should be determined through consultation with an appropriately qualified and experienced bat ecologist, but will need to integrate the location of suitable retained trees and habitat connections with avoidance of areas with highest potential future lightspill. To provide the opportunity for bats to find and utilise new roost sites prior to development, bat boxes should be put in place at an appropriate stage in advance of works commencing.

Long-term roost replacement and enhancement: crevices

5.2.8 The bat boxes described above should be retained on completion of development in order to mitigate for the loss of bat roosting opportunities during the site demolition works. Measures to ensure the long-term availability of roost sites within the site are described below.

5.2.9 Of the bats confirmed or possibly roosting in the buildings at the site, Common Pipistrelle are considered to be primarily crevice or hole-dwelling bats. To provide replacement and maintain opportunities for this bat species within the completed development, and deliver enhancements to the long-term roosting potential of the site, a number of features suitable for crevice dwelling bats should be incorporated into the new buildings.

5.2.10 The following features should be incorporated into the new buildings to provide long-term replacement roost sites for crevice dwelling bats. Features to be installed to mitigate for loss of roost sites for crevice dwelling species across B2, B3, B27 and B33 should comprise:

- A minimum of eight dedicated features such as Schwegler 1FR Bat Tubes or 'Habibat' type boxes incorporated into south- to west-facing elevations.
- A selection of other opportunities for crevice dwelling bats (a minimum of eight) should be provided in a variety of locations. These may include a selection of:
  - Provision of 20mm x 100mm gaps beneath roof and ridge tiles to allow access by bats to the underfelt below. Alternatively dedicated bat access tiles could be installed to perform a similar function;
  - Provision of gaps to allow access by bats into cavity walls; and
  - Provision of 20mm x 200mm gaps along soffit boards providing access to the soffit box (installing soffit bat boxes if desired) or the internal roof space where appropriate.

5.2.11 Where any features such as crevices for roosting bats are provided in association with the buildings, bitumastic (traditional) roofing felt should be used to avoid entanglement of bats.

5.2.12 All replacement roost sites should be located away from areas most affected by construction and operational phase noise and lighting. The precise position of replacement roost sites should be determined through consultation with an appropriately qualified and experienced ecologist at the detailed design stage, but would in any case need to integrate the location of suitable retained trees and habitat connections with avoidance of areas subject to significant levels of light spill.

***Enhancement of roosting opportunities***

5.2.13 The proposed development would provide opportunity to enhance the value of the site for roosting bats in the long-term in accordance with the 2019 NPPF and the 2006 NERC Act through the provision of additional opportunities for roosting bats to those described above. The detailed design and location of such features would be determined at an appropriate stage prior to construction, but in addition to the mitigation measures described above, consideration should be given to inclusion of additional roosting opportunities including:

- Erection of additional bat boxes on mature trees across the site; and/or
- Creation of additional bat roosting opportunities on new buildings within the site e.g. through the use of bat bricks within the external walls of buildings, raised tiles, accessible roof voids etc. (suitable opportunities are described in *Section 5.2.9* above).

5.2.14 By providing a variety of roosting opportunities in different locations and orientations within the new buildings and retained trees across the site, a range of roost spaces with varied microclimates will be provided that will offer long-term roosting opportunities for bats throughout the year.

***Approach and timing of works***

5.2.15 Works affecting confirmed or possible roost sites should ideally be carried out at a time of year when bats are least likely to be present. Little is known about the hibernation habits of Pipistrelles. In view of the difficulties in ruling out use of the roost buildings by small numbers of hibernating bats, works to buildings during the winter hibernation months (November-March) should be avoided, since any bats present during this period may be in torpor and would be particularly sensitive to disturbance. Although the findings of the surveys suggest that only non-breeding bat roosts are present at the site, given that a degree of uncertainty always exists in relation to the exact status of a summer roost, best

practice is to also avoid the peak breeding period (June to August) when young bats, unable to fly, may be present.

- 5.2.16 In the event that building stripping or demolition is required outside of the timeframe described above then works to B2, B3, B27 and in the vicinity of B33 potentially affecting roosting bats should be either: (i) preceded by an updated survey to confirm the continued absence of a breeding roost (for demolition works between June and August); or (ii) be carried out during periods of mild weather when bats are active with minimum night time temperatures exceeding 7°C for five consecutive nights (for demolition works between November and February).
- 5.2.17 As identified above, bat boxes on retained trees should be provided in advance of loss of any roost in order to provide alternative roost sites prior to works commencing.
- 5.2.18 All demolition or stripping works involving the removal of features from B2, B3 and B27<sup>8</sup> with the potential to conceal roosting bats should be overseen by a licensed bat worker under an Ecological Watching Brief. Potential features on these buildings include lifted barge boards, roof tiles, gaps in brickwork and weatherboarding. Suitable features should be inspected prior to demolition/stripping and a cautious approach should be employed, particularly in the vicinity of the known roosts, with key features removed by hand where appropriate.
- 5.2.19 Should any bat be encountered during these works, it would be moved by the licensed bat worker to one of the pre-installed bat boxes described in *Section 5.2.6*.

#### *Trees*

- 5.2.20 The Phase 2 surveys identified the presence of small, low-status bat roosts in Trees 17, 18, 25, G1 and G3. Emerging development proposals for the site indicate that these trees will be retained and therefore current knowledge suggests that no mitigation in relation to these features is required at this time. Any future iterations of the masterplan should have regard to the roost sites identified and the findings of any subsequent survey work (see *Section 5.2.24* below) and be subject to review and comment by a suitably qualified ecologist.
- 5.2.21 Although current knowledge suggests that the identified roost sites in trees can be retained, due to the presence of opportunities for roosting bats within a number of trees across the site and the highly mobile nature of bats, an approach to works affecting trees lost to development or affected by future maintenance works (e.g. for health and safety) is set out below. This involves either further survey prior to works commencing to confirm

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<sup>8</sup> B33 falls outside the site boundary and will not be directly affected.

continued absence of roosting bats or through a sensitive approach to works. In the event that retention of a tree identified as providing opportunities for roosting bats is not possible, due to the transitory nature with which bats may use roost sites in trees, it is recommended that felling works should be carried out in accordance with the following procedure, including where the 2019 Phase 2 surveys have not identified a roost as being present:

1. In the event that future pruning or felling works for reasons of health and safety are required to any tree/tree group with confirmed/probable roosts (Trees 17, 18, 25, G1 and G3) such works have the potential to disturb or destroy any roosts present. If it is not possible to retain the roost site associated with the tree/tree group, a European Protected Species (EPS) licence would need to be obtained from Natural England prior to the commencement of any works affecting the roost sites associated with these trees.
2. Other trees suitable for climbing inspections should first be climbed by a licensed bat worker to inspect potential roost sites for bats. In the event that no bats are encountered during an exhaustive search then any features should be 'soft stopped' to prevent re-occupation prior to felling. In the event that a bat is encountered, where the tree is already covered under an EPS licence, this should be moved to the bat boxes installed prior to felling works commencing. If a bat roost is encountered during survey of a tree not covered under an EPS licence, then felling/works to this tree should be delayed until an EPS licence has been sought and obtained from Natural England. Where bat roosts are present within any tree subject to felling, the tree should be 'soft felled' in accordance with the methodology described under point 5 below.
3. Trees with 'high' potential, for which an exhaustive climbed inspection is not possible or practicable should be subject to three emergence/re-entry surveys following BCT best practice guidelines to confirm the absence of roosting bats prior to any works affecting the tree commencing.
4. Trees with 'moderate' potential, for which an exhaustive climbed inspection is not possible or practicable should be subject to two emergence/re-entry surveys following BCT best practice guidelines to confirm the absence of roosting bats prior to any works affecting the tree commencing.
5. 'Low' potential trees that are unsuitable for climbing inspections and/or have not been subject to an emergence survey immediately in advance of works should be 'soft felled' under the supervision of a suitably qualified ecologist. Soft felling involves progressive removal of the tree, using ropes to gently lower sections of tree potentially supporting roosting bats to the ground for inspection by a suitably qualified ecologist. Where appropriate, features should be left on the ground overnight before clearing to allow any bats present to escape.

5.2.22 In the event that a roosting bat is discovered during any of the above works to trees not covered by an appropriate EPS licence, trimming/felling works must cease and Natural England contacted to agree an appropriate course of action. A licence may need to be applied for, and approved, before works can continue.

*Maintenance of roosting opportunities*

5.2.23 The integrity of retained roosting opportunities within and adjacent to the site should be conserved through the maintenance of connections to commuting and foraging habitat and sensitive use of lighting throughout the construction and operational phases (see *Section 5.3* below). In addition, trees not supporting roosting bats at the time of survey have potential to support bats in the future and therefore these trees should be retained and their ability to support roosting bats maintained, where possible to do so. Where significant loss of future roosting opportunities arises, this should be offset through alternative roost provision elsewhere within the site.

*Further survey*

5.2.24 Due to access constraints associated with the B33 group of buildings, it was not possible to carry out a detailed Phase 1 bat scoping survey or to carry out Phase 2 emergence/re-entry surveys in line with published guidelines (BCT, 2016). It is therefore recommended that where possible detailed Phase 1 scoping survey and Phase 2 emergence/re-entry surveys of the buildings associated with B33 are updated prior to a planning application being submitted and accordingly the recommendations included within this document revised.

5.2.25 In addition, bats may occupy roost sites on a seasonal or temporary basis and old roost sites may be abandoned and new roosts occupied within relatively short periods of time. Where appropriate, bat survey work, including emergence/re-entry surveys and/or climbing inspections of buildings and trees with potential to support roosting bats affected by the proposed development should be updated in advance of development commencing. The guidance of a suitably qualified ecologist should be sought to determine if and when surveys should be updated with regard to the development programme. This would ensure that up-to-date information is available to inform the extent of any mitigation and licensing requirements relating to bats.

**5.3 Foraging and commuting bats**

5.3.1 The site is considered as a whole to be of no more than low district importance for foraging bats. The site is expected to comprise a significant proportion of foraging habitat for moderate numbers of Common Pipistrelle and Soprano Pipistrelle bats and provides foraging habitat for low numbers of at least eight other species/species groups on a more occasional or infrequent basis.

- 5.3.2 A number of the bat species identified at the site (Barbastelle, Soprano Pipistrelle, Noctule, Greater Horseshoe, Lesser Horseshoe and Brown Long-eared bat) are listed as Species of Principal Importance under Section 41 of the 2006 NERC Act and therefore the effects of development on foraging and commuting habitat are a material consideration in the planning process.
- 5.3.3 The development proposals indicated on the *Milton Keynes East Concept Masterplan* (jtp, 2017) show the retention of the majority of hedgerows, treelines and woodlands within the northern and western sections of the site. However, the majority of hedgerows and plantation woodland copses within the central and south-eastern areas of the site, associated with the proposed secondary school and areas of commercial development, will be lost. In the long-term, the loss of species-poor hedgerows and plantation woodland copses could be mitigated through the planting of new hedgerows and scattered trees to re-connect habitats across the site. In addition, the development of the site would result in the loss of further areas of foraging habitats within the development areas where buildings and hardstanding takes the place of areas currently dominated by grazed grassland and arable habitats. Although the field interiors are currently of limited value for foraging bats and it is expected that the proposed gardens and areas of open space within the development areas will provide new opportunities for roosting bats as these mature, consideration should be given to the use of pollen and nectar rich species within the formal planting schemes, enhancement of woodland edge habitats, new shrub and tree planting and inclusion of areas of rough and meadow grassland within areas of open space in order to maximise opportunities for foraging and commuting bats following development.
- 5.3.4 The site is currently subject to very limited light spill, generally associated with car headlights and streetlighting from off-site roads to the north, south and crossing the site. The integrity of retained and new foraging and commuting habitat, both within the proposed development area and its surrounds, should be conserved through the sensitive use of lighting throughout the construction and operational phases of the proposed development. In accordance with the Bat Conservation Trust and Institute of Lighting Practitioners guidance (BCT and ILP, 2018) this could be achieved through employment of a selection of the following measures in the vicinity of retained/newly created areas of suitable foraging habitat and in the vicinity of trees and buildings providing opportunities for roosting bats:
- Use of only the minimum amount of light required for safety and amenity, and minimise upward reflected light.
  - Avoidance of bare bulbs or upward-pointing lights. The spread of light should be kept near to or below the horizontal.

- Use of narrow spectrum bulbs (between 4000 and 2700k) and/or low UV emitting bulb types.
- Avoidance of light-spill into adjacent areas through luminaire design or with accessories, such as hoods, cowls, louvres and shields to direct the light.
- Minimising the height of lighting columns.
- For pedestrian lighting, use of low level lighting that is as directional as possible and below 3 lux at ground level.
- Where necessary, use of embedded road lights to illuminate roadways and light only high-risk stretches of roads such as crossings and merges.
- Limiting the times that lights are on to provide some dark periods for wildlife and/or use automatic dimmers to reduce lighting outside times of peak use.

5.3.5 It is recommended that all detailed external lighting proposals are reviewed at appropriate design stages by a suitably qualified ecologist. This could be secured via a condition of planning consent.

5.3.6 Furthermore, in addition to the above measures to maintain opportunities for foraging and commuting bats within and adjacent to the developed areas of the site, the proposed areas of informal public open space will provide extensive opportunities to enhance these areas of the site for bats through the creation and enhancement of meadow grassland, scrub and woodland habitats and the creation of new wetland features. In order to maximise future opportunities for foraging and commuting bats within these areas of open space, it is recommended that the following measures are included in the landscape strategy for these areas of the site:

- Linear features such as hedgerows and treelines should be retained wherever possible and enhanced through infilling of gaps or provision of complementary scrub and tree planting. Where loss is unavoidable, for example at road or footpath access points, loss should be minimised and compensatory habitat provided at an appropriate location elsewhere.
- Where possible, new linear features such as hedgerows and treelines should be created to improve connectivity between areas of suitable roosting and foraging habitat within the site and the wider area.
- Landscape proposals within areas of open space across site should seek to include high quality habitat for foraging bats. This might include shrub planting, creation of areas of rough and meadow grassland, woodland and marginal vegetation and/or use of native species-rich hedgerows and treelines along boundaries.
- Creation of new wetland habitats including reedbeds, ponds and drains either as stand-alone features or as part of the surface water drainage strategy. These

habitats are capable of supporting large numbers of invertebrates, providing a significant foraging resource for bats.

## **6 CONCLUSION**

- 6.1 The bat survey work carried out at the site identified a number of roost sites associated with individual/small numbers of roosting bats within buildings and trees. The emerging proposals indicate that the bat roosts associated with the on-site buildings (B2, B3, B27) will be lost to the proposed development, and the off-site roost in B33 may be adversely affected in the absence of suitable avoidance measures. The emerging proposals indicate however that it will be possible to retain the tree roosts (Trees 17, 18, 25, G1 and G3) recorded within the site. These are all considered to be low status, non-breeding roosts supporting low numbers of Common Pipistrelle and unidentified bat species.
- 6.2 Although the roosts to be affected by the proposed development works are considered in combination to be of no more than low local value, the proposed works must give due regard to the legal protection afforded to all bats, which protects both individual bats and the conservation status of populations.
- 6.3 Measures to ensure the protection of individual bats during construction works and maintenance of opportunities for roosting bats in the long-term, including provision of a range of new bat roosting opportunities and suitable timing of activities, is described in *Section 5* of this report. The measures described should form the basis of a detailed Method Statement which would accompany an application to Natural England for a licence to permit development works affecting bats
- 6.4 Measures are also described for the maintenance and enhancement of current opportunities provided by the site for foraging and bats. These include sensitive lighting design and development of a suitable landscape strategy for the site, including the retention, enhancement and creation of high value habitats for foraging bats. The proposed development areas are currently dominated by grazed and arable farmland of limited value for foraging bats and it is likely that these measures could maintain and possibly enhance the value of the site in the long-term for this group.
- 6.5 Subject to the implementation of the measures described in *Section 5*, it is considered that the favourable conservation status of the local bat population would be maintained and, through long-term provision of higher quality roosting and foraging habitats, potentially enhanced. This would ensure compliance with the nature conservation objectives of the EC Habitats Directive, the 2006 NERC Act and the guidance underpinning the 2019 National Planning Policy Framework.

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Project Reference: 2090.52  
Document Title: Bat Survey Report  
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Issue	Description	Date of Issue	Signed
1	Bat Survey Report	February 2020	AM

	Personnel	Position
Author	Clare Bird MCIEEM	Senior Ecologist
Approved for issue	Adrian Meurer MCIEEM	Director

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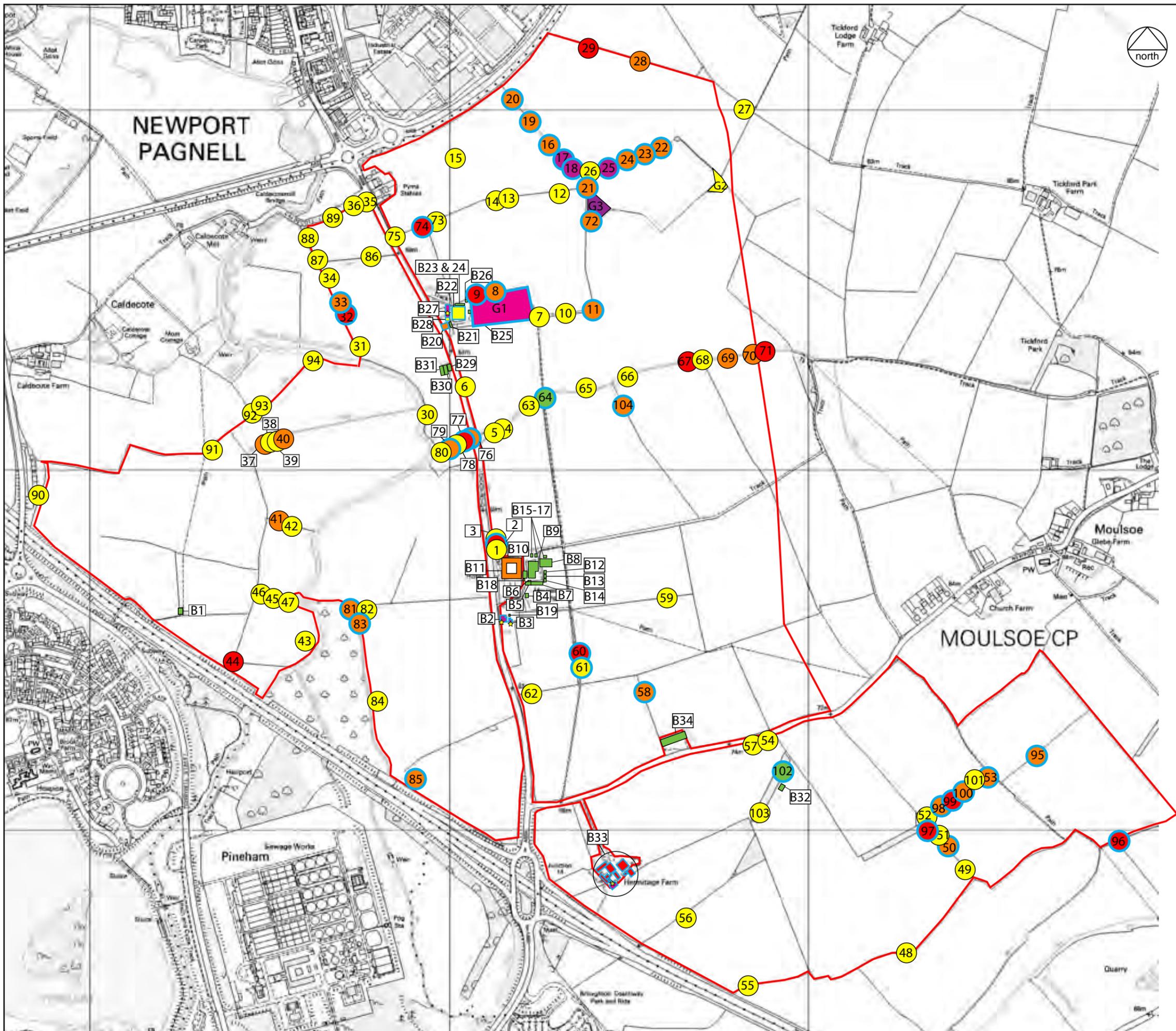
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**APPENDIX A**

**Bat Roost Survey Summary Plan**



**KEY**

- Site boundary
- Tree/building subject to Phase 2 roost survey

**BUILDINGS \***

- Confirmed bat roost
- Probable bat roost
- High bat roost potential
- Moderate bat roost potential
- Low bat roost potential
- Negligible bat roost potential

**TREES \***

- Confirmed bat roost
- High bat roost potential
- Moderate bat roost potential
- Low bat roost potential
- Negligible bat roost potential

**EMERGENCE/RE-ENTRY RESULTS \*\***

- Common Pipistrelle
- Silent bat

\* Roosting categories relate to roost potential in accordance with the BCT 2016 guidelines. All other trees within the site are regarded as having 'negligible' potential to support roosting bats.

\*\* For more detail see Appendix B.

CLIENT:  
St James

PROJECT:  
Milton Keynes East

TITLE:  
Bat Roost Survey Summary Plan

SCALE AT A3: Not to Scale      DATE: February 2020

2090.52/18

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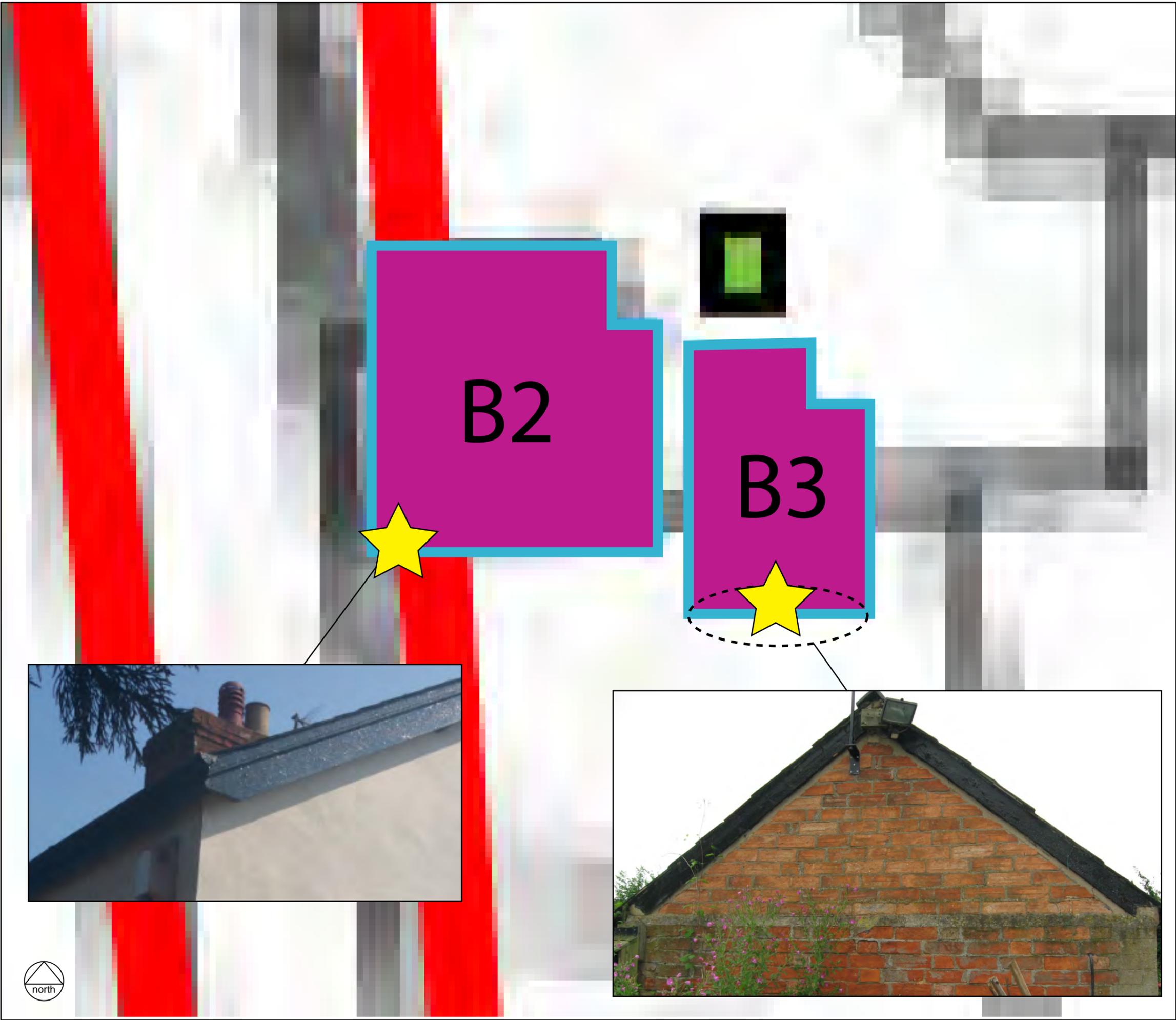
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**APPENDIX B**

**Bat Roost Survey Summary Plans – B2, B3 and B27**



**KEY**

 Site boundary

**BUILDINGS**

 Confirmed roost

**EMERGENCE/RE-ENTRY SURVEY RESULTS**

 Common Pipistrelle

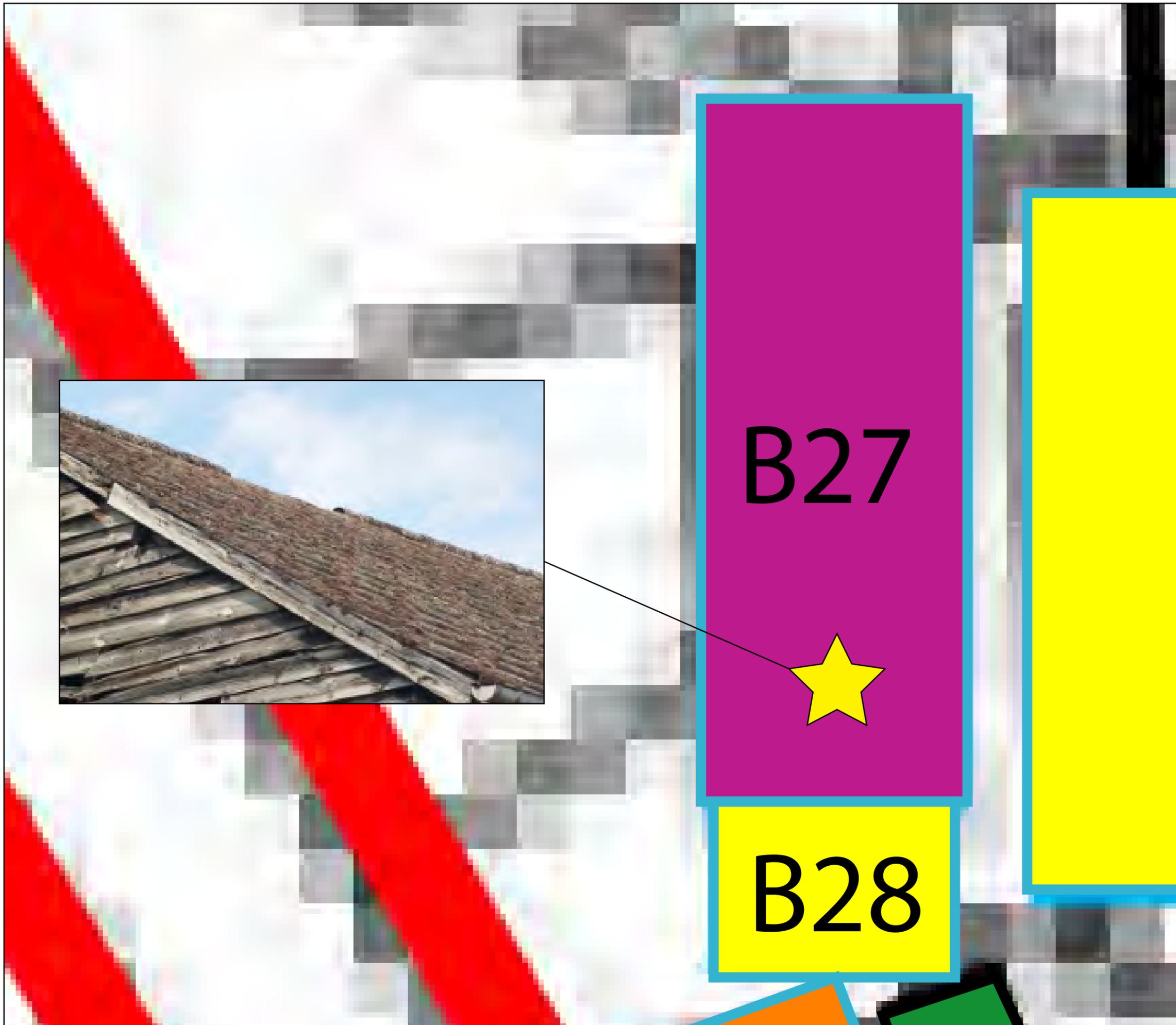
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**St James**  
 PROJECT:  
**Milton Keynes East**  
 TITLE:  
**Bat Roost Survey Summary Plan - B2 & B3**  
 SCALE AT A3:                      DATE:  
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**KEY**

 Site boundary

**BUILDINGS**

 Confirmed roost

**EMERGENCE/RE-ENTRY SURVEY RESULTS**

 Common Pipistrelle

B27



B28



CLIENT:  
St James

PROJECT:  
Milton Keynes East

TITLE:  
Bat Roost Survey Summary Plan - B27

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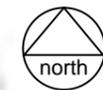
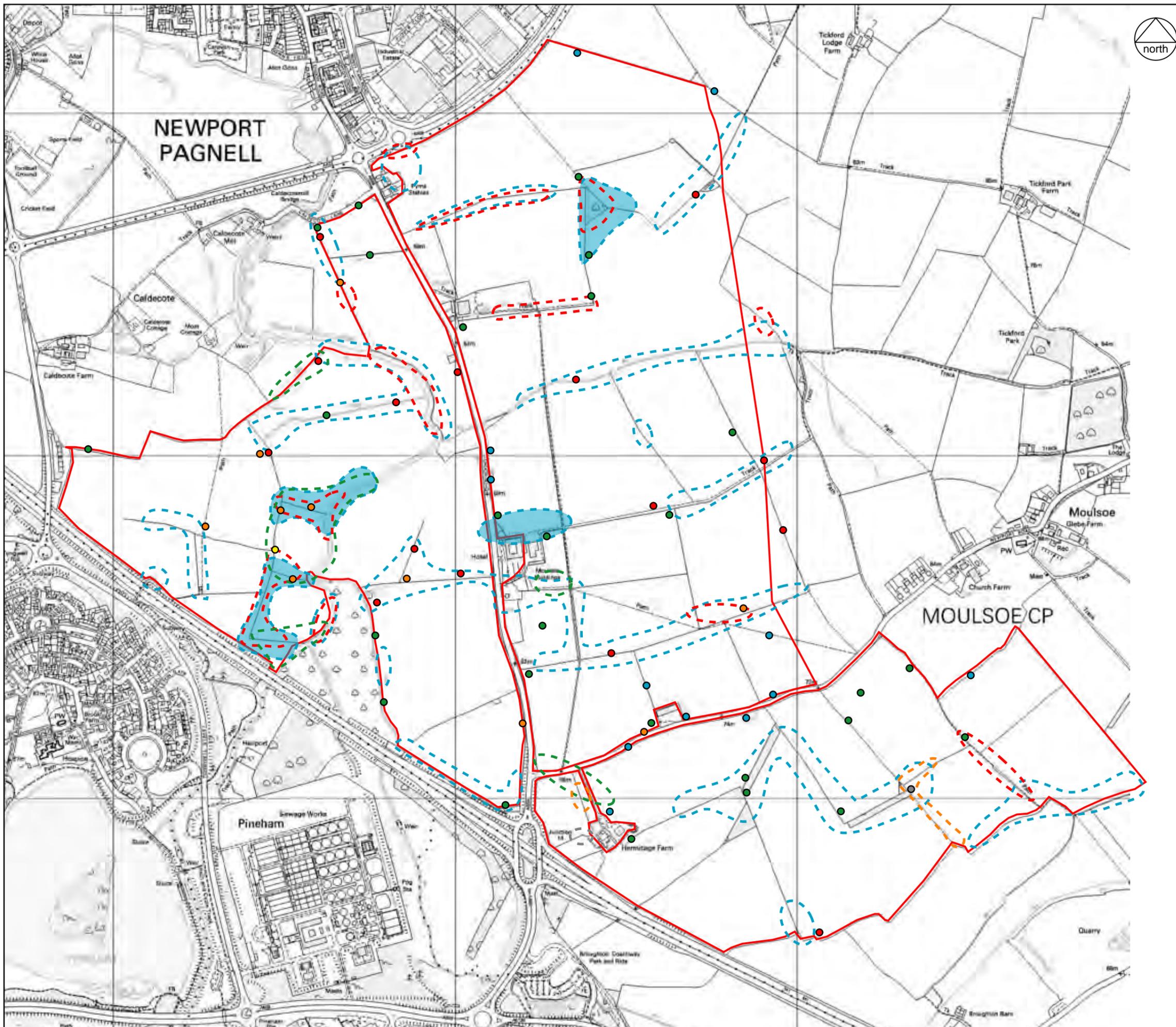
## APPENDIX C

### Bat Activity Transect Coverage and Automated Detector Location Plan



**APPENDIX D**

**Bat Activity Survey Summary Plan**



**KEY**

- Site boundary
  
- Bat foraging and commuting activity**
- Common Pipistrelle
  - Single bat pass
  - Occasional bat pass / foraging
  - Moderate foraging activity
- Soprano Pipistrelle
  - Single bat pass
  - Occasional bat pass / foraging
- Noctule
  - Single bat pass
  - Occasional bat pass / foraging
- Myotis* sp.
  - Single bat pass
  - Occasional bat pass / foraging
- Brown Long-eared bat
  - Single bat pass
  - Occasional bat pass / foraging
- Serotine
  - Single bat pass

CLIENT:  
St James

PROJECT:  
Milton Keynes East

TITLE:  
Bat Activity Survey Summary Plan

SCALE AT A3:  
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February 2020

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## **APPENDIX E**

### **Photographs**



**Photo 1.** Southern elevation of B1.



**Photo 2.** Northern and eastern elevations of B2.



**Photo 3.** Southern and western elevations of B2.



**Photo 4.** Western elevation of B3.



**Photo 5.** Eastern and southern elevations of B4.



**Photo 6.** Southern elevation of B5.



**Photo 7.** Northern elevation of B6.



**Photo 8.** Northern elevation of B7.



**Photo 9.** Western and southern elevations of B8.



**Photo 10.** Northern and eastern elevations of B9.



**Photo 11.** Southern and eastern elevations of B10.



**Photo 12.** Northern elevation of B11.



**Photo 13.** Northern and eastern elevations of B12.



**Photo 14.** Northern and eastern elevations of B13 and 14.



**Photo 15.** Northern elevation of B15 and B16 in the foreground with B9 behind.



**Photo 16.** Northern elevation of B17 in the foreground with B8 behind.



**Photo 17.** Southern and eastern elevations of B18 in foreground and southern elevation of B10 in rear.



**Photo 18.** Northern elevation of B19.



**Photo 19.** Eastern elevation of B20.



**Photo 20.** Western elevation of B20.



**Photo 21.** Southern and western elevations of B21.



**Photo 22.** Southern elevation of B22.



**Photo 23.** Northern and western elevations of B23 and 24. To the left of the photo is B22.



**Photo 24.** Northern elevation of B25.



**Photo 25.** Southern and western elevations of B26.



**Photo 26.** Northern and eastern elevations of B27.



**Photo 27.** Southern and eastern elevations of B27 in the right of the photo and eastern elevation of B28 in the left of the photo.



**Photo 28.** Southern and eastern elevations of B28 in foreground and southern elevation of B27 to rear.



**Photo 29.** Northern and western elevations of B29 in centre of photo and northern elevation of B30 in right of photo.



**Photo 30.** Northern elevation of B30 and B31 and western elevation of B31.



**Photo 31.** Southern and eastern elevations of B32.



**Photo 32.** Collection of buildings at Hermitage Farm (off-site) (B33).



**Photo 33.** Southern elevation of B34.

# **Appendix 4 Dormouse Survey report**



**MILTON KEYNES EAST**

**DORMOUSE SURVEY REPORT**

**Prepared for St James**

**by**

**Hankinson Duckett Associates**

**HDA ref: 2090.52**

**February 2020**

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5 Conclusion and Recommendations	5
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HDA Document Control and Quality Assurance Record

## **APPENDICES**

A Dormouse Survey Summary Plan

# 1 INTRODUCTION

## 1.1 Site location and summary description

1.1.1 This report describes a Hazel Dormouse survey conducted within approximately 362ha of land at Newport Pagnell, Buckinghamshire, hereinafter referred to as 'the site'. The site centre is located by National Grid Reference SP 893 415. The study and subsequent report were commissioned by Berkeley Strategic and St James respectively.

1.1.2 The site is located to the south of Newport Pagnell, on the north-eastern edge of Milton Keynes, Buckinghamshire. The site is dominated by agricultural land comprising intensively managed arable and grazed grassland fields with associated farmyards, agricultural buildings and residential farm houses. Field boundaries generally consist of hedgerows, treelines and fencing with occasional ponds and parcels of woodland, and the River Ouzel flows from south to north through the western part of the site. The site is bordered to the north by a construction site for residential development and the A422 beyond which lies the town of Newport Pagnell; to the east by arable farmland; to the west by the Pineham Nature Reserve and the M1 Motorway beyond which lies the town of Milton Keynes; and to the south by arable farmland.

1.1.3 The location and boundary of the site are shown in *Appendix A*. Detailed descriptions of the habitats within the site are given in the Ecological Appraisal (HDA, 2020).

## 1.2 Background and Legislative context

1.2.1 The Hazel Dormouse (hereinafter referred to as 'Dormouse') is a nocturnal animal that lives in woody habitats, mainly deciduous woodland and scrub, where it feeds on a wide variety of arboreal foods including flowers, fruits and insects. Habitats supporting a high diversity of tree and shrub species are subsequently beneficial to this species as these provide an unbroken sequence of food throughout the Dormouse active season. The Dormouse lives in the tree and shrub layer throughout the spring, summer and autumn during which time it rarely descends to the ground. During the winter however, when little food is available, Dormice descend to ground level where they save energy by going into hibernation under logs or under vegetation and leaf litter at the base of coppice stumps and thick hedgerows (Bright et al., 2006).

1.2.2 The Dormouse has undergone substantial declines in recent years as a result of habitat loss, deterioration and fragmentation and is consequently protected under the 2019 Conservation of Habitats and Species (Amendment) (EU Exit) Regulations. The 2019 Regulations make it an offence to:

- Deliberately capture, injure or kill Dormice;
- Deliberately disturb Dormice, in particular any disturbance which is likely to: (i) impair their ability to survive, to breed or reproduce, or to rear or nurture their

young; or to hibernate or migrate; (ii) affect significantly the local distribution or abundance of Dormice;

- Damage or destroy a Dormouse breeding site or resting place; or
- To (a) be in possession of, or to control; (b) to transport any live or dead Dormouse or any part of a Dormouse; (c) to sell or exchange or (d) offer for sale or exchange any live or dead Dormouse or part of a Dormouse.

1.2.3 In addition, Dormice are protected under the 1981 Wildlife and Countryside Act (as amended). Dormice are listed on Schedule 5 of the Act and are subject to the provisions of Sections 9.4b and 9.4c, which make it an offence to:

- Intentionally or recklessly disturb a Dormouse while it is occupying a structure or place which it uses for shelter or protection; or
- Intentionally or recklessly obstruct access to any structure or place used for shelter or protection by a Dormouse.

1.2.4 If works are planned that are likely to constitute an offence under the above legislation, a Natural England EPS licence should be applied for, and granted, prior to works commencing.

1.2.5 Dormice are also identified as a Biodiversity Action Plan (BAP) species for the UK and as a Species of Principal Importance under Section 41 of the 2006 NERC Act. This requires planning authorities to regard this species as a material consideration in the planning process.

### **1.3 Development proposals**

1.3.1 Proposals for the site include mixed use development with associated landscaping and infrastructure.

### **1.4 Scope and purpose of the report**

1.4.1 During an initial walkover survey undertaken by HDA in 2012, habitats within and adjacent to the site were identified as suitable for use by Dormice, including mature hedgerows, broadleaved woodland and scrub habitats. In view of the presence of suitable habitat for this species, a Dormouse survey was subsequently undertaken to determine the presence/ likely absence of Dormice at the site and to identify any need for licensing and mitigation in relation to the proposed development. The findings of this work are the subject of this report.

## 2 METHODOLOGY

### 2.1 Nest tube survey

2.1.1 A Dormouse nest tube survey was conducted at the site by Ceri Jennings and Adrian Meurer MCIEEM of Hankinson Duckett Associates, in accordance with the methodology described in *Section 3.2.6* of the Dormouse Conservation Handbook (Bright et al., 2006).

2.1.2 A total of 200 Dormouse nest tubes were installed across the site and its surrounds on 3<sup>rd</sup> May 2012. The distribution of nest tubes across the survey area is shown on the plan provided in *Appendix A*. A series of three subsequent monitoring visits were made. On each visit, all tubes were inspected for the presence of Dormice or evidence of occupation by Dormice such as nests. Evidence of other small mammals using the tubes was also recorded. The dates of all Dormouse survey visits are provided in *Table 1*.

**Table 1:** Dormouse survey visits

Date	Reason for visit
3 <sup>rd</sup> May 2012	Installing nest tubes
7 <sup>th</sup> and 8 <sup>th</sup> August 2012	Nest tube monitoring
27 <sup>th</sup> and 28 <sup>th</sup> September 2012	Nest tube monitoring
16 <sup>th</sup> and 17 <sup>th</sup> October 2012	Nest tube monitoring and removal

2.1.3 The Dormouse Conservation Handbook describes a scoring system for nest tube surveys which provides an indicator of the robustness of a survey. The system is based on an 'index of probability', whereby each month of the year in which Dormice are active is assigned a value according to the likelihood of Dormice using nest tubes (and leaving evidence of occupation) in that particular month. *Table 2* identifies the value of each month according to this system.

**Table 2:** Index of probability of finding Dormice present in nest tubes in any one month (Chanin and Woods, 2003, in Bright *et al.*, 2006).

Month	April	May	June	July	Aug	Sept	Oct	Nov
Index score	1	4	2	2	5	7	2	2

2.1.4 Values for individual months are based on the use of 50 tubes. If the number of tubes used is increased, the score for each month increases proportionately. In accordance with this methodology, the assumed absence of Dormice from a site should not be based on a total search effort score of less than 20 points.

2.1.5 During the survey of the site 200 nest tubes were in place for the months of May, June, July, August, September and October 2012. Although 200 nest tubes were installed, given the size of the site/ extent of habitat present this was broadly equivalent to 50 tubes

being installed across four sample areas. This provided a total score of 22 points. The results are therefore considered to provide a robust assessment of presence/ likely absence of Dormice within the survey area.

## **2.2 Habitat assessment**

2.2.1 As an additional element to the nest tube survey, areas of potentially suitable habitat within the site were assessed for their suitability to support breeding populations of Dormice, or to provide habitat linkages between areas of suitable breeding habitat.

## **3 RESULTS**

### **3.1 Habitat assessment**

3.1.1 The areas of improved and semi-improved grassland, arable farmland, amenity grassland, open waterbodies, hardstanding and buildings that dominate the site generally comprise unsuitable habitats for Dormice.

3.1.2 Suitable Dormouse habitat is however found within limited areas of broadleaved woodland, mature hedgerows and scrub found within the site, including:

- The network of hedgerows bordering and running throughout the site along field boundaries. Although some of the hedgerows are defunct, many are relatively species-rich and intact and comprise a mixture of native species including Hawthorn, Blackthorn, Elder, Field Maple, English Elm and Dog Rose. Many hedgerows also incorporate areas of tree planting and dense Bramble scrub. The hedgerows are considered to provide good connectivity and encompass vegetation in which is likely to provide foraging opportunities for Dormice across the active season. The variety of species present within these hedgerows enhances their suitability for Dormice due to the presence of a range of species useful for foraging Dormice, in particular Bramble, Hawthorn and Blackthorn.
- Small areas of tree planting, scrub and scattered trees are found in the south-east of the site and comprise species including White Poplar, Ash, Pedunculate Oak, Norway Maple and Crab Apple with a scrub understorey.
- In the north-east and east of the site, areas of mixed woodland are present with a mixture of mature and early mature trees. Species present include Pedunculate Oak, Rowan, Poplar sp., White Willow, Beech, Wild Cherry, Norway Maple, Scot's Pine, Ash and Elder, with an understorey typically comprising Dog Rose and Bramble.

3.1.3 In summary, the site is dominated by sub-optimal or unsuitable habitat for Dormice. The site does however support a variety of woody species in association with hedgerows, woodland parcels and small areas of scrub which provide limited areas of good quality Dormouse habitat. Many of the species present produce fruits/ nuts and flowers, and

would support invertebrate populations of value to foraging Dormice throughout the year. The habitats within the site are however somewhat isolated from any substantial areas of high quality Dormouse habitat in the wider area.

### **3.2 Nest tube survey**

3.2.1 No Dormice or evidence of Dormice was recorded during the nest tube survey. Several caches and nests characteristic of Harvest Mouse, Wood Mouse and Vole were recorded in several nest tubes across the site.

## **4 IMPACT ASSESSMENT**

### **4.1 Dormouse presence/absence**

4.1.1 Three elements have been considered in the determination of the presence/ likely absence of Dormice at the site: any existence of local Dormouse records for the wider area, habitat assessment and the nest tube survey results. With regard to these factors:

1. A desk study carried out as part of the Ecological Appraisal (HDA, 2020) identified no records of Dormice for the desk study area.
2. Although the site supports areas of suitable Dormouse habitat, these are generally limited in extent and/or and have limited connectivity with larger areas of habitat in the wider area.
3. No Dormice or evidence of Dormice was recorded during the 2012 nest tube survey.

4.1.2 It is therefore considered that Dormice are highly unlikely to have been present at the site at the time of the 2012 nest tube survey and given the relatively poor dispersal of this species and the absence of significant change in the extent of character of habitat within or adjacent to the site since the survey was undertaken, it is highly unlikely that Dormice have colonised the site in the intervening period.

### **4.2 Dormouse impact assessment**

4.2.1 Given the likely absence of Dormice at the site, the development proposals are considered highly unlikely to have any impact on Dormice and no requirement for mitigation or licensing has been identified.

## **5 CONCLUSION AND RECOMMENDATIONS**

5.1 No evidence of Dormouse was identified during the 2012 nest tube survey. Based on the absence of local Dormouse records, the results of the nest tube survey and habitat assessment, Dormice are considered highly likely to remain absent from the site. No impact avoidance or mitigation measures are therefore recommended in relation to Dormice.

**REFERENCES**

Bright, P., Morris, P. and Mitchell-Jones, T. (2006) *The Dormouse Conservation Handbook, 2<sup>nd</sup> Edition*. English Nature, Peterborough.

HDA (2020) *Milton Keynes East: Ecological Appraisal*. Hankinson Duckett Associates, Wallingford.

## HDA Document Control and Quality Assurance Record

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Project Reference: 2090.52  
Document Title: Dormouse Survey Report  
Commissioning Party: St James

Issue	Description	Date of Issue	Signed
1	Dormouse Survey Report	February 2020	AM

	Personnel	Position
Author	Caitlin Coombs	Assistant Ecologist
Approved for issue	Adrian Meurer MCIEEM	Director

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**APPENDIX A**

**Dormouse Survey Summary Plan**



# **Appendix 5 Water Vole and Otter Survey Report**

**MILTON KEYNES EAST**

**WATER VOLE AND OTTER SURVEY**

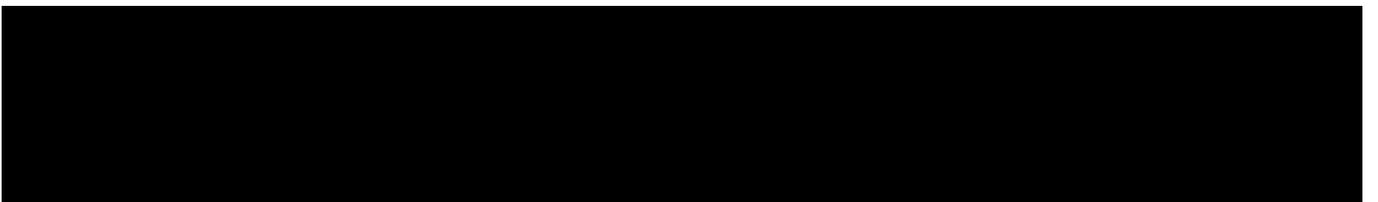
**Prepared for St James**

**by**

**Hankinson Duckett Associates**

**HDA ref: 2090.52**

**February 2020**



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## **APPENDICES**

- A Water Vole and Otter Survey Plan
- B Field Survey Recording Cards

# 1 INTRODUCTION

## 1.1 Site location and summary description

1.1.1 This report describes a Water Vole and Otter survey of watercourses associated with approximately 362ha of land at Newport Pagnell, Buckinghamshire hereinafter referred to as 'the site'. The site can be located by National Grid Reference SP 893419. The study was commissioned by St James in September 2018.

1.1.2 The site is located to the south of Newport Pagnell, on the north-eastern edge of Milton Keynes, Buckinghamshire. The site is dominated by agricultural land comprising intensively managed arable and grazed grassland fields with associated farmyards, agricultural buildings and residential farm houses. Field boundaries generally consist of hedgerows, treelines and fencing with occasional ponds and parcels of woodland. A number of ditches and drains are present and the River Ouzel flows from south to north through the western part of the site.

1.1.3 The site is bordered to the north by a construction site for residential development and the A422 beyond which lies the town of Newport Pagnell; to the east by arable farmland; to the west by the Pineham Nature Reserve and the M1 Motorway beyond which lies the town of Milton Keynes; and to the south by arable farmland.

1.1.4 The location and boundary of the site are shown in *Appendix A*. Detailed descriptions of the habitats within the site are given in the Ecological Appraisal (HDA, 2020).

## 1.2 Legislative context

1.2.1 Otters are protected under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. The 2019 Regulations make it an offence to:

- Deliberately capture, injure or kill an Otter;
- Deliberately disturb Otters, in particular any disturbance which is likely to: (i) impair their ability to survive, to breed or reproduce, or to rear or nurture their young; or to hibernate or migrate; (ii) affect significantly the local distribution or abundance of Otters;
- Damage or destroy an Otter breeding site or resting place; or
- To (a) be in possession of, or to control; (b) to transport any live or dead Otter or any part of an Otter; (c) to sell or exchange or (d) offer for sale or exchange any live or dead Otter or part of an Otter.

1.2.2 The Water Vole is fully protected through its inclusion on Schedule 5 of the 1981 Wildlife and Countryside Act (as amended). The Otter is subject to the provisions of Sections 9.4b and 9.4c of the Act only. This makes it an offence to:

- Intentionally or recklessly kill, injure or take a Water Vole;

- Possess or control live or dead specimens or anything derived from a Water Vole;
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place which Water Voles or Otters use for shelter or protection; or
- Intentionally or recklessly disturb Water Voles or Otters while they are using such a place, unless permitted under a licence issued by Natural England.

1.2.3 If works are planned that are likely to constitute an offence under the above legislation, a Natural England EPS licence should be applied for, and granted, prior to works commencing.

1.2.4 In addition, the Otter and Water Vole are listed as priority species on the UK Biodiversity Action Plan (BAP) and identified as Species of Principal Importance identified under Section 41 of the 2006 NERC Act. Section 40 of the NERC Act, planning policy and underpinning guidance require that these species are a material consideration in the planning process.

### **1.3 Development Proposals**

1.3.1 Proposals for the site include mixed use development with associated landscaping and infrastructure.

### **1.4 Scope and purpose of the report**

1.4.1 During an initial walkover survey undertaken by HDA in 2012, habitat in the form of the River Ouzel, Broughton Brook and drains within and adjacent to the site were identified as suitable for use by Otter and/ or Water Vole. These watercourses form part a wide network of waterways throughout the site and the wider area and subsequently an Otter and Water Vole Survey was undertaken. The 2012 Otter and Water Vole Survey identified:

- Signs of Water Vole in the form of a burrow, six latrines and feeding remains along Ditch 1 (see *Appendix A*).
- A single Otter spraint beneath a bridge over the River Ouzel approximately 180m to the north of the site.

1.4.2 Given the findings of the Otter and Water Vole 2012 survey and the length of time since the 2012 survey work was undertaken, the Otter and Water Vole Survey was subsequently updated to determine the current status of these species at the site. presence/ likely absence of Dormice at the site and to identify any need for licensing and mitigation in relation to the proposed development. The findings of this work are the subject of this report. Specifically, the aims of the study were:

- i) To identify the continued presence/ likely absence of Otters and Water Voles at the site and, if present, the level and type of activity; and
- ii) If present, to predict potential impacts of development on Otters and Water Voles and inform recommendations for impact avoidance, minimisation and mitigation.

## **2 METHODOLOGY**

2.1 The field survey was carried out on the over two days on the 27<sup>th</sup> September 2018 by Shannon Davies and Kate Hair of HDA and on the 26<sup>th</sup> April 2019 by Shannon Davies and Anna Potter of HDA. The survey was based on the methodology described in the Water Vole Mitigation Handbook (Dean et al., 2016) and the method used for the Otter Survey of England 1991-1994 (Strachan 1998, Strachan and Jefferies, 1996). A total of eleven hours was spent carrying out the field survey. Weather conditions were mild and dry.

2.2 During the survey, the channels and banks of all suitable watercourses within and adjacent to the site were examined for signs of Water Vole such as latrines, burrows, footprints, paths, feeding lawns, feeding remains, sightings and sounds of Water Voles entering the water. These areas were also examined for signs of Otter including sightings, footprints, holts, slides, spraints, rolled vegetation (wisps/twists), vegetation mattresses (couches), refuges and feeding remains. Any signs of Mink and Brown Rat were also recorded.

2.3 The locations of the surveyed watercourses are given in *Appendix A*. The survey forms used were adapted from the Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust Water Vole Survey Form. A completed survey form showing site habitats and survey results is given in *Appendix B*.

### **2.4 Limitations**

2.4.1 The entire length of the River Ouzel and Broughton Brook was surveyed in detail from the banks as it was considered unsafe to enter these watercourses due to their depth and flow. This is not considered a significant constraint however as, with minor exceptions (see below), the banks of the watercourses were fully accessible to the water's edge thereby allowing thorough survey of all areas of the bank where field signs may have been present.

2.4.2 Limited sections of the Broughton Brook had steep earth banks and it was not possible to access some short stretches of the banks of the River Ouzel due to encroachment by dense scrub. This is not considered a significant constraint however as over-shaded areas generally provide lower quality habitat for Water Voles due to the absence of marginal vegetation, and it was possible to survey vertical banks from the opposite side of

the watercourse to check for field signs such as burrows/ holts. Given that the vast majority of the river and brook sections provided higher quality habitat, and were surveyed in detail, this is not considered a significant constraint to survey.

- 2.4.3 No other constraints were encountered and the survey is therefore considered to allow a robust assessment of the likely effects of the proposed development on Otters and Water Voles and to inform the recommendations provided in *Section 5* of this report.

### **3 HABITAT DESCRIPTION**

- 3.1 A summary of the habitat provided by suitable watercourses and waterbodies within and immediately adjacent to the site is given below. These are mapped in *Appendix A*.

#### *River Ouzel*

- 3.2 The River Ouzel flows in a northerly direction through the western area of the site (survey Section 1, 2 and 3). Farmland borders the majority of the River within the site. The western bank is bordered by grazed grassland and the eastern bank is bordered by grazed grassland and arable fields and Pineham Nature Reserve to the south. The River channel varies from approximately 3m-5m wide and estimated to be over 1m deep with a soft silt base. The river had a slow to fast flow at the time of survey with generally shallow sloping banks to the water's edge.

- 3.3 The banks, especially the western bank, are densely vegetated with rough grassland, tall ruderal vegetation, and marginal vegetation that encroaches into the channel. Species present include Common Nettle, Himalayan Balsam, Hogweed, Yellow Frag Iris, Water Lilies, Bindweed, willowherb, Arrow-head, Bullrush, Spike Rush and Hard Rush. Willow and Hawthorn scrub is also scattered along the banks, in particular along the eastern bank, creating densely shaded areas with limited bankside vegetation.

#### *Broughton Brook*

- 3.4 Broughton Brook (survey Sections 4 and 5) is a tributary of the River Ouzel to the south of the site and has a northward flow into the River Ouzel. The brook channel is approximately 2m wide with a deep silt base and steep earth banks up to 2m high.

- 3.5 The western bank of the brook borders the off-site Pineham Nature Reserve and the eastern bank borders on-site arable farmland. Bankside vegetation is dominated rough grassland and tall ruderals in conjunction with scattered willow scrub. Species present include dense areas of Common Nettle, Bramble, thistles, willowherb and False Oat-grass.

#### *Ditch and drain network*

3.6 The majority of the on-site ditch and drain network subject to survey lead into the River Ouzel (e.g. Ditches 1, 2 and 3) a notable exception being a drain located in the south-east of the site (Ditch 4). All of the ditches were dry at the time of survey and therefore provide only suboptimal habitat for Water Voles, due to the seasonal drying, limited availability of suitable food and in some cases heavy shading from bankside trees and hedgerows.

#### *Other waterbodies*

3.7 A number of ponds are present within the site. These are of limited size, are relatively isolated from the suitable Water Vole or Otter habitat associated with the watercourses described above and, in most instances, have been observed to dry out on a seasonal basis. These ponds were subsequently not subject to full survey due to their lack of suitability of both Otter and Water Vole.

## **4 RESULTS**

### **4.1 Desk Study**

4.1.1 During the desk study carried out as part of the Ecological Appraisal (HDA, 2020), Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) provided 5 records of Otter for the desk study area, the closest of which pertains to the River Ouzel at a location approximately 80m to the south of the site, dating from 2009.

4.1.2 No records of Water Vole were provided.

### **4.2 Field Survey**

4.2.1 No evidence of Water Voles was encountered during the updated field survey. The ditch from which evidence of Water Vole was recorded in 2012 (Ditch 1) was dry during both the 2018 and 2019 survey visits and therefore unsuitable for this species.

4.2.2 The 2019 survey recorded multiple signs of Otter activity along the western bank of the River Ouzel, including dried and fresh Otter spraints, tracks and potential feeding remains. The level of Otter activity was higher than that recorded in the 2012 survey during which no evidence of this species was recorded from the site itself. In addition during the updated survey, a well-worn mammal path with an Otter footprint leading from the waterbody into the adjacent grassland fields was recorded; the path was in close proximity to the potential Otter feeding sign which comprised the remains of a Signal Crayfish.

4.2.3 Signs of Brown Rat *Rattus norvegicus* and Field Vole *Microtus agrestis*/ Bank Vole *Myodes glareolus*, including burrows, footprints and runs were also frequently recorded along the length of the surveyed watercourses.

## **5 ASSESSMENT AND RECOMMENDATIONS**

### **5.1 Water Vole**

5.1.1 No evidence of Water Voles was encountered during the updated field survey. The ditch from which evidence of Water Vole was recorded in 2012 (Ditch 1) was dry during both the 2018 and 2019 survey visits and was therefore unsuitable for this species. This ditch is intimately connected to the River Ouzel which provides high quality Water Vole habitat, and it would be expected that if this species was still present at the site then evidence would have been recorded along the river. It is therefore considered that this species was absent from the site at the time of the 2018 and 2019 survey visits.

5.1.2 Notwithstanding the above, the site continues to provide suitable habitat for Water Voles and the confirmed presence of Otter indicates the absence of American Mink which may otherwise render the habitat unsuitable as a result of high levels of predation<sup>1</sup>. Water Voles are a relatively mobile species and it is therefore conceivable that this species may recolonise the site in the future if populations remain in the wider area.

### **5.2 Otter**

5.2.1 The results of the survey suggest that Otter are routinely using the section of the River Ouzel within the site for foraging and movement. The river and connecting Boughton Brook provide high quality hunting opportunities and the scrub and trees growing along the edges of the watercourses provide potential habitat for laying-up sites or holts (although no evidence of such use was recorded), as well as a sheltered passage along the course of the river.

5.2.2 Otters are usually solitary in riparian habitats and generally have a large home range of up to 40km for males and roughly half that for females, although territories can sometimes be considerably smaller (Harris and Yalden 2008). It is therefore highly likely that the Section of river within the site forms a small part of a larger Otter territory.

### **5.3 Safe Guarding**

5.3.1 Although the survey findings indicate that Water Vole are currently absent from the site and that the site is likely to form only a small part of a more extensive Otter territory, any development proposals for the site should ensure that the ability of the watercourses, in particular the River Ouzel and Boughton Brook, to support these species is maintained. This would enable Water Vole to recolonise the site and allow Otter to continue using the site in addition to using the watercourses for movement across the wider area. This could be achieved through the following measures:

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<sup>1</sup> Otter generally outcompete the introduced American Mink. American Mink predate Water Voles and where Mink are established sustainable populations of Water Vole are rarely present.

- The section of the River Ouzel and Broughton Brook flowing through the site should be retained and where possible the existing channels and associated vegetation should be maintained and culverting of banks avoided. The number of crossing points should be minimised and designed with regard to the guidance given in *Section 5.3.2* below.
- Buffer strips of at least 8m in width should be retained between the river, brook, drains and any developed areas.
- Construction and operational phase lighting should be designed to avoid light spill onto river/ brook corridors.
- Mature trees and scrub along the river and brook corridor should be retained and where development occurs in the vicinity of the watercourses, use of dense native scrub planting should be considered to provide screening and reduce disturbance. Scrub planting should be managed by coppicing to encourage dense growth which would have the added benefit of providing opportunities for Otter laying-up sites.
- The root plates of fallen mature trees and piles of logs and brash from management of bankside trees and scrub should be retained as potential holts and laying up sites for Otters.
- Where possible, flood debris such as logs and tree branches should be retained within the river and brook channel to provide resting sites.
- The river and brook corridor should be managed to maintain a good level and diversity of aquatic and marginal vegetation which will benefit invertebrate and fish species and continue to provide a food source for Water Voles and Otters.
- Landscape design should give consideration to provision of sections of the river and brook where disturbance by people and dogs would be minimised, thereby providing quiet, undisturbed areas where Otters and Water Voles can rest during the day.
- Where possible, any hedgerows or woodland currently adjoining the river and/or brook corridor should be retained and complemented by additional native tree planting and the development of scrub/grassland ecotone habitats at their edges.

5.3.2 Where new road bridges are to be constructed over the River Ouzel or Broughton Brook, bridge design should follow the *Nature Conservation Advice in Relation to Otters* outlined in the *Design Manual for Roads and Bridges* (The Highways Agency, 1999) in order to allow the safe passage for both Otters and Water Voles beneath the road and avoid road traffic accidents. In summary, any new bridges should:

- Allow enough space between the abutments of the bridge and the riverbank to enable Otters and Water Voles to pass at times of high water flow. If possible, the bridge abutments should be set back far enough to allow the natural riverbank and riverbed to be retained.
- Where it is not possible to leave a gap between the riverbanks and the bridge abutments, ledges should be incorporated to allow Otters and Water Voles to pass under the bridge at times of high water flow. The ledge should be sited at least 150mm above the highest water level, allowing for 600mm headroom and incorporate an access ramp at each end.

- Where there is not enough space to install a bridge with a ledge of the correct dimensions, an underpass should be incorporated into the bridge design and fencing installed along the road edge. The underpass should be located within 50m of the riverbank and above possible flood levels. The underpass should comprise a 600mm wide cylindrical pipe, or 900mm if the crossing is over 20m in length. The entrance should also be located near the road so animals associate the underpass with crossing the road.

5.3.3 In addition to the measures outlined above, it is important that the current quality of water entering the River Ouzel, Broughton Brook and other watercourses is maintained during the construction and operational phases of the proposed development. In the absence of measures to prevent pollution or sedimentation of the watercourses, impacts on Otters could arise either as a result of poisoning or indirect impacts on food supply. In order to avoid impacts associated with water quality, all construction works should be carried out in accordance with the Environment Agency's Prevention Guidance, available from <http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/>; and interceptors should be installed where necessary to prevent pollution and sedimentation entering the aquatic environment. The design of the surface and foul water infrastructure for the operational phase should also ensure that pollution of these watercourses is avoided, where possible giving consideration to the use of SuDS where this might complement the riparian habitat.

## 5.4 Further survey

5.4.1 Otters and Water Voles are highly mobile creatures and can readily colonise/ abandon sites. It is recommended that the survey is updated prior to works commencing to confirm that the status of Water Vole or Otter at the site has not changed.

5.4.2 Any vegetation clearance to enable development works along the edge of the river and brook (e.g. for bridge crossings) should also only proceed after prior inspection by a suitably qualified ecologist and, if necessary, carried out under supervision, in order to ensure that neither species is likely to be affected by works.

## 6 CONCLUSION

6.1 No evidence of Water Vole was recorded during the updated survey and it is considered that Water Vole are currently absent from the site. Notwithstanding this, Water Vole were recorded at the site in 2012 and it is conceivable that this mobile species may recolonize the site in the future. Therefore, opportunities for this species should be maintained through inclusion of the measures set out in *Section 5* above.

6.2 Evidence of Otter was recorded during the updated survey, and the section of the River Ouzel that flows through the site is likely to comprise a small part of a larger Otter

territory. The River Ouzel comprises the primary focus of Otter habitat and opportunities for foraging and movement within the site should be retained within any new development through inclusion of the measures set out in *Section 5* above.

6.3 Subject to implementation of the measures set out in *Section 5.3* of this report to maintain the integrity of the River Ouzel and Broughton Brook for Otter and Water Vole it is concluded that development of the site could maintain the favourable conservation status of the local Otter population and maintain opportunities for both Otter and Water Vole at the site in the long-term.

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## HDA Document Control and Quality Assurance Record

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Project Reference: 2090.52

Document Title: Water Vole and Otter Survey

Commissioning Party: St James

Issue	Description	Date of Issue	Signed
1	Water Vole and Otter Survey	February 2020	AM

	Personnel	Position
Author	Shannon Davies	Assistant Ecologist
Approved for issue	Adrian Meurer	Director

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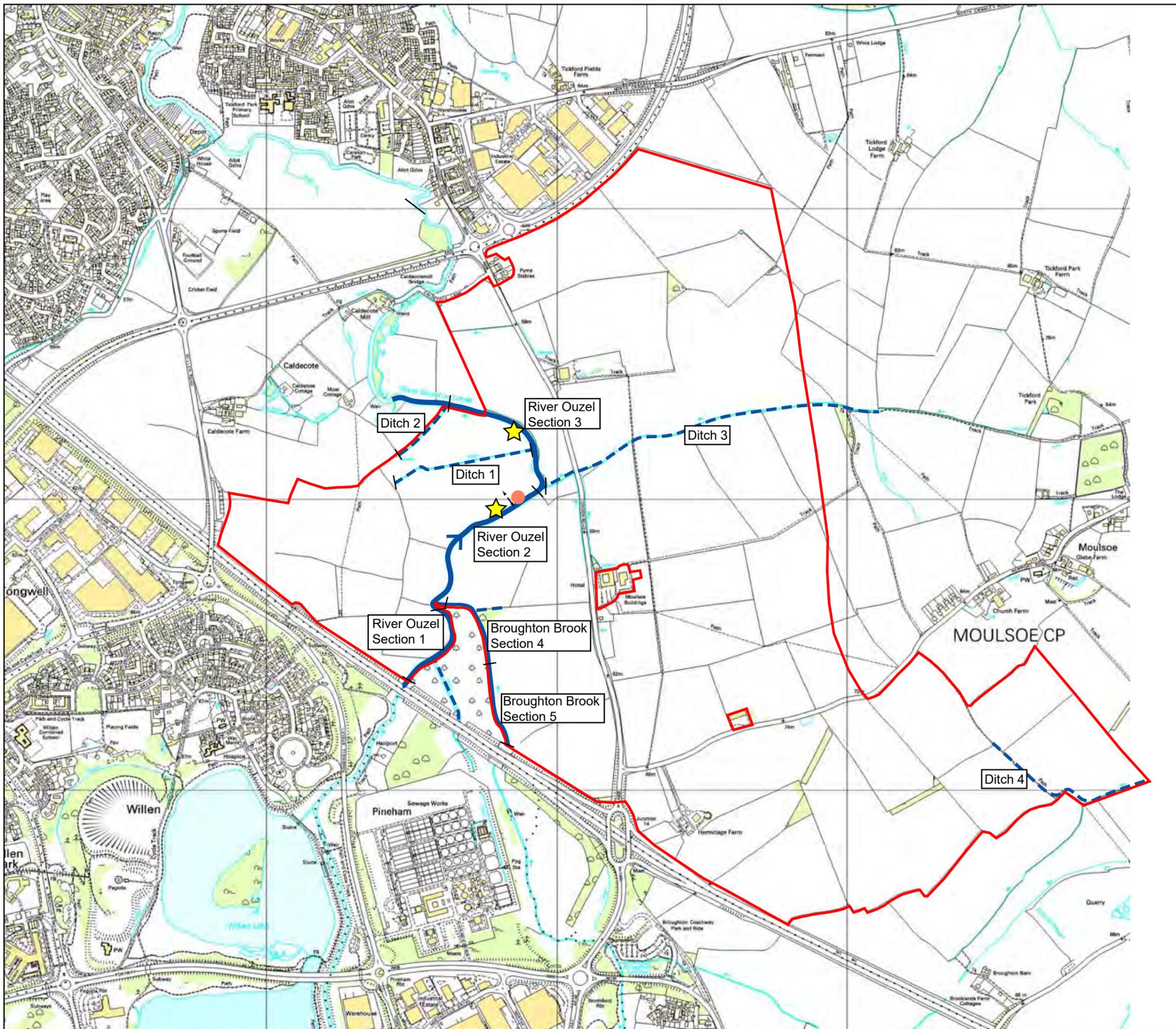
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**APPENDIX A**

**Water Vole and Otter Survey Plan**



**KEY**

- Site boundary
- Running water
- Dry ditch
- Otter spraint
- Otter feeding signs
- Mammal path with Otter tracks

No evidence of Water Vole recorded

CLIENT:  
St James  
PROJECT:  
Milton Keynes East  
TITLE:  
Water Vole and Otter Survey Plan  
SCALE AT A3:  
Not to Scale  
DATE:  
February 2020

2090.52 / 12

Based on Ordnance Survey mapping with permission of Her Majesty's Stationery Office  
Licence no. AR18372

Landscape Architecture  
Masterplanning  
Ecology



**APPENDIX B**

**Field Survey Recording Card**

# Water Vole and Otter Survey Form

↑  
Arrows  
leaves (plant?)

Surveyors Names	SD + KH	Watercourse	Part 1
Date	27.09.2018	Site reference	Newport Pag.

## Habitat Assessment

Main Habitat		Bank profile		Bank Vegetation (DAFORN)		Land Use within 50m		
Ditch / dyke		Flat <10°		Bankside trees	F	Woodland		
Gravel Pit		Shallow <45°	✓	Shrubs	R	Conifer		
Sludge Pool		Steep >45°	✓	Herbs	D	Arable Crop	✓	
Lake		Vertical/ undercut		Reeds / sedges	D	Rough grassland	✓	
Reservoir				Submerged Weed	P	Managed grassland		
Natural Pond		<b>Water Course</b>		Tall Grass	R	Fen / Carr / Marsh		
Artificial Pond		Ave depth (m)	?	Short Grass	R	Urban / industrial		
Running Water	✓	Ave Width (m)	1	Bare Earth	R	Park / garden		
Marsh / bog		<b>Flow</b>		<b>Grazing?</b>		<b>General Comments</b>		
Canal		Static		Cattle		limitation couldn't get to water edge in some places		
	<b>Shore</b>	<b>Base</b>	Slow	✓	Horses			
Boulder			Fast		Sheep			
Stone / Gravel			<b>Water Management</b>		Bank trampled			
Sand		✓	Dredging		Bank fenced off			✓
Silt / clay		✓	Weed cutting					
Earth	✓	✓	Mowing	✗	<b>Level of disturbance</b>			
Earth cliffs			Water level control	✗	Between 1-5			
Reinforced			Boating		(1 = low, 5 = High)			1
			Angling					

## Field Signs

	Tally		Total	Other Animals
	Water Vole			
Sightings	/			<b>Mink</b>
Latrines				Sightings
Droppings				Scats
Burrows				Tracks
Feeding signs				<b>Rat</b>
Tracks				Sightings
Runs				Droppings
Lawns	Tracks / runs			
	Otter		Total	Other species / comments:
Sightings	/			
Spraints				
Tracks				

Nettle,  
Himalayan Balsam  
Reeds, Sedges, Hogweed

Willow  
Yellow Iris  
Water lilies/l

Bindweed

**Sketch of Site (indicating any Water Vole or Otter activity)**

<table border="1"> <tr><td>Mature Trees</td><td></td></tr> <tr><td>Over-hanging Branches</td><td></td></tr> <tr><td>Fallen Tree</td><td></td></tr> <tr><td>Exposed Roots</td><td></td></tr> <tr><td>Pollarded Tree</td><td></td></tr> <tr><td>Sapling</td><td></td></tr> <tr><td>Scrub</td><td></td></tr> <tr><td>Hedgerow</td><td></td></tr> <tr><td>Fence</td><td></td></tr> <tr><td>Reed/ sedge bed</td><td></td></tr> <tr><td>Artificial Bank</td><td></td></tr> <tr><td>Earth Cliff</td><td></td></tr> <tr><td>Pool</td><td></td></tr> <tr><td>Riffle</td><td></td></tr> <tr><td>Rapids</td><td></td></tr> <tr><td>Waterfall</td><td></td></tr> <tr><td>Protruding Rock</td><td></td></tr> <tr><td>Culvert</td><td></td></tr> </table>	Mature Trees		Over-hanging Branches		Fallen Tree		Exposed Roots		Pollarded Tree		Sapling		Scrub		Hedgerow		Fence		Reed/ sedge bed		Artificial Bank		Earth Cliff		Pool		Riffle		Rapids		Waterfall		Protruding Rock		Culvert			<table border="1"> <tr><th colspan="2">ADJACENT LAND-USE CODES</th></tr> <tr><td>BW</td><td>Broadleaf Wood</td></tr> <tr><td>WL</td><td>Wetland</td></tr> <tr><td>CP</td><td>Conifer Plantation</td></tr> <tr><td>URB</td><td>Gardens and Urban</td></tr> <tr><td>TL</td><td>Tilled Land (crop)</td></tr> <tr><td>IG</td><td>Improved Grassland</td></tr> <tr><td>MH</td><td>Moorland/heath</td></tr> <tr><td>RP</td><td>Rough Pasture</td></tr> <tr><th colspan="2">OTHER FEATURES</th></tr> <tr><td>Road bridge</td><td></td></tr> <tr><td>Foot bridge</td><td></td></tr> <tr><td>Weir</td><td></td></tr> <tr><td>Ford</td><td></td></tr> <tr><td>Outfall</td><td></td></tr> <tr><td>Dredgings/ Spoil</td><td></td></tr> <tr><td>Silt bars</td><td></td></tr> <tr><td>Islands</td><td></td></tr> <tr><th colspan="2">FIELD SIGN CODES</th></tr> <tr><td>dr</td><td>Droppings</td></tr> <tr><td>la</td><td>Latrines</td></tr> <tr><td>sc</td><td>Scats/Spraints</td></tr> <tr><td>bu</td><td>Burrows</td></tr> <tr><td>fs</td><td>Feeding signs</td></tr> <tr><td>lw</td><td>Lawn</td></tr> <tr><td>pr</td><td>Prints</td></tr> <tr><td colspan="2">e.g. 2 x water vole latrines</td></tr> <tr><td colspan="2" style="text-align: center;">2 x Aa</td></tr> </table>	ADJACENT LAND-USE CODES		BW	Broadleaf Wood	WL	Wetland	CP	Conifer Plantation	URB	Gardens and Urban	TL	Tilled Land (crop)	IG	Improved Grassland	MH	Moorland/heath	RP	Rough Pasture	OTHER FEATURES		Road bridge		Foot bridge		Weir		Ford		Outfall		Dredgings/ Spoil		Silt bars		Islands		FIELD SIGN CODES		dr	Droppings	la	Latrines	sc	Scats/Spraints	bu	Burrows	fs	Feeding signs	lw	Lawn	pr	Prints	e.g. 2 x water vole latrines		2 x Aa	
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PINEHAM NATURE RESERVE

## Water Vole and Otter Survey Form

Surveyors Names	SD + KH	Watercourse	2
Date	27.09.18	Site reference	Newport Pgs.

### Habitat Assessment

Main Habitat		Bank profile		Bank Vegetation (DAFORN)		Land Use within 50m		
Ditch / dyke		Flat <10°		Bankside trees	R	Woodland		
Gravel Pit		Shallow <45°	✓	Shrubs	R	Conifer		
Sludge Pool		Steep >45°	✓	Herbs	A	Arable Crop		
Lake		Vertical/ undercut		Reeds / sedges	D	Rough grassland	✓	
Reservoir				Submerged Weed	F	Managed grassland	✓	
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Running Water	✓	Ave Width (m)	3	Bare Earth	R	Park / garden		
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Canal		Static		Cattle		↓		
	<b>Shore</b>	<b>Base</b>	Slow	Horses				
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Stone / Gravel			<b>Water Management</b>		Bank trampled			
Sand			Dredging		Bank fenced off			
Silt / clay			Weed cutting					
Earth	✓	✓	Mowing		<b>Level of disturbance</b>			
Earth cliffs			Water level control	Between 1-5	2			
Reinforced			Boating	(1 = low, 5 = High)				
			Angling					

### Field Signs

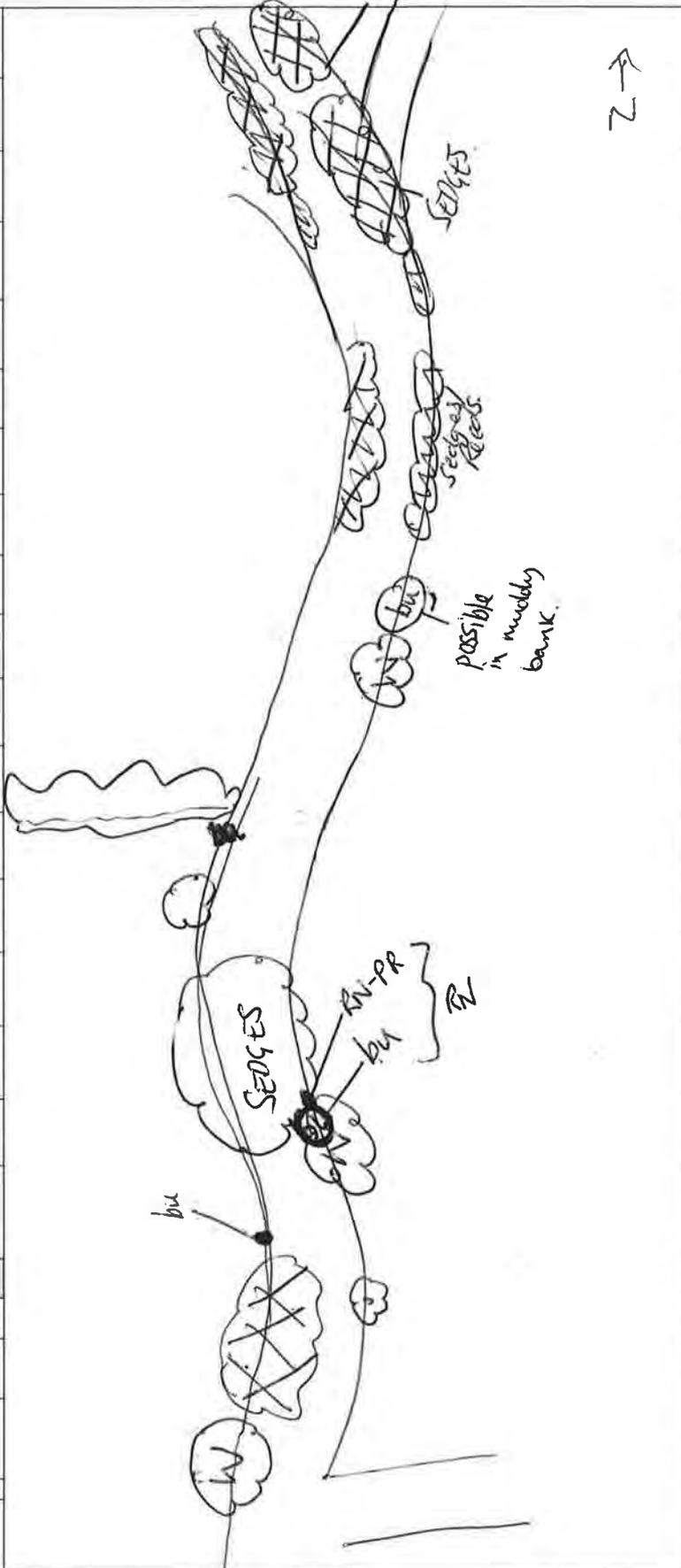
	Tally		Total	Other Animals	
	Water Vole				
Sightings	/			<b>Mink</b>	
Latrines				Sightings	
Droppings				Scats	
Burrows				Tracks	
Feeding signs				<b>Rat</b>	
Tracks				Sightings	
Runs				Droppings	
Lawns	Tracks / runs	1 + burrow			
	<b>Otter</b>			<b>Other species / comments:</b>	
Sightings	/				
Sprints					
Tracks					

mugwort

teasel

Sketch of Site (indicating any Water Vole or Otter activity)

Mature Trees	
Over-hanging Branches	
Fallen Tree	
Exposed Roots	
Pollarded Tree	
Sapling	
Scrub	
Hedgerow	
Fence	
Reed/ sedge bed	
Artificial Bank	
Earth Cliff	
Pool	
Riffle	
Rapids	
Waterfall	
Protruding Rock	
Culvert	
ANIMAL CODES	
Water vole	Aa
Mink	Nv
Otter	Ll
Rat	Rn
Field vole	Ma



ADJACENT LAND-USE CODES	
BW	Broadleaf Wood
WL	Wetland
CP	Conifer Plantation
URB	Gardens and Urban
TL	Tilled Land (crop)
IG	Improved Grassland
MH	Moorland/heath
RP	Rough Pasture
OTHER FEATURES	
Road bridge	
Foot bridge	
Weir	
Ford	
Outfall	
Dredgings/ Spoil	
Silt bars	
Islands	
FIELD SIGN CODES	
dr	Droppings
la	Latrines
sc	Scats/Spraints
bu	Burrows
fs	Feeding signs
lw	Lawn
pr	Prints
e.g 2 water vole latrines	
( 2 x Aa )	

## Water Vole and Otter Survey Form

Surveyors Names	SD + KH	Watercourse	DITCH 1
Date	27.09.18	Site reference	N. Pag.

### Habitat Assessment

Main Habitat		Bank profile		Bank Vegetation (DAFORN)		Land Use within 50m	
Ditch / dyke	✓	Flat <10°		Bankside trees	O	Woodland	
Gravel Pit		Shallow <45°	✓	Shrubs	ZO	Conifer	
Sludge Pool		Steep >45°		Herbs	ZO	Arable Crop	
Lake		Vertical/ undercut		Reeds / sedges	ZO	Rough grassland	
Reservoir			Submerged Weed	Z	Managed grassland	✓	
Natural Pond		<b>Water Course</b>		Tall Grass	R	Fen / Carr / Marsh	
Artificial Pond		Ave depth (m)	✓	Short Grass	R	Urban / industrial	
Running Water	✓	Ave Width (m)	1/2	Bare Earth	R	Park / garden	
Marsh / bog		<b>Flow</b>		<b>Grazing?</b>		<b>General Comments</b>	
Canal		Static		Cattle	✓	Dry Stream  Bank Fenced off on one side.	
	<b>Shore</b>	<b>Base</b>	Slow	Horses			
Boulder			Fast	Sheep			
Stone / Gravel			<b>Water Management</b>		Bank trampled		
Sand			Dredging				
Silt / clay			Weed cutting	Bank fenced off	✓		
Earth	✓	✓	Mowing	<b>Level of disturbance</b>			
Earth cliffs			Water level control	Between 1-5	4		
Reinforced			Boating	(1 = low, 5 = High)			
			Angling				

### Field Signs

	Tally		Total	Other Animals	
	Water Vole				
Sightings	/			<b>Mink</b>	
Latrines				Sightings	
Droppings				Scats	
Burrows				Tracks	
Feeding signs				<b>Rat</b>	
Tracks				Sightings	
Runs				Droppings	
Lawns				Tracks / runs	
	<b>Otter</b>		<b>Other species / comments:</b>		
Sightings	/				
Sprints					
Tracks					

# Sketch of Site (indicating any Water Vole or Otter activity)

Mature Trees			<b>ADJACENT LAND-USE CODES</b>	
Over-hanging Branches			BW	Broadleaf Wood
Fallen Tree			WL	Wetland
Exposed Roots			CP	Conifer Plantation
Pollarded Tree			URB	Gardens and Urban
Sapling			TL	Tilled Land (crop)
Scrub			IG	Improved Grassland
Hedgerow			MH	Moorland/heath
Fence			RP	Rough Pasture
Reed/ sedge bed			<b>OTHER FEATURES</b>	
Artificial Bank			Road bridge	
Earth Cliff			Foot bridge	FB
Pool			Weir	
Riffle			Ford	
Rapids			Outfall	
Waterfall			Dredgings/ Spoil	
Protruding Rock			Silt bars	
Culvert			Islands	
<b>ANIMAL CODES</b>			<b>FIELD SIGN CODES</b>	
Water vole	Aa		dr	Droppings
Mink	Nv	la	Latrines	
Otter	LI	sc	Scats/Spraints	
Rat	Rn	bu	Burrows	
Field vole	Ma	fs	Feeding signs	
		lw	Lawn	
		pr	Prints	
		e.g. 2 water vole latrines		
		( 2 x Aa )		

## Water Vole and Otter Survey Form

Surveyors Names	SD + KH	Watercourse	SECTION 3
Date	27.09	Site reference	N. pag

### Habitat Assessment

Main Habitat		Bank profile		Bank Vegetation (DAFORN)		Land Use within 50m	
Ditch / dyke		Flat <10°		Bankside trees	F	Woodland	
Gravel Pit		Shallow <45°	✓	Shrubs	R	Conifer	
Sludge Pool		Steep >45°	✓	Herbs	A	Arable Crop	
Lake		Vertical/ undercut	✓	Reeds / sedges	D	Rough grassland	
Reservoir				Submerged Weed	R	Managed grassland	✓
Natural Pond		<b>Water Course</b>		Tall Grass	R	Fen / Carr / Marsh	
Artificial Pond		Ave depth (m)	?	Short Grass	R	Urban / industrial	
Running Water	✓	Ave Width (m)	4	Bare Earth	O	Park / garden	
Marsh / bog		<b>Flow</b>		<b>Grazing?</b>		<b>General Comments</b>	
Canal		Static		Cattle			
	<b>Shore</b>	Slow	✓	Horses			
Boulder		Fast		Sheep			
Stone / Gravel		<b>Water Management</b>		Bank trampled			
Sand		Dredging		Bank fenced off	✓		
Silt / clay		Weed cutting					
Earth		Mowing		<b>Level of disturbance</b>			
Earth cliffs		Water level control		Between 1-5	1		
Reinforced		Boating		(1 = low, 5 = High)			
		Angling					

### Field Signs

	Tally		Total	Other Animals	
	<b>Water Vole</b>				
Sightings	/			<b>Mink</b>	
Latrines				Sightings	
Droppings				Scats	
Burrows				Tracks	
Feeding signs				<b>Rat</b>	
Tracks				Sightings	
Runs				Droppings	
Lawns				Tracks / runs	1 Rat prints.
	<b>Otter</b>		<b>Other species / comments:</b>		
Sightings	/				
Spraints					
Tracks					

# Sketch of Site (indicating any Water Vole or Otter activity)

Mature Trees			<b>ADJACENT LAND-USE CODES</b>	
Over-hanging Branches			BW	Broadleaf Wood
Fallen Tree			WL	Wetland
Exposed Roots			CP	Conifer Plantation
Pollarded Tree			URB	Gardens and Urban
Sapling			TL	Tilled Land (crop)
Scrub			IG	Improved Grassland
Hedgerow			MH	Moorland/heath
Fence			RP	Rough Pasture
Reed/ sedge bed			<b>OTHER FEATURES</b>	
Artificial Bank			Road bridge	
Earth Cliff			Foot bridge FB	
Pool			Weir	
Riffle			Ford	
Rapids			Outfall	
Waterfall			Dredgings/ Spoil	
Protruding Rock			Silt bars	
Culvert			Islands	
<b>ANIMAL CODES</b>			<b>FIELD SIGN CODES</b>	
Water vole	Aa		dr	Droppings
Mink	Nv	la	Latrines	
Otter	Li	sc	Scats/Sprints	
Rat	Rn	bu	Burrows	
Field vole	Ma	fs	Feeding signs	
		lw	Lawn	
		pr	Prints	
		e.g. 2 water vole latrines		
		( 2 x Aa )		

## Water Vole and Otter Survey Form

Surveyors Names	SD+KH	Watercourse	5
Date	27.09.18	Site reference	N. Pag

### Habitat Assessment

Main Habitat			Bank profile	Bank Vegetation (DAFORN)	Land Use within 50m	
Ditch / dyke		✓	Flat <10°	Bankside trees	Woodland	
Gravel Pit			Shallow <45°	✓ Shrubs	Conifer	
Sludge Pool			Steep >45°	Herbs	Arable Crop	
Lake			Vertical/ undercut	Reeds / sedges	↑ Rough grassland	
Reservoir				Submerged Weed	N Managed grassland	
Natural Pond			<b>Water Course</b>		Fen / Carr / Marsh	
Artificial Pond			Ave depth (m)	✓ Short Grass	Urban / industrial	
Running Water			Ave Width (m)	1/2 Bare Earth	Park / garden	
Marsh / bog			<b>Flow</b>		<b>Grazing?</b>	
Canal			Static	Cattle	DRY + V. OVERGRAZED	
	<b>Shore</b>	<b>Base</b>	Slow	Horses		
Boulder			Fast	Sheep		
Stone / Gravel			<b>Water Management</b>			
Sand			Dredging	Bank trampled		
Silt / clay			Weed cutting	Bank fenced off		
Earth			Mowing	<b>Level of disturbance</b>		
Earth cliffs			Water level control	Between 1-5		
Reinforced			Boating	(1 = low, 5 = High)		
			Angling			

### Field Signs

	Tally		Total	Other Animals	
	Water Vole				
Sightings				<b>Mink</b>	
Latrines				Sightings	
Droppings				Scats	
Burrows				Tracks	
Feeding signs				<b>Rat</b>	
Tracks				Sightings	
Runs				Droppings	
Lawns				Tracks / runs	
	<b>Otter</b>			<b>Other species / comments:</b>	
Sightings					
Spraints					
Tracks					

Sweet meadow Sweet -  
Bull msh

Sketch of Site (indicating any Water Vole or Otter activity)

Mature Trees		<b>ADJACENT LAND-USE CODES</b>		
Over-hanging Branches		BW	Broadleaf Wood	
Fallen Tree		WL	Wetland	
Exposed Roots		CP	Conifer Plantation	
Pollarded Tree		URB	Gardens and Urban	
Sapling		TL	Tilled Land (crop)	
Scrub		IG	Improved Grassland	
Hedgerow		MH	Moorland/heath	
Fence		RP	Rough Pasture	
Reed/ sedge bed		<b>OTHER FEATURES</b>		
Artificial Bank		Road bridge		
Earth Cliff		Foot bridge		
Pool		Weir		
Riffle		Ford		
Rapids		Outfall		
Waterfall		Dredgings/ Spoil		
Protruding Rock		Silt bars		
Culvert		Islands		
<b>ANIMAL CODES</b>		<b>FIELD SIGN CODES</b>		
Water vole		Aa	dr	Droppings
Mink	Nv	la	Latrines	
Otter	LI	sc	Scats/ Spraints	
Rat	Rn	bu	Burrows	
Field vole	Ma	fs	Feeding signs	
		lw	Lawn	
		pr	Prints	
		e.g. 2 water vole latrines		
		2 x Aa		

## Water Vole and Otter Survey Form

Surveyors Names	SD + KH	Watercourse	SECTION 4
Date	27.09.18	Site reference	N. pag

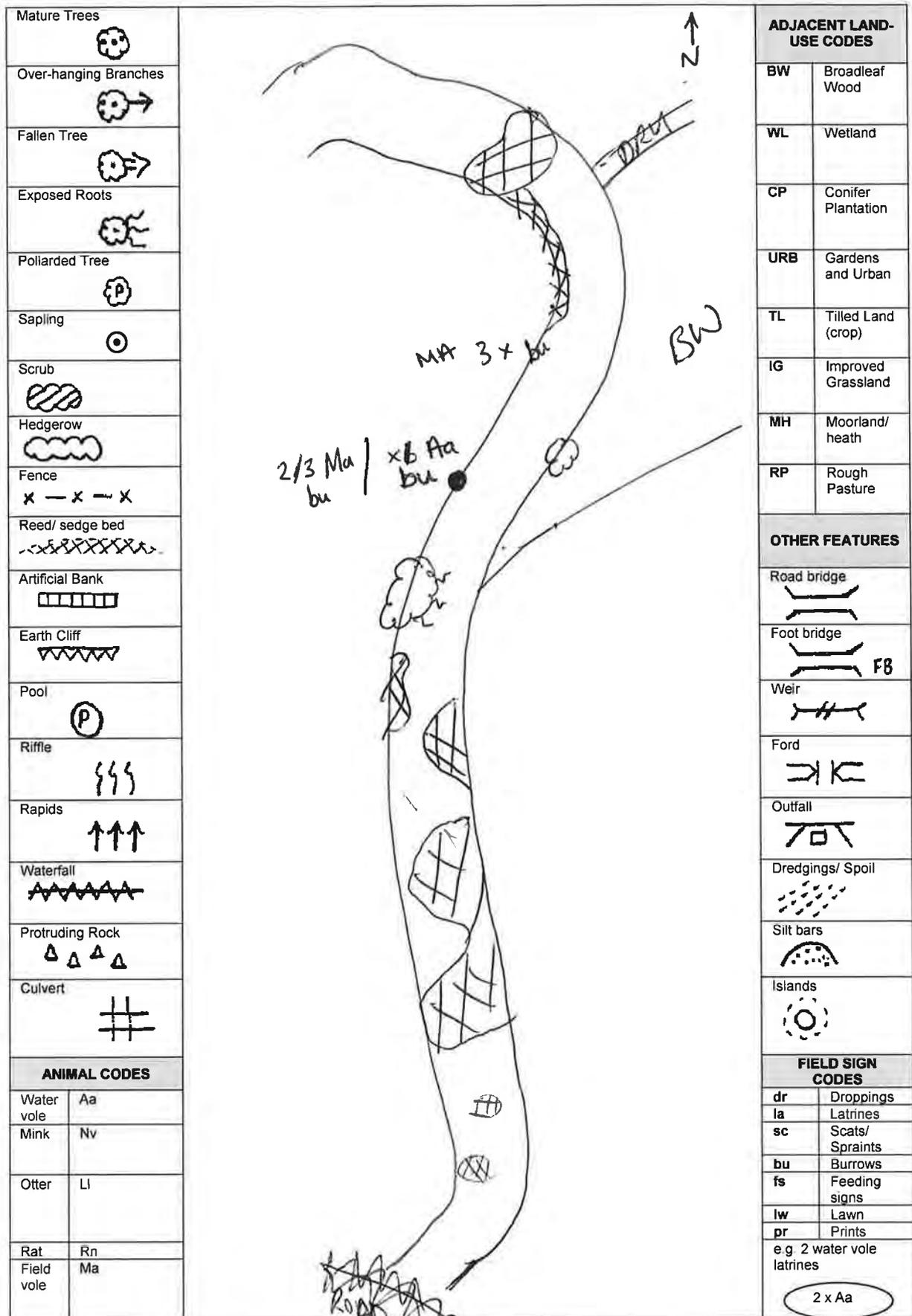
### Habitat Assessment

Main Habitat		Bank profile		Bank Vegetation (DAFORN)		Land Use within 50m		
Ditch / dyke		Flat <10°		Bankside trees	F	Woodland		
Gravel Pit		Shallow <45°		Shrubs	R	Conifer		
Sludge Pool		Steep >45°		Herbs	A	Arable Crop		
Lake		Vertical/ undercut		Reeds / sedges	A	Rough grassland	✓	
Reservoir				Submerged Weed	F	Managed grassland	✓	
Natural Pond		<b>Water Course</b>		Tall Grass	R	Fen / Carr / Marsh		
Artificial Pond		Ave depth (m)	✓	Short Grass	R	Urban / industrial		
Running Water	✓	Ave Width (m)	2	Bare Earth	O	Park / garden		
Marsh / bog		<b>Flow</b>		<b>Grazing?</b>		<b>General Comments</b>		
Canal		Static		Cattle				
	<b>Shore</b>	<b>Base</b>	Slow	✓	Horses			
Boulder			Fast		Sheep			
Stone / Gravel		✓	<b>Water Management</b>		Bank trampled			
Sand			Dredging		Bank fenced off			✓
Silt / clay			Weed cutting					
Earth	✓	✓	Mowing		<b>Level of disturbance</b>			
Earth cliffs			Water level control		Between 1-5			
Reinforced			Boating		(1 = low, 5 = High)			1
			Angling					

### Field Signs

	Tally		Total	Other Animals	
	Water Vole				
Sightings	/			<b>Mink</b>	
Latrines				Sightings	
Droppings				Scats	
Burrows				Tracks	
Feeding signs				<b>Rat</b>	
Tracks				Sightings	
Runs				Droppings	
Lawns				Tracks / runs	
	Otter		Total	Other species / comments:	
Sightings	/				Some very small holes, presumed field vole / smaller rodent.
Spraints					
Tracks					

# Sketch of Site (indicating any Water Vole or Otter activity)



Mature Trees	
Over-hanging Branches	
Fallen Tree	
Exposed Roots	
Pollarded Tree	
Sapling	
Scrub	
Hedgerow	
Fence	
Reed/ sedge bed	
Artificial Bank	
Earth Cliff	
Pool	
Riffle	
Rapids	
Waterfall	
Protruding Rock	
Culvert	

ANIMAL CODES	
Water vole	Aa
Mink	Nv
Otter	LI
Rat	Rn
Field vole	Ma

ADJACENT LAND-USE CODES	
BW	Broadleaf Wood
WL	Wetland
CP	Conifer Plantation
URB	Gardens and Urban
TL	Tilled Land (crop)
IG	Improved Grassland
MH	Moorland/heath
RP	Rough Pasture

OTHER FEATURES	
Road bridge	
Foot bridge	
Weir	
Ford	
Outfall	
Dredgings/ Spoil	
Silt bars	
Islands	

FIELD SIGN CODES	
dr	Droppings
la	Latrines
sc	Scats/Sprints
bu	Burrows
fs	Feeding signs
lw	Lawn
pr	Prints
e.g 2 water vole latrines	
( 2 x Aa )	

## Water Vole and Otter Survey Form

Surveyors Names	SD + KH	Watercourse	SECTION 5
Date	28.09.18	Site reference	Newport. p.

### Habitat Assessment

Main Habitat		Bank profile		Bank Vegetation (DAFORN)		Land Use within 50m	
Ditch / dyke		Flat <10°		Bankside trees	F	Woodland	
Gravel Pit		Shallow <45°		Shrubs	R	Conifer	
Sludge Pool		Steep >45°	✓	Herbs	A	Arable Crop	
Lake		Vertical/ undercut		Reeds / sedges	A	Rough grassland	✓
Reservoir				Submerged Weed	F	Managed grassland	✓
Natural Pond		<b>Water Course</b>		Tall Grass	O	Fen / Carr / Marsh	
Artificial Pond		Ave depth (m)	✓	Short Grass	R	Urban / industrial	
Running Water	✓	Ave Width (m)	B	Bare Earth	R	Park / garden	
Marsh / bog		<b>Flow</b>		<b>Grazing?</b>		<b>General Comments</b>	
Canal		Static		Cattle			
	<b>Shore</b>	<b>Base</b>	Slow	Horses			
Boulder			Fast	Sheep			
Stone / Gravel			<b>Water Management</b>		Bank trampled		
Sand			Dredging		Bank fenced off		
Silt / clay			Weed cutting				
Earth	✓	✓	Mowing	<b>Level of disturbance</b>			
Earth cliffs			Water level control	Between 1-5			
Reinforced			Boating	(1 = low, 5 = High)			
			Angling				

### Field Signs

	Tally		Total	Other Animals	
	Water Vole				
Sightings	/			<b>Mink</b>	
Latrines				Sightings	
Droppings				Scats	
Burrows				Tracks	✓
Feeding signs				<b>Rat</b>	
Tracks				Sightings	
Runs				Droppings	✓
Lawns	Tracks / runs				
	<b>Otter</b>		<b>Other species / comments:</b>		
Sightings	/		Rat burrows.		
Spraints					
Tracks					

# Sketch of Site (indicating any Water Vole or Otter activity)

Mature Trees			<b>ADJACENT LAND-USE CODES</b>	
Over-hanging Branches			BW	Broadleaf Wood
Fallen Tree			WL	Wetland
Exposed Roots			CP	Conifer Plantation
Pollarded Tree			URB	Gardens and Urban
Sapling			TL	Tilled Land (crop)
Scrub			IG	Improved Grassland
Hedgerow			MH	Moorland/heath
Fence			RP	Rough Pasture
Reed/ sedge bed			<b>OTHER FEATURES</b>	
Artificial Bank			Road bridge	
Earth Cliff			Foot bridge	FB
Pool			Weir	
Riffle			Ford	
Rapids			Outfall	
Waterfall			Dredgings/ Spoil	
Protruding Rock			Silt bars	
Culvert			Islands	
<b>ANIMAL CODES</b>			<b>FIELD SIGN CODES</b>	
Water vole	Aa		dr	Droppings
Mink	Nv	la	Latrines	
Otter	LI	sc	Scats/ Spraints	
		bu	Burrows	
		fs	Feeding signs	
		lw	Lawn	
		pr	Prints	
Rat	Rn	e.g 2 water vole latrines		
Field vole	Ma			

Arrow-head  
Spike Rush  
Hard Rush.

## Water Vole and Otter Survey Form

Surveyors Names	SD + AP.	Watercourse	1
Date	26.04.2019	Site reference	Newport Pagnell

### Habitat Assessment

Main Habitat		Bank profile		Bank Vegetation (DAFORN)		Land Use within 50m		
Ditch / dyke		Flat <10°		Bankside trees	F	Woodland		
Gravel Pit		Shallow <45°	✓	Shrubs	R	Conifer		
Sludge Pool		Steep >45°	✓	Herbs	D	Arable Crop	✓	
Lake		Vertical/ undercut		Reeds / sedges	D	Rough grassland	✓	
Reservoir				Submerged Weed	F	Managed grassland		
Natural Pond		<b>Water Course</b>		Tall Grass	R	Fen / Carr / Marsh		
Artificial Pond		Ave depth (m)		Short Grass	R	Urban / industrial		
Running Water	✓	Ave Width (m)	2	Bare Earth	R	Park / garden		
Marsh / bog		<b>Flow</b>		<b>Grazing?</b>		<b>General Comments</b>		
Canal		Static		Cattle		Only did the one bank - Didn't enter the water at any point due to River flow + depth.		
	<b>Shore</b>	<b>Base</b>	Slow	✓	Horses			
Boulder			Fast	✓	Sheep			
Stone / Gravel			<b>Water Management</b>		Bank trampled			
Sand			Dredging	✓	Bank fenced off			✓
Silt / clay		✓	Weed cutting	✓				
Earth	✓	✓	Mowing		<b>Level of disturbance</b>			
Earth cliffs			Water level control		Between 1-5			1
Reinforced			Boating		(1 = low, 5 = High)			
			Angling					

### Field Signs

	Tally		Total	Other Animals
	Water Vole			
Sightings				<b>Mink</b>
Latrines				Sightings
Droppings				Scats
Burrows	1 - POSSIBLE			Tracks
Feeding signs				<b>Rat</b>
Tracks				Sightings
Runs				Droppings
Lawns				Tracks / runs
	<b>Otter</b>			<b>Other species / comments:</b>
Sightings				4 field vole burrows.
Sprints				
Tracks				

NETTLE  
 HIMALAYAN BALSAM  
 HARD RUBUS, SEDGES, HOGWEED

WILLOW  
 YELLOW FLAG IRIS  
 WATER LILLIES  
 BINDWEED

**Sketch of Site (indicating any Water Vole or Otter activity)**

Mature Trees			<b>ADJACENT LAND-USE CODES</b>	
Over-hanging Branches			BW	Broadleaf Wood
Fallen Tree			WL	Wetland
Exposed Roots			CP	Conifer Plantation
Pollarded Tree			URB	Gardens and Urban
Sapling			TL	Tilled Land (crop)
Scrub			IG	Improved Grassland
Hedgerow			MH	Moorland/heath
Fence			RP	Rough Pasture
Reed/ sedge bed			<b>OTHER FEATURES</b>	
Artificial Bank			Road bridge	
Earth Cliff			Foot bridge	
Pool			Weir	
Riffle			Ford	
Rapids			Outfall	
Waterfall			Dredgings/ Spoil	
Protruding Rock			Silt bars	
Culvert			Islands	
<b>ANIMAL CODES</b>			<b>FIELD SIGN CODES</b>	
Water vole	Aa		dr	Droppings
Mink	Nv	la	Latrines	
Otter	LI	sc	Scats/ Spraints	
		bu	Burrows	
		fs	Feeding signs	
		lw	Lawn	
		pr	Prints	
Rat	Rn	e.g. 2 water vole latrines		
Field vole	Ma			

PINEHAM NATURE RESERVE

## Water Vole and Otter Survey Form

Surveyors Names	SD + AP	Watercourse	2
Date	26.09.2019	Site reference	Newport Pagnell

### Habitat Assessment

Main Habitat		Bank profile		Bank Vegetation (DAFORN)		Land Use within 50m		
Ditch / dyke		Flat <10°		Bankside trees	R	Woodland		
Gravel Pit		Shallow <45°		Shrubs	R	Conifer		
Sludge Pool		Steep >45°		Herbs	A	Arable Crop		
Lake		Vertical/ undercut		Reeds / sedges	D	Rough grassland	✓	
Reservoir				Submerged Weed	F	Managed grassland	✓	
Natural Pond		<b>Water Course</b>		Tall Grass	R	Fen / Carr / Marsh		
Artificial Pond		Ave depth (m)		Short Grass	R	Urban / industrial		
Running Water	✓	Ave Width (m)	3	Bare Earth	R	Park / garden		
Marsh / bog		<b>Flow</b>		<b>Grazing?</b>		<b>General Comments</b>		
Canal		Static		Cattle				
	<b>Shore</b>	<b>Base</b>	Slow	Horses				
Boulder			Fast	✓	Sheep			
Stone / Gravel			<b>Water Management</b>		Bank trampled			
Sand			Dredging		Bank fenced off			
Silt / clay			Weed cutting					
Earth	✓	✓	Mowing		<b>Level of disturbance</b>			
Earth cliffs			Water level control		Between 1-5			2
Reinforced			Boating		(1 = low, 5 = High)			
			Angling					

### Field Signs

	Tally		Total	Other Animals	
	Water Vole				
Sightings				<b>Mink</b>	
Latrines				Sightings	
Droppings				Scats	
Burrows	11	- POSS		Tracks	
Feeding signs				<b>Rat</b>	
Tracks				Sightings	
Runs				Droppings	
Lawns				Tracks / runs	
	<b>Otter</b>			<b>Other species / comments:</b>	
Sightings				Rat + Mouse burrows	
Spraints	1	+ feeding signs (crayfish)			
Tracks	1				

# Sketch of Site (indicating any Water Vole or Otter activity)

Mature Trees			<b>ADJACENT LAND-USE CODES</b>	
Over-hanging Branches			BW	Broadleaf Wood
Fallen Tree			WL	Wetland
Exposed Roots			CP	Conifer Plantation
Pollarded Tree			URB	Gardens and Urban
Sapling			TL	Tilled Land (crop)
Scrub			IG	Improved Grassland
Hedgerow			MH	Moorland/heath
Fence			RP	Rough Pasture
Reed/ sedge bed			<b>OTHER FEATURES</b>	
Artificial Bank			Road bridge	
Earth Cliff				
Pool			Foot bridge F8	
Riffle			Weir	
Rapids			Ford	
Waterfall			Outfall	
Protruding Rock			Dredgings/ Spoil	
Culvert			Silt bars	
<b>ANIMAL CODES</b>			Islands	
Water vole	Aa			
Mink	Nv	<b>FIELD SIGN CODES</b>		
Otter	LI	dr	Droppings	
Rat	Rn	la	Latrines	
Field vole	Ma	sc	Scats/ Spraints	
		bu	Burrows	
		fs	Feeding signs	
		lw	Lawn	
		pr	Prints	
		e.g. 2 water vole latrines		

## Water Vole and Otter Survey Form

Surveyors Names	SD + AP	Watercourse	SECTION 3
Date	26.04.2019	Site reference	Newport Pagnell.

### Habitat Assessment

Main Habitat		Bank profile		Bank Vegetation (DAFORN)		Land Use within 50m	
Ditch / dyke		Flat <10°		Bankside trees		Woodland	
Gravel Pit		Shallow <45°	✓	Shrubs		Conifer	
Sludge Pool		Steep >45°	✓	Herbs		Arable Crop	
Lake		Vertical/ undercut	✓	Reeds / sedges		Rough grassland	
Reservoir				Submerged Weed		Managed grassland	✓
Natural Pond		<b>Water Course</b>		Tall Grass		Fen / Carr / Marsh	
Artificial Pond		Ave depth (m)		Short Grass		Urban / industrial	
Running Water	✓	Ave Width (m)	4	Bare Earth		Park / garden	
Marsh / bog		<b>Flow</b>		<b>Grazing?</b>		<b>General Comments</b>	
Canal		Static		Cattle			
	<b>Shore</b>	<b>Base</b>	Slow	Horses			
Boulder			Fast	✓ Sheep			
Stone / Gravel			<b>Water Management</b>		Bank trampled		
Sand			Dredging	Bank fenced off	✓		
Silt / clay			Weed cutting				
Earth	✓	✓	Mowing	<b>Level of disturbance</b>			
Earth cliffs			Water level control	Between 1-5	1		
Reinforced			Boating	(1 = low, 5 = High)			
			Angling				

### Field Signs

	Tally		Total	Other Animals		
	Water Vole					
Sightings	/			<b>Mink</b>		
Latrines				Sightings		
Droppings				Scats		
Burrows				Tracks		
Feeding signs				<b>Rat</b>		
Tracks				Sightings		
Runs				Droppings		
Lawns				Tracks / runs		
			<b>Otter</b>		<b>Other species / comments:</b>	
Sightings					Deer prints	
Spraints	1					
Tracks						

# Sketch of Site (indicating any Water Vole or Otter activity)

Mature Trees			<b>ADJACENT LAND-USE CODES</b>	
Over-hanging Branches			BW	Broadleaf Wood
Fallen Tree			WL	Wetland
Exposed Roots			CP	Conifer Plantation
Pollarded Tree			URB	Gardens and Urban
Sapling			TL	Tilled Land (crop)
Scrub			IG	Improved Grassland
Hedgerow			MH	Moorland/heath
Fence			RP	Rough Pasture
Reed/ sedge bed			<b>OTHER FEATURES</b>	
Artificial Bank			Road bridge	
Earth Cliff			Foot bridge	F8
Pool			Weir	
Riffle			Ford	
Rapids			Outfall	
Waterfall			Dredgings/ Spoil	
Protruding Rock			Silt bars	
Culvert			Islands	
<b>ANIMAL CODES</b>			<b>FIELD SIGN CODES</b>	
Water vole	Aa		dr	Droppings
Mink	Nv	la	Latrines	
Otter	LI	sc	Scats/Spraints	
Rat	Rn	bu	Burrows	
Field vole	Ma	fs	Feeding signs	
		lw	Lawn	
		pr	Prints	
		e.g. 2 water vole latrines		

## Water Vole and Otter Survey Form

Surveyors Names	SD + AP	Watercourse	SECTION 4
Date	26.04.2019	Site reference	Newport Pagnell

### Habitat Assessment

Main Habitat		Bank profile		Bank Vegetation (DAFORN)		Land Use within 50m	
Ditch / dyke		Flat <10°		Bankside trees	F	Woodland	
Gravel Pit		Shallow <45°		Shrubs	R	Conifer	
Sludge Pool		Steep >45°	✓	Herbs	A	Arable Crop	
Lake		Vertical/ undercut		Reeds / sedges	A	Rough grassland	✓
Reservoir				Submerged Weed	F	Managed grassland	✓
Natural Pond		<b>Water Course</b>		Tall Grass	R	Fen / Carr / Marsh	
Artificial Pond		Ave depth (m)		Short Grass	R	Urban / industrial	
Running Water	✓	Ave Width (m)	2	Bare Earth	O	Park / garden	
Marsh / bog		<b>Flow</b>		<b>Grazing?</b>		<b>General Comments</b>	
Canal		Static		Cattle			
	<b>Shore</b>	<b>Base</b>	Slow	Horses			
Boulder			Fast	Sheep			
Stone / Gravel		✓	<b>Water Management</b>		Bank trampled		
Sand			Dredging	Bank fenced off	✓		
Silt / clay			Weed cutting				
Earth	✓	✓	Mowing	<b>Level of disturbance</b>			
Earth cliffs			Water level control	Between 1-5	1		
Reinforced			Boating	(1 = low, 5 = High)			
			Angling				

### Field Signs

	Tally		Total	Other Animals
	Water Vole			
Sightings				<b>Mink</b>
Latrines				Sightings
Droppings				Scats
Burrows				Tracks
Feeding signs				<b>Rat</b>
Tracks				Sightings
Runs				Droppings
Lawns				Tracks / runs
	<b>Otter</b>			<b>Other species / comments:</b>
Sightings				Multiple small rodent poss field vole burrows.
Spraints				
Tracks				

False - Oat-grass  
 Willow herb.  
 Nettle  
 Thistles.

**Sketch of Site** (indicating any Water Vole or Otter activity)

Mature Trees			<b>ADJACENT LAND-USE CODES</b>	
Over-hanging Branches			BW	Broadleaf Wood
Fallen Tree			WL	Wetland
Exposed Roots			CP	Conifer Plantation
Pollarded Tree			URB	Gardens and Urban
Sapling			TL	Tilled Land (crop)
Scrub			IG	Improved Grassland
Hedgerow			MH	Moorland/heath
Fence			RP	Rough Pasture
Reed/ sedge bed			<b>OTHER FEATURES</b>	
Artificial Bank			Road bridge	
Earth Cliff			FB	
Pool			Weir	
Riffle			Ford	
Rapids			Outfall	
Waterfall		Dredgings/ Spoil		
Protruding Rock		Silt bars		
Culvert		Islands		
<b>ANIMAL CODES</b>		<b>FIELD SIGN CODES</b>		
Water vole	Aa	dr	Droppings	
Mink	Nv	la	Latrines	
Otter	Li	sc	Scats/ Spraints	
		bu	Burrows	
		fs	Feeding signs	
		lw	Lawn	
		pr	Prints	
Rat	Rn	e.g. 2 water vole latrines		
Field vole	Ma	2 x Aa		

## Water Vole and Otter Survey Form

Surveyors Names	SD + AP	Watercourse	SECTION 5
Date	26.04.2019	Site reference	Newport Pagwell

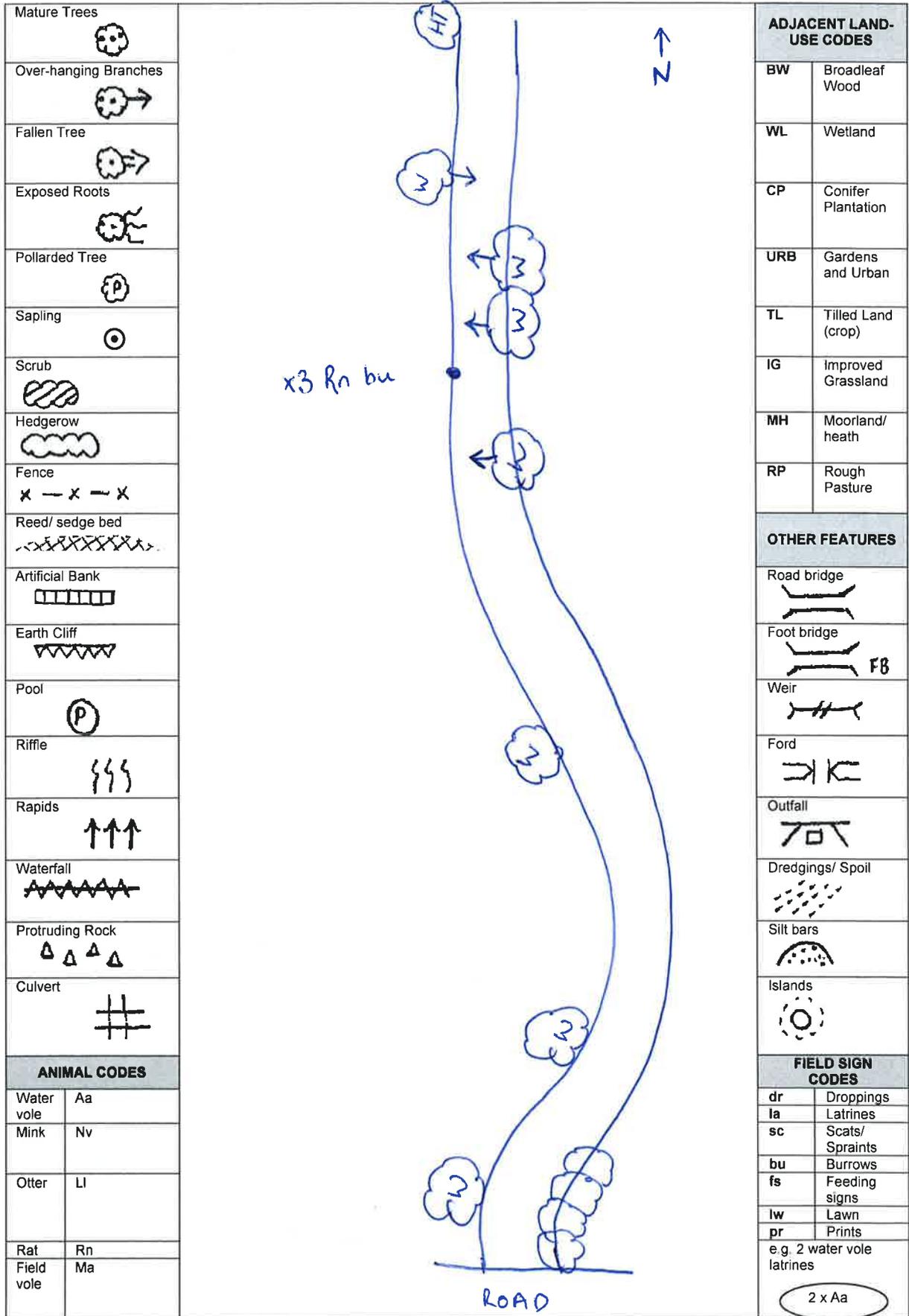
### Habitat Assessment

Main Habitat		Bank profile		Bank Vegetation (DAFORN)		Land Use within 50m	
Ditch / dyke		Flat <10°		Bankside trees	F	Woodland	
Gravel Pit		Shallow <45°		Shrubs	R	Conifer	
Sludge Pool		Steep >45°	✓	Herbs	A	Arable Crop	
Lake		Vertical/ undercut		Reeds / sedges	A	Rough grassland	✓
Reservoir				Submerged Weed	F	Managed grassland	✓
Natural Pond		<b>Water Course</b>		Tall Grass	O	Fen / Carr / Marsh	
Artificial Pond		Ave depth (m)		Short Grass	R	Urban / industrial	
Running Water	✓	Ave Width (m)	2	Bare Earth	R	Park / garden	
Marsh / bog		<b>Flow</b>		<b>Grazing?</b>		<b>General Comments</b>	
Canal		Static		Cattle		/	
	<b>Shore</b>	Slow		Horses			
Boulder		Fast	✓	Sheep			
Stone / Gravel		<b>Water Management</b>		Bank trampled			
Sand		Dredging		Bank fenced off			
Silt / clay		Weed cutting					
Earth	✓	Mowing		<b>Level of disturbance</b>			
Earth cliffs		Water level control		Between 1-5	1		
Reinforced		Boating		(1 = low, 5 = High)			
		Angling					

### Field Signs

	Tally		Total	Other Animals	
	Water Vole				
Sightings	/			<b>Mink</b>	
Latrines				Sightings	
Droppings				Scats	
Burrows				Tracks	
Feeding signs				<b>Rat</b>	
Tracks				Sightings	
Runs				Droppings	
Lawns				Tracks / runs	
	<b>Otter</b>			<b>Other species / comments:</b>	
Sightings	/			Rat burrows	
Spraints					
Tracks					

# Sketch of Site (indicating any Water Vole or Otter activity)



# **Appendix 6 Badger Survey Report**



**NEWPORT PAGNELL ECOLOGY  
BADGER SURVEY REPORT**

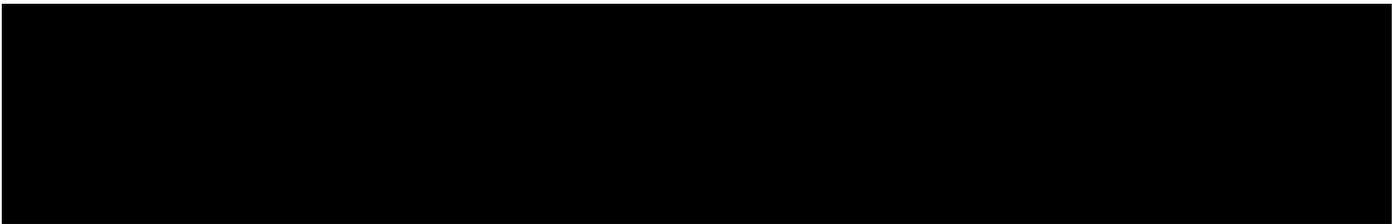
**Prepared for St James**

**by**

**Hankinson Duckett Associates**

**HDA ref: 2090.52**

**February 2020**



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HDA Document Control and Quality Assurance Record

## **APPENDICES**

- A Badger Survey Summary Plan
- B Field Recording Cards
- C Badger Sett Type Definitions

# 1 INTRODUCTION

## 1.1 Site location and summary description

1.1.1 This report describes the results of a survey for Badgers *Meles meles* conducted on approximately 362ha of land at Newport Pagnell, Buckinghamshire, hereinafter referred to as 'the site'. The site centre is located by National Grid Reference SP 893 415. The study was commissioned by St James in August 2019.

1.1.2 The site is located to the south of Newport Pagnell, on the north-eastern edge of Milton Keynes, Buckinghamshire. The site is dominated by agricultural land comprising intensively managed arable and grazed grassland fields with associated farmyards, agricultural buildings and residential farm houses. Field boundaries generally consist of hedgerows, treelines and fencing with occasional ponds and parcels of woodland, and the River Ouzel flows from south to north through the western part of the site. The site is bordered to the north by a construction site for residential development and the A422 beyond which lies the town of Newport Pagnell; to the east by arable farmland; to the west by the Pineham Nature Reserve and the M1 Motorway beyond which lies the town of Milton Keynes; and to the south by arable farmland.

1.1.3 The location and boundary of the site are shown in *Appendix A*. Detailed descriptions of the habitats within the site are given in the Ecological Appraisal (HDA, 2020).

## 1.2 Legislative context

1.2.1 Badgers and their setts are protected under the 1992 Protection of Badgers Act (HMSO, 1992). Unless permitted under a licence issued by Natural England, this makes it an offence to:

- Kill, injure or capture a Badger;
- Damage, destroy or obstruct access to a Badger sett displaying signs of current use; or
- Disturb Badgers while they are occupying a sett.

## 1.3 Development proposals

1.3.1 Proposals for the site include mixed use development with associated landscaping and infrastructure.

## 1.4 Scope and purpose of the report

1.4.1 A Badger survey of the site and wider area was undertaken by HDA in 2013 recorded several Badger setts within the site, and a subsequent walkover survey in 2019 confirmed the continued presence of suitable sett-building and foraging habitat in the form of rough and semi-improved grassland, arable field margins, hedgerow bases, scrub and woodland habitats within and bordering the site. In addition, during a desk study (HAD,

2020) BMERC provided 21 records of Badger within 2km of the site, three of which relate to the site including:

- A record in the central area of the site dating from 2014;
- A record in the southern area of the site dating from 2012; and
- A record in the north of the site dating from 2004.

1.4.2 In recognition of the findings of previous survey work and the time that has passed since this was undertaken, the findings of the desk study, the continued presence of suitable habitat and within the legislative context set out in *Section 1.2* a Badger survey was carried out in order to:

- i) Establish the presence/probable absence of active Badger setts within or adjacent to the site;
- ii) Assess the relative importance of different parts of the site for Badgers; and
- iii) Predict likely impacts potentially arising from development of the site and give recommendations for impact avoidance, minimisation and mitigation.

1.4.3 Where appropriate, the findings of the 2013 Badger survey are referred to in this report.

## **2 METHODOLOGY**

2.1 A detailed walkover survey of the site and, where possible, adjacent land was undertaken on the 25<sup>th</sup> and 26<sup>th</sup> April 2019, 4<sup>th</sup> and 5<sup>th</sup> June 2019 and 3<sup>rd</sup> December 2019 by Hayley Snowdon GradCIEEM, Anna Senior MCIEEM and Caitlin Coombs of HDA. The survey involved walking around the site looking for evidence of Badger activity including setts and other field signs such as footprints, latrines, feeding scrapes and hairs. All holes and scrapes were examined to assess what species was using or had dug them. For each confirmed Badger sett a recording card was completed detailing the type of sett, number of entrances and level of activity (from disused to well-used). Completed recording cards are given in *Appendix B* and descriptions of the sett type classifications used are given in *Appendix C*.

2.2 A subjective assessment of the foraging potential of the habitats within the site was also made, based on the availability of potential food sources.

- Good foraging habitat: provides Badgers with a variety of foraging opportunities through the year (e.g. agriculturally improved pasture, hedgerows and gardens).
- Moderate foraging habitat: foraging opportunities can be limited by season and management regime (e.g. cereal crops, rough grassland, woodland and scrub).
- Poor foraging habitat: areas that provide few foraging opportunities for Badgers (e.g. heathland, moorland and wetlands).

2.3 A total of 29 hours was spent carrying out the field survey. Weather conditions were as follows:

- 25<sup>th</sup> April 2019 - bright and mild
- 26<sup>th</sup> April 2019 - occasional short showers
- 4<sup>th</sup> June 2019 - overcast with a light breeze and showers in the afternoon
- 5<sup>th</sup> June 2019 - mild, sunny with clouds and a light breeze
- 3<sup>rd</sup> December 2019 - cool, sunny with clouds and a light breeze.

## 2.4 Limitations

2.4.1 As is often the case with Badger surveys, the density of some areas of scrub within and adjacent to the survey area was such that it was not possible to survey them exhaustively. These areas were circumnavigated and examined for evidence of paths leading into them and other evidence of recent use by Badgers.

2.4.2 A small minority of land outside the survey area, but within 30m of the survey area boundary, could not be accessed or viewed adequately to confirm the absence of Badgers. This includes private land supporting residential dwellings and gardens, grazed fields and woodland to the north of and south of the site. Although these areas do provide suitable sett building habitat, they were separated from the site by either a river, steep ditch or a dual carriageway, and therefore any underground tunnels of setts present in these areas would not encroach into the site. Where appropriate, lack of access or limited visibility of these off-site areas has been considered in the assessment and recommendations provided in this report.

2.4.3 In summary, no significant limitations were encountered during the survey that might otherwise affect the assessment of the importance of the site for Badgers and the recommendations provided in *Section 4* of this report.

## 3 RESULTS

### 3.1 Setts

3.1.1 A total of twelve setts were recorded during the Badger survey, two of which were in 'current use' and all of which are located within the site. The location of each sett is shown on the map in *Appendix A* and Sett Recording Cards are given in *Appendix B*. Natural England's 2009 guidance was used to determine whether setts should be regarded as being in 'current use'. Where appropriate, the findings of the Badger survey undertaken in 2013 are referred to, and setts identified in 2013 but not in 2019 are shown on the map in *Appendix A*.

3.1.2 A brief description of each sett encountered during the survey is given below.

- 3.1.3 **Sett A:** A possible outlying sett, not in 'current use' at the time of survey, comprising one disused entrance. The sett is located within a parcel of woodland next to a residential property in the centre of the site, which was being used as a rubbish dump at the time of survey, with loose soil and debris present. The entrance maintains width down the tunnel and is possibly of Badger origin, although is located within an area containing many Rabbit burrows. No signs of Badger activity were observed in the vicinity of the sett. The hole is possibly used by Rabbits.
- 3.1.4 **Sett B:** An outlying sett, not in 'current use' at the time of survey, comprising one disused entrance. The sett is located within a parcel of woodland next to a residential property in the centre of the site, which was being used as a rubbish dump at the time of survey, with loose soil and debris present. The entrance is potentially of Badger origin, although no signs of Badger activity were observed in the vicinity of the sett.
- 3.1.5 **Sett C:** An outlying sett, not in 'current use' at the time of survey, comprising one disused entrance. The sett is located at the edge of a parcel of woodland in the north-east of the site, close to a hedgerow. No signs of Badger activity were observed in the vicinity of the sett.
- 3.1.6 **Sett D:** An outlying sett, not in 'current use' at the time of survey, comprising two partially-used entrances. The sett is located underneath a log pile beside a barn, within a grazed paddock in the central area of the site, immediately east of a main road. Both entrances were relatively clear of debris and large spoil heaps were present. Although potentially of Badger origin, no signs of Badger activity were observed in the vicinity of the sett. Rabbit droppings were present at sett entrances, indicating recent use by this species.
- 3.1.7 **Sett E:** An outlying sett, not in 'current use' at the time of survey, comprising two disused entrances. The sett is located within an area of woodland and scrub immediately east of a main road, and to the north of hotel buildings. Although potentially of Badger origin, no signs of Badger activity were observed in the vicinity of the sett. The hole is possibly occasionally used by Rabbits. This sett was also identified in 2013, at which time it was also not considered to be 'current use' at the time of survey.
- 3.1.8 **Sett F:** An outlying sett, in 'current use' at the time of survey, comprising one partially-used entrance. The sett is located at a hedgerow base in the corner of an arable field in the centre of the site, immediately east of a main road. A clear entrance with paths leading towards it indicated recent use by Badgers.

- 3.1.9 **Sett G:** An outlying sett, not in 'current use' at the time of survey, comprising one disused entrance. The sett is located at a hedgerow base at the edge of an arable field in the north of the site. The entrance is potentially of Badger origin, although no signs of Badger activity were observed in the vicinity of the sett. The hole is appeared to be used by Rabbits.
- 3.1.10 **Sett H:** An outlying sett, not in 'current use' at the time of survey, comprising one disused entrance. The sett is located at the base of a defunct hedgerow at the edge of an arable field in the centre of the site. The entrance was overgrown with vegetation and no signs of Badger were observed in the vicinity of the sett, indicating it was not in current use at the time of survey.
- 3.1.11 **Sett I:** An outlying sett, not in 'current use' at the time of survey, comprising two partially-used entrances. The sett is located at a hedgerow base at the edge of a grassland field in the centre of the site, immediately east of a main road. Although likely to be of Badger origin, no signs of Badger activity were observed in the vicinity of the sett. Fox and Rabbit droppings were observed at one of the entrances, indicating recent use by these species.
- 3.1.12 **Sett J:** An outlying sett, not in 'current use' at the time of survey, comprising one partially-used entrance. The sett is located in an arable field margin, adjacent to a ditch and hedgerow, in the west of the site. No signs of Badger activity were observed in the vicinity of the sett. Rabbit droppings were observed at one of the entrances, indicating recent use by this species.
- 3.1.13 **Sett K:** An outlying sett, not in 'current use' at the time of survey, comprising two disused entrances. The sett is located in a small woodland copse in the south-eastern area of the site, adjacent to an arable field. A large spoil heap was present outside one of the entrances, and the other entrance was internally collapsed. No signs of Badger activity were observed in the vicinity of the sett.
- 3.1.14 **Sett L:** An outlying sett, in 'current use' at the time of survey, comprising two partially-used entrances. The sett is located at the edge of a ditch in an arable field margin, adjacent to a hedgerow, in the south of the site. Tracks leading through vegetation and towards the entrances indicated recent use by Badgers.
- 3.2 Other signs of Badger activity**
- 3.2.1 Badger foraging signs, including dung pits, latrines, ground scrapings and snuffle holes, were recorded across the site, particularly within woodland areas and along field margins.

3.2.2 A number of well used mammal paths were also recorded within the site, particularly passing through areas of scrub and woodland field margins. It is likely that these paths are used by Badgers, as well as Rabbits, Foxes and deer which were also recorded within the survey area.

### **3.3 Foraging habitat**

3.3.1 The grassland, arable field margins, hedgerow, scrub and woodland habitats within the site provide good to moderate quality foraging habitat for Badgers. The intensively managed arable fields which dominated the site however only offer low quality foraging habitat for Badgers. Similar habitats are relatively abundant in the wider area.

## **4 ASSESSMENT AND RECOMMENDATIONS**

### **4.1 Setts**

4.1.1 Two Badger setts in 'current use' were recorded during the survey, both of which are outlying setts and are located within the site. These include Sett F, located at a hedgerow base in the corner of an arable field in the centre of the site, and Sett L, located at the edge of a ditch in an arable field margin, adjacent to a hedgerow, in the south of the site.

4.1.2 Ten outlying setts (Setts A, B, C, D, E, G, H, I, J and K), not showing any signs of current use at the time of survey, were also recorded within the site.

4.1.3 Signs of Badger activity including paths, foraging signs, Badger hairs, latrines and droppings were also recorded across the site.

4.1.4 The Protection of Badgers Act protects Badgers and their setts. Any works involving the disturbance of a Badger occupying a sett, or destruction of a sett displaying signs indicating 'current use' by a Badger (Natural England, 2009), will require a licence from Natural England.

4.1.5 It is recommended that, where possible, all Badger setts are retained within the development scheme for the site, with access to areas of suitable foraging habitat maintained.

#### *Setts F and L*

4.1.6 Setts F and L (both outlying setts) displayed signs of current use at the time of survey, and therefore priority should be given to their protection and retention within the development scheme with a minimum stand-off of 20m maintained between active entrances and any proposed excavation works. The stand-off zone should be demarcated using suitable fencing/notices throughout construction works and site staff made aware of its presence. In order to minimise disturbance during the operational

phase consideration should be given to use of fencing and dense scrub planting to limit access to retained setts.

4.1.7 Where this stand-off is not possible, in order to prevent any physical damage or disturbance to the sett(s) during the construction phase, works encroaching into the stand-off zone but beyond 10m from an active hole should be subject to the approval of a suitably qualified ecologist<sup>1</sup>. Where appropriate, approved work within this area should be carried out under an Ecological Watching Brief and restrictions placed on night-time working/lighting in the vicinity of the sett.

4.1.8 In the event that it is not possible to retain Setts F & L or works have potential to damage these setts or disturb Badgers present, it would be necessary to apply for a Natural England licence to close and/or damage/destroy the sett(s) prior to works commencing. The recommended method for sett closure involves the affected entrances being “soft stopped” initially to confirm current use, followed by the installation of one-way gates at the sett entrances. The entrance(s) are then monitored until use by Badgers has ceased, after which the sett is destroyed under the supervision of a suitably qualified ecologist. Closure of setts usually takes in the region of three to six weeks and licences are usually only granted for works affecting setts between July and November outside of the Badger breeding season. Where only part of a Badger sett is to be affected by the works, exclusion by use of one-way gates may not be effective due to the presence of interlying tunnels, in which case it may be necessary to proceed to supervised destruction of the affected part of the sett under the supervision of a suitably qualified ecologist even if the entrance remains active. All procedures relating to the closure or damage to a sett or disturbance of occupying Badgers would need to be subject of a detailed method statement and monitored by the licensee and/or accredited agents. The requirement for this would be assessed on finalisation of the scheme design and, if necessary, the detail of any replacement sett provision would be provided in the detailed method statement to be prepared in support of the licence application.

4.1.9 Outlying setts are low-status non-breeding setts that may be occupied on only a temporary basis and therefore alternative setts are expected to be present in the wider area. Loss of these setts is therefore unlikely to have any long-term impact on the local Badger population.

*Setts A, B, C, D, E, G, H, I, J and K*

4.1.10 Current knowledge suggests that Setts A, B, C, D, E, G, H, I, J and K are not in ‘current use’ in the context of the 1992 Badgers Act (Natural England, 2009) and therefore a

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<sup>1</sup> In the event that the suitably qualified ecologist considers there to be a risk of works within the 10-20m zone which could result in damage to the sett or disturbance to occupying Badgers that cannot be avoided, a licence will be required as described in *Section 4.1.6*.

Badger licence would not currently be required for any works affecting these setts. It should be noted however that outlying setts may not be permanently occupied and may be used on a seasonal or irregular basis and it is possible that these setts could be reoccupied prior to development commencing. It is therefore recommended that, where possible, Setts A, B, C, D, E, G, H, I, J and K are also retained within the development scheme for the site, maintaining a suitable standoff and ensuring that areas of foraging habitat remain readily accessible.

*Further survey*

4.1.11 Badgers are very mobile animals and setts may be abandoned, new setts dug and old setts reclaimed within short periods of time. It would therefore be prudent to resurvey the site in advance of each design stage and prior to works commencing in order to confirm the status of Badgers across the site and inform any need for avoidance, mitigation and licensing measures.

**4.2 Foraging and connectivity**

4.2.1 The grassland, arable field margins, hedgerow, scrub and woodland habitats within the site provide good to moderate quality foraging habitat for Badgers. The intensively managed arable fields which dominated the site however only offer low quality foraging habitat for Badgers. It is likely that these habitats are used for regular foraging by the local Badger population.

4.2.2 Although the development of the site will result in a loss of foraging habitat where built development takes the place of existing grassland and woodland habitats, habitats of similar and higher quality than those existing within the site are abundant in the wider area. It is also likely that the open space proposals will maintain opportunities at the site for foraging Badgers following development, and that the gardens of the proposed development may also provide opportunities for foraging Badgers as these mature. The landscape scheme for the site should seek to maximise opportunities for foraging Badgers through maintenance of corridors between any retained Badger sett and areas of foraging habitat in the wider area and inclusion of high quality Badger foraging habitats such as tree and scrub planting, establishment of rough and meadow grasslands and use of fruit and nut providing species within planting schemes.

4.2.3 To avoid entrapment of Badgers foraging and moving around the site during the site preparation, earthworks and construction phases, any steep sided holes left open overnight should be equipped with a mammal ladder (a reinforced plywood board >60cm wide set at an angle of no greater than 30° to the base of the pit) and temporarily open pipes with a diameter of >150mm should be plugged.

## **5 CONCLUSION**

5.1 A total of two active Badger setts were recorded within the site, including two active outlying setts located at a hedgerow base in the corner of an arable field in the centre of the site, and at the edge of a ditch in an arable field margin, adjacent to a hedgerow, in the south of the site. In addition, ten disused outlying setts were recorded within the site.

5.2 Measures by which development proposals can protect Badgers associated with these setts are provided in *Section 4* above, in addition to maintenance of opportunities for foraging Badgers at the site following development. Subject to the implementation of these measures to protect individual Badgers during works, and to avoid/ minimise impacts on Badger setts during works, it is unlikely that the proposed development would have any significant long-term impact on the local Badger population.

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Issue	Description	Date of Issue	Signed
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	Personnel	Position
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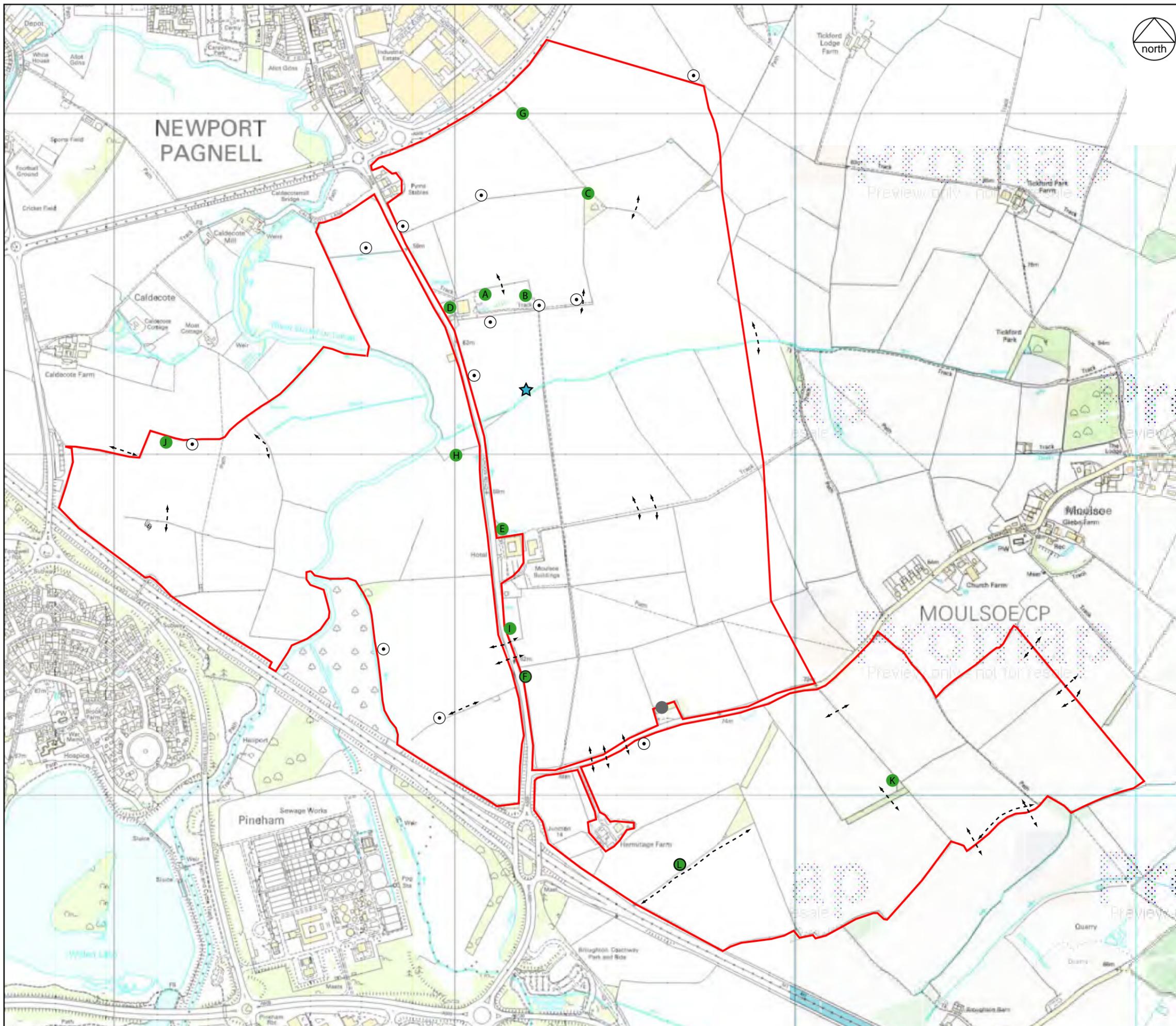
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**APPENDIX A**

**Badger Survey Summary Plan**



**KEY**

-  Site boundary
-  Outlying sett
-  Sett present in 2013 but not in 2019
-  Active sett
-  Mammal path
-  Badger latrine
-  Badger foraging signs
-  Badger Footprint

DO NOT SCALE OFF PLAN

CLIENT:  
**St James**  
 PROJECT:  
**Milton Keynes**  
 TITLE:  
**Badger Survey Summary Plan**  
 SCALE AT A3:                      DATE:  
 Not to Scale                      February 2020

2090.52 / 16

Based on Ordnance Survey mapping with permission of Her Majesty's Stationary Office



Landscape Architecture  
 Masterplanning  
 Ecology

## **APPENDIX B**

### **Field Recording Cards**

**BADGER SETT RECORDING CARD**

Site: Nawport Pannel

Sett ref: (A) A

Grid Reference: SP 89086 42471

Date: 4-6-19

Surveyor AS / CC

**Habitat**

Woodland  Scrub  Hedge  Ditch  Field  Garden   
Quarry  Embankment / Cutting  Conifer plantation  Other

Notes: In old rubbish dump - loose soil + debris present

**Number of Entrances** Well used  Partially used  Disused

Notes: Possible sett of Badger origin - hole maintains with down  
'muck' - locate with area of rabbit holes so not likely to  
be of rabbit origin.

**Sett in Current Use** Yes  No

**Category of Sett**

Main (many holes with conspicuous spoil heaps, looks active. Well worn paths. Can be disused)

Annexe (close to main (<150m) usually connected to it by well-worn paths)

Subsidiary (few holes (3-5). At least 50m from main with no obvious paths)

Outlying (one or two holes, used sporadically, no obvious paths)

Notes: .....

**Signs of Occupation** Bedding  Hairs  Tracks  Dung Pits  Scratching

Notes: None

**Vulnerability** (i.e. ease of public access; obviousness; nearby development)

Notes: .....



Well used entrance



Disused entrance



Partially used entrance

**BADGER SETT RECORDING CARD**

Site: *Newport Pagford*

Sett ref: *B2B*

Grid Reference: *SP 89221 42459*

Date: *04-06-2019*

Surveyor *AB/CC*

**Habitat**

Woodland  Scrub  Hedge  Ditch  Field  Garden   
Quarry  Embankment / Cutting  Conifer plantation  Other

Notes: *loose soil + spain - old tip*

**Number of Entrances** Well used  Partially used  Disused

Notes: .....

**Sett in Current Use** Yes  No

**Category of Sett**

Main (many holes with conspicuous spoil heaps, looks active. Well worn paths. Can be disused)

Annexe (close to main (<150m) usually connected to it by well-worn paths)

Subsidiary (few holes (3-5). At least 50m from main with no obvious paths)

Outlying  (one or two holes, used sporadically, no obvious paths)

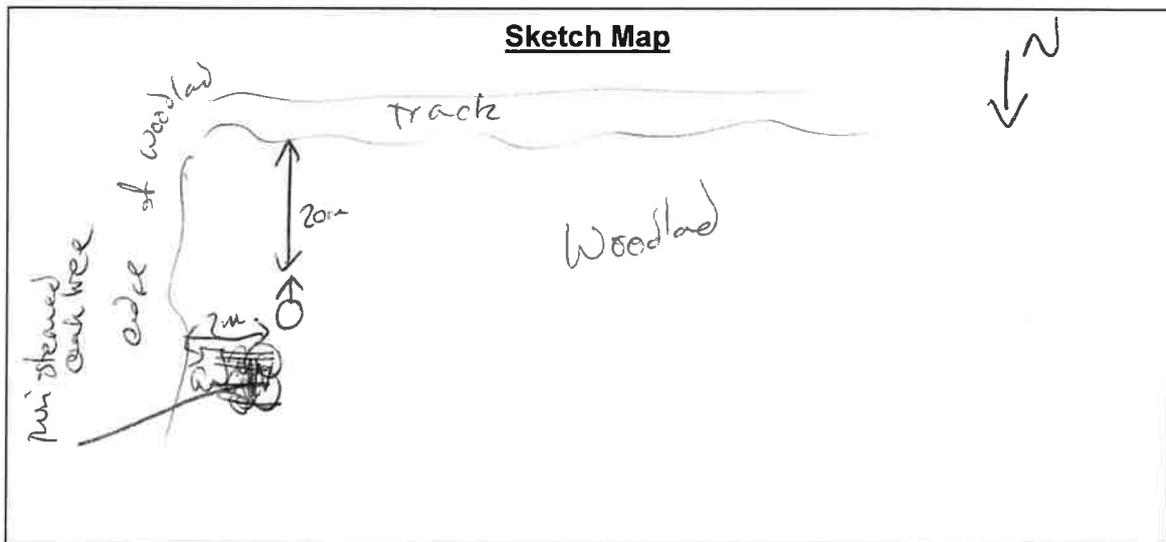
Notes: *Possible hole of badger origin - but no signs of use by badgers*

**Signs of Occupation** Bedding  Hairs  Tracks  Dung Pits  Scratching

Notes: *No signs*

**Vulnerability** (i.e. ease of public access; obviousness; nearby development)

Notes: .....



Well used entrance  Disused entrance  Partially used entrance

**BADGER SETT RECORDING CARD**

Site: Newport Pagnell

Sett ref: ~~2~~ 30C

Date: 04-06-2019

Grid Reference: SP 89383 42751

Surveyor AS/CC

**Habitat**

Woodland  Scrub  Hedge  Ditch  Field  Garden   
Quarry  Embankment / Cutting  Conifer plantation  Other

Notes: edge of Woodland - close to hedgerow.

**Number of Entrances** Well used  Partially used  Disused

Notes: Possible hole of badger origin - in use by badgers

**Sett in Current Use** Yes  No

**Category of Sett**

- Main (many holes with conspicuous spoil heaps, looks active. Well worn paths. Can be disused)
- Annexe (close to main (<150m) usually connected to it by well-worn paths)
- Subsidiary (few holes (3-5). At least 50m from main with no obvious paths)
- Outlying  (one or two holes, used sporadically, no obvious paths)

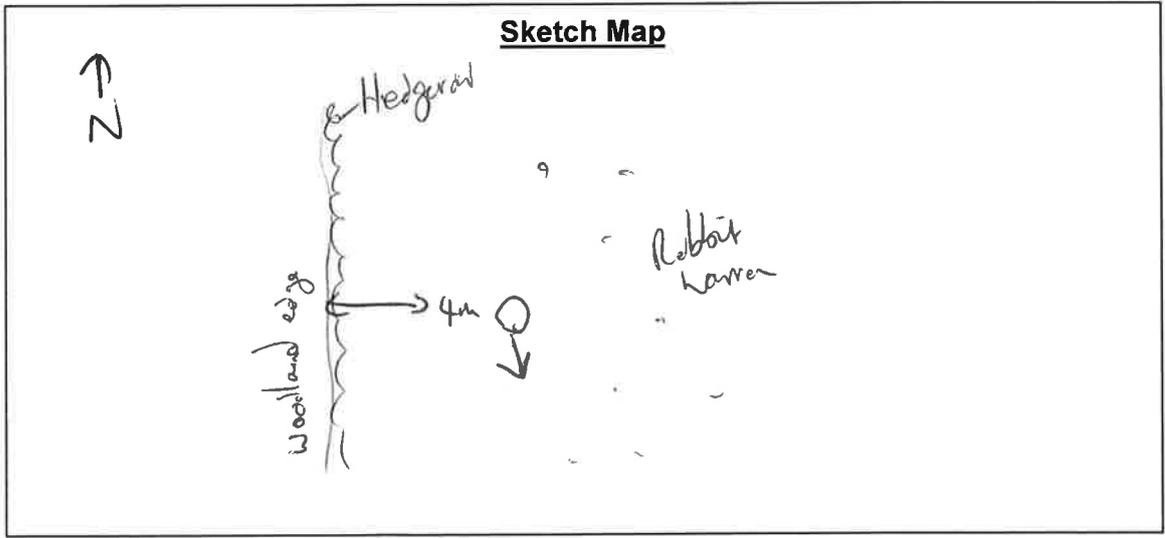
Notes:

**Signs of Occupation** Bedding  Hairs  Tracks  Dung Pits  Scratching

Notes: No recent signs

**Vulnerability** (i.e. ease of public access; obviousness; nearby development)

Notes:



Well used entrance    
  Disused entrance    
  Partially used entrance

**BADGER SETT RECORDING CARD**

Site: *Newport Pagnell*

Sett ref: *40*

Date: *04-06-2019*

Grid Reference: *SP 88986 42445*

Surveyor *AS/CC*

**Habitat**

Woodland      Scrub      Hedge      Ditch      Field      Garden  
 Quarry      Embankment / Cutting      Conifer plantation      Other

Notes: *Edge of paddock at base of barn - in log pile*

**Number of Entrances** Well used  Partially used  Disused

Notes: *Relatively clear holes - could be used by badgers but rabbit droppings noted at entrances. No badger signs nearby.*

**Sett in Current Use** Yes  No

**Category of Sett**

Main (many holes with conspicuous spoil heaps, looks active. Well worn paths. Can be disused)

Annexe (close to main (<150m) usually connected to it by well-worn paths)

Subsidiary (few holes (3-5). At least 50m from main with no obvious paths)

Outlying (one or two holes, used sporadically, no obvious paths)

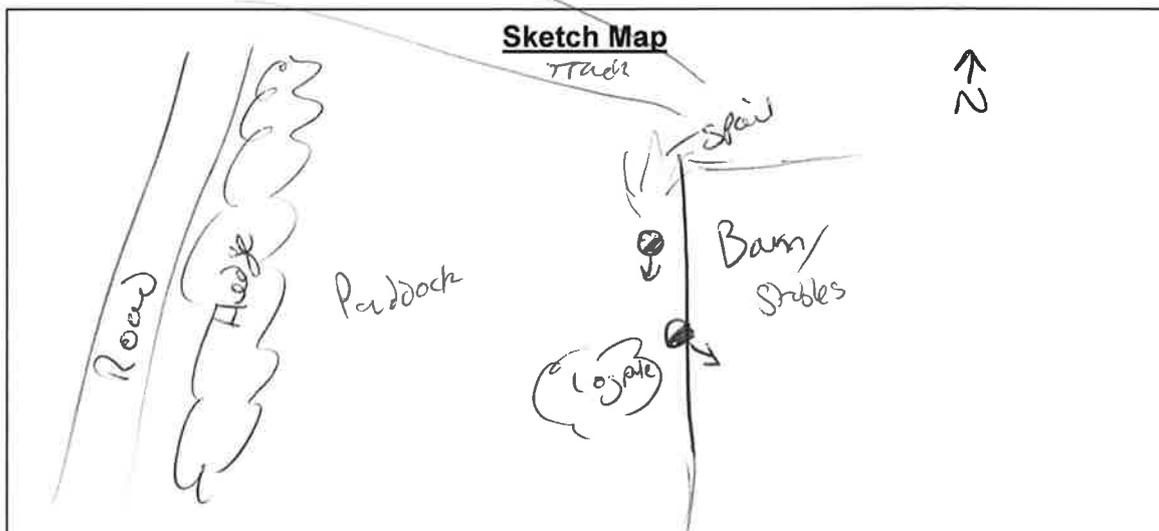
Notes: *One hole goes below barn concrete base*

**Signs of Occupation** Bedding      Hairs      Tracks      Dung Pits      Scratching

Notes: *No recent signs of Badger*

**Vulnerability** (i.e. ease of public access; obviousness; nearby development)

Notes: .....



● Well used entrance      ○ Disused entrance      ◐ Partially used entrance

**BADGER SETT RECORDING CARD**

Site: Newport Pagnell

Sett ref: E

Grid Reference: SP89133 41 778

Date: 25/4/2019

Surveyor HS

**Habitat**

Woodland

Scrub

Hedge

Ditch

Field

Garden

Quarry

Embankment / Cutting

Conifer plantation

Other

Notes: area of scrubby woodland to east of road and to north of hotel.

**Number of Entrances** Well used      Partially used      Disused 2

Notes: .....

**Sett in Current Use** Yes      No

**Category of Sett**

- Main (many holes with conspicuous spoil heaps, looks active. Well worn paths. Can be disused)
- Annexe (close to main (<150m) usually connected to it by well-worn paths)
- Subsidiary (few holes (3-5). At least 50m from main with no obvious paths)
- Outlying (one or two holes, used sporadically, no obvious paths)

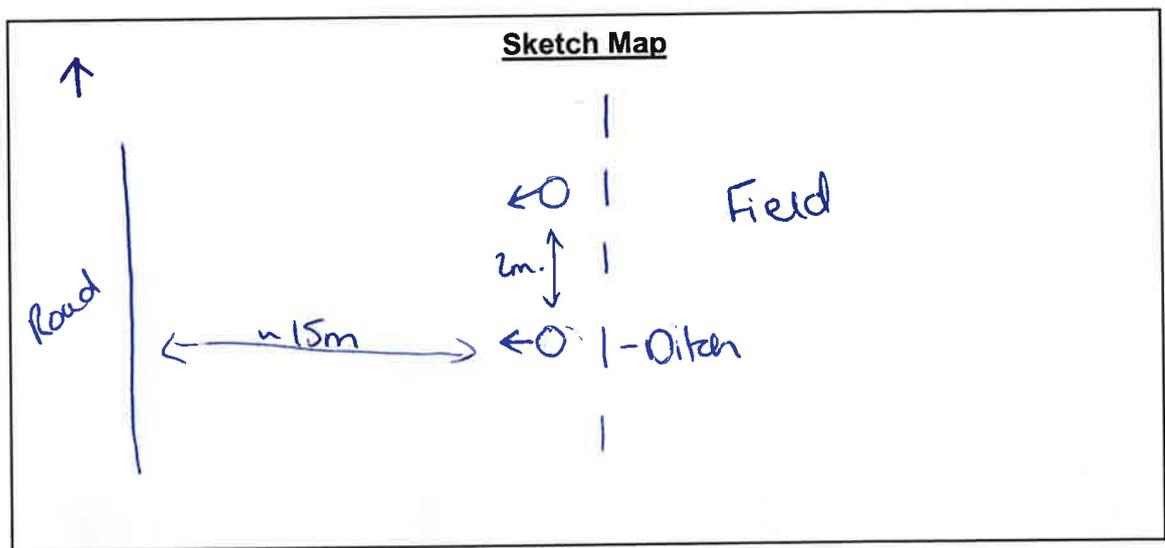
Notes: .....

**Signs of Occupation** Bedding Hairs Tracks Dung Pits Scratching

Notes: No signs of occupation by Badger. Possible occasional use by Rabbit.

**Vulnerability** (i.e. ease of public access; obviousness; nearby development)

Notes: .....



Well used entrance     
  Disused entrance     
  Partially used entrance

**BADGER SETT RECORDING CARD**

Site: Newport Pagnell

Sett ref: ~~M4/F3~~ (also recorded in 2013) Date: 25/4/2019

Grid Reference: SP89194 41367

Surveyor MS

**Habitat**

Woodland    Scrub    Hedge    Ditch    Field    Garden  
Quarry    Embankment / Cutting    Conifer plantation    Other

Notes.....  
.....

**Number of Entrances** Well used      Partially used 1 Disused     

Notes: large hole, old spoil pile, faint mammal path leading to it. likely used on an occasional basis.

**Sett in Current Use** Yes  No

**Category of Sett**

Main (many holes with conspicuous spoil heaps, looks active. Well worn paths. Can be disused)

Annexe (close to main (<150m) usually connected to it by well-worn paths)

Subsidiary (few holes (3-5). At least 50m from main with no obvious paths)

Outlying (one or two holes, used sporadically, no obvious paths)

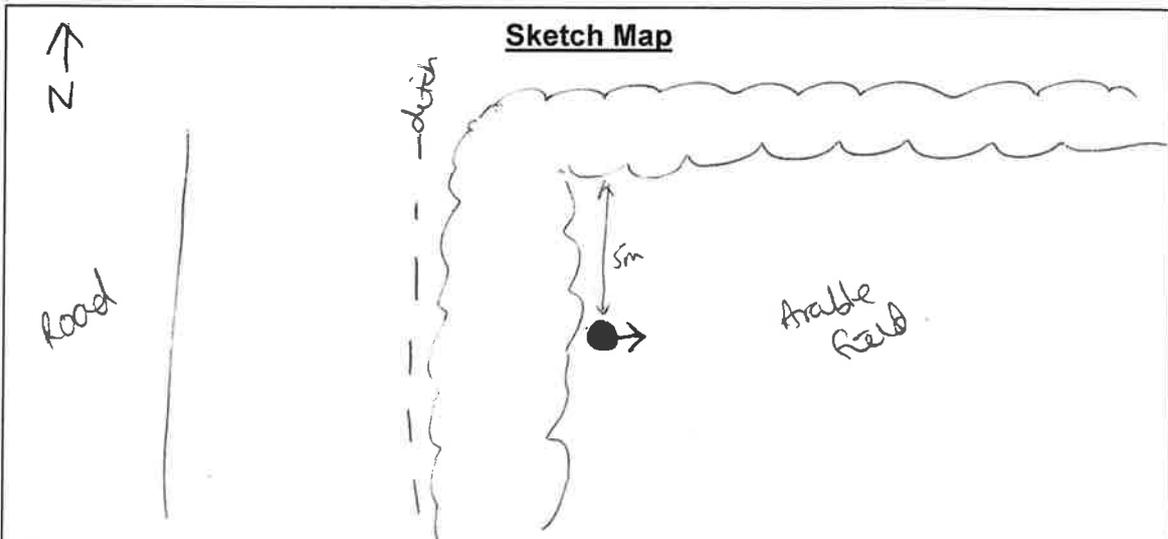
Notes: All other holes in vicinity of sett appear Rabbit in origin and one currently in use by rabbits.

**Signs of Occupation** Bedding    Hairs    Tracks    Dung Pits    Scratching

Notes: clear hole, mammal paths leading to hole.

**Vulnerability** (i.e. ease of public access; obviousness; nearby development)

Notes.....  
.....



Well used entrance     Disused entrance     Partially used entrance

# BADGER SETT RECORDING CARD

Site: Newport Pagnell

Sett ref: ~~426~~ G

Grid Reference: SP 89194 43000

Date: 05/06/2019

Surveyor CC

## Habitat

Woodland    Scrub    Hedge    Ditch    Field    Garden  
Quarry    Embankment / Cutting    Conifer plantation    Other

Notes: close to lot of rabbit holes. Under Hawthorn tree + fallen wooden stake

**Number of Entrances** Well used \_\_\_\_\_ Partially used \_\_\_\_\_ Disused

Notes: possible hole of badger origin - but no sign of use by badges

**Sett in Current Use** Yes \_\_\_\_\_ No

## Category of Sett

- Main (many holes with conspicuous spoil heaps, looks active. Well worn paths. Can be disused)
- Annexe (close to main (<150m) usually connected to it by well-worn paths)
- Subsidiary (few holes (3-5). At least 50m from main with no obvious paths)
- Outlying (one or two holes, used sporadically, no obvious paths)

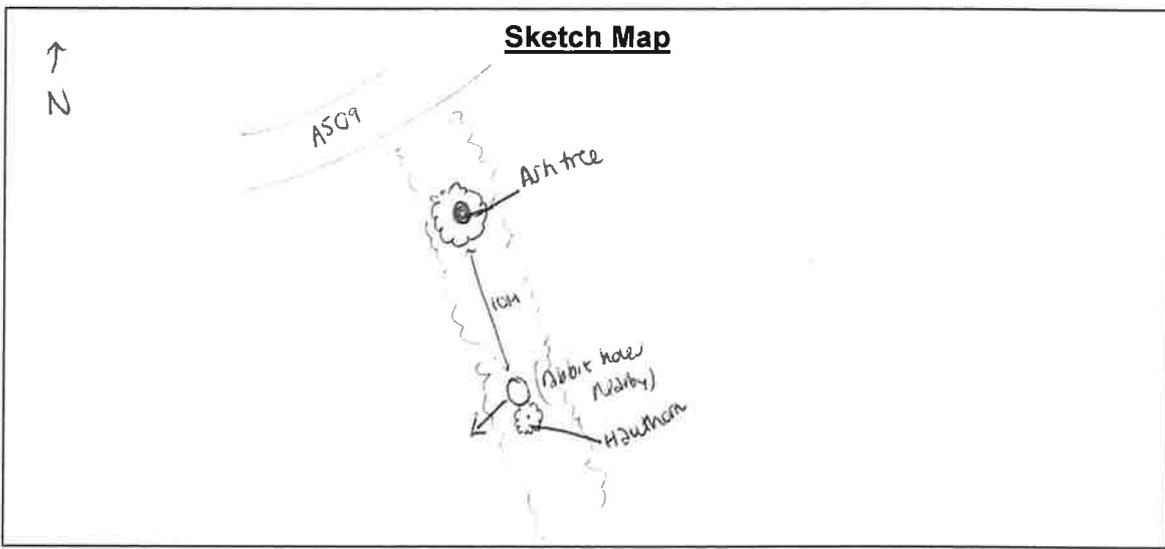
Notes: .....

**Signs of Occupation** Bedding    Hairs    Tracks    Dung Pits    Scratching

Notes: no recent signs

**Vulnerability** (i.e. ease of public access; obviousness; nearby development)

Notes: .....



Well used entrance     Disused entrance     Partially used entrance

# BADGER SETT RECORDING CARD

Site: Newport Pagnell

Sett ref: 44

Date: 05/06/19

Grid Reference: SP 89031 42012

Surveyor CC

## Habitat

Woodland      Scrub      Hedge      Ditch      Field      Garden  
Quarry      Embankment / Cutting      Conifer plantation      Other

Notes: in defunct hedgerow, south of barbed wire fence, east of elder tree

**Number of Entrances** Well used  Partially used  Disused

Notes: overgrown with grass. Could be a large rabbit hole or an old badger sett entrance

**Sett in Current Use** Yes  No

## Category of Sett

Main (many holes with conspicuous spoil heaps, looks active. Well worn paths. Can be disused)

Annexe (close to main (<150m) usually connected to it by well-worn paths)

Subsidiary (few holes (3-5). At least 50m from main with no obvious paths)

Outlying (one or two holes, used sporadically, no obvious paths)

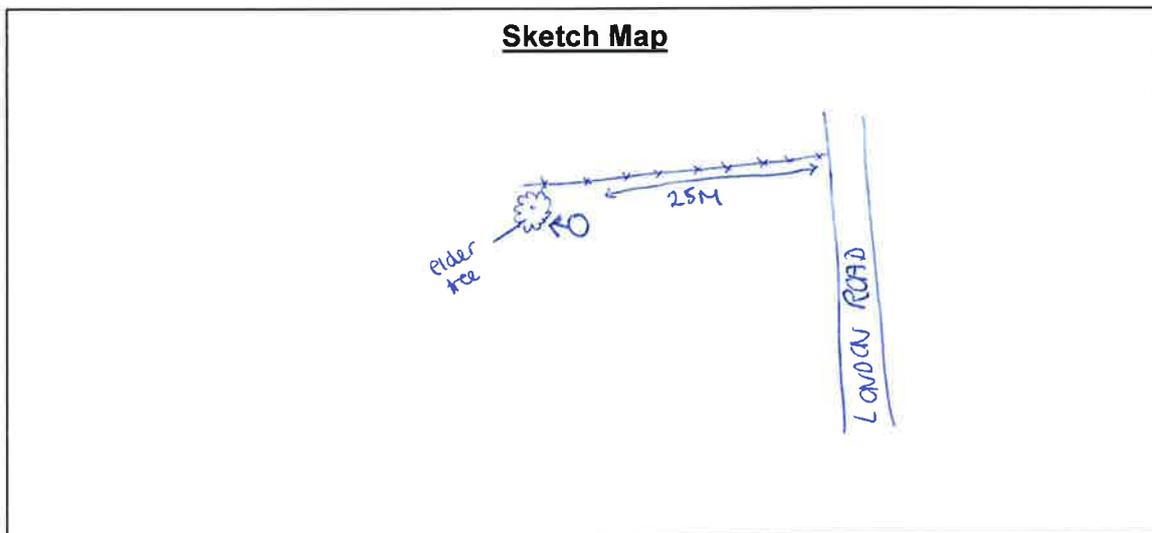
Notes:

**Signs of Occupation** Bedding      Hairs      Tracks      Dung Pits      Scratching

Notes: no recent sign of badger use

**Vulnerability** (i.e. ease of public access; obviousness; nearby development)

Notes:



Well used entrance



Disused entrance



Partially used entrance

**BADGER SETT RECORDING CARD**

Site: Newport Pagnell

Sett ref: 1

Date: 25/4/2019

Grid Reference: SP 89170 41443

Surveyor US

**Habitat**

Woodland      Scrub      Hedge      Ditch      Field      Garden  
Quarry      Embankment / Cutting      Conifer plantation      Other

Notes: Below hedgerow - grassland to east road to west

**Number of Entrances** Well used      Partially used 2 Disused     

Notes: Two holes likely Badger in origin - Fox & Rabbit droppings at 1 of the entrances

**Sett in Current Use** Yes      No ✓ Not by Badger

**Category of Sett**

- Main (many holes with conspicuous spoil heaps, looks active. Well worn paths. Can be disused)
- Annexe (close to main (<150m) usually connected to it by well-worn paths)
- Subsidiary (few holes (3-5). At least 50m from main with no obvious paths)
- Outlying (one or two holes, used sporadically, no obvious paths)

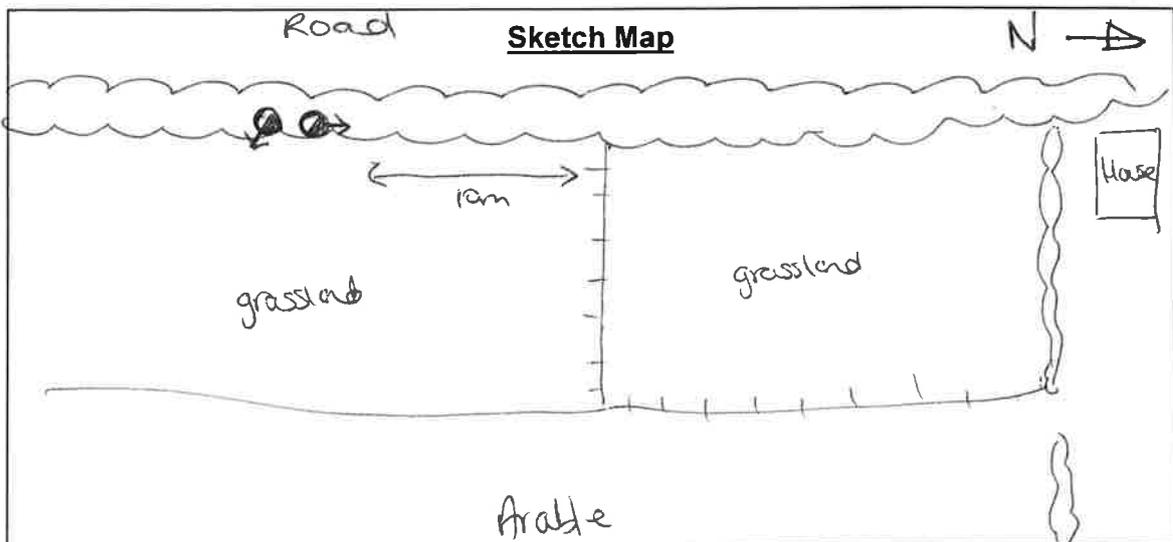
Notes: .....

**Signs of Occupation** Bedding      Hairs      Tracks      Dung Pits      Scratching

Notes: None

**Vulnerability** (i.e. ease of public access; obviousness; nearby development)

Notes: .....



● Well used entrance      ○ Disused entrance      ◐ Partially used entrance

# BADGER SETT RECORDING CARD

Site: NEWPORT PAGNELL

Sett ref: J

Date: 3/12/2019

Grid Reference: SP 88189 42039

Surveyor CC

## Habitat

Woodland    Scrub    Hedge    Ditch    Field    Garden  
Quarry    Embankment / Cutting    Conifer plantation    Other

Notes: in field margin next to ditch and hedgerow

**Number of Entrances** Well used \_\_\_\_\_ Partially used 1 Disused \_\_\_\_\_

Notes: single entrance, possibly of badger origin, now in use by rabbit

**Sett in Current Use** Yes \_\_\_\_\_ No

## Category of Sett

Main (many holes with conspicuous spoil heaps, looks active. Well worn paths. Can be disused)

Annexe (close to main (<150m) usually connected to it by well-worn paths)

Subsidiary (few holes (3-5). At least 50m from main with no obvious paths)

Outlying (one or two holes, used sporadically, no obvious paths)

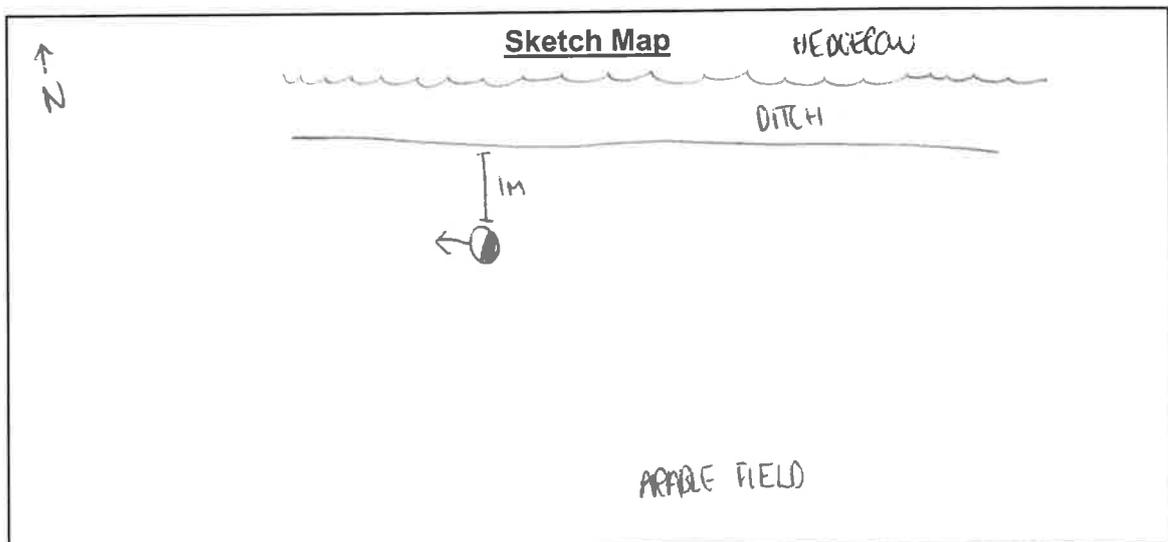
Notes:

**Signs of Occupation** Bedding    Hairs    Tracks    Dung Pits    Scratching

Notes: No signs of badger found. Rabbit droppings at entrance

**Vulnerability** (i.e. ease of public access; obviousness; nearby development)

Notes:



Well used entrance

Disused entrance

Partially used entrance

## BADGER SETT RECORDING CARD

Site: Newport Pagnell

Sett ref: 3 K

Date: 26/04/19

Grid Reference: SP 90303 41016

Surveyor HS

**Habitat**

Woodland     Scrub     Hedge     Ditch     Field     Garden  
 Quarry     Embankment / Cutting     Conifer plantation     Other

Notes: Small escape adjacent to arable field

**Number of Entrances** Well used  Partially used  Disused 2

Notes: Possibly Badger in origin. 1 hole has collapsed internally

**Sett in Current Use** Yes  No

**Category of Sett**

- Main (many holes with conspicuous spoil heaps, looks active. Well worn paths. Can be disused)
- Annexe (close to main (<150m) usually connected to it by well-worn paths)
- Subsidiary (few holes (3-5). At least 50m from main with no obvious paths)
- Outlying** (one or two holes, used sporadically, no obvious paths)

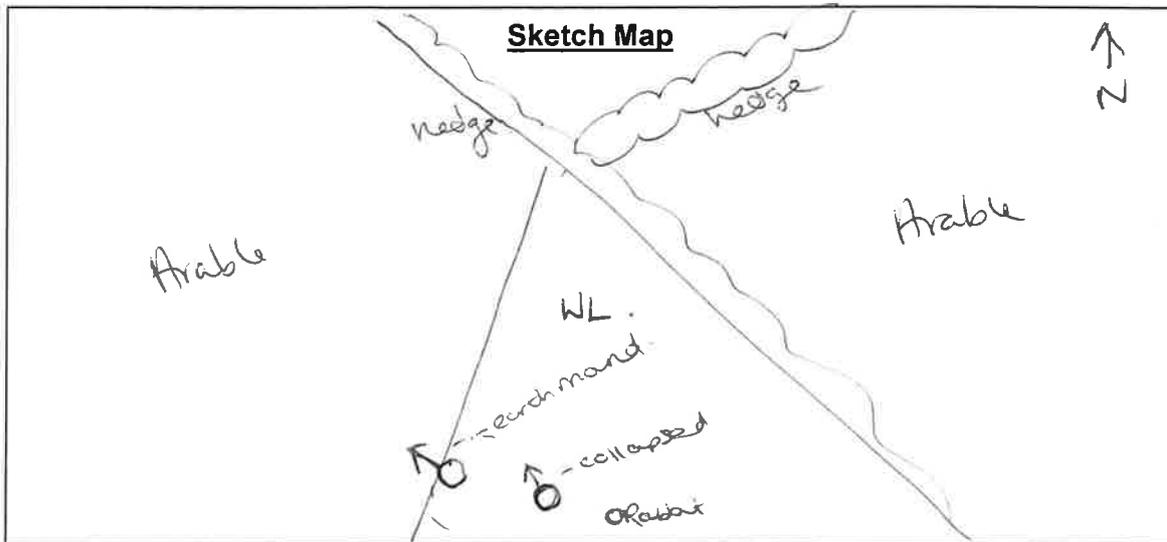
Notes: .....

**Signs of Occupation** Bedding    Hairs    Tracks    Dung Pits    Scratching

Notes: None - holes have not been used for some time. 1 collapsed. Other tunnel does narrow about 1m in but still quite wide

**Vulnerability** (i.e. ease of public access; obviousness; nearby development)

Notes: .....



Well used entrance     Disused entrance     Partially used entrance

# BADGER SETT RECORDING CARD

Site: Newport Pagnon

Sett ref: L

Date: 26/4/2019

Grid Reference: SP89671 40771

Surveyor HS

## Habitat

Woodland

Scrub

Hedge

Ditch

Field

Garden

Quarry

Embankment / Cutting

Conifer plantation

Other

Notes: holes on edge of arable field within grass margin and along ditch

## Number of Entrances

Well used     

Partially used 2

Disused     

Notes: Hole entrance characteristic of Badger but tunnels than travel in different directions

## Sett in Current Use

Yes

No

## Category of Sett

Main

(many holes with conspicuous spoil heaps, looks active. Well worn paths. Can be disused)

Annexe

(close to main (<150m) usually connected to it by well-worn paths)

Subsidiary

(few holes (3-5). At least 50m from main with no obvious paths)

Outlying

(one or two holes, used sporadically, no obvious paths)

Notes

Looks like tunnels

## Signs of Occupation

Bedding

Hairs

Tracks

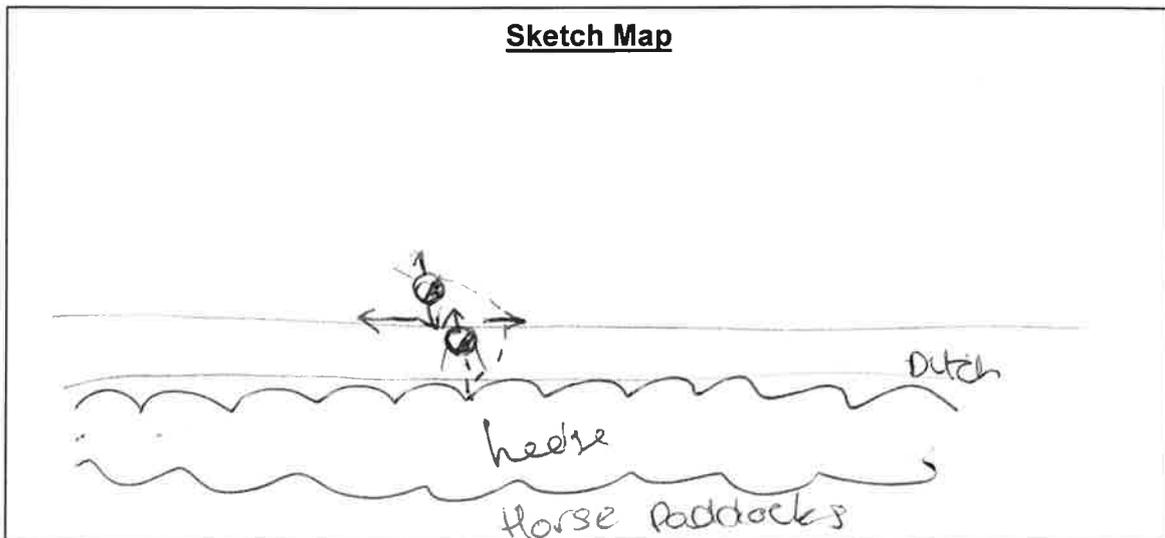
Dung Pits

Scratching

Notes: mammal paths leading through vegetation towards holes

## Vulnerability (i.e. ease of public access; obviousness; nearby development)

Notes



Well used entrance



Disused entrance



Partially used entrance

## **APPENDIX C**

### **Badger Sett Type Definitions**

## **Badger Sett Type Definitions**

*From: Harris, S., Cresswell, P. and Jefferies, D. (1989) Surveying Badgers. The Mammal Society, Bristol.*

In most cases each social group of Badgers has more than one sett in its territory, and these vary in status and level of use. Whenever there is a Badger problem in an area, it is essential to undertake a thorough survey to establish (i) how many social groups may be involved and (ii) the distribution and status of any setts being threatened. The extent of any problem depends on the type of sett under threat, and so the different types of Badger sett occupied by a single group of Badgers are described below.

**Main setts:** Normally each group of Badgers has only one main sett, and so by counting all the main setts in an area you can find out how many social groups of Badgers are present. Main setts usually have several holes with large spoil heaps, and the sett generally looks well used. There will be obvious paths to and from the sett and between sett entrances. In the British national Badger survey the average number of holes for a main sett was twelve, although main setts may be much smaller, even a single hole in exceptional circumstances. Although normally the breeding sett, and in continuous use, it is possible to find a main sett that has become disused due to excessive interference, illegal digging, tree felling or some other reason.

**Annexe setts:** these are often close to a main sett, normally less than 150 metres away, and are connected to the main sett by one or more obvious well worn paths. Usually they have several holes but may not be in use all the time, even if the main sett is very active. The average number of holes per annexe sett in the British survey was eight.

**Subsidiary setts:** These are usually at least 50 metres from a main sett, and do not have an obvious path connecting with another sett. They are not continuously active. The average number of holes per subsidiary sett in the British survey was four.

**Outlying setts:** These often have little spoil outside the holes, have no obvious path connecting them with another sett, and are only used sporadically. When not in use by Badgers, they are often taken over by foxes or even rabbits. However, they can still be recognised as Badger setts by the shape of the tunnel (not the actual entrance hole), which is at least 25 centimetres in diameter and rounded or a flattened oval shape (i.e. broader than high). Fox and Rabbit tunnels are smaller and often taller than broad. The average number of holes per outlying sett in the British survey was two.

Note: These sett definitions form part of a continuum, and setts do not always fit neatly into these categories.

# **Appendix 7 Wintering and Breeding Bird Assessment**



**MILTON KEYNES EAST  
BREEDING AND WINTERING BIRD ASSESSMENT**

**Prepared for St James**

**by**

**Hankinson Duckett Associates**

**HDA ref: 2090.52**

**February 2020**

**h** [REDACTED]  
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[REDACTED]  
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HDA Document Control and Quality Assurance Record

## **APPENDICES**

A	Site Location and Bird Survey Area Plan
B	Phase 1 Habitat Survey Plan and Target Notes (HDA, 2020)
C	Breeding Bird Survey Results Summary Table
D	Wintering Bird Survey Results Summary Table
E	Site Evaluation Methodology

## **1 INTRODUCTION**

### **1.1 Introduction and site description**

1.1.1 This report describes the results of breeding and wintering bird surveys carried out at approximately 362ha of land at Newport Pagnell, Buckinghamshire hereinafter referred to as 'the site'. The site centre is located by National Grid Reference SP 893 415. The study was commissioned by St James in September 2018.

1.1.2 The site is located to the south of Newport Pagnell, on the north-eastern edge of Milton Keynes, Buckinghamshire. The site is dominated by agricultural land comprising intensively managed arable and grazed grassland fields with associated farmyards, agricultural buildings and residential farm houses. Field boundaries generally consist of hedgerows, treelines and fencing with occasional ponds and parcels of woodland, and the River Ouzel flows from south to north through the western part of the site. The site is bordered to the north by a construction site for residential development and the A422 beyond which lies the town of Newport Pagnell; to the east by arable farmland; to the west by the Pineham Nature Reserve and the M1 Motorway beyond which lies the town of Milton Keynes; and to the south by arable farmland.

1.1.3 The location and boundary of the site are shown in *Appendix A*. Detailed descriptions of the habitats within the site are given in the Ecological Appraisal (HDA, 2020) and a Phase 1 Habitat Plan and detailed target notes are provided in *Appendix B*.

### **1.2 Development proposals**

1.2.1 Proposals for the site include mixed use development with associated landscaping and infrastructure.

### **1.3 Legislative context**

1.3.1 All species of bird are protected through Part 1, Sections 1 to 8, of the 1981 Wildlife and Countryside Act (as amended). Subject to the provisions of Part 1 it is an offence to:

- Intentionally kill, injure or take any wild bird;
- Take, damage or destroy the nest of any wild bird whilst that nest is in use or being built;
- Take or destroy an egg of any wild bird;
- Possess or be in control of any live or dead wild bird, or anything derived from such a bird; and/or
- Possess or be in control of an egg of a wild bird, or any part of such an egg.

1.3.2 In addition, selected species of particular nature conservation interest included in Schedule 1 of the Act are afforded a higher level of protection, with significantly higher

penalties applying where an offence is committed. In addition to the basic level of protection described above, it is an offence to:

- Intentionally disturb any wild bird included in Schedule 1 whilst it is building a nest or is in, on or near a nest containing eggs or young; and/or
- Disturb dependent young of such a bird.

1.3.3 Some bird species included on Annex 1 of the Council Directive 79/409 EEC on the Conservation of Wild Birds are afforded additional protection under the 2019 Conservation of Habitats and Species (Amendment) (EU Exit) Regulations. The 2019 Regulations allow for the setting up of Special Protection Areas (SPAs) where internationally important populations occur.

1.3.4 Many bird species are scarce and/or have undergone significant declines in recent years and these are listed as priority species on the UK Biodiversity Action Plan (BAP) and identified as Species of Principal Importance under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act. Section 40 of the NERC Act and planning policy requires that these bird species are a material consideration in the planning process.

1.3.5 The UKBAP and birds listed as Species of Principal Importance generally reflect those 'red listed' by the RSPB in their publication '*Birds of Conservation Concern*' (BoCC) (RSPB, 2015).

## **1.4 Scope and purpose of the report**

1.4.1 An initial site walkover identified potential for Birds of Conservation Concern (RSPB, 2015), Species of Principal Importance and species specially protected under Schedule 1 of the 1981 Wildlife and Countryside Act to occur within the site. Bird surveys were subsequently instructed in order to identify the assemblage of birds at the site and to inform the likely implications of the proposed development on breeding and wintering birds.

1.4.2 This report presents the findings of the wintering and breeding bird survey work and identifies:

- The bird species using the site;
- Their status (wintering, breeding or otherwise);
- The approximate number and distribution of species meeting nature conservation criteria;
- The nature conservation value of the site for breeding and wintering birds, and;
- The potential effects of the proposed development on the ornithological interest of the site.

## 2 DESK STUDY

### 2.1 Statutory Designated Sites

2.1.1 No internationally designated sites are located within 10km of the site and no nationally designated sites are located within 5km of the site.

#### Non-statutory designated areas

2.1.2 Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) provided details of two Local Wildlife Sites (LWS) within 2km of the site. These include:

- Willen Lake LWS located approximately 410m to the south of the site at its closest point. This 93.36ha LWS supports UK BAP Priority Habitats including lowland meadow and open water with associated habitats of swamp, tall-herb fen and flowing water. The LWS is also noted for its bird populations and supports significant non-breeding numbers of qualifying bird species including 61 species meeting BTO Birds of Conservation Concern (BoCC) criteria; and
- Tongwell Lake LWS located approximately 800m to the south-west of the site at its closest point. This 20.90ha LWS comprises a lake with fringing aquatic vegetation, woodland and amenity grassland and is noted for supporting a wide range of bird species particularly during the winter. Over 120 bird species have been recorded since 1974 including 8 species included on the BoCC Red list.

### 2.2 Existing bird records

2.2.1 BMERC provided 1061 bird records, pertaining to 126 bird species, for the desk study area. Table 1 below details the notable bird species recorded within 2km of the site:

**Table 1:** Notable bird species recorded within desk study area

Common Name	Scientific Name	Annex 1 <sup>1</sup>	WCA 1 <sup>2</sup>	NERC 41 <sup>3</sup>	BOCC4 (2015) <sup>4</sup>
Arctic Tern	<i>Sterna paradisaea</i>				Orange
Avocet	<i>Recurvirostra avosetta</i>				Orange
Barn Owl	<i>Tyto alba</i>				Green
Barnacle Goose	<i>Branta leucopsis</i>				Orange
Bar-tailed Godwit	<i>Limosa lapponica</i>				Orange
Bewick's Swan	<i>Cygnus columbianus</i> ssp. <i>bewickii</i>				Orange
Bittern	<i>Botaurus stellaris</i>				Orange
Black Redstart	<i>Phoenicurus ochruros</i>				Red
Black Tern	<i>Chlidonias niger</i>				Green
Black-headed Gull	<i>Chroicocephalus ridibundus</i>				Orange

Common Name	Scientific Name	Annex 1 <sup>1</sup>	WCA 1 <sup>2</sup>	NERC 41 <sup>3</sup>	BOCC4 (2015) <sup>4</sup>
Black-necked Grebe	<i>Podiceps nigricollis</i>				Orange
Black-tailed Godwit	<i>Limosa limosa</i>				Red
Brambling	<i>Fringilla montifringilla</i>				Green
Brent Goose	<i>Branta bernicla</i>				Orange
Bullfinch	<i>Pyrrhula pyrrhula</i>				Orange
Caspian Gull	<i>Larus cachinnans</i>				Orange
Cetti's Warbler	<i>Cettia cetti</i>				Green
Common Gull	<i>Larus canus</i>				Orange
Common Scoter	<i>Melanitta nigra</i>				Red
Common Tern	<i>Sterna hirundo</i>				Orange
Corn Bunting	<i>Emberiza calandra</i>				Red
Cuckoo	<i>Cuculus canorus</i>				Red
Curlew (Eurasian)	<i>Numenius arquata</i>				Red
Dartford Warbler	<i>Sylvia undata</i>				Orange
Dunlin	<i>Calidris alpina</i>				Orange
Dunnock	<i>Prunella modularis</i>				Orange
Fieldfare	<i>Turdus pilaris</i>				Red
Firecrest	<i>Regulus ignicapilla</i>				Green
Gadwall	<i>Anas strepera</i>				Orange
Gannet	<i>Morus bassanus</i>				Orange
Garganey	<i>Anas querquedula</i>				Orange
Glaucous Gull	<i>Larus hyperboreus</i>				Orange
Goldeneye	<i>Bucephala clangula</i>				Orange
Grasshopper Warbler	<i>Locustella naevia</i>				Red
Great B.b. Gull	<i>Larus marinus</i>				Orange
Green Sandpiper	<i>Tringa ochropus</i>				Orange
Greenshank	<i>Tringa nebularia</i>				Orange
Grey Partridge	<i>Perdix perdix</i>				Red
Grey Plover	<i>Pluvialis squatarola</i>				Orange
Grey Wagtail	<i>Motacilla cinerea</i>				Red
Greylag Goose	<i>Anser anser</i>				Orange
Hen Harrier	<i>Circus cyaneus</i>				Red
Herring Gull	<i>Larus argentatus</i>				Red
Hobby	<i>Falco subbuteo</i>				Green
House Martin	<i>Delichon urbicum</i>				Orange
House Sparrow	<i>Passer domesticus</i>				Red
Iceland Gull	<i>Larus glaucoides</i>				Orange
Kestrel	<i>Falco tinnunculus</i>				Orange
Kingfisher	<i>Alcedo atthis</i>				Orange
Kittiwake	<i>Rissa tridactyla</i>				Red
Knot	<i>Calidris canutus</i>				Orange
Lapwing	<i>Vanellus vanellus</i>				Red
Lesser B.b. Gull	<i>Larus fuscus</i>				Orange
Lesser Redpoll	<i>Carduelis cabaret</i>				Red
Lesser Sp. Woodpecker	<i>Dendrocopos minor</i>				Red

Common Name	Scientific Name	Annex 1 <sup>1</sup>	WCA 1 <sup>2</sup>	NERC 41 <sup>3</sup>	BOCC4 (2015) <sup>4</sup>
Linnet	<i>Carduelis cannabina</i>				
Little Gull	<i>Larus minutus</i>				
Little Ringed Plover	<i>Charadrius dubius</i>				
Little Tern	<i>Sternula albifrons</i>				
Mallard	<i>Anas platyrhynchos</i>				
Marsh Harrier	<i>Circus aeruginosus</i>				
Marsh Tit	<i>Poecile palustris</i>				
Meadow Pipit	<i>Anthus pratensis</i>				
Mealy (Common) Redpoll	<i>Carduelis flammea</i>				
Mediterranean Gull	<i>Larus melanocephalus</i>				
Merlin	<i>Falco columbarius</i>				
Mistle Thrush	<i>Turdus viscivorus</i>				
Mute Swan	<i>Cygnus olor</i>				
Nightingale	<i>Luscinia megarhynchos</i>				
Osprey	<i>Pandion haliaetus</i>				
Oystercatcher	<i>Haematopus ostralegus</i>				
Peregrine Falcon	<i>Falco peregrinus</i>				
Pied Flycatcher	<i>Ficedula hypoleuca</i>				
Pink-footed Goose	<i>Anser brachyrhynchus</i>				
Pintail	<i>Anas acuta</i>				
Pochard	<i>Aythya ferina</i>				
Red Kite	<i>Milvus milvus</i>				
Red-necked Grebe	<i>Podiceps grisegena</i>				
Red-necked Phalarope	<i>Phalaropus lobatus</i>				
Redshank	<i>Tringa totanus</i>				
Redstart	<i>Phoenicurus phoenicurus</i>				
Redwing	<i>Turdus iliacus</i>				
Reed Bunting	<i>Emberiza schoeniclus</i>				
Ring Ouzel	<i>Turdus torquatus</i>				
Ringed Plover	<i>Charadrius hiaticula</i>				
Ruff	<i>Calidris pugnax</i>				
Sanderling	<i>Calidris alba</i>				
Sandpiper (Common)	<i>Actitis hypoleucos</i>				
Scaup	<i>Aythya marila</i>				
Shag	<i>Phalacrocorax aristotelis</i>				
Shelduck	<i>Tadorna tadorna</i>				
Short-eared Owl	<i>Asio flammeus</i>				
Shoveler	<i>Anas clypeata</i>				
Skylark	<i>Alda arvensis</i>				

Common Name	Scientific Name	Annex I <sup>1</sup>	WCA 1 <sup>2</sup>	NERC 41 <sup>3</sup>	BOCC4 (2015) <sup>4</sup>
Slavonian Grebe	<i>Podiceps auritus</i>				Red
Smew	<i>Mergellus albellus</i>				Orange
Snipe	<i>Gallinago gallinago</i>				Orange
Song Thrush	<i>Turdus philomelos</i>				Red
Spoonbill	<i>Platalea leucorodia</i>				Orange
Spotted Flycatcher	<i>Muscicapa striata</i>				Red
Spotted Redshank	<i>Tringa erythropus</i>				Orange
Starling	<i>Sturnus vulgaris</i>				Red
Stock Dove	<i>Columba oenas</i>				Orange
Swift	<i>Apus apus</i>				Orange
Tawny Owl	<i>Strix aluco</i>				Orange
Teal	<i>Anas crecca</i>				Orange
Temminck's Stint	<i>Calidris temminckii</i>				White
Tree Pipit	<i>Anthus trivialis</i>				Red
Tree Sparrow	<i>Passer montanus</i>				Red
Turnstone	<i>Arenaria interpres</i>				Orange
Turtle Dove	<i>Streptopelia turtur</i>				Red
Velvet Scoter	<i>Melanitta fusca</i>				Green
Whimbrel	<i>Numerius phaeopus</i>				Red
Whinchat	<i>Saxicola rubetra</i>				Red
White-fronted Goose	<i>Anser albifrons</i>				Red
Whooper Swan	<i>Cygnus cygnus</i>				Orange
Wigeon	<i>Anas penelope</i>				Orange
Willow Tit	<i>Poecile montanus/montana</i>				Red
Willow Warbler	<i>Phylloscopus trochilus</i>				Orange
Wood Sandpiper	<i>Tringa glareola</i>				Orange
Wood Warbler	<i>Phylloscopus sibilatrix</i>				Red
Woodcock	<i>Scolopax rusticola</i>				Red
Wryneck	<i>Jynx torquilla</i>				White
Yellow Wagtail	<i>Motacilla flava</i>				Red
Yellowhammer	<i>Emberiza citrinella</i>				Red
Yellow-legged Gull	<i>Larus michahellis</i>				Orange

Notes:

1 Species listed in Annex I of Council Directive 79/409/EEC on the conservation of wild birds

2 Species specially protected under Schedule 1 of the 1981 Wildlife and Countryside Act

3 Species included in the UK Biodiversity Action Plan and of Principal Importance under the 2006 NERC Act

4 Species included in the Birds of Conservation Concern Red and Amber lists (RSPB, 2015)

### 3 METHODOLOGY

#### 3.1 Field survey

3.1.1 Both wintering and breeding bird surveys were carried out to inform the ornithological assessment of the site. The methodologies for the breeding and wintering bird surveys undertaken are described below. Due to the large size of the site, the site was divided

into 6 survey areas which were surveyed simultaneously by up to 3 surveyors on each survey visit. A plan showing the survey areas is provided in *Appendix A*.

### 3.1.2 Wintering bird survey

3.1.2.1 The field survey methodology used for the wintering bird survey broadly followed the territory mapping methods outlined by Bibby, Burgess, Hill & Mustoe (2000) carried out over 5 visits.

3.1.2.2 On each visit a route was followed that allowed all parts of the site and immediately adjacent habitat to be surveyed. The area covered by the wintering bird survey is shown in *Appendix A*. To avoid bias, routes were varied slightly from visit to visit. The survey visits were carried out by Adrian Meurer, Anna Senior and Hayley Snowdon of HDA, with all aural or visual bird encounters noted. In addition, other notable evidence of birds, such as raptor kills and owl pellets, was searched for and recorded during the survey.

3.1.2.3 Where species meeting the nature conservation criteria given in *Section 3.3.1* below were recorded these were mapped using standard BTO notation. Birds not meeting the nature conservation criteria were simply recorded as present and a subjective assessment of abundance was made.

#### *Timing of visits*

3.1.2.4 Surveys were generally carried out in dry and bright weather conditions with low winds, thereby maximising the opportunity to record bird activity. The time, date and weather conditions for each visit are shown in *Table 2*.

**Table 2:** Wintering bird survey timings and weather conditions

Visit	Visit dates	Time	Weather conditions
1	12 <sup>th</sup> November 2018	08:00 – 13:00	10-15°C, partially overcast (30-50% cloud) with sunny spells, dry, light breeze.
2	4 <sup>th</sup> December 2018	08:20 – 13:00	0-4°C, clear skies (<5% cloud), dry, still.
3	21 <sup>st</sup> January 2019/ 23 <sup>rd</sup> January 2019	08:30 – 13:45 / 10:45-13:45	2°C, overcast (90% cloud) at start becoming clearer from 11am, dry, light breeze / 0-2°C clear skies, dry, light breeze.
4	27 <sup>th</sup> February 2019	07:10 – 15:40	1-17°C, clear skies (<5% cloud), dry, very light breeze, frost on ground.
5	19 <sup>th</sup> March 2019	06:50 – 14:30	7-12°C, mostly overcast (80-90% cloud), dry, breeze.

3.1.2.5 Approximately 48 hours were spent recording birds over the 5 visits for the wintering bird survey.

### 3.1.3 Breeding bird survey

3.1.3.1 The field survey methodology used for the breeding bird survey broadly followed the territory mapping methods outlined by Bibby, Burgess, Hill & Mustoe (2000) carried out over 5 visits.

3.1.3.2 On each visit a route was followed that allowed all parts of the site and adjacent land to be surveyed. The area covered by the breeding bird survey is shown in *Appendix A*. To avoid bias, routes were varied slightly from visit to visit. The survey was carried out by Hayley Snowdon and Anna Potter of HDA, with all aural or visual bird encounters noted. In addition, other notable evidence of birds, such as raptor kills and owl pellets, was searched for and recorded during the survey.

3.1.3.3 Where species meeting the nature conservation criteria given in *Section 3.3.1* below were recorded these were mapped using standard BTO notation. Particular attention was given to recording evidence of breeding (e.g. song, display or territorial disputes) and recording different individuals of the same species simultaneously, indicating separate breeding territories. Birds not meeting the nature conservation criteria were simply recorded as present and a subjective assessment of abundance was made.

#### *Timing of visits*

3.1.3.4 Surveys were generally carried out in dry and bright weather conditions with low winds, thereby maximising the opportunity to record bird activity. All visits were timed to coincide with highest periods of bird activity (i.e. avoiding early afternoon) and included a visit during the peak breeding season for most species. The time, date and weather conditions for each visit are shown in *Table 3*.

**Table 3:** Breeding bird survey timings and weather conditions

Visit	Visit dates	Time	Weather conditions
1	29 <sup>th</sup> April 2019	07:30 – 13:15	6-12°C, clear skies (100% cloud), dry, light breeze.
2	24 <sup>th</sup> May 2019	07:30 – 15:00	12-21°C, clear skies (0% cloud), dry, bright, calm.
3	3 <sup>rd</sup> June 2019	08:00 – 17:00	12-20°C, partially overcast (10-80% cloud), dry, light breeze.
4	18 <sup>th</sup> June 2019	06:30 – 15:00	11-23°C, partially overcast (40-100% cloud), mostly dry with a single short period of drizzle, calm, humid.
5	9 <sup>th</sup> July 2019	10:30 – 17:15	19-21°C, overcast (100% cloud), dry, light breeze.

3.1.3.5 Approximately 65 hours were spent recording birds over the 5 visits for the breeding bird survey.

### **3.2 Interpretation of territory mapping results**

3.2.1 Interpretation of the breeding bird field survey data follows the guidelines given for the territory mapping method in Bibby, Burgess, Hill and Mustoe (2000).

3.2.2 For territorial bird species of nature conservation interest, during the breeding bird survey the presence of a species in the same location on a minimum of two visits is generally taken to constitute a breeding pair, although in some instances a cautious approach has been applied when estimating the number of breeding pairs. For other species alternative measures were applied again following Bibby, Burgess, Hill & Mustoe (2000). All species recorded at the boundaries of the site have been included within the analysis.

### **3.3 Conservation evaluation**

3.3.1 The ornithological importance of the site is assessed in two ways.

3.3.2 Firstly the conservation status of individual species is assessed by reference to the following criteria:

- Species listed on Annex 1 of the EU Birds Directive (Codified version: 2009/147/EC) (EC, 2009);
- Species specially protected under Schedule 1 of the 1981 Wildlife and Countryside Act (HMSO, 1981);
- Species included in the Birds of Conservation Concern red and amber lists (RSPB, 2015); and
- Species included in the UK Biodiversity Action Plan (BAP) / Species of Principal Importance identified under the Natural Environment and Rural Communities (NERC) Act 2006.

3.3.2 Secondly, the species assemblage of all birds is assessed with regard to published guidance on: (a) the selection of biological Sites of Special Scientific Interest (SSSIs) (*Appendix E: Drewitt et al., 2015*); and (b) Criteria for the Selection of Local Wildlife Sites in Berkshire, Buckinghamshire and Oxfordshire (TVERC and BMERC, 2009).

### **3.4 Limitations**

3.4.1 A short period of precipitation was recorded during the fourth breeding bird survey. This was not found to have significantly affected levels of bird activity in the vicinity of the surveyors and as such is not considered a significant constraint to the findings of the breeding bird surveys.

3.4.2 The third wintering bird survey was carried out over two days due to surveyor availability. This may have resulted in an occasional double counting or under-recording of birds in some areas, where individuals or small groups moved to different areas of the site

between the surveys. This was taken into consideration during the analysis of the results and is not considered to be a significant limitation in this instance.

3.4.3 On a small number of occasions noise disturbance was experienced in the southern area of the site, including the flying of model aircraft and the use of sound cannons. These were not found to have caused a significant effect on the levels of bird activity in the vicinity of these areas and are not considered a significant constraint to the findings of the bird surveys.

3.4.4 No other constraints were encountered during the survey and it is considered that the survey findings allow a robust assessment of the likely importance of the site for breeding and wintering birds.

## 4 RESULTS

### 4.1 Wintering bird survey

4.1.1 A total of 58 bird species were recorded during the wintering bird survey, of which 55 were recorded directly from habitat associated with the site or immediately adjacent to the site (rather than simply flying over). A complete list of birds recorded during the wintering bird survey and a description of their distribution across the site is given in *Appendix D. Table 4* lists all species recorded in association with the site, together with an indication of the maximum number of individuals of species of conservation interest recorded using the site on any one visit.

**Table 4:** Wintering bird species at Land East of Milton Keynes: 12<sup>th</sup> November 2018 - 19<sup>th</sup> March 2019

Common Name	Latin Name	Notes on Occurrence
Mute Swan	<i>Cygnus olor</i>	Individuals and pairs recorded within the River Ouzel channel in the western area of the site, with up to eight individuals recorded on any one occasion. Small groups also recorded flying over the site.
Greylag Goose	<i>Anser anser</i>	Two individuals recorded adjacent to the river channel in the western area of the site during the fourth survey visit.
Canada Goose	<i>Branta canadensis</i>	Up to four individuals recorded on three of the survey visits, associated with the river corridor in the west of the site.
Mallard	<i>Anas platyrhynchos</i>	Up to two individuals recorded using the river corridor during three of the survey visits. A group of six individuals was recorded flying over the site on the third visit.

Common Name	Latin Name	Notes on Occurrence
Red-legged Partridge	<i>Alectoris rufa</i>	Small groups and individuals recorded in the central and southern areas of the site during the first, third and fifth surveys.
Grey Partridge	<i>Perdix perdix</i>	Eight individuals recorded foraging in the north-western area of the site on the first survey only. The birds flew off to the west outside of the site boundary.
Pheasant	<i>Phasianus colchicus</i>	Up to 12 individuals recorded across the site during all surveys.
Cormorant	<i>Phalacrocorax carbo</i>	One individual recorded flying over the west of the site on the first survey and one individual recorded in the river corridor on the third survey.
Red Kite	<i>Milvus milvus</i>	One individual recorded foraging over the site on the second survey and two individuals recorded foraging over the site on the fifth survey.
Sparrowhawk	<i>Accipiter nisus</i>	Individual recorded on two occasions, associated with the western and central areas of the site.
Buzzard (Common)	<i>Buteo buteo</i>	At least three individuals recorded foraging over the site on each survey visit, with up to 6 individuals recorded foraging across the site during the third and fourth survey visits.
Moorhen	<i>Gallinula chloropus</i>	Individual recorded during the fifth survey along the river corridor in the west of the site.
Lapwing	<i>Vanellus vanellus</i>	Individuals and small groups recorded during all surveys other than the first, with a maximum count of 22 individuals recorded in the south of the site during the second survey visit.
Woodcock	<i>Scolopax rusticola</i>	Individual recorded below a hedgerow in the southern area of the site on a single occasion during the second survey visit.
Snipe	<i>Gallinago gallinago</i>	Individual recorded on a single occasion during the third survey visit in association with a hedgerow in the central area of the site.
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	At least 10 individuals recorded flying over the site or foraging in fields on the first four survey visits. A maximum count of 88 individuals recorded during the second survey visit.
Feral Pigeon	<i>Columba livia</i> (domest.)	Five individuals recorded on the fourth survey.
Stock Dove	<i>Columba oenas</i>	Two individuals recorded in association with hedgerows in the northern area of the site during the first survey visit.

Common Name	Latin Name	Notes on Occurrence
Woodpigeon	<i>Columba palumbus</i>	Groups and individuals recorded across the site with a maximum count of 210 individuals across the site during the third survey.
Collared Dove	<i>Streptopelia decaocto</i>	Five individuals recorded on the fifth survey located within the northern and southern areas of the site.
Kingfisher	<i>Alcedo atthis</i>	Individual recorded during the first and fifth survey visits along the river corridor in the west of the site.
Green Woodpecker	<i>Picus viridis</i>	Up to four individuals recorded on three of the survey visits.
Great Spotted Woodpecker	<i>Dendrocopos major</i>	Up to four individuals recorded across the site during the first four surveys.
Kestrel	<i>Falco tinnunculus</i>	Individual recorded on three occasions foraging within the western, central and southern areas of the site.
Magpie	<i>Pica pica</i>	Up to 20 individuals recorded across the site during all survey visits.
Jackdaw	<i>Corvus monedula</i>	Individuals and small groups recorded across the site during all survey visits other than the first, with a maximum count of 35 individuals.
Rook	<i>Corvus fruilegus</i>	Groups and individuals recorded across all areas of the site, with a maximum count of 163 individuals recorded during the first survey.
Carrion Crow	<i>Corvus corone</i>	Up to 34 individuals recorded across the site on each survey visit.
Blue Tit	<i>Parus caeruleus</i>	Up to 57 individuals recorded on any one survey in association with hedgerow and woodland habitats.
Great Tit	<i>Parus major</i>	Up to 57 individuals recorded on any one survey in association with hedgerow and woodland habitats.
Skylark	<i>Alauda arvensis</i>	Individuals and small groups recorded across the site in association with arable fields. A maximum count of 44 individuals was recorded across the site during the fourth survey visit.
Long-tailed Tit	<i>Aegithalos caudatus</i>	12 individuals recorded in the southern area of the site during the first survey.
Chiffchaff	<i>Phylloscopus collybita</i>	One individual recorded on the fifth survey in the western area of the site.
Willow Warbler	<i>Phylloscopus trochilus</i>	One individual recorded within Pineham Nature Reserve immediately adjacent to the south of the site.
Reed Warbler	<i>Acrocephalus scirpaceus</i>	Two individuals recorded adjacent to the river in the western area of the site.
Wren	<i>Troglodytes troglodytes</i>	Up to 14 individuals recorded across the site on all survey visits.

Common Name	Latin Name	Notes on Occurrence
Starling	<i>Sturnus vulgaris</i>	Small group of 12 individuals recorded in the western area of the site in association with grassland on the first survey visit and a pair recorded in association with farm buildings in the southern area of the site during the fifth survey visit.
Blackbird	<i>Turdus merula</i>	At least 27 individuals recorded across the site on each visit in association with hedgerow and woodland habitats. A maximum count of 47 individuals was recorded across the site on the fourth survey visit.
Fieldfare	<i>Turdus pilaris</i>	Groups recorded across the site in association with arable fields and hedgerows. Groups ranging in size from 40 - 150 individuals recorded during the first and second surveys, with a maximum count of 212 individuals recorded across the site on the second survey. Up to five individuals recorded on the third and fifth surveys in the southern area of the site only.
Song Thrush	<i>Turdus philomelos</i>	Individuals recorded across the site in association with hedgerows and woodland. At least one individual was recorded during each survey with a maximum count of six individuals recorded across the site on the fourth survey visit.
Redwing	<i>Turdus iliacus</i>	Small groups recorded across farmland habitats during all surveys other than the first. Up to 50 individuals recorded across the site during a single survey visit.
Mistle Thrush	<i>Turdus viscivorus</i>	Small numbers of individuals recorded across the site during the fourth and fifth surveys. A maximum count of five individuals was recorded during the fifth survey.
Robin	<i>Erithacus rubecula</i>	At least 17 individuals recorded across the site on each visit.
Wheatear	<i>Oenanthe oenanthe</i>	Two individuals recorded in the central area of the site during the third and fourth survey visits and two individuals recorded in the northern area of the site during the fourth survey visit.
Dunnock	<i>Prunella modularis</i>	Up to 15 individuals recorded in association with hedgerows across the site during all survey visits.
House Sparrow	<i>Passer domesticus</i>	Six individuals recorded in the west of the site during the second survey visit and two individuals recorded in the south of the site during the third survey visit.

Common Name	Latin Name	Notes on Occurrence
Pied Wagtail	<i>Motacilla alba</i>	Small groups and individuals recorded across the site during all surveys, with up to 29 individuals recorded on a single survey.
Chaffinch	<i>Fringilla coelebs</i>	Up to 110 individuals recorded across the site on each survey visit.
Bullfinch	<i>Pyrrhula pyrrhula</i>	Three individuals recorded on the first survey visit only, located in the central and southern areas of the site.
Greenfinch	<i>Carduelis chloris</i>	Up to four individuals recorded across the site during the majority of survey visits.
Linnet	<i>Carduelis cannabina</i>	Up to 29 individuals recorded across the site during all survey visits. This species was recorded most consistently in the northern area of the site in association with hedgerows, but was recorded in all areas of the site on at least one occasion.
Goldfinch	<i>Carduelis carduelis</i>	Up to 50 individuals recorded across the site on each survey visit.
Siskin	<i>Carduelis spinus</i>	Five individuals recorded in the northern area of the site during the third survey visit.
Yellowhammer	<i>Emberiza citrinella</i>	A minimum of five individuals recorded across the site during all surveys other than the second. A maximum count of fourteen individuals was recorded during the fifth survey visit.
Reed Bunting	<i>Emberiza schoeniclus</i>	Low numbers of individuals recorded in the western areas of the site during the third, fourth and fifth surveys. A maximum count of nine individuals was recorded on the fifth survey.

4.1.2 In addition to the above, a further three species including Common Gull, Lesser Black-backed Gull and Herring Gull were recorded simply flying over the site on an occasional basis.

## 4.2 Breeding bird survey

4.2.1 A total of 54 bird species were recorded during the breeding bird survey, of which 39 are considered to be either breeding or hold a significant proportion of a breeding territory (either wholly or in part) in association with the site. A complete list of recorded birds and a description of their distribution across the site is given in *Appendix C. Table 5* lists all species thought to hold significant breeding territories within the site. For species meeting nature conservation criteria, *Table 5* also provides an estimate of the number of breeding territories or pairs of each species within the site. For species not meeting

nature conservation criteria, a simple estimate of abundance has been made (Abundant/Frequent/Occasional/Rare).

**Table 5:** Breeding bird species at Milton Keynes East: 29<sup>th</sup> April - 9<sup>th</sup> July 2019

Common Name	Scientific Name	Notes On Breeding/ Occurrence	No. Territories/ Breeding Pairs Associated With Site*
Mute Swan	<i>Cygnus olor</i>	Adult and juvenile recorded in river corridor on a number of survey visits. Likely 1 breeding pair within the site.	1
Mallard	<i>Anas platyrhynchos</i>	Small numbers of pairs/ individuals recorded within the river corridor in the west of the site and flying over the site. At least one pair likely breeding within the site.	1
Red-legged Partridge	<i>Alectoris rufa</i>	Occasional: Small numbers of pairs/ individuals recorded in association with arable habitats across the site. Likely breeding within the site.	n/a
Pheasant	<i>Phasianus colchicus</i>	Occasional: Individuals and pairs recorded on an occasional basis in association with farmland habitats across the site. Likely breeding within the site.	n/a
Red Kite	<i>Milvus milvus</i>	Pairs and individuals recorded foraging over the site on most survey visits. Likely hold part of a breeding territory within the site with nest in an off-site location.	1 (part of breeding territory)
Buzzard (Common)	<i>Buteo buteo</i>	Frequent: Individuals and small groups recorded foraging over site on all surveys. Adult with juveniles recorded on one survey indicating this species is likely breeding within or in close vicinity of the site.	n/a
Barn Owl	<i>Tyto alba</i>	One breeding territory within the site, potentially nesting in an undetermined building or hollow tree within or close to the site. Recorded foraging across farmland habitats across the site during the bat activity survey.	1
Lapwing	<i>Vanellus vanellus</i>	Up to four breeding territories recorded in association with the arable farmland habitats in the western and north-eastern areas of the site.	Up to 4
Woodpigeon	<i>Columba palumbus</i>	Abundant: High numbers of pairs/small groups recorded foraging within farmland habitats across the site.	n/a
Collared Dove	<i>Streptopelia decaocto</i>	Rare: Pairs recorded on an occasional basis within the site. Likely breeding within site.	n/a

Common Name	Scientific Name	Notes On Breeding/ Occurrence	No. Territories/ Breeding Pairs Associated With Site*
Green Woodpecker	<i>Picus viridis</i>	Occasional: Individual recorded on most survey visits in the western area of the site, with three individuals recorded on the fourth survey visit in the central area of the site. Likely breeding in small numbers within the site.	n/a
Magpie	<i>Pica pica</i>	Frequent: Pairs and individuals regularly recorded across the site. Likely breeding within the site.	n/a
Jackdaw	<i>Corvus monedula</i>	Abundant: Small groups recorded across the site during all survey visits. Highly likely to be breeding within the site near the Moulsoe buildings, where highest numbers were recorded.	n/a
Rook	<i>Corvus fruilegus</i>	Frequent: Large numbers of pairs/ small groups recorded foraging in association with woodland, grassland and farmland habitats across the site.	n/a
Carrion Crow	<i>Corvus corone</i>	Frequent: Small groups and pairs regularly recorded foraging throughout the site and on land immediately adjacent to the site. Highly likely breeding within site.	n/a
Blue Tit	<i>Parus caeruleus</i>	Abundant: Small groups and pairs regularly recorded foraging throughout the site and on land immediately adjacent to the site. Highly likely that a large number of breeding pairs are present within the site.	n/a
Great Tit	<i>Parus major</i>	Abundant: Small groups and pairs regularly recorded foraging throughout the site and on land immediately adjacent to the site. Highly likely that a large number of breeding pairs are present within the site.	n/a
Skylark	<i>Alauda arvensis</i>	Up to 41 breeding territories associated with arable and grassland fields across all areas of the site.	Up to 41
Long-tailed Tit	<i>Aegithalos caudatus</i>	Frequent: Small groups recorded in association with hedgerow, tree and woodland habitats across the site. Likely breeding within the site.	n/a
Chiffchaff	<i>Phylloscopus collybita</i>	Rare: Low numbers of individuals recorded within the site. Likely breeding within site.	n/a

Common Name	Scientific Name	Notes On Breeding/ Occurrence	No. Territories/ Breeding Pairs Associated With Site*
Blackcap	<i>Sylvia atricapilla</i>	Occasional: Individuals recorded occasionally within the site, with highest numbers recorded in the west of the site. Highly likely a small number of breeding territories are present within the site.	n/a
Whitethroat	<i>Sylvia communis</i>	Frequent: Moderate numbers of individuals recorded in association with hedgerow habitats across the site. Likely breeding within the site.	n/a
Sedge Warbler	<i>Acrocephalus schoenobaenus</i>	Three individuals recorded on a single survey in association with vegetation along the river corridor in the west of the site. Possibly breeding within site.	n/a
Wren	<i>Troglodytes troglodytes</i>	Frequent: Low-moderate numbers of individuals recorded in association with hedgerow and woodland habitats across the site. Likely breeding within the site.	n/a
Starling	<i>Sturnus vulgaris</i>	At least one breeding pair within the site, with four juveniles recorded within the western-most area of the site. Individuals also recorded in central area of the site.	1
Blackbird	<i>Turdus merula</i>	Abundant: Pairs and individuals recorded in association with hedgerow and woodland habitats across the site on all surveys.	n/a
Song Thrush	<i>Turdus philomelos</i>	Up to 4 breeding pairs in association with woodland in the south-eastern area of the site and hedgerows in the north-eastern area of the site.	Up to 4
Robin	<i>Erithacus rubecula</i>	Frequent: Regularly recorded in association with hedgerow and woodland habitat across the site.	
Dunnock	<i>Prunella modularis</i>	Up to 31 breeding territories in association with hedgerow habitats located across the site.	Up to 31
House Sparrow	<i>Passer domesticus</i>	Up to twenty-six breeding territories recorded in association with hedgerow habitats close to buildings within the site.	Up to 26

Common Name	Scientific Name	Notes On Breeding/ Occurrence	No. Territories/ Breeding Pairs Associated With Site*
Yellow Wagtail	<i>Motacilla flava</i>	At least two breeding territories; one in the central area of the site and one in the western area of the site. Pairs and individuals were also recorded foraging in the central area of the site and the south-western area of the site but were not displaying breeding behaviour at the time of these surveys.	At least 2
Pied Wagtail	<i>Motacilla alba</i>	Occasional: Small numbers of pairs/ individuals recorded in association with grazed grassland habitats on an occasional basis. Likely breeding within the site.	n/a
Chaffinch	<i>Fringilla coelebs</i>	Frequent: Small groups recorded foraging within hedgerows across the site on a regular basis.	n/a
Bullfinch	<i>Pyrrhula pyrrhula</i>	Up to one breeding pair associated with hedgerow and farmland habitat within the western area of the site.	1
Greenfinch	<i>Carduelis chloris</i>	Occasional: Individuals and small groups recorded on most surveys within the central-eastern and south-eastern areas of the site. Likely breeding in small numbers within the site.	n/a
Linnet	<i>Carduelis cannabina</i>	Up to nine breeding territories associated with hedgerows along arable fields in the eastern areas of the site.	Up to 9
Goldfinch	<i>Carduelis carduelis</i>	Frequent: Pairs and small groups recorded across the site on all of survey visits.	n/a
Yellowhammer	<i>Emberiza citrinella</i>	Up to 42 breeding territories recorded in association with hedgerows across the site.	42
Reed Bunting	<i>Emberiza schoeniclus</i>	Up to six breeding pairs recorded in association with vegetation along the river corridor or within neighbouring fields in the west of the site.	Up to 6

\*Only species meeting nature conservation criteria holding significant breeding territory over the site are considered in this column.

4.2.2 A further 13 species, not including species simply flying over, were also recorded using land within the site during the breeding bird survey which are considered unlikely to breed or hold distinct territories over the site but may be breeding within the vicinity of the site. These include species either recorded as single birds, during one survey visit only, or in unsuitable breeding habitat. Such records may relate to species breeding nearby

and using the site on an occasional basis for feeding, loafing, etc. *Table 6* below details these species.

**Table 6:** Non-breeding bird species at Milton Keynes East: 29th April - 9th July 2019

Common Name	Scientific Name	NOTES ON BREEDING/ OCCURRENCE
Canada Goose	<i>Branta canadensis</i>	Rare: Small number of individuals recorded foraging or flying over the site on an occasional basis. Likely breeding in the vicinity of the site.
Grey Heron	<i>Ardea cinerea</i>	Rare: Individual recorded on a single occasion in association with the river corridor in the west of the site. Likely to be breeding in close vicinity of the site.
Sparrowhawk	<i>Accipiter nisus</i>	Rare: Individual recorded on a single occasion within the central area of the site near the Moulsoe Buildings. Unlikely breeding within the site.
Moorhen	<i>Gallinula chloropus</i>	Rare: Individual recorded on a single occasion within the pond in the east of the site. Unlikely breeding within the site.
Feral Pigeon	<i>Columba livia</i> (domest.)	Rare: Low numbers recorded foraging over site on a single occasion.
Swift	<i>Apus apus</i>	Individuals recorded flying over the site on three occasions. Unlikely breeding within the site.
Great Spotted Woodpecker	<i>Dendrocopos major</i>	Rare: Individual recorded on two occasions. Likely breeding in the vicinity of the site.
Kestrel	<i>Falco tinnunculus</i>	Rare: Individual recorded foraging within the south-eastern area of the site on a single occasion. Likely breeding in the vicinity of the site.
Swallow	<i>Hirundo rustica</i>	Frequent: Moderate numbers of pairs/ small groups recorded foraging over arable fields. No nest sites recorded.
Reed Warbler	<i>Acrocephalus scirpaceus</i>	Rare: Individual recorded on a single occasion in association with the river corridor in the west of the site. Unlikely to be breeding within site.
Nuthatch	<i>Sitta europaea</i>	Rare: Individual recorded on a single occasion in the north of the site.
Grey Wagtail	<i>Motacilla cinerea</i>	Rare: Individual recorded on a single survey in the central area of the site. Unlikely breeding within the site.
Meadow Pipit	<i>Anthus pratensis</i>	Rare: Individuals recorded in association with arable farmland habitat on a small number of occasions in the western area of the site and the south-eastern area of the site.

## 5 EVALUATION

### 5.1 Importance of individual species

#### 5.1.2 Wintering bird survey

5.1.2.1 *Table 7* below lists the species recorded using the site during the wintering bird survey which meet at least one of a range of criteria relating to statutory protection or conservation importance. Species simply recorded as flying over are excluded from the list.

**Table 7:** Species recorded using the site during the wintering bird survey that meet at least one of a range of criteria relating to statutory protection or conservation importance.

COMMON NAME	LATIN NAME	Annex 1 Directive 2009/247/EC	Sched. 1 W&C Act 1982	UK BAP/ Sec.41 NERC Act.	BoCC 2015 (Red/ Amber/ Green/ No status)
Mute Swan	<i>Cygnus olor</i>				Amber
Greylag Goose	<i>Anser anser</i>				Amber
Mallard	<i>Anas platyrhynchos</i>				Amber
Grey Partridge	<i>Perdix perdix</i>				Red
Red Kite	<i>Milvus milvus</i>				Green
Lapwing	<i>Vanellus vanellus</i>				Red
Woodcock	<i>Scolopax rusticola</i>				Red
Snipe	<i>Gallinago gallinago</i>				Amber
Black-headed Gull	<i>Chroicocephalus ridibundus</i>				Amber
Stock Dove	<i>Columba oenas</i>				Amber
Kingfisher	<i>Alcedo atthis</i>				Amber
Kestrel	<i>Falco tinnunculus</i>				Amber
Skylark	<i>Alauda arvensis</i>				Red
Willow Warbler	<i>Phylloscopus trochilus</i>				Amber
Starling	<i>Sturnus vulgaris</i>				Red
Fieldfare	<i>Turdus pilaris</i>				Red
Song Thrush	<i>Turdus philomelos</i>				Red
Redwing	<i>Turdus iliacus</i>				Red
Mistle Thrush	<i>Turdus viscivorus</i>				Red
Dunnock	<i>Prunella modularis</i>				Amber
House Sparrow	<i>Passer domesticus</i>				Red
Bullfinch	<i>Pyrrhula pyrrhula</i>				Amber
Linnet	<i>Carduelis cannabina</i>				Red
Yellowhammer	<i>Emberiza citrinella</i>				Red
Reed Bunting	<i>Emberiza schoeniclus</i>				Amber

Notes on Table 7:

- 1 Species listed on Annex 1 of the EU Birds Directive (Codified version: 2009/147/EC) (EC, 2009). For the conservation of these species the 2019 Conservation of Habitats and Species (Amendment) EU Exit Regulations provides for the setting up of Special Protection Areas (SPAs) where internationally important populations exist.
- 2 Species specially protected by Schedule 1 of the 1981 Wildlife and Countryside Act (as amended).
- 3 Priority Species included in the UK Biodiversity Action Plan (BAP) / Species of Principal Importance under the 2006 Natural Environment and Rural Communities (NERC) Act.
- 4 Species included in the Birds of Conservation Concern 4 red and amber lists (RSPB, 2015). Red list – rapidly declining species and species of global conservation concern. Amber list – moderately declining species, rare breeders, internationally important and localised species, and those with an unfavourable conservation status in Europe.

- 5.1.2.2 Two species included on Annex 1 of the EU Birds Directive were recorded during the wintering bird survey, namely Red Kite and Kingfisher. Annex 1 species are those that are considered to be in danger of extinction; vulnerable to changes in their habitat; considered rare because of small populations or restricted local distribution; and/or require particular attention for reasons of the specific nature of habitat. For these species their most suitable territories must be conserved as Special Protection Areas (SPAs). As such consideration has been given to whether the site forms an internationally important area for the maintenance of the UK population of these species, either in isolation or in combination with adjacent land.
- 5.1.2.3 In recent years the Red Kite has become relatively common and widespread within its UK range, having an expanding population following recent reintroductions in association with common and widespread habitats, and has subsequently been relisted as being of 'Green' status (i.e. of least concern) under BoCC4 (RSPB, 2015). It is therefore extremely unlikely that the site would qualify as a SPA for this species, either in isolation or as part of a wider protected area.
- 5.1.2.4 Kingfishers are considered widespread in central and southern England with approximately 3,600–6,100 breeding pairs recorded throughout the UK. An individual Kingfisher was recorded on two occasions in association with the river corridor in the west of the site during the wintering bird surveys and Kingfisher were not considered to be breeding at the site during the breeding surveys, with no records of this species being made. As such, it is therefore extremely unlikely that the site would qualify as a SPA for this species, either in isolation or as part of a wider protected area.
- 5.1.2.5 In addition, Red Kite and Kingfisher are also included on Schedule 1 of the 1981 Wildlife and Countryside Act (as amended) and receive additional protection against disturbance of active nest sites relative to other breeding birds. No sightings of Kingfisher were recorded during the breeding bird survey and it is unlikely this species is breeding at the site, and although Red Kites were recorded foraging within the site during the breeding bird survey no breeding behaviour was recorded. As such, the additional protection afforded to these species is unlikely to apply at the Milton Keynes East site.
- 5.1.2.6 Two additional species included on Schedule 1 of the 1981 Wildlife and Countryside Act (as amended) were recorded during the wintering bird survey namely Fieldfare and Redwing.
- 5.1.2.7 Both Fieldfare and Redwing are present in large numbers in Britain during the winter, but only a very small number remain through the summer to breed. During the winter, the

British Redwing population is approximately 750,000 individuals, but following the northward migration in the spring, only 30-50 pairs remain to breed. The Fieldfare has a similar life history; 750,000 individuals may be present in Britain during the winter months, but during summer, only 1-5 pairs remain. The majority of records of Fieldfare and Redwing nesting in Britain occur in Northern Britain. It is therefore extremely unlikely that Fieldfare or Redwing are breeding on the site, as supported by the findings of the breeding bird survey. As such the additional protection afforded to these two species is unlikely to apply at this site.

5.1.2.8 During the wintering bird survey eleven red-listed bird species were recorded within the site. Species recorded include Lapwing, Woodcock, Skylark, Starling, Fieldfare, Song Thrush, Redwing, Mistle Thrush, House Sparrow, Linnet and Yellowhammer which are included on the red list under the criteria of having undergone a rapid ( $\geq 50\%$ ) decline in UK breeding population over last 25 years and/or in the long-term, defined as the time from the first BoCC assessment (1969). *Table 8* below compares the UK wintering population of the red listed bird species in relation to the numbers recorded within the site.

**Table 8:** Wintering populations of red listed bird species

Species	UK Wintering Population (based on Musgrove <i>et al</i> , 2013)	No. supported by site	Proportion of UK population supported by site (%)
Lapwing	650,000	22	0.003
Woodcock	1,400,000	1	0.00007
Skylark	3,000,000*	44	0.0014
Starling	3,800,000*	12	0.00003
Fieldfare	720,000	212	0.03
Song Thrush	2,400,000*	6	0.00025
Redwing	690,000	50	0.007
Mistle Thrush	340,000*	5	0.001
House Sparrow	10,600,000*	6	0.00006
Linnet	860,000*	29	0.003
Yellowhammer	1,420,000*	14	0.00099

\* Wintering population of resident species estimated by doubling numbers of pairs/territories given by Musgrove *et al*. for the UK breeding population.

5.1.2.9 Of the red listed birds wintering at the Milton Keynes East site, in terms of British population, conservation status and number of wintering territories supported by the site, the species of highest nature conservation interest is Fieldfare with the site supporting up to 0.03% of the UK's wintering population of this species. Despite the rapid decline of the Fieldfare's UK breeding population, this species remains relatively common and widespread with a UK population of around 720,000 wintering individuals. Up to 212 Fieldfare were recorded across the site during the surveys although this number was

often much lower, representing only a very small proportion (<0.03%) of the British wintering population.

- 5.1.2.10 Twelve amber listed species were recorded wintering at the site, including Mute Swan, Greylag Goose, Mallard, Snipe, Black-headed Gull, Stock Dove, Kingfisher, Kestrel, Willow Warbler, Dunnock, Bullfinch and Reed Bunting. These species are included on the BoCC amber list due to the following:
- Mute Swan, Mallard and Black-headed Gull are included on the BoCC amber list due to moderate (25% to 50%) non-breeding population declines over the past 25 years and/ or long-term;
  - Snipe is included on the BoCC amber list due to moderate (25% to 50%) breeding range decline;
  - Greylag Goose is included on the BoCC amber list due to over 50% of the non-breeding population being found at ten or fewer sites in the UK;
  - Stock Dove is included on the BoCC amber list due to the UK supporting at least 20% of the European breeding population;
  - Kingfisher is included on the BoCC amber list due to it being listed as Vulnerable on the IUCN Red List<sup>1</sup>; and
  - Kestrel, Willow Warbler, Dunnock, Bullfinch and Reed Bunting are included on the BoCC amber list due to moderate (25% to 50%) breeding population declines over the past 25 years and/ or long-term.

5.1.2.11 *Table 9* below shows the UK wintering population of the amber listed bird species in relation to the numbers recorded within the site.

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<sup>1</sup> Vulnerable (IUCN Red List, 2012): A taxon is Vulnerable when it is considered to be facing a high risk of extinction in the wild in Great Britain.

**Table 9:** Wintering populations of amber listed bird species

Species	UK Wintering Population (based on Musgrove <i>et al.</i> , 2013)	No. supported by site	Proportion of UK population supported by site (%)
Mute Swan	79,000	5	0.006
Greylag Goose	230,000	2	0.0009
Mallard	710,000	2	0.0003
Snipe	1,100,000	1	0.00009
Black-headed Gull	2,200,000	84	0.004
Stock Dove	520,000*	2	0.0004
Kingfisher	7,600 – 12,800*	1	0.0002
Kestrel	92,000*	1	0.0001
Willow Warbler	4,800,000*	1	0.00002
Dunnock	5,000,000	15	0.000003
Bullfinch	440,000	3	0.0007
Reed Bunting	1,420,000*	9	0.0006

\* Wintering population of resident species estimated by doubling numbers of pairs/territories given by Musgrove *et al.* for the UK breeding population.

5.1.2.12 All the above species remain relatively common and widespread in Britain however and the site holds only a very small proportion (<0.01%) of their British breeding populations. As such it is considered that the site is unlikely to be of significant importance for the populations of amber listed bird species recorded during the wintering bird surveys.

5.1.2.13 A description of the distribution of red and amber list breeding birds across the site and the habitats with which they were associated is given in *Appendix D*.

5.1.2.14 Lapwing, Skylark, Starling, Song Thrush, Dunnock, House Sparrow, Bullfinch, Linnet, Yellowhammer and Reed Bunting are also UK Biodiversity Action Plan (BAP) priority species (UKBAP, 2007) and listed as Species of Principal Importance under Section 41 of the 2006 NERC Act. Although these are all relatively common and widespread species and the site is only likely to support a small proportion of their British wintering populations, where possible development proposals should seek to maintain opportunities at the site for these species following development. This is discussed further in *Section 6* below.

5.1.3 *Breeding bird survey*

5.1.3.1 *Table 10* lists the species recorded during the survey that are thought to hold breeding territories on or over the site which meet at least one of a range of criteria relating to statutory protection or conservation importance. Species recorded during the survey but not thought to hold significant territory on or over the site are excluded from *Table 10*

and, unless specifically mentioned, are not used in the evaluation of the importance of the site for individual breeding bird species.

**Table 10:** Species recorded holding breeding territories on or over the site that meet at least one of a range of criteria relating to statutory protection or conservation importance.

Common Name	Scientific Name	Annex I <sup>1</sup>	WCA 1 <sup>2</sup>	NERC 41 <sup>3</sup>	BOCC4 (2015) <sup>4</sup>
Mute Swan	<i>Cygnus olor</i>				Amber
Mallard	<i>Anas platyrhynchos</i>				Amber
Barn Owl	<i>Tyto alba</i>				Green
Lapwing	<i>Vanellus vanellus</i>				Red
Skylark	<i>Alauda arvensis</i>				Red
Starling	<i>Sturnus vulgaris</i>				Red
Song Thrush	<i>Turdus philomelos</i>				Red
Duncock	<i>Prunella modularis</i>				Amber
Red Kite	<i>Milvus milvus</i>				Green
House Sparrow	<i>Passer domesticus</i>				Red
Yellow Wagtail	<i>Motacilla flava</i>				Red
Bullfinch	<i>Pyrrhula pyrrhula</i>				Amber
Linnet	<i>Carduelis cannabina</i>				Red
Yellowhammer	<i>Emberiza citrinella</i>				Red
Reed Bunting	<i>Emberiza schoeniclus</i>				Amber

Notes on Table 10:

- 1 Species listed on Annex 1 of the EU Birds Directive (Codified version: 2009/147/EC) (EC, 2009). For the conservation of these species member states shall classify in number and size the most suitable territories for these species as Special Protection Areas (SPAs).
- 2 Species specially protected by Schedule 1 of the 1981 Wildlife and Countryside Act (as amended).
- 3 Priority Species included in the UK Biodiversity Action Plan (BAP) (UKBP, 2007)/Species of Principal Importance under the 2006 Natural Environment and Rural Communities (NERC) Act.
- 4 Species included in the Birds of Conservation Concern 4 red and amber lists (RSPB, 2015). Red list – rapidly declining species and species of global conservation concern. Amber list – moderately declining species, rare breeders, internationally important and localised species, and those with an unfavourable conservation status in Europe.

5.1.3.2 Red Kite was the only species included on both Annex 1 of the EU Birds Directive and Schedule 1 of the 1981 Wildlife and Countryside Act (as amended) recorded as holding a breeding territory within or over the site during the 2019 breeding bird survey due to this

species having a regular presence foraging over the site in similar locations, indicating a likely nesting site nearby. However, as no nest site or nesting behaviour was recorded during the surveys it is likely the site forms part of a much larger breeding territory for this species. As mentioned in *Section 5.1.2.3* above, Red Kite has become relatively common and widespread within its UK range in recent years. In addition, only a small number of individuals was recorded at the site and it is therefore extremely unlikely that the site would qualify as a SPA for this species, either in isolation or as part of a wider protected area.

5.1.3.3 Barn Owl was the only other bird species included in Schedule 1 of the 1981 Wildlife and Countryside Act (as amended) considered to be nesting within, or close to, the site. Although no nest site for this species was identified within the site itself, it is conceivable that this species is nesting within one of the buildings or trees.

5.1.3.4 Thirteen of the species recorded breeding in association with the site are included in the Birds of Conservation Concern (BoCC) red or amber lists (RSPB, 2015). Although inclusion on these lists does not confer special statutory protection or present any legal constraints on development, the species concerned are all of conservation importance and therefore mitigation would be required if significant populations of such species are likely to be affected by development of the site. This is not the case for the Milton Keynes East site.

5.1.3.5 Eight red-listed bird species were recorded breeding within or holding significant breeding territory over the site namely Lapwing, Skylark, Starling, Song Thrush, House Sparrow, Yellow Wagtail, Linnet and Yellowhammer. These species are included on the red list under the following criteria:

- Lapwing, Starling and Yellow Wagtail are included on the BoCC red list due to severe decline in their UK breeding population size (>50%) over 25 years and over the longer term defined as the entire period used for assessments since the first BoCC review in 1969; and
- Skylark, Song Thrush, House Sparrow, Linnet and Yellowhammer are included on the BoCC red list due to severe decline in their UK breeding population size (>50%) over the longer term defined as the entire period used for assessments since the first BoCC review in 1969.

5.1.3.6 *Table 11* below shows the UK population of the red listed bird species in relation to the number of territories or breeding pairs supported by the site.

**Table 11:** Breeding populations of red listed bird species

Species	UK Breeding Population (based on Musgrove <i>et al.</i> , 2013)	No. territories supported by site	Proportion of UK population supported by site (%)
Lapwing	140,000	4	0.003
Skylark	1,500,000	41	0.002
Starling	1,900,000	1	0.00005
Song Thrush	1,200,000	4	0.0003
House Sparrow	5,300,000	26	0.0007
Yellow Wagtail	15,000	2	0.013
Linnet	430,000	9	0.002
Yellowhammer	710,000	42	0.006

5.1.3.7 Other than Yellow Wagtail, all the red listed species recorded within the site remain relatively common and widespread in Britain and the site holds only a very small proportion (<0.01%) of their UK breeding populations. Yellow Wagtail was found to hold at least two breeding territories within the site accounting for 0.013% of the UK population. Breeding behaviour such as being recorded in the same location twice or more, calling, travelling with food and the presence of juveniles with an adult female all indicated that this species was breeding within the site. Up to 7 individuals of this species, including juveniles, were recorded on a single occasion, with this species recorded foraging within both arable and grassland habitats within the site. Yellow Wagtails favour damp habitats such as wet meadows, grazing marshes and river valleys, but also use arable fields, for breeding. As such it is possible that the habitats within the site form only a small part of a much wider foraging range for the individuals recorded during the breeding bird survey. Notwithstanding this, breeding habitat at the site for Yellow Wagtail has the potential to be lost as part of the proposed development. The importance of the site for this species is considered further below.

5.1.3.8 Although Skylark, Linnet and Yellowhammer are relatively common species and hold only a very small proportion of their UK breeding populations (0.002%, 0.002% and 0.006% respectively) at the site, a relatively large number of breeding territories were recorded during the surveys. Although similar opportunities to those provided by the site are abundant in the wider area and, like many small farmland birds, the likely cause of national population declines in these bird species is agricultural intensification, particularly the increased use of pesticides and decrease in winter stubble left in arable fields resulting in loss of foraging opportunities, the landscape scheme for the proposed development should give consideration to the retention and enhancement of suitable habitats for these species and, where this is not possible, off-site compensation may be required. This is discussed further in *Section 6* below.

5.1.3.9 A further five bird species meeting nature conservation criteria are considered to hold breeding territories within the site namely Mute Swan, Mallard, Dunnock, Bullfinch and Reed Bunting. These species are included on the amber list under the following criteria:

- Mute Swan, Mallard, included on the BoCC amber list due to moderate (25% to 50%) non-breeding population declines over the past 25 years and/ or long-term; and
- Dunnock, Bullfinch and Reed Bunting are included on the BoCC amber list due to moderate (25% to 50%) breeding population declines over the past 25 years and/ or long-term.

**Table 12:** Breeding populations of amber listed bird species.

Species	UK Breeding Population (based on Musgrove <i>et al.</i> , 2013)	No. territories supported by site	Proportion of UK population supported by site (%)
Mute Swan	6,400	1	0.016
Mallard	Up to 146,000	1	0.0007
Dunnock	2,500,000	31	0.001
Bullfinch	220,000	1	0.0005
Reed Bunting	250,000	6	0.002

5.1.3.10 Of these amber listed species recorded breeding at the site, in terms of UK population, conservation status and number of territories associated with the site, the species of greatest nature conservation interest is Mute Swan which has an estimated UK breeding population of 6,400 breeding pairs (Musgrove *et al.*, 2013). Up to 2 individuals of this species, usually including a female with a juvenile, were recorded within the river channel in the west of the site. Based on counts of individuals it is expected that up to 1 breeding pair could hold territories associated with the site which equates to 0.016% of the UK breeding population. The likely contributor of the Mute Swan's population decline is lead poisoning from the use of lead fishing weights, which has largely been solved by a ban on the sale of these products. The site is dominated by arable and grassland fields bordered by hedgerows, with a river flowing through the western area of the site. Similar habitat is widely available in the wider area, and as such, it is likely that the habitats within the site form only a small part of a much wider foraging range for the individuals recorded during the breeding bird survey and for this species in general. It is therefore considered unlikely that the site is of significant importance for the populations of Mute Swan and other wetland birds, including Mallard, recorded at the site during the breeding bird survey.

5.1.3.11 A description of the distribution of red and amber listed birds across the site and the habitats with which they were associated is given in *Appendix C*.

5.1.3.12 A number of the species recorded (including Skylark, Linnet, Yellowhammer, Reed Bunting, Yellow Wagtail, Starling, Dunnock, House Sparrow, Bullfinch, Song Thrush and Lapwing) are also UK Biodiversity Action Plan (BAP) species (UKBAP, 2007). Therefore, where possible development proposals should seek to maintain opportunities for breeding by these species at the site following development. This is discussed further in *Section 6* below.

## **5.2 Importance of the site**

### *Wintering*

5.2.1.1 The site does not comprise an area of semi-natural habitat supporting greater than 1% of the wintering population of any one species or an assemblage of greater than 20,000 wetland birds and is not regularly used by an exceptional population of a nationally or county rare or rapidly declining species (red-listed species). The site is therefore not eligible for selection as a SPA or SSSI on the basis of its value for wintering or non-breeding birds.

5.2.1.2 A document prepared by Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) and Thames Valley Environmental Records Centre (TVERC) titled '*Criteria for the Selection of Local Wildlife Sites in Berkshire, Buckinghamshire and Oxfordshire*' (BMERC and TVERC, 2009), provides information and advice on how Local Wildlife Sites should be identified. Criteria for selection of a Local Wildlife Site in relation to birds is outlined in *Section 5.7* of the document and takes into account consideration of a site as a Local Wildlife Site for its notable breeding birds, notable non-breeding birds and sites which support a significant assemblage of birds associated with a habitat present on the site.

5.2.1.3 Species recorded at the site which are listed as notable species on the Local Wildlife Site (LWS) criteria 5.7.A for non-breeding birds include Red Kite. Red Kite was recorded in low numbers during both the wintering and breeding bird surveys and was considered to hold part of a breeding territory over the site, due to its regular presence. The non-breeding criteria requires that the site supports 'significant non-breeding numbers' and also must have a known roost site for Red Kite. As no breeding behaviour or no known nesting sites were recorded and Red Kites were only recorded in low numbers at the site, it is considered highly unlikely that the site would be considered as a Local Wildlife Site based on the criteria for this species.

5.2.1.4 Although the site is not considered to qualify for designation on the basis of its wintering bird assemblage, either wholly or in part, the site does support a number of wintering bird species of nature conservation interest, albeit in very low numbers of relatively common and widespread species. Similar quality habitat to that found in the site is however

relatively abundant in the surrounding area and as such the site is considered to be of no more than low district value for wintering birds. This interest largely arises from the size of the site rather than a reflection of habitat quality. The proposals should nonetheless seek to include measures to maintain opportunities for populations of the species of nature conservation interest recorded during the wintering bird survey where possible. These are discussed in *Section 6* below.

## 5.2.2 *Breeding birds*

5.2.2.1 Published guidance on the selection of biological SSSIs (Drewitt *et al.*, 2015) provides a method for evaluating assemblages of breeding birds. Sites are eligible for selection as SSSIs if they support an especially good range of bird species characteristic of the habitat. This method has been employed to evaluate the site, using updated national population estimates, described in *Appendix E*.

5.2.2.2 The site supports a number of avian habitats including a network of hedgerows along the site boundaries, woodland, arable land, the wet grassland fields in the west of the site and the river corridor. The site does not however qualify as a candidate SSSI, either wholly or in part, for its lowland damp grassland, lowland farmland or woodland bird assemblages, as the site index value scores are below the threshold site index value for these habitats (10 [41.6%] for lowland damp grassland, 15 [57.7%] for lowland farmland and 13 [33.3%] for woodland).

5.2.2.3 As described above, BMERC and TVERC provide information and advice on how Local Wildlife Sites should be identified in the publication '*Criteria for the Selection of Local Wildlife Sites in Berkshire, Buckinghamshire and Oxfordshire*' (BMERC and TVERC, 2009). Criteria for selection of a Local Wildlife Site in relation to birds is outlined in *Section 5.7* of the document and takes into account consideration of a site as a Local Wildlife Site for its notable breeding birds, notable non-breeding birds and sites which support a significant assemblage of birds associated with a habitat present on the site.

5.2.2.4 Species recorded at the site which are listed as notable species on the Local Wildlife Site (LWS) criteria 5.7.A for breeding birds include Grey Heron. Grey Heron was only recorded at the site on a single occasion, and although it is likely this species uses the site for foraging on an occasional basis, it is not considered to be breeding at the site and as such does not meet the criteria of 'two nests' being present for the site to be considered as a LWS.

5.2.2.5 Criteria 5.7.B of the LWS selection criteria uses an index approach for breeding birds within six different habitat types. Qualifying species and scores for criteria 5.7.B are listed in the tables included in *Appendix F*. The breeding bird assemblage for each of the

relevant habitats within the site do not meet the qualifying score for consideration as a LWS. As such, the site is not considered wholly, or in part, to qualify as a LWS for its bird assemblage. Table 13 below identifies the site's score for each supported habitat type and whether the score qualifies for consideration of the site as a LWS.

**Table 13:** Index scores for assemblage of birds associated with habitats present on the site

Habitat Type	Total index score for site	Qualifying score	Does site meet LWS criteria?
Lowland damp grassland	4	21	No
Lowland open waters and margins*	20	47	No
Woodland	14	52	No

\* Reflects the most similar habitat type to the river habitat that is located within the site.

5.2.2.6 Whilst the site is not considered to qualify for designation on the basis of its breeding bird assemblage, either wholly or in part, the site does support a number of breeding bird species of nature conservation interest, albeit in mostly very low numbers of relatively common and widespread species. Two breeding pairs of Yellow Wagtail were recorded within the site and although this accounts for 0.013% of the British population of this species, similar quality habitat to that found in the site is relatively abundant in the surrounding area and as such the site is considered to be of no more than low district interest for breeding birds. As with the wintering bird interest of the site, this largely relates to the large size of the site rather than the quality of the habitats present. The proposals should nonetheless seek to include measures to maintain opportunities for populations of the species of nature conservation interest recorded during the breeding bird survey where possible. This is discussed further in *Section 6* below.

## 6 RECOMMENDATIONS

6.1 All species recorded during the survey are relatively common and widespread, with the site supporting only a very small proportion of the British wintering and/or breeding population of any one species.

6.2 The site is considered to be of no higher than low district interest for birds on the basis of the quality and extent of habitats present, the species of nature conservation interest recorded and their respective abundance. The site is dominated by intensively farmed arable habitats which in general are of relatively low value to breeding birds, and habitats of higher ornithological interest including woodland, hedgerows, scattered mature trees, grassland, scrub and wetland (river) are often limited in extent and restricted to field boundaries or have interfaces with off-site habitats. Furthermore, habitats providing similar opportunities for birds are relatively abundant in the local area. The site does not

meet the requisite score for qualification as a candidate SPA or SSSI and is highly unlikely to qualify, either wholly or in part, as a Local Wildlife Site (LWS).

*Maintenance of opportunities for wintering and breeding birds*

- 6.3 Notwithstanding the above, where possible, the proposals for the site should seek to maintain and enhance opportunities for bird species of nature conservation interest recorded holding wintering and/or breeding territories on or over the site during the survey.
- 6.4 The bird species of highest conservation interest recorded during the surveys in the context of the site is the invertebrate eating passerine Yellow Wagtail. Yellow Wagtails are associated with arable farmland, wet pastures and upland hay meadow habitats and migrate from Africa to the UK to breed between April and September. The cause of their population decline is unknown but is likely due to a combination of habitat loss and agricultural intensification. This species was recorded foraging and showing signs of breeding behaviour in arable fields across the site with at least two breeding pairs located in the westernmost arable field and an arable field in the central area of the site. It is highly likely that the arable fields associated with the Yellow Wagtail records will be lost to the proposed development scheme. Due to the similar arable and grassland habitats being abundant in the wider area and nationally, it is considered that loss of these habitats from the site in isolation are unlikely to result in a significant adverse impact on the conservation status of this species. Notwithstanding this, the landscape strategy for the site should seek to maintain opportunities for this species at the site, such as retention of wet meadow grassland habitats along the River Ouzel in the west of the site.
- 6.5 The proposed development would result in the loss of open farmland habitats and this would inevitably affect current populations of species of conservation interest associated with the open fields, including Skylark and Lapwing. Skylarks in particular, were recorded as holding a relatively large number of breeding territories (41 territories) across the site during the breeding bird survey. These birds are associated with open, relatively undisturbed habitats and it is unlikely that suitable opportunities could be incorporated into the open space strategy for the proposed development. As such, off-site compensation works may be required to enhance farmland habitat in the wider area. This could include the provision of 'Skylark plots' within retained arable land in the vicinity of the site.
- 6.6 The site also supports a relatively large number of breeding territories for Yellowhammer (up to 42 territories) associated with hedgerow habitats bordering arable fields across the site. Yellowhammer are associated with species-rich hedgerow and scrub habitats within

areas of open countryside and are known to avoid towns and busy inhabited areas. As such, consideration should be given to the retention, enhancement and creation of habitat for this species within the open space strategy for the site, ensuring that open habitat is retained adjacent to hedgerow and scrub habitats, particularly in areas bordering retained off-site arable habitats to the east of the site.

6.7 Notwithstanding the above, the intensively farmed arable habitats that dominate the site offer limited opportunities for many species of nature conservation interest recorded at the site, and the proposed development could provide opportunity to create new habitats of high value (both for birds and in their own right), benefitting other species of conservation concern currently found at the site and potentially providing opportunities for other species not already present. This could be achieved through the following measures:

- Retention and enhancement of the existing network of linear habitats within the site including hedgerows, treelines and mature scattered trees. Where this is not possible, provide alternative habitat corridors to allow movement of wildlife across and around the site.
- Where possible, retention of existing woodland, hedgerows, scrub, mature trees, wet grassland, the river corridor and ponds within the site, and enhancement of these habitats through sensitive management and complementary planting. Encourage deadwood habitat where safe to do so to provide opportunities for hole nesting birds such as blue tits.
- Creation of new wetland habitats to create new opportunities for wetland birds, either as standalone features or as part of the site surface water drainage strategy. This could include a range of additional permanent and ephemeral waterbodies, ditches, swales, wet woodland and wet grassland habitats.
- Provision of new high value habitats for birds and other wildlife within areas of proposed informal open space such as species-rich meadow and rough grassland, native woodland, species-rich hedgerows and scrub habitats. Consideration could be given to the sowing of grassland or wildflower seed mixes formulated to provide a food source for small farmland birds such as Linnet and Yellowhammer.
- Planting schemes should use native species where appropriate, using species characteristic of the area, sourced from stock of local provenance where possible;
- Use of high value plants for foraging birds within the landscape planting scheme, including fruit and nut producing species in addition to those with high pollen and nectar yields (attracting invertebrate prey);
- Provision of a range of bird boxes situated on new buildings and existing trees within the proposed development and areas of open space. Within the built environment these could include boxes specifically designed to encourage House Sparrow, Starling and Swift. Consideration should also be given to the provision of Kestrel and Owl boxes on suitable retained mature trees overlooking areas of grassland within informal open space in the east of the site and the open countryside beyond.

6.8 It is recommended that any hedgerow or scrub management works should be carried out during January and/or February, in order to allow the majority of fruit and nuts to be eaten by birds prior to removal and to avoid impacts on nesting birds (see below).

*Protection of birds during site clearance works*

6.9 All breeding birds should be afforded the basic level of protection provided by the 1981 Wildlife and Countryside Act (as amended), i.e. protection of nest sites during the breeding season. It is recommended that any tree felling, ground clearance, hedgerow management, scrub clearance and building demolition works are done outside of the bird nesting season (generally taken as March to September inclusive) to avoid risk of an offence being committed. In the event that this is not possible, these works should be overseen by a suitably qualified ecologist who would check for nesting birds prior to and during works. In the event that nesting birds are present, it will be necessary to delay works in the vicinity of an active nest until nesting is complete.

6.10 In addition, as Barn Owls can breed throughout the year it is recommended that any initial works to suitable buildings between October and February are also preceded by a check by a suitably qualified ecologist to confirm absence of this species prior to works commencing.

## **7 CONCLUSION**

7.1 In conclusion, subject to the implementation of sufficient retention, creation and enhancement of habitat for notable bird species recorded within the site as described above, the proposed development at the Milton Keynes East site is considered unlikely to result in a significant adverse impacts on local populations of breeding birds.

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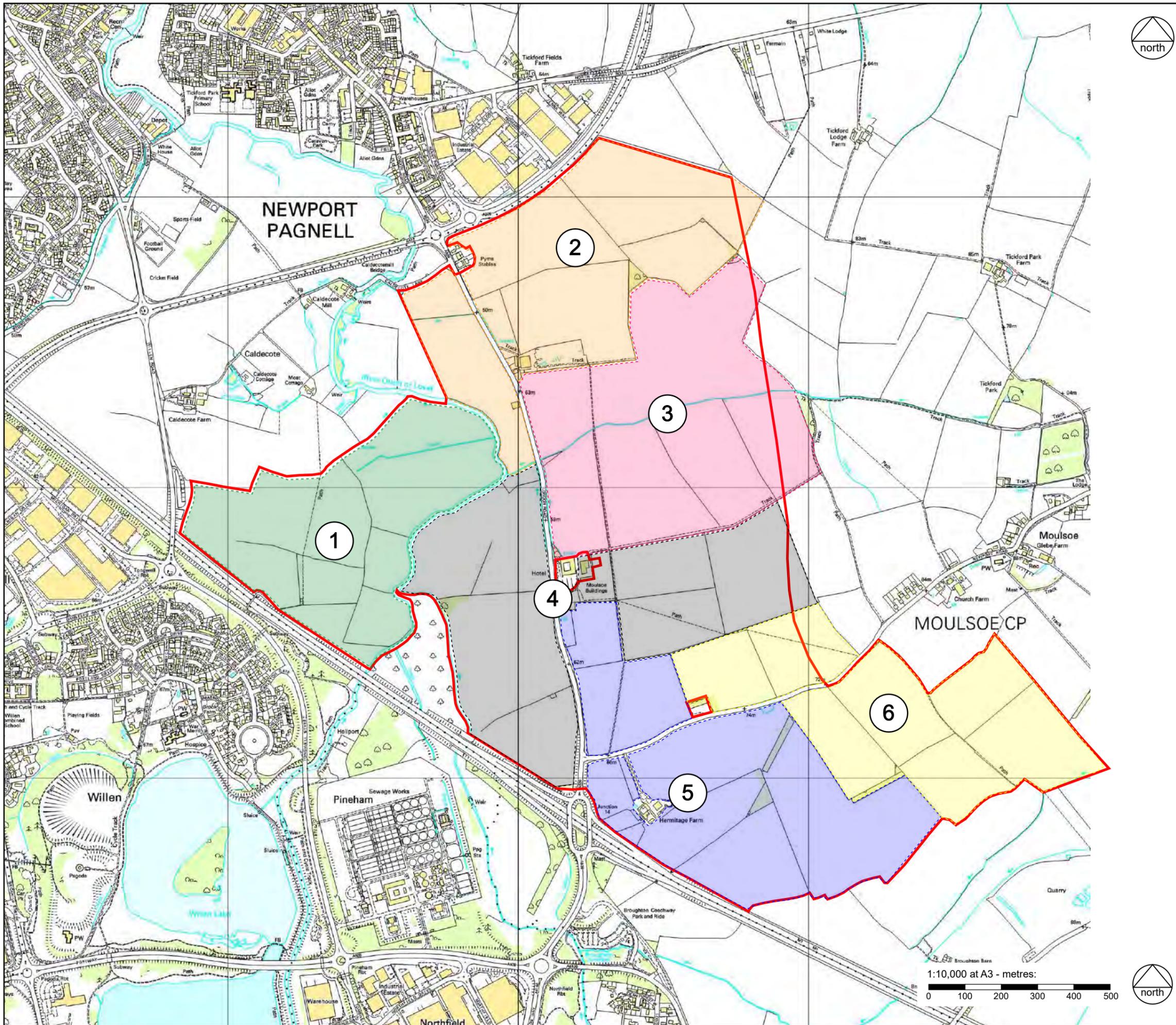
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**Appendix A**

**Site Location and Bird Survey Area Plan**



**KEY**

-  Site boundary
-  Transect number

CLIENT:  
**St James**  
 PROJECT:  
**Milton Keynes East**  
 TITLE:  
**Site Location and Bird Survey Transect Plan**  
 SCALE AT A3: 1:10,000      DATE: February 2020

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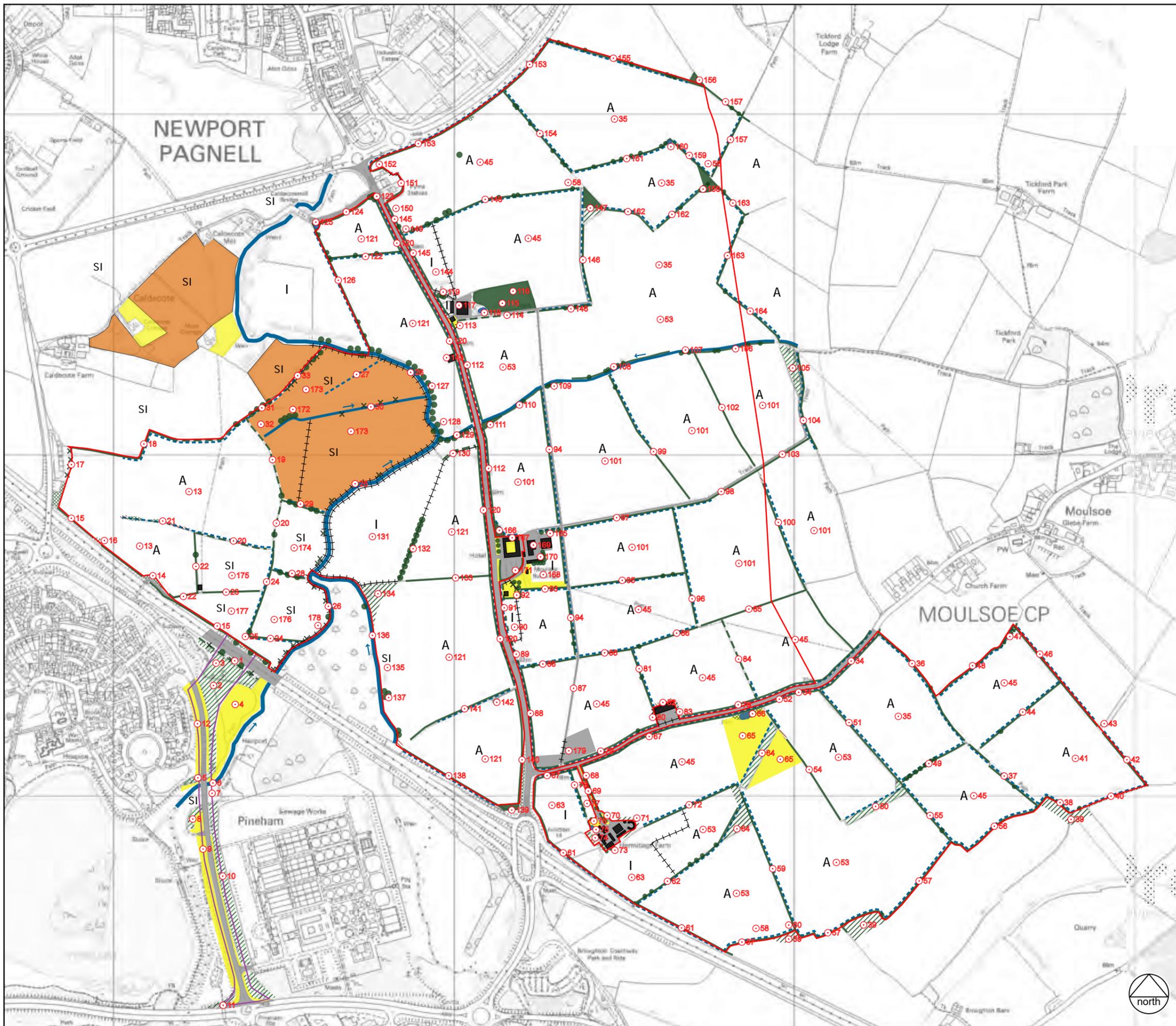


1:10,000 at A3 - metres:  
 0 100 200 300 400 500



**Appendix B**

**Phase 1 Habitat Survey Plan and Target Notes**



**KEY**

-  2019 Survey boundary
-  Additional area surveyed in 2015
-  Semi-natural broadleaved woodland
-  Broadleaved plantation woodland
-  Mixed plantation woodland
-  Scattered trees
-  Intact hedgerow
-  Defunct hedgerow
-  Dense scrub
-  Scattered scrub
-  Tall ruderals
-  SI Species-rich semi-improved grassland
-  SI Species-poor semi-improved grassland
-  I Improved grassland
-  Amenity grassland
-  A Arable land
-  Watercourse and direction of flow
-  Dry / seasonally wet ditch
-  Standing water
-  Fence
-  Hardstanding
-  Buildings
-  Target note

CLIENT:  
**St James**

PROJECT:  
**Milton Keynes East**

TITLE:  
**Phase 1 Habitat Survey Plan**

SCALE AT A3: DATE:  
**Not to scale** **February 2020**

2090.52 / 15

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**Landscape Architecture**  
**Masterplanning**  
**Ecology**



## Target notes<sup>10</sup>:

1. The southern verge of the M1 motorway comprises an outgrown defunct hedgerow with regenerated scattered scrub and trees. Scrub and tree species include Sycamore (*Acer pseudoplatanus*), Crack Willow (*Salix fragilis*), Blackthorn (*Prunus spinosa*), Hawthorn (*Crataegus monogyna*), Ash (*Fraxinus excelsior*) and Silver Birch (*Betula pendula*). The hedgerow is dominated by Hawthorn and Elder (*Sambucus nigra*) and is sparse and leggy due to lack of management and shading from adjacent trees and scrub. The ground flora is sparse due to lack of light penetration through the canopy and includes Wood Avens (*Geum urbanum*), Herb Robert (*Geranium robertianum*), Garlic Mustard (*Alliaria petiolata*), Ivy (*Hedera helix*), Bramble (*Rubus fruticosus*), Nettle (*Urtica dioica*) and mosses. There are also occasional patches of tussocky grassland along the roadside.
2. An area of mixed planted woodland dominated by early-mature Scot's Pine (*Pinus Sylvestris*) and Silver Birch. The understorey scrub is moderately dense and includes Dogwood (*Cornus sanguinea*), Elder, Ash (saplings), Blackthorn and Dog Rose (*Rosa canina*). The sparse ground flora is dominated by Bramble with Wood Avens, Herb Robert, Yorkshire Fog (*Holcus lanatus*), Cock's-foot (*Dactylis glomerata*) and Male Fern (*Dryopteris filix-mas*). A network of paths around and through the woodland are lined by mown amenity grassland.
3. A woodland ride, along which electricity pylons run, comprising relatively species-poor damp grassland with abundant tall ruderals and scrub and tree saplings along woodland edges. The dominant grassland species are Cock's-foot and Yorkshire Fog with less frequent Creeping Bent (*Agrostis stolonifera*), Meadow Foxtail (*Alopecurus pratensis*), Knapweed sp. (*Centaurea* sp.) and Trefoil sp. (*Lotus* sp.). Frequent ruderal species includes Great Willowherb (*Epilobium hirsutum*), Nettle, Bramble, Cleavers (*Galium aparine*) and Broad-leaved Dock (*Rumex obtusifolius*). Himalayan Balsam (*Impatiens glandulifera*) is also abundant, which is an invasive plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). Scrub species includes dominant Dogwood with Elder, Laurel sp., Wild Cherry (*Prunus avium*), Hawthorn, Cotoneaster sp. and Rowan (*Sorbus aucuparia*).
4. An infrequently mown area of species-poor grassland dominated by Perennial Rye-grass (*Lolium perenne*) and Rough Meadow-grass (*Poa trivialis*). The scrubby margin of the grassland abutting woodland to the west is dominated by Goat Willow (*Salix caprea*), Dogwood and Hawthorn. A small number of young White Willow (*Salix alba*) trees have also been planted, scattered within the grassland.
5. Tree and scrub planting to both sides of a road bridge dominated by young and early-mature Field Maple (*Acer campestre*) and Alder (*Alnus glutinosa*) with a sparse understorey of Hazel (*Corylus avellana*). Scot's Pine is also present.
6. The River Ouzel passes under a wide concrete road bridge beneath Tongwell Street. The banks of the river generally comprise tussocky grasses with frequent Willow (*Salix* sp.) trees.
7. A strip of tall tussocky grassland running along the southern bank of the River Ouzel both sides of the road bridge. The grassland is unmanaged and dominated by perennial grasses including Cock's-foot, Creeping Bent, Fescue (*Festuca* sp.), Couch Grass (*Elymus repens*), Tufted Hair-grass (*Deschampsia cespitosa*) and Common Reed (*Phragmites australis*). Frequent forb species include Creeping Cinquefoil (*Potentilla reptans*), Cleavers and Common Vetch (*Vicia sativa*). Ruderals are abundant and include Creeping Thistle (*Cirsium arvense*), Teasel (*Dipsacus fullonum*), Nettle, Great Willowherb, Hogweed (*Heracleum*

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<sup>10</sup> Target notes 1-12 relate to additional area surveyed in March 2015.

*sphondylium*), Mugwort (*Artemisia vulgaris*), Ground Elder (*Aegopodium podagraria*), Bristly Ox-tongue (*Picris echioides*), Broad-leaved Dock and Himalayan Balsam

8. Tree and scrub planting to the south of the river comprises young and early-mature Silver Birch, Alder, Wild Cherry and Scot's Pine with a sparse understorey of Cherry Laurel (*Prunus laurocerasus*), Field Rose (*Rosa arvensis*) and Osier (*Salix viminalis*). The ground layer comprises mostly bare ground.
9. The verges of Tongwell Street comprise frequently mown species-poor grassland. Species include Creeping Bent, Perennial Rye-grass, Fescue, White Champion (*Silene latifolia*), Red Clover (*Trifolium pratense*), Bristly Ox-tongue, Dandelion (*Taraxacum officinale*), Selfheal (*Prunella vulgaris*), Hawkbit (*Leontodon* sp.), Common Ragwort (*Senecio jacobaea*), Creeping Cinquefoil, White Clover (*Trifolium repens*), Creeping Buttercup (*Ranunculus repens*), Ribwort Plantain (*Plantago lanceolata*), Daisy (*Bellis perennis*) and Yarrow (*Achillea millefolium*).
10. Tree and shrub planting along the eastern side of Tongwell street comprising early-mature trees including Silver Birch, Alder, Wild Cherry, Poplar (*Populus* sp.) and Scot's Pine with an understorey of Cherry Laurel, Osier, Guelder Rose (*Viburnum opulus*), Dog Rose, Hazel and Dogwood.
11. Tree and shrub planting along the north-western side of the roundabout comprising early-mature Sycamore (*Acer pseudoplatanus*), Norway Maple (*Acer platanoides*), Alder and Hornbeam (*Carpinus betulus*) with an understorey of Dog Rose, Hazel and Blackthorn.
12. Western verge of Tongwell Street to the north of the river bridge comprising frequently mown amenity grassland lined with dense tree and shrub planting to the west.
13. A large field in the westernmost area of the site used for intensive arable farming. At the time of the survey the field had cereal stubble present, with scattered herbs and arable weeds throughout including Cleavers, Field Speedwell (*Veronica persica*), Bristly Ox-tongue, Sow-thistle sp. (*Sonchus* sp.) and Scentless Mayweed (*Tripleurospermum inodorum*). Grassland field margins are approximately 3m wide and are dominated by Annual Meadow-grass (*Poa annua*) and Black-grass (*Alopecurus myosuroides*) with occasional Barley (*Hordeum vulgare*), Wild Oat (*Avena fatua*), Field Speedwell and Field Pansy (*Viola arvensis*). An abundance of ruderal vegetation along hedgerow bases includes Cleavers, Creeping Thistle, Knotgrass (*Polygonum aviculare*), Field Bindweed (*Convolvulus arvensis*), Bristly Ox-tongue, Hogweed, Forget-me-not (*Myosotis* sp.) Nettle, Bramble, Hemlock (*Conium maculatum*), Scarlet Pimpernel (*Anagallis arvensis*), Burdock (*Arctium* sp.), Hoary Willowherb (*Epilobium parviflorum*), Sow-thistle and Dove's-foot Crane's-bill (*Geranium molle*).
14. Small area of planted trees and scrub including early-mature Sycamore with a Hawthorn understorey.
15. Hedgerows running along the site boundary adjacent to the M1 motorway to the west are intact and species-poor, dominated by Hawthorn occasional Elder and abundant Bramble. A steep bank lies beyond the site boundary in some places. The hedgerow has been laid in the past but is generally quite sparse and leggy at the base. The hedgerow measures approximately 3-4m high and 1-2m wide.
16. A small patch of dense scrub protruding from the field boundary comprising Blackthorn, English Elm (*Ulmus procera*), Elder and Wild Cherry with abundant Bramble, Nettle, Prickly Sow-thistle (*Sonchus asper*) and Creeping Thistle at the ground layer.

17. Perhaps once a hedgerow, this section of field boundary now comprises occasional Elder and dead, Ivy-covered Elm trees with abundant Nettle, Bramble and Creeping Thistle.
18. A mostly intact outgrown species-poor hedgerow forming the northern boundary of the westernmost arable field within the site. The hedgerow is generally heavily dominated by Hawthorn and in some places by Blackthorn, with occasional Elder, English Elm, Field Maple, Goat Willow, Crab Apple (*Malus sylvestris*) and an Oak (*Quercus* sp.) standard. The ground flora is sparse and dominated by Nettle and Bramble. The hedgerow measures approximately 3m high and 2-3m wide. Along much of its length is a dry ditch with a channel measuring up to 1.5m and 2-3m wide at the eastern end.
19. A defunct, species-poor hedgerow with substantial gaps dominated by Elder with occasional Hawthorn and English Elm. Some gaps are now filled by Bramble.
20. Mostly defunct, species-poor hedgerows along the boundaries of the western arable field with English Elm, Field Maple, Crab Apple, Elder, Hazel and two mature Crack Willow trees along the northern section of hedgerow. Substantial gaps in the hedgerows often support Bramble. The western section of hedgerow is accompanied by a dry ditch with a channel of approximately 1m deep and 1m wide.
21. A length of seasonally wet ditch, approximately 2m wide and 1m deep, running through the westernmost arable field and supporting dense stands of scrub and ruderal vegetation. Along the western end are stands of scrub comprising Hawthorn and Goat Willow and other stretches of the ditch were overgrown with Bramble scrub at the time of survey.
22. An outgrown hedgerow with a few large gaps dominated by Hawthorn with Ash, English Elm, Crack Willow, Elder and abundant Bramble.
23. Infrequently managed, intact, species-poor hedgerow dominated by Hawthorn with occasional Blackthorn and Elder with abundant Bramble. The hedgerow measures approximately 3-4m tall and up to 2m wide.
24. Infrequently managed, intact, species-poor hedgerows dominated by Hawthorn and Blackthorn with occasional Elder, Field Maple and Bramble, and a mature Ash tree. The hedgerows measured approximately 3-4m in height and up to 3m wide. Seasonally wet ditches with channels measuring 3-4m wide and up to 1m deep run beneath the hedgerows and support very occasional Greater Pond Sedge (*Carex riparia*).
25. A damp depression alongside the corner of a hedgerow which is known to fill with water during/following particularly wet weather, but was dry at the time of survey.
26. The River Ouzel flows in a northerly direction through the site. The river channel is approximately 5-10m wide and estimated to be over 1m deep with a soft silt base. The earth banks located within the site are generally dominated by rough grass and ruderal vegetation with occasional scrub and trees. Species identified during the survey included Cock's-foot, False Oat-grass (*Arrhenatherum elatius*), Nettle, Teasel, Bramble, Great Willowherb, Hogweed, Broad-leaved Dock and Creeping Thistle. Scrub and tree species include Crack Willow and Hawthorn. Common Reed is also locally abundant.
27. Shallow, seasonally wet ditch running through a field of semi-improved grassland bordered by tussocky grasses.
28. A relatively short section of outgrown, mostly intact, species-poor hedgerow and a seasonally wet ditch with mature Crack Willow trees along its length. The hedgerow is dominated by

Hawthorn with frequent Blackthorn and rare occurrences of Guelder Rose and Crab Apple. The ditch channel measures approximately 2m wide and 0.5m deep.

29. A relatively short section of outgrown, mostly-intact, species-poor hedgerow and dry ditch with mature Crack Willow trees. The hedgerow measures up to 5m high and 4m wide and is dominated by Blackthorn with frequent Hawthorn, Elder and English Elm. The ditch channel measures approximately 2m wide and 0.5m deep.
30. A seasonally wet ditch with a channel measuring up to 2-3m wide and 0.5-1m deep supporting dense marginal vegetation dominated by Reed Canary-grass (*Phalaris arundinacea*) with occasional Common Reed. The banks of the ditch support rough grasses with occasional small Crack Willow trees and Goat Willow. The western end is much shallower with grasses and tall ruderals.
31. A defunct, outgrown, species-poor hedgerow with mature trees and a dry ditch beneath. The hedgerow includes Hawthorn, Field Maple, Elder and Blackthorn with Crack Willow and Field Maple trees. The seasonally wet ditch has a channel measuring approximately 2m wide and up to 1.5m deep and supports dense ruderal vegetation where there is less shading.
32. The westernmost margin of a grassland field dominated by tall ruderal vegetation, in particular Common Nettle.
33. A seasonally wet ditch supporting dense marginal vegetation including dominant Reed Canary Grass and occasional Common Reed, Great Willowherb and Meadowsweet. The banks of the ditch support rough grasses with occasional scrub and trees including Hawthorn, Ash and Crack Willow.
34. Infrequently managed intact boundary hedgerow dominated by Hawthorn and Blackthorn with Dog Rose and Bramble, measuring approximately 2.5m high and 2.5m wide. A narrow semi-improved grassland field margin runs along the southern side of hedgerow and a shallow dry ditch with a channel measuring approximately 1m wide and 0.5m deep runs along the northern side along Newport Road.
35. Intensively farmed arable land used primarily for cereal production. The field margins, comprising species-poor improved and semi-improved grassland, are generally minimal but up to 2m wide along some boundaries and up to 6m where footpaths and tracks occur alongside hedgerows. Typical margin species include abundant Barren Brome (*Bromus sterilis*) with Cock's-foot, Perennial Rye-grass, False Oat-grass, Hogweed, Dove's-foot Crane's-bill, White Clover, Creeping Buttercup, Ribwort Plantain, Field Bindweed, Broad-leaved Dock, Bristly Ox-tongue, Broad-leaved Willowherb (*Epilobium montanum*) and Bramble. Sapling scrub is also abundant along some boundaries. Tracks and footpath margins are subject to periodical mowing.
36. Intact, native, species-poor hedgerow dominated by Blackthorn and Hawthorn with frequent English Elm, occasional Field Maple and Dog Rose, and an early-mature Ash tree. The hedgerow measured approximately 2.5m high and up to 3m wide and had been recently flail cut at the time of survey. A dry ditch runs along the base of the hedgerow with a channel measuring approximately 1m deep and 1m wide and supports Great Willowherb in places.
37. Intact, native hedgerow dominated by Blackthorn and Hawthorn with occasional Elder. The hedgerow measures approximately 2.5m high and 1-2m wide and had been recently flail cut at the time of survey. A dry ditch runs along the base of the hedgerow with a channel measuring approximately 1m deep and 1m wide and supports Great Willowherb in places.

38. Mostly intact, native hedgerow dominated by Blackthorn and Hawthorn with frequent English Elm, Elder and Bramble, and small Ash trees. The hedgerow measures approximately 2.5m high and 1-2m wide and was outgrown at the time of survey. Dry ditch as described for TN37.
39. A small area of tree planting just beyond the site boundary including young Ash, Oak, Rowan (*Sorbus aucuparia*), Goat Willow and Alder.
40. Field boundary with dry (probably seasonally wet) ditch and regular stands of dense scrub. The ditch channel typically measures 2-3m wide and 1-1.5m deep. Scrub along the southern bank of the ditch includes Hawthorn, Blackthorn, Elder, Goat Willow and Bramble with a small number of early mature Ash trees.
41. Intensively farmed arable land used primarily for cereal production. Along the western margin of the field is a footpath along a 3m wide mown grassland buffer (see TN35).
42. Mostly intact, native, species-poor hedgerow dominated by Hawthorn with English Elm, Elder and Dog Rose. The hedgerow measured approximately 2m high and 1-2m wide and had been recently flail cut at the time of survey. A dry ditch running along the east side of the hedgerow has a channel measuring approximately 1m deep and 1m wide.
43. A small stand of dense scrub and small trees including Horse Chestnut, Blackthorn, Hawthorn, Crab Apple, Poplar and Ash.
44. Intact, native, species-poor hedgerow dominated by Blackthorn and Hawthorn with English Elm, Elder, Ash and Dog Rose and early-mature Ash trees. The hedgerow measures approximately 2m high and 2m wide and had been recently flail cut at the time of survey. A shallow dry ditch running along the north side of the hedgerow has a channel measuring approximately 0.3m deep and 1m wide.
45. Intensively farmed arable land used primarily for cereal production. The grassland field margins are generally very narrow (see TN35).
46. Intact, native, species-poor hedgerow dominated by Blackthorn and Hawthorn with English Elm, Elder, Ash, Field Maple and Crab Apple and early-mature Ash trees. The hedgerow measures approximately 2m high and 2m wide. A shallow dry ditch running along the east side of the hedgerow has a channel measuring approximately 0.3m deep and 1m wide.
47. An area of dense scrub dominated by Bramble with mixed tree planting including Aspen (*Populus tremula*), Pedunculate Oak, Ash, Scot's Pine, Wild Cherry, Blackthorn and domestic Apple (*Malus domestica*).
48. Intact, native, species-poor hedgerow dominated by Blackthorn with English Elm and Field Maple. The hedgerow measured approximately 2m high and 1-2m wide and had been recently flail cut at the time of survey. A shallow dry ditch running along the southern side of the hedgerow has a channel measuring approximately 0.5m deep and 1-2m wide and is generally choked with Bramble and tall ruderal vegetation.
49. Intact native hedgerow dominated by Blackthorn with Hawthorn, English Elm, Crab Apple, Dog Rose and Bramble. The hedgerow measures approximately 2m high and 2m wide and had been recently flail cut at the time of survey. Seven mature Ash trees located along the hedgerow have severe decay and support a number of cavities. A shallow dry ditch running along the northern side of the hedgerow has a channel measuring approximately 0.5m deep and 1m wide.

50. A strip of woodland comprising tree planting and regenerated trees and scrub including Ash, Pedunculate Oak, Norway Maple, Scot's Pine, Alder, Aspen, Wild Cherry and Poplar species. The scrub understorey includes Blackthorn, Bramble and Dogwood. An outgrown Hawthorn and Elm dominated hedgerow and a dry ditch runs along the northern edge of the woodland.
51. Intact, species-poor hedgerow dominated by Hawthorn with Blackthorn, English Elm and Dog Rose. The hedgerow had not recently been cut at the time of survey and measured approximately 2-3m high and 2m wide. A shallow dry ditch running along the eastern side of the hedgerow has a channel measuring approximately 0.5m deep and 1m wide.
52. A small Rhododendron sp. plant growing within the field margin.
53. Intensively farmed arable land used primarily for cereal production, cropped with wheat at time of survey. The field has narrow grassland field margins (see TN35) with wider mown grassland tracks. Field margins are between 0.5m and 4m.
54. Mostly intact, species-poor hedgerow dominated by Blackthorn and English Elm. The hedgerow measures approximately 2m high and 1-2m wide. A dry ditch occurs along the hedgerow at the northern end of the boundary and supports dense Bramble scrub and tall ruderal vegetation including Great Willowherb and Nettle.
55. Intact, species-poor hedgerow dominated by Blackthorn with Hawthorn, English Elm, Crab Apple, and a mature Pedunculate Oak tree. The hedgerow measures approximately 2.5m high and 1-2m wide and had been recently flail cut on just one side at the time of survey. A dry ditch running along the east side of the hedgerow has a channel measuring approximately 1m deep and 1.5m wide and supports Nettle and Great Willowherb in places.
56. Mostly intact, species-poor hedgerow dominated by Blackthorn and English Elm with Hawthorn, Goat Willow, Dog Rose and Bramble. The hedgerow was flailed on the field side and outgrown on top, measuring up to 4m high. A dry ditch running along the boundary has a channel measuring approximately 0.5-1m deep and 1-2m wide.
57. Intact native hedgerow dominated by Blackthorn with Hawthorn, English Elm, Crab Apple, Elder and Ash. The hedgerow measures approximately 2.5m high and 1-2m wide and had been recently flail cut on just one side at the time of survey. A dry ditch running along the east side of the hedgerow has a channel measuring approximately 1m deep and 1.5m wide and supports Nettle and Great Willowherb in places.
58. Field margin, approximately 4m in width, at southern end of an arable field used for cereal production. The area comprises tussocky grassland with species typical of species-poor improved/semi-improved grassland, including dominant Perennial Rye-grass and False Oat-grass with abundant ruderal vegetation including Creeping Thistle, Hogweed, Bristly Ox-tongue and Nettle.
59. Intact, species-poor hedgerow dominated by Blackthorn with Hawthorn with a dry ditch running along the eastern side (as TN55).
60. Corner of arable field left fallow comprising grasses and ruderal vegetation. Species include dominant Bristly Ox-tongue with Nettle, Fescue species, Creeping Bent, Cock's-foot and False Oat-grass. Appeared to have been mown at the time of survey, displaying a short uniform sward.

61. Site boundary bordering the M1 motorway comprising post and rail fence with intact, species-poor hedgerow and dry ditches. The hedgerows are dominated by Hawthorn with occasional Elder.
62. Mostly intact native hedgerow dominated by Blackthorn and Hawthorn with English Elm, Dog Rose, Ash, Elder and a number of early mature Ash trees. The hedgerow measures approximately 2.5m high and 1-2m wide and had not been flail cut at the time of survey. A dry ditch running along the hedgerow base has a channel measuring approximately 1-1.5m deep and 2m wide.
63. A tall earth bund of around seven years of age surrounds the western and southern sides of Hermitage Farm and supports recently established species-poor improved grassland grazed by horses and cattle. The grassland generally has a short sward and species recorded include Perennial Rye-grass, Cock's-foot, False Oat-grass, Soft Brome (*Bromus hordeaceus*), Timothy (*Phleum pratense*), Brome species, Meadow Foxtail, White Clover and Bristly Ox-tongue. The grassland is divided into fenced paddocks which are grazed by cattle and horses.
64. Small areas of woodland comprising a mix of tree planting and regenerated trees and scrub including White Poplar (*Populus alba*), Ash, Pedunculate Oak, Norway Maple and Crab Apple. The scrub understorey includes Hawthorn, Blackthorn, Elder, Hazel and Bramble. The north-eastern strip of woodland also supports planted Scot's Pine. Very little ground flora is present, which is likely due to heavy shading.
65. An area of species-poor amenity grassland in the corner of an arable field, managed by regular mowing. A band of woodland runs diagonally through the centre of the grassland. Species recorded within the sward include Perennial Rye-grass, Cock's-foot, Yorkshire Fog, Fescue, False Oat-grass, Hawkbit (*Leontodon* sp.), White Clover, Creeping Thistle, Dandelion, Hogweed, Common Vetch (*Vicia sativa*) and Greater Plantain (*Plantago major*). The northern section of the grassland is used as a dog agility training area and the southern section is used as a runway for model aircraft.
66. A fairly large pond adjacent to Newport Road measuring approximately 30x20m surrounded by dense scrub and occasional trees. Little aquatic or marginal vegetation was recorded although there are small amounts of Greater Reedmace (*Typha latifolia*), Greater Pond Sedge and Water Lily (*Nymphaeaceae* sp.). Great Willowherb and Nettle dominate less shaded areas of the margins. To the east of the pond is a small area of young to early-mature trees dominated by Ash and Wild Cherry, and dense Blackthorn scrub dominates the western banks. Crack Willow trees and scrub is also present along the banks of the pond. Hedgerow borders the pond to the north (see TN67).
67. Mostly intact, species-poor hedgerow along Newport Road, dominated by Hawthorn with English Elm, Ash, Crab Apple and Bramble. The hedgerow measures approximately 2m high and 1.5m wide. A shallow dry ditch running along the hedgerow base has a channel measuring up to 0.5m deep and 1m wide.
68. Intact, species-poor hedgerow dominated by Hawthorn with English Elm, Ash, Crab Apple and Bramble. The hedgerow measures approximately 2m high and 1.5m wide.
69. The driveway to Hermitage Farm comprises a concrete road and a verge along the eastern edge with amenity grass and scattered trees. The grassland is regularly mown and includes Perennial Rye-grass, Fescue species, Annual Meadow-grass, Cock's-foot, White Clover, Dandelion, Dove's-foot Crane's-bill and Hogweed. Tree species included Horse Chestnut (*Aesculus hippocastanum*), Goat Willow, Red Oak (*Quercus rubra*), Wild Cherry and Weeping Willow.

70. A small area of amenity grassland (see TN69) with small trees including domestic Apple, Plum (*Prunus* sp.), Cypress (*Cupressaceae* sp.), Norway Spruce and a young Pedunculate Oak tree.
71. A small area of planted semi-mature trees around the eastern edge of the Hermitage Farm buildings. Species include Wild Cherry, Pedunculate Oak, Silver Birch, Rowan, Ash, Whitebeam (*Sorbus aria*), Holm Oak (*Quercus ilex*) and Norway Maple. English Elm is also present in the understory and the ground layer supports Bramble and Nettle.
72. Mostly intact, species-poor hedgerow dominated by Blackthorn with Hawthorn, English Elm and Ash. The hedgerow measures approximately 2.5m high and 1.5m wide and was flailed on the northern side only at the time of survey. A dry ditch running along the northern side of the hedgerow has a channel measuring up to 1m deep and 1.5m wide.
73. Line of Pedunculate Oak and Norway Maple trees running along the boundary of Hermitage farmyard bordering the grassland field/ bund to the south-west.
74. A small area of planted semi-mature trees including Pedunculate Oak, Wild Cherry, Scot's Pine, Cypress, Field Maple and Horse Chestnut.
75. A small natural pond located in the corner of the garden of Hermitage Farmhouse. No marginal vegetation was recorded and aquatic vegetation was limited to abundant Duckweed (*Lemna minor*). Pollarded Ash and Crack Willow and Hawthorn is also present on the banks of the pond.
76. Garden of Hermitage Farmhouse comprising amenity grassland with shrub and flower beds on the margins. The southern and eastern boundaries of the garden comprise Cypress, Common Box (*Buxus sempervirens*) and Holly hedging. A mature Ash and a Norway Maple tree exist on the northern margin.
77. A small field comprising improved grassland regularly grazed by horses. Two mature domestic Apple trees and Wild Cherry tree grow within the grassland.
78. Mostly intact native, species-poor hedgerow dominated by Hawthorn with Blackthorn, English Elm and Elder. A small number of early-mature trees including Ash, Wild Cherry and Horse Chestnut also occur within the hedgerow. The hedgerow measures approximately 2m high and 1m wide and was recently flail cut at the time of survey. A large gap in the hedgerow to the north has been filled with recently planted Hawthorn. A dry ditch running along the western side of the hedgerow has a channel measuring up to 0.5m deep and 1m wide.
79. Mostly intact native, species-poor hedgerow along Newport Road dominated by Hawthorn with English Elm, Blackthorn, Ash, Elder, Crab Apple and Bramble. A shallow dry ditch running along the hedgerow base has a channel measuring up to 0.5m deep and 1m wide.
80. A fenceline with scattered scrub forms the boundary with a commercial unit located off Newport Road. The scrub comprises mostly Elder and Hawthorn with abundant Ivy.
81. Mostly intact native hedgerow dominated by Hawthorn and Blackthorn with English Elm and Crab Apple. The hedgerow measures approximately 2m high and 1.5m wide. A dry ditch running along the hedgerow base has a channel measuring around 1m deep and 1m wide.
82. A wide section of field margin bordering a commercial unit located off Newport Road comprising Common Nettles with rubble and other building waste.

83. A small strip of planted early-mature trees and shrubs including Wild Cherry, Field Maple and Rowan. Elder has also colonised and the ground layer comprises Common Nettle and Bramble.
84. A field boundary hedgerow which is species-poor and defunct with large gaps and comprises Hawthorn with occasional Elder.
85. An intact native, species-poor hedgerow dominated by Hawthorn and Blackthorn with English Elm, Ash and Elder. The hedgerow measures approximately 2.5m high and 2.5m wide and had been recently flail cut at the time of survey.
86. An intact native hedgerow dominated by Hawthorn and Blackthorn with English Elm, Ash and Elder. The hedgerow measured approximately 2.5m high and 2.5m wide and had been recently flail cut at the time of survey. A shallow dry ditch running along the hedgerow base has a channel measuring up to 0.5m deep and around 1m wide.
87. A network of gravel tracks running through the eastern area of the site with narrow rough grassland verges.
88. An intact native, species-poor hedgerow along London Road dominated by Hawthorn with English Elm, Blackthorn, Ash, Elder, Crab Apple and Bramble. A shallow dry ditch running along the hedgerow base has a channel measuring up to 0.5m deep and 1m wide.
89. A section of recently planted Hawthorn and Blackthorn hedgerow along London Road.
90. An area of land comprising relatively recently established species-poor grassland along the western margin of an arable field. The species recorded within the sward included False Oat-grass, Cock's-foot, Greater Bird's-foot Trefoil (*Lotus pedunculatus*), Hogweed, Yarrow, Dandelion, Broadleaved Dock, Knapweed (*Centaurea* sp.), Common Mouse-ear (*Cerastium fontanum*), Ox-eye Daisy (*Leucanthemum vulgare*), Red Clover, White Clover and Creeping Thistle. The area in the north-west of the field is fenced and mown for amenity use.
91. A slightly gappy section of species-poor hedgerow running along the boundary of the site adjacent to London Road. Species include Elm, Hawthorn and Blackthorn.
92. Species-poor hedgerows forming the southern and eastern boundaries of the garden of Moulsoe Farmhouse including Blackthorn and Yew (*Taxus baccata*) with Clematis sp. and a young Birch (*Betula* sp.) tree.
93. An intact native, species-poor hedgerow dominated by Hawthorn with English Elm and Blackthorn. The hedgerow measured approximately 2.5m high and 2m wide and had been recently flail cut at the time of survey. A dry ditch running along the hedgerow base has a channel measuring up to 1m deep and 1.5m wide.
94. An intact native, species-poor hedgerow dominated by Hawthorn, Blackthorn and English Elm with Ash, Crab Apple and Elder. The hedgerow measures approximately 2.5m high and 2m wide and had been recently flail cut at the time of survey. A dry ditch running along the hedgerow base has a channel measuring up to 1.5m deep and 2m wide which supports Great Willowherb, Nettle and Bramble. Two mature Ash trees located along the hedgerow have severe decay and a number of cavities.
95. An intact native, species-poor hedgerow dominated by English Elm with Hawthorn, Blackthorn, Ash, Field Maple and Dog Rose. The hedgerow measures approximately 2.5m high and 1.5m wide. A dry ditch running along the hedgerow base has a channel measuring up to 1m deep and 1.5m wide.

96. A mostly intact native, species-poor hedgerow dominated by Hawthorn with abundant English Elm and Blackthorn. The hedgerow measures approximately 2.5m high and 1.5m wide. A dry ditch running along the hedgerow base has a channel typically measuring up to 1m deep and 1m wide but it has a steep bank of up to the 2m high to field margin to the east. The ditch had recently been dredged and had bare earth banks.
97. An intact native, species-poor hedgerow dominated by Hawthorn with abundant English Elm and Blackthorn, and occasional Oak. The hedgerow measures approximately 2.5m high and 1.5m wide. A dry ditch running along the hedgerow base has a channel measuring around 1m deep and 1m wide with a grassy base.
98. An intact native, species-poor hedgerow dominated by Hawthorn and English Elm with Blackthorn and Norway Maple. A dry ditch with a channel measuring around 1m deep and 1m wide runs along the western end of the hedgerow.
99. A mostly intact native, species-poor hedgerow including Hawthorn, Blackthorn, Dog Rose, Ash, English Elm, Elder and Bramble. The hedgerow measures approximately 2m high and 1.5m wide and had been recently flail cut at the time of survey. A dry ditch running along the northern end of the hedgerow base has a channel measuring around 1m deep and 1m wide.
100. A mostly intact native, species-poor hedgerow measuring approximately 2.5m high and 2m wide which had been recently flail cut at the time of survey. A shallow dry ditch running along the hedgerow base has a channel measuring around 0.5m deep and 1m wide. The northern end of the boundary comprises Bramble scrub.
101. Intensively farmed arable land used primarily for cereal production. These fields had cereal stubble present and appeared to have been planted with a cover crop with minimum tillage at the time of survey. The field margins are generally narrow (see TN35) but along the stream corridor (TN107) are much wider and comprise rough grassland (see TN58).
102. An intact native, species-poor hedgerow dominated by Hawthorn and Blackthorn with English Elm and Elder. The hedgerow measures approximately 3m high and 2m wide and had not been recently managed at the time of survey.
103. An intact native, species-poor hedgerow dominated by Hawthorn and Blackthorn with Wild Cherry. The hedgerow measured approximately 2.5m high and 1.5m wide. Oak trees exist nearer the eastern end of the hedgerow.
104. An intact native hedgerow dominated by Hawthorn with abundant English Elm and Blackthorn. The hedgerow measures approximately 2m high and 1.5m wide and had been recently flail cut at the time of survey. A dry ditch running along the hedgerow base has a channel typically measuring up to 1-1.5m deep and 1m wide and had recently been dredged.
105. A small area of planted woodland with a sparse scrub understorey including Pedunculate Oak, Norway Maple, Scot's Pine, Small-leaved Lime (*Tilia cordata*) and Wild Cherry. The scrub understorey includes Common Box, Dog Rose and Bramble.
106. An intact native, species-poor hedgerow running along a brook corridor dominated by Hawthorn and Blackthorn with Ash and English Elm, including mature Ash trees. The hedgerow had been flail cut on the sides only and measured approximately 3-5m high and 2m wide.
107. A small brook flowing westwards into the River Ouzel in the central area of the site. The brook channel measures around 1.5-2m deep and 3-4m wide. At the time of survey, the

brook was mostly dry with localised pooling around 10cm deep, but the flow of water is often strong during times of wetter weather. The bankside vegetation, which had been recently cut, includes grasses and ruderal vegetation including Great Willowherb. Fool's Watercress (*Apium nodiflorum*) is present within the channel in places.

108. An intact native, species-poor hedgerow running along a brook corridor dominated by Hawthorn with Blackthorn, Crab Apple, Crack Willow and mature Ash trees. The hedgerow had been recently flail cut at the time of survey and measured approximately 2.5m high and 1.5m wide.
109. A short section of scrub resembling a defunct hedgerow located along the southern side of a brook corridor which includes dense Blackthorn, Elder, Hawthorn, English Elm and Bramble.
110. A mostly intact native, species-poor hedgerow running along a brook corridor dominated by Hawthorn with Blackthorn with abundant English Elm. The hedgerow had been recently flail cut on the sides and measures around 3-4m high and 1-2m wide.
111. A small area of regenerated English Elm and Elder with a small number of mature Pedunculate Oak and Ash and (probably planted) early-mature Whitebeam and Sycamore. The ground flora comprises a sparse covering of Common Nettle.
112. An intact native hedgerow along London Road dominated by Hawthorn with English Elm, Blackthorn, Ash, Elder, Crab Apple and Bramble. A shallow dry ditch running along the hedgerow base has a channel measuring up to 0.5m deep and 1m wide.
113. Semi-detached farmhouses along London Road with gardens comprising amenity grassland with a small number of Apple trees and ornamental shrubs and flowers on the margins.
114. A line of outgrown scrub and young trees resembling a defunct hedgerow which exists along a 2-3m high earth embankment sloping downward from the arable field to the south to a gravel track to the north. The dominant species are Hawthorn, Blackthorn, English Elm and Elder with occasional Crab Apple, Field Maple, Pedunculate Oak and Horse Chestnut. A small number of mature Ash trees occur at the eastern end of the boundary and dense stands of Bramble dominate the western end.
115. A larger area of woodland comprising a mix of mature and early-mature regenerated trees, and a range of planted trees. Occasional mature Pedunculate Oak trees occur predominantly around the northern and eastern edges of the woodland. Other species include Rowan, Poplar species, White Willow, Beech (*Fagus sylvatica*), Wild Cherry, Norway Maple, Scot's Pine, Prunus sp., Lilac Tree (*Syringa vulgaris*), Box Maple (*Acer negundo*), Elder and Goat Willow. Large areas of the woodland have seasonal standing water (TN116). Damper areas in the south-western areas of the woodland support a higher density of Willow species.
116. Areas of the woodland support seasonal standing water often during the winter and early spring. Areas in the north-eastern area of the woodland support dense stands of Greater Pond Sedge and towards the south-west of the woodland damper areas are dominated by White Willow and Goat Willow.
117. A complex of brick, timber and corrugated metal buildings surrounded by concrete hardstanding and gravel. Frequently there are piles of building materials, rubble, logs and farm machinery. Ruderal vegetation is abundant and includes Nettle, Bristly Ox-tongue, White Dead-nettle (*Lamium album*), Bramble, Poppy (*Papaver* sp.), Burdock, Cock's-foot and False Oat-grass.

118. A pond located at the south-eastern edge of a farmyard (TN117) measuring approximately 15x8m and surrounded by dense stands of Lesser Pond Sedge and Greater Pond Sedge. No other aquatic or marginal vegetation was recorded other than Duckweed. Nettle, Great Willowherb and Woody Nightshade (*Solanum dulcamara*) is also found on the pond banks. The water appears to be heavily polluted due to runoff from the farm, and waste materials such as old tyres were recorded within the water.
119. A small area of grazed improved grassland located between London Road and a farmyard. Along a short section of track to the north is a group of early-mature trees including Scot's Pine, Ash and Apple. On the margins of the area are occasional tall ruderal and scattered scrub including English Elm, Blackthorn and Bramble. A log pile is present.
120. A mostly intact native hedgerow along the eastern side of London Road dominated by Hawthorn with Blackthorn, English Elm, Ash and Elder. The hedgerow had not been recently managed and measured approximately 2m high and 2m wide at the time of survey. A shallow dry ditch runs along the eastern side of the hedgerow with a channel measuring approximately 0.5m deep and 1m wide.
121. Intensively farmed arable land used primarily for cereal production. The field margins are generally narrow (2-3m) and support common and widespread ruderal and arable weed species including Nettle, Hogweed, Cleavers, Horsetail (*Equisetum* sp.), Bristly Ox-tongue, Mugwort, Spear Thistle (*Cirsium vulgare*), Creeping Thistle, Cock's-foot, False Oat-grass, White Champion, White Dead-nettle, Green Alkanet (*Pentaglottis sempervirens*), Wall Rocket (*Diploaxis tenuifolia*) and Forget-me-not.
122. A mostly intact native, species-poor hedgerow dominated by Hawthorn with Blackthorn, English Elm, Ash, Elder and a mature Oak tree. The hedgerow had not been recently managed and measured approximately 2m high and 2m wide at the time of survey. A dry ditch runs along the eastern side of the hedgerow with a channel measuring approximately 1m deep and 1-2m wide supporting dense Nettle, Great Willowherb and Bramble.
123. Corner of an arable field supporting a small number of mature Pedunculate Oak trees and young Scot's Pine with a sparse understory dominated by Elder with Hazel, and a ground layer of Bramble and Ivy.
124. Intact hedgerow forming the boundary of the site including Hawthorn, Blackthorn, Elder, Alder, Blackthorn and Crab Apple. Scrub and trees located beyond the boundary adjacent to a single lane road include abundant young Ash trees.
125. Corner of an arable field supporting a small number of mature Pedunculate Oak and Crack Willow trees with Hawthorn and Blackthorn in the understory. Beneath is a seasonal pond which was dry at the time of survey and supports no aquatic or marginal vegetation.
126. A mostly intact native hedgerow dominated by Blackthorn with Hawthorn, Elder and Ash, Oak and Aspen trees. The hedgerow had not been recently managed and measured approximately 2m high and 2m wide at the time of survey. A dry ditch runs along the western side of the hedgerow with a channel measuring approximately 1m deep and 1m wide. Gaps in the hedgerow support dense Bramble with Cleavers.
127. A wide margin along the River Ouzel corridor which borders arable fields to the east comprises mature trees, occasional scrub and a wide rough grassland field margin. Tree species include Crack Willow, Ash, White Willow and hybrid Black Poplar (*Populus nigra* x *deltoides* = *P. x canadensis*). The less-shaded banks of the river support rough grassland and ruderals including Cock's-foot, Timothy, Creeping Bent, Perennial Rye-grass, False Oat-

grass, Wild Oat and Common Reed. Other abundant species include Nettle, Teasel, Hogweed, Cleavers, Spear Thistle, Himalayan Balsam, Broad-leaved Dock and Bramble.

128. A small area of uncultivated ground comprising tussocky grass including Timothy, Cock's-foot and Italian Rye-grass (*Lolium multiflorum*).
129. Brook corridor lined with mature Ash and Crack Willow trees. Rough grass and Bramble grow along the banks of the brook.
130. A short section of defunct native hedgerow dominated by Hawthorn with abundant English Elm and Elder. Substantial gaps in the hedgerow are filled with Bramble.
131. A large riverside field comprising improved grassland established on former arable land. The sward is regularly grazed by cattle and was short at the time of survey. It is dominated by Perennial Rye-grass with occasional Cock's-foot and White Clover.
132. A field boundary comprising a line of mature hybrid Poplar trees with a defunct outgrown hedgerow beneath including Hawthorn, Blackthorn, English Elm, Elder and Bramble.
133. A mostly intact native hedgerow running along a brook corridor dominated by Hawthorn and Blackthorn with abundant English Elm, Elder and Bramble. The hedgerow had not been recently cut and no ditch was associated with the boundary.
134. A small wet area in the corner of an arable field adjacent to the Broughton Brook supporting planted hybrid Black Poplar trees with a ground layer dominated by Cleavers and Common Nettle.
135. A wide margin along the site boundary adjacent to Broughton Brook comprising rough species-poor grassland. The grassland is dominated by tussocky Cock's-foot with occasional Broad-leaved Dock, Hogweed and Nettle.
136. A tributary to the River Ouzel, known as Broughton Brook, with a 4-5m wide channel and a strong northerly flow. The eastern bank within the site had been recently cut and comprises grasses and abundant Common Nettle. The channel itself supports abundant Reed Canarygrass and Common Club Rush (*Schoenoplectus lacustris*). The western bank comprises rough grass and scrub.
137. A small group of early-mature Crack Willow trees along the bank of Broughton Brook.
138. Intact hedgerow and fenceline running along the site boundary adjacent to the M1 motorway. The hedgerow is dominated by Hawthorn with occasional Elder, English Elm and abundant Bramble. The hedgerow measures approximately 3m high and 2m wide. A seasonally wet ditch runs to the south of the hedgerow and supports Common Reed and Greater Pond-sedge along its western section with Crack Willow and Goat Willow trees along its bank.
139. A small area of regenerated woodland in the corner of an arable field. The area is dominated by early-mature Elm (possibly Smooth-leaved Elm (*Ulmus minor*)). The understory comprises suckered Elm and occasional Ash and Wild Cherry, with fallen deadwood throughout.
140. An outgrown native hedgerow with adjacent mature scrub dominated by Hawthorn with occasional Blackthorn, English Elm, Elder, Wild Cherry, Pedunculate Oak and an early-mature Ash tree. The hedgerow had not been recently cut. A ditch running along its eastern edge has a channel measuring approximately 1m deep and 1m wide, becoming deeper at the southern end.

141. A mostly defunct native hedgerow dominated by Hawthorn with Blackthorn, English Elm, Elder, Field Maple and Crab Apple. A dry ditch runs along the hedgerow with a channel measuring approximately 0.5m deep and 1m wide, becoming shallower at the western end.
142. A utilities sub-station comprising hardstanding, with a track leading from London Road to the east, and dense scrub on the margins dominated by Bramble.
143. A complex of barns constructed of timber and corrugated metal used for storage and as a shelter for cattle. The surrounding field margins comprise bare earth, rough grass and tall ruderals.
144. A small field comprising improved species-poor grassland which is regularly grazed by horses and has a short sward. The grassland may have been relatively recently established over former arable land. The dominant species include Perennial Rye-grass, Creeping Buttercup, White Clover and Dandelion.
145. An intact native hedgerow along London Road dominated by Hawthorn with English Elm, Blackthorn, Ash, Elder, Crab Apple and Bramble. A shallow dry ditch running along the hedgerow base has a channel measuring up to 0.5m deep and 1m wide.
146. Two intact native hedgerows along a gravel track dominated by Hawthorn with English Elm, Blackthorn, Ash, Elder and Bramble. The hedgerows measure approximately 2.5m high and 1.5m wide and had been flail cut on just one side at the time of survey. Shallow dry ditches running along the hedgerow bases have a channel measuring up to 0.5m deep and 1m wide.
147. Small area of woodland dominated by fairly mature native trees in the north and early-mature specimens in the south which have likely been planted more recently. Tree species include Pedunculate Oak, Ash, Norway Maple, Poplar species, Aspen and Small-leaved Lime, and the understorey also includes Blackthorn and Crab Apple. Ground flora is heavily shaded and dominated by Cow Parsley (*Anthriscus Sylvestris*) and Common Nettle.
148. An intact native hedgerow dominated by Hawthorn with English Elm, Ash, and Crab Apple, including a small number of mature Ash trees. The hedgerow had recently been flail cut to approximately 2m high and 2m wide at the time of survey. A dry ditch runs along the western side of the hedgerow with a channel measuring approximately 1m deep and 1m wide and is choked with grasses and tall ruderal vegetation.
149. Corner of an arable field supporting early-mature Ash and Scot's Pine.
150. A wide strip of mown improved species-poor grassland along the western margin of an arable field. The grassland may have been relatively recently established over former arable land.
151. A section of the site boundary which borders a complex of residential properties comprises wooden post and rail fencing and lines of 8-12m tall Cypress trees.
152. A mostly unmanaged area of land in the corner of an arable field comprising improved grassland with stands of dense tall ruderal vegetation. A section had been mown for amenity use by neighbouring residential properties. Other sections had been used for the dumping of garden waste and storing trailers.
153. Field boundary bordering the A509 to the north comprising a fenceline and hedgerow with a dry ditch and scrub to the north. The hedgerow is intact, heavily dominated by Hawthorn and had been flail cut to approximately 2.5m high and 1.5m wide. The shallow dry ditch running along the hedgerow base to the north had a channel measuring up to 0.5m deep and 1m wide.

and is heavily overgrown with scrub, in particular Bramble. Scrub and tree planting along the verge of the A509 includes Hawthorn, Wild Cherry and Crack Willow.

- 154.** An intact native hedgerow dominated by Hawthorn with English Elm, Ash, Blackthorn and Crab Apple, including a small number of mature Ash trees. The hedgerow had recently been flail cut to approximately 2m high and 2m wide at the time of survey. A dry ditch runs along the eastern side of the hedgerow with a channel measuring approximately 1m deep and 1m wide and supports frequent Great Willowherb.
- 155.** An intact native hedgerow dominated by Hawthorn with English Elm, Ash, Blackthorn, Crab Apple and Dog Rose. A dry ditch runs along the southern side of the hedgerow with a channel measuring approximately 1m deep and 1m wide. A number of mature Oak and Ash trees occur along the southern bank of the ditch.
- 156.** A small area of woodland within the corner of an arable field just beyond the site boundary. The area supports a couple of mature Oak trees and an abundance of smaller trees and scrub including Field Maple, English Elm, Hawthorn, Ash, Horse Chestnut and Lime (*Tilia* sp.), some of which are likely to have been planted.
- 157.** Two mostly intact native hedgerows dominated by Hawthorn with English Elm, Blackthorn and Oak. The hedgerows measure approximately 2.5m high and 1m wide and had been flail cut on just one side at the time of survey.
- 158.** A small area between arable fields dominated by early-mature Ash and Norway Maple trees with a ground layer of Bramble and Nettle. The foundations and one wall remain of a former brick farm building in the centre of the area.
- 159.** A mostly intact native hedgerow dominated by Hawthorn, Blackthorn and English Elm measuring approximately 2.5m high and 1.5m wide. A dry ditch runs along the eastern side of the hedgerow with a channel measuring approximately 1m deep and 1m wide.
- 160.** Pond: A seasonally wet pond located in the corner of an arable field and surrounded by hedgerow and dense scrub and Ash trees. The pond measures approximately 10x6m and forms part of the ditch network, being fed from a drainage pipe to the east. The pond was mostly dry at the time of survey and supports no aquatic or marginal vegetation other than Greater Reedmace. Surrounding scrub includes Hawthorn, Blackthorn and Bramble.
- 161.** An intact native hedgerow dominated by Hawthorn, Blackthorn and English Elm, with a number of mature Ash trees. The hedgerow had recently been flail cut on the southern side only. A shallow dry ditch runs along the base of the hedgerow with a channel measuring approximately 0.5m deep and 1m wide.
- 162.** An intact native hedgerow heavily dominated by Hawthorn with Ash and a mature Oak tree. The hedgerow had recently been flail cut to approximately 2m high and 1.5m wide at the time of survey. A shallow dry ditch runs along the base of the hedgerow with a channel measuring approximately 0.5m deep and 1m wide.
- 163.** An intact native hedgerow dominated by Hawthorn with English Elm, Blackthorn and Ash. The hedgerow had recently been flail cut at the time of survey. A very shallow dry ditch runs along the base of the hedgerow with a channel measuring up to 0.3m deep and 1m wide.
- 164.** An intact native hedgerow dominated by Hawthorn with English Elm, Blackthorn and Ash. A shallow dry ditch runs along the base of the hedgerow with a channel measuring approximately 0.5m deep and 1m wide.

165. A line of planted early mature trees included Pedunculate Oak, Norway Maple and Wild Cherry, and a dry ditch with a channel measuring approximately 2m wide and 1m deep supporting abundant Great Willowherb and Bramble.
166. A small area in the corner of an arable field supporting mature Oak trees and early-mature Norway Maple with a sparse understory of English Elm and Elder. The ground flora includes Bramble, Nettle and Ivy.
167. Site boundary bordering hotel to the south comprising a dry ditch with a channel measuring approximately 1.5m deep and 2m wide. The southern bank comprises a brick wall and the northern bank was earth with recently cut ruderal vegetation dominated by Bramble, Nettle and Ivy.
168. An area of species-poor grassland used as a campsite and for grazing horses. The grassland is intensively managed through mowing or grazing and has a short sward. The sward is dominated by Perennial Rye-grass with Cock's-foot, Yorkshire Fog, White Clover, Dandelion, Common Chickweed, Red Clover, Creeping Thistle and Forget-me-not. More frequent ruderals occur on the margins of the area including Broad-leaved Dock, Nettle, Mugwort, Bristly Ox-tongue, Green Alkanet and Teasel.
169. A complex of large sheds and warehouse style buildings surrounded by areas of hardstanding.
170. A line of early-mature Cypress, Oak, Norway Maple and Field Maple of approximately 15m in height.
171. A line of early-mature Cypress trees around 15m in height, forming the boundary between the site and hotel grounds to the west.
172. Four mature Pedunculate Oak (*Quercus robur*) trees.
173. Two lightly cattle grazed fields, comprising relatively species-rich semi-improved neutral grassland to the west of the River Ouzel. Its species composition is broadly characteristic of NVC classification MG4 (Meadow Foxtail - Great Burnet grassland), with scattered tussocks of Thistle sp. throughout. Species recorded include Meadow Foxtail, Sweet Vernal-grass (*Anthoxanthum odoratum*), Yorkshire Fog, Red Fescue (*Festuca rubra*), Tall Fescue (*Festuca arundinacea*), Tufted Hair-grass, Cock's-foot, Creeping Bent, Rough Meadow-grass, Smooth Meadow-grass (*Poa pratensis*), Meadow Oat-grass (*Avenula pratensis*), Crested Dog's-tail (*Cynosurus cristatus*), False Oat-grass, Perennial Rye-grass, Soft Brome, Field Woodrush (*Luzula campestris*), Hairy Sedge (*Carex hirta*), Meadow Buttercup, Creeping Buttercup, Dandelion, Cut-leaved Cranesbill (*Geranium dissectum*), Common Nettle, Common Sorrel (*Rumex acetosa*), Curled Dock (*Rumex crispus*), Broad-leaved Dock, Pignut (*Conopodium majus*), Common Mouse-ear, Germander Speedwell (*Veronica chamaedrys*), Lesser Stitchwort (*Stellaria graminea*), Yarrow, Spear Thistle, Creeping Thistle, Red Clover, Cuckoo Flower (*Cardamine pratensis*), Meadow Vetchling (*Lathyrus pratensis*), Greater Burnet (*Sanguisorba officinalis*), Hogweed, Lady's Bedstraw (*Galium verum*), Lesser Trefoil (*Trifolium dubium*), and Tormentil (*Potentilla erecta*). The western area of the southern field shows evidence of ridge and furrow.
174. Species-poor, semi-improved grassland field subject to heavy cattle grazing with a short sward at the time of survey. The species composition has a high dominance of grasses, in particular Perennial Rye-grass. Other species present include Small Cat's-tail, Annual Meadow-grass, Meadow Barley (*Hordeum brachyantherum*), Common Bent (*Agrostis*

**Appendix C**

**Breeding Bird Survey Results Summary Table**

Breeding bird survey results summary table for Milton Keynes East in 2019:

Common Name	Scientific Name	Annex 1 <sup>1</sup>	WCA 1 <sup>2</sup>	NERC 41 <sup>3</sup>	BOCC4 (2015) <sup>4</sup>	IBA**	NOTES ON BREEDING/OCCURRENCE	NO. TERRITORIES/ BREEDING PAIRS ASSOCIATED WITH SITE***
<b>Mute Swan</b>	<i>Cygnus olor</i>				Amber	3	Adult and juvenile recorded in river corridor on a number of survey visits. Likely 1 breeding pair within the site.	1
Canada Goose	<i>Branta canadensis</i>					2	Rare: Small number of individuals recorded foraging or flying over the site on an occasional basis. Likely breeding within the vicinity of the site.	n/a
<b>Mallard</b>	<i>Anas platyrhynchos</i>				Amber	1	Small numbers of pairs/ individuals recorded within the river corridor in the west of the site and flying over the site. At least one pair likely breeding within the site.	1
<b>Red-legged Partridge</b>	<i>Alectoris rufa</i>					2	Occasional: Small numbers of pairs/ individuals recorded in association with arable habitats across the site. Likely breeding within the site.	n/a
<b>Pheasant</b>	<i>Phasianus colchicus</i>					0	Occasional: Individuals and pairs recorded on an occasional basis in association with farmland habitats across the site. Likely breeding within the site.	n/a
Grey Heron	<i>Ardea cinerea</i>				Green	2	Rare: Individual recorded on a single occasion in association with the river corridor in the west of the site. Likely to be breeding in close vicinity of the site.	n/a
<b>Red Kite</b>	<i>Milvus milvus</i>				Green	3	Pairs and individuals recorded foraging over the site on most survey visits. Likely hold part of breeding territory within the site with nest in an off-site location.	n/a
Sparrowhawk	<i>Accipiter nisus</i>				Green	2	Rare: Individual recorded on a single occasion within the central area of the site near the Moulsoe Buildings. Unlikely breeding within the site.	n/a
<b>Buzzard (Common)</b>	<i>Buteo buteo</i>				Green	2	Frequent: Individuals and small groups recorded foraging over site on all surveys. Adult with juveniles recorded on one survey indicating this species is likely breeding within the site.	n/a
<b>Barn Owl</b>	<i>Tyto alba</i>				Green	3	One breeding territory within the site, potentially nesting in an undetermined building or hollow tree within or close to the site. Recorded foraging across farmland habitats across the site during the bat activity survey.	1

Moorhen	<i>Gallinula chloropus</i>				Green	1	Rare: Individual recorded on a single occasion within the pond in the east of the site. Unlikely breeding within the site.	n/a
Lapwing	<i>Vanellus vanellus</i>				Red	1	Up to four breeding territories recorded in association with the arable farmland habitats in the western and north-eastern areas of the site.	Up to 4
Black-headed Gull	<i>Chroicocephalus ridibundus</i>				Amber	1	Rare: Recorded flying over the site on a small number of surveys. Not breeding within the site.	0
Feral Pigeon	<i>Columba livia</i> (domest.)					1	rare: Low numbers recorded foraging over site on all visits on a small number of occasions.	n/a
Woodpigeon	<i>Columba palumbus</i>					0	Abundant: High numbers of pairs/small groups recorded foraging within farmland habitats across the site.	n/a
Collared Dove	<i>Streptopelia decaocto</i>				Green	1	Rare: Pairs recorded in on an occasional basis within the site. Likely breeding within site.	n/a
Swift	<i>Apus apus</i>				Amber	2	Individuals recorded flying over the site on three occasions. Unlikely breeding within the site.	0
Green Woodpecker	<i>Picus viridis</i>				Green	2	Occasional: individual recorded on most survey visits in the western area of the site, with three individuals recorded on the fourth survey visit in the central area of the site. Likely breeding in small numbers within the site.	n/a
Great Spotted Woodpecker	<i>Dendrocopos major</i>				Green	1	Rare: Individual recorded on a two occasions. Likely breeding within the vicinity of the site.	n/a
Kestrel	<i>Falco tinnunculus</i>				Amber	2	Rare: Individual recorded foraging within the south-eastern area of the site on a single occasion. Likely breeding in the vicinity of the site.	n/a
Magpie	<i>Pica pica</i>				Green	1	Frequent: Pairs and individuals regularly recorded across the site. Likely breeding within the site.	n/a
Jackdaw	<i>Corvus monedula</i>				Green	0	Abundant: Small groups recorded across the site during all survey visits. Highly likely to be breeding within site.	n/a
Rook	<i>Corvus fruilegus</i>				Green	1	Frequent: Large numbers of pairs/ small groups recorded foraging in association with woodland, grassland and farmland habitats across the site. Rookery present within trees to the east of London Road.	n/a
Carrion Crow	<i>Corvus corone</i>				Green	1	Frequent: Small groups and pairs regularly recorded foraging throughout the site and on land immediately adjacent to the site. Highly likely breeding within site.	n/a

<b>Blue Tit</b>	<i>Parus caeruleus</i>				Green	0	Abundant: Small groups and pairs regularly recorded foraging throughout the site and on land immediately adjacent to the site. Highly likely that a large number of breeding pairs are present within the site.	n/a
<b>Great Tit</b>	<i>Parus major</i>				Green	0	Abundant: Small groups and pairs regularly recorded foraging throughout the site and on land immediately adjacent to the site. Highly likely that a large number of breeding pairs are present within the site.	n/a
<b>Skylark</b>	<i>Alauda arvensis</i>				Red	0	Up to 41 breeding territories associated with arable and grassland fields across all areas of the site.	Up to 41
Swallow	<i>Hirundo rustica</i>				Green	1	Frequent: Moderate numbers of pairs/ small groups recorded foraging over arable fields. Possibly breeding within the site but no breeding behaviour recorded.	n/a
House Martin	<i>Delichon urbicum</i>				Amber	1	Rare: Individual recorded flying over the site on a single occasion. Unlikely breeding within the site.	0
<b>Long-tailed Tit</b>	<i>Aegithalos caudatus</i>				Green	1	Frequent: Small groups recorded in association with hedgerow, tree and woodland habitats across the site. Likely breeding within the site.	n/a
<b>Chiffchaff</b>	<i>Phylloscopus collybita</i>				Green	0	Rare: Low numbers of individuals recorded within the site. Likely breeding within site.	n/a
<b>Blackcap</b>	<i>Sylvia atricapilla</i>				Green	0	Occasional: Individuals recorded occasionally within the site. Highest numbers recorded in the west of the site. Highly likely a small number of breeding territories are present within the site.	n/a
<b>Whitethroat</b>	<i>Sylvia communis</i>				Green	0	Frequent: Moderate numbers of individuals recorded in association with hedgerow habitats across the site. Likely breeding within the site.	n/a
<b>Sedge Warbler</b>	<i>Acrocephalus schoenobaenus</i>				Green	1	Three individuals recorded on a single survey in association with vegetation along the river corridor in the west of the site. Possibly breeding within site.	n/a
Reed Warbler	<i>Acrocephalus scirpaceus</i>				Green	1	Rare: Individual recorded on a single occasion in association with the river corridor in the west of the site. Unlikely to be breeding within site.	n/a
Nuthatch	<i>Sitta europaea</i>				Green	1	Rare: Individual recorded on a single occasion in the north of the site.	n/a
<b>Wren</b>	<i>Troglodytes troglodytes</i>				Green	0	Frequent: Low-moderate numbers of individuals recorded in association with hedgerow and woodland habitats across the site. Likely breeding within the site.	n/a

<b>Starling</b>	<i>Sturnus vulgaris</i>				Red	0	At least one breeding pair within the site, with four juveniles recorded within the western-most area of the site. Individuals also recorded in central area of the site.	1
<b>Blackbird</b>	<i>Turdus merula</i>				Green	0	Abundant: Pairs and individuals recorded across the site on all surveys.	n/a
<b>Song Thrush</b>	<i>Turdus philomelos</i>				Red	0	Up to 4 breeding pairs in association with woodland in the south-eastern area of the site and hedgerows in the north-eastern area of the site	Up to 4
<b>Robin</b>	<i>Erithacus rubecula</i>				Green	0	Frequent: Regularly recorded in association with hedgerow and woodland habitat across the site.	
<b>Dunnock</b>	<i>Prunella modularis</i>				Amber	0	Up to 31 breeding territories in association with hedgerow habitats located across the site.	Up to 31
<b>House Sparrow</b>	<i>Passer domesticus</i>				Red	0	Up to twenty-six breeding territories recorded in association with hedgerow habitats close to buildings within the site.	Up to 26
<b>Yellow Wagtail</b>	<i>Motacilla flava</i>				Red	2	At least two breeding territories; one in the central area of the site and one in the western area of the site. Pairs and individuals were also recorded foraging in the central area of the site and the south-western area of the site but were not displaying breeding behaviour at the time of surveys.	At least 2
<b>Grey Wagtail</b>	<i>Motacilla cinerea</i>				Red	2	Rare: Individual recorded on a single survey in the central area of the site. Unlikely breeding within the site.	0
<b>Pied Wagtail</b>	<i>Motacilla alba</i>				Green	1	Occasional: Small numbers of pairs/ individuals recorded in association with grazed grassland habitats on an occasional basis. Likely breeding within the site.	n/a
<b>Meadow Pipit</b>	<i>Anthus pratensis</i>				Amber	0	Rare: Individuals recorded in association with arable farmland habitat on a small number of occasions in the western area of the site and the south-eastern area of the site.	0
<b>Chaffinch</b>	<i>Fringilla coelebs</i>				Green	0	Frequent: Small groups recorded foraging within hedgerows across the site on a regular basis.	n/a
<b>Bullfinch</b>	<i>Pyrrhula pyrrhula</i>				Amber	1	Up to one breeding pair possible associated with hedgerow and farmland habitat within the western area of the site.	1
<b>Greenfinch</b>	<i>Carduelis chloris</i>				Green	0	Occasional: Individuals and small groups recorded on most surveys within the central eastern and south-eastern areas of the site. Likely breeding in small numbers within the site.	n/a

<b>Linnet</b>	<i>Carduelis cannabina</i>				Red	1	Up to nine breeding territories associated with hedgerows along arable fields in the eastern areas of the site.	Up to 9
<b>Goldfinch</b>	<i>Carduelis carduelis</i>				Green	0	Frequent: Pairs and small groups recorded across the site on all of survey visits.	n/a
<b>Yellowhammer</b>	<i>Emberiza citrinella</i>				Red	1	Up to 42 breeding territories recorded in association with hedgerows across the site.	42
<b>Reed Bunting</b>	<i>Emberiza schoeniclus</i>				Amber	1	Up to six breeding pairs recorded in association with vegetation along the river corridor or within neighbouring fields in the west of the site.	Up to 6
total = 54 species (39 holding breeding territories over site)		1 (1 possible territory)	2 (1 possible breeding)	11 (11 breeding)	9 Red list (8 breeding); 10 Amber list (5 breeding)			

\* Species listed in **bold** are considered to hold significant areas of breeding territory over the site during the 2019 breeding season.

\*\* Index of Breeding Abundance (IBA) values based on latest robust breeding population data (Musgrove et al, 2013) using criteria from JNCC guidance for selection of biological SSSIs (Drewitt et al., 2015).

\*\*\* Only species meeting nature conservation criteria holding significant breeding territory over the site are considered in this column.

**Appendix D**

**Wintering Bird Survey Results Summary Table**

Wintering bird survey results summary table for Milton Keynes East 2018-2019:

COMMON NAME	LATIN NAME	Annex 1 Directive 2009/247/E C	Sched. 1 W&C Act 1982	UK BAP/ Sec.41 NERC Act.	BoCC 2015 (Red/ Amber/ Green/ No status)	IBA*	NOTES ON OCCURRENCE
Mute Swan	<i>Cygnus olor</i>					3	Individuals and pairs recorded within the River Ouzel channel in the western area of the site, with up to eight individuals recorded on any one occasion. Small groups also recorded flying over the site.
Greylag Goose	<i>Anser anser</i>					2	Two individuals recorded near the river channel in the western area of the site during the fourth survey visit.
Canada Goose	<i>Branta canadensis</i>					2	Up to four individuals recorded on three of the survey visits, associated with the river corridor in the west of the site.
Mallard	<i>Anas platyrhynchos</i>					1	Up to two individuals recorded using the river corridor during three of the survey visits. A group of six individuals was recorded flying over the site on the third visit.
Red-legged Partridge	<i>Alectoris rufa</i>					2	Small groups and individuals recorded in the central and southern areas of the site during the first, third and fifth surveys.
Pheasant	<i>Phasianus colchicus</i>					0	Up to 12 individuals recorded across the site during all surveys.
Cormorant	<i>Phalacrocorax carbo</i>					3	Six individuals recorded on the first survey and one individual recorded on the third survey.
Red Kite	<i>Milvus milvus</i>					3	One individual recorded on the second survey and two individuals recorded on the fifth survey.
Sparrowhawk	<i>Accipiter nisus</i>					2	Individual recorded on two occasions.
Buzzard (Common)	<i>Buteo buteo</i>					2	At least 3 individuals recorded across the site on each survey visit, with up to 6 individuals recorded during the third and fourth survey visits.
Moorhen	<i>Gallinula chloropus</i>					1	Individual recorded during the fifth survey along the river corridor in the west of the site.
Grey Partridge	<i>Perdix perdix</i>					2	Eight individuals recorded flying westwards from land east of the river corridor during the first survey.
Lapwing	<i>Vanellus vanellus</i>					1	Individuals and small groups recorded during all surveys other than the first, with a maximum count of 22 individuals recorded in the south of the site during the second survey.
Woodcock	<i>Scolopax rusticola</i>					2	Individual recorded below a hedgerow in the southern area of the site during the second survey visit.
Snipe	<i>Gallinago gallinago</i>					2	Individual recorded on a single occasion during the third survey visit in association with a hedgerow in the central area of the site.
Black-headed Gull	<i>Chroicocephalus ridibundus</i>					1	At least 10 individuals recorded flying over the site or foraging in fields on the first four survey visits. A maximum count of 88 individuals recorded during the second survey visit.
Common Gull	<i>Larus canus</i>					2	Eight individuals recorded flying over the site during the fourth survey visit.
Lesser B.b. Gull	<i>Larus fuscus</i>					1	Three individuals recorded flying over the site during the second survey.
Herring Gull	<i>Larus argentatus</i>					1	Individual recorded flying over the site on a single occasion.
Feral Pigeon	<i>Columba livia</i> (domest.)					1	Five individuals recorded on the fourth survey.
Stock Dove	<i>Columba oenas</i>					1	Two individuals recorded in association with hedgerows in the northern area of the site during the first survey visit.

Woodpigeon	<i>Columba palumbus</i>					0	Groups and individuals recorded across the site with a maximum count of 210 individuals during the third survey.
Collared Dove	<i>Streptopelia decaocto</i>					1	Five individuals recorded on the fifth survey located within the northern and southern areas of the site.
Kingfisher	<i>Alcedo atthis</i>					3	Individual recorded during the first and fifth survey visits along the river corridor in the west of the site.
Green Woodpecker	<i>Picus viridis</i>					2	Up to four individuals recorded on three of the survey visits.
Great Spotted Woodpecker	<i>Dendrocopos major</i>					1	Up to four individuals recorded across the site during the first four surveys.
Kestrel	<i>Falco tinnunculus</i>					2	Individual recorded on three occasions foraging within the western, central and southern areas of the site.
Magpie	<i>Pica pica</i>					1	Up to 20 individuals recorded across the site during all survey visits.
Jackdaw	<i>Corvus monedula</i>					0	Individuals and small groups recorded across the site during all survey visits other than the first, with a maximum count of 35 individuals.
Rook	<i>Corvus fruilagus</i>					1	Groups and individuals recorded across all areas of the site, with a maximum count of 163 individuals recorded during the first survey.
Carrion Crow	<i>Corvus corone</i>					1	Up to 34 individuals recorded across the site on each survey visit.
Blue Tit	<i>Parus caeruleus</i>					0	Up to 57 individuals recorded on any one survey in association with hedgerow and woodland habitats.
Great Tit	<i>Parus major</i>					0	Up to 57 individuals recorded on any one survey in association with hedgerow and woodland habitats.
Skylark	<i>Alauda arvensis</i>					0	Individuals and small groups recorded across the site in association with arable fields. A maximum count of 44 individuals was recorded across the site during the fourth survey visit.
Long-tailed Tit	<i>Aegithalos caudatus</i>					1	12 individuals recorded in the southern area of the site during the first survey.
Chiffchaff	<i>Phylloscopus collybita</i>					0	One individual recorded on the fifth survey in the western area of the site.
Willow Warbler	<i>Phylloscopus trochilus</i>					0	One individual recorded within Pineham Nature Reserve immediately adjacent to the south of the site.
Reed Warbler	<i>Acrocephalus scirpaceus</i>					1	Two individuals recorded adjacent to the river in the western area of the site.
Wren	<i>Troglodytes troglodytes</i>					0	Up to fourteen individuals recorded across the site.
Starling	<i>Sturnus vulgaris</i>					0	Small group of 12 individuals recorded in the western area of the site in association with grassland on the first survey visit and a pair recorded in association with farm buildings in the southern area of the site during the fifth survey visit.
Blackbird	<i>Turdus merula</i>					0	At least 27 individuals recorded across the site on each visit in association with hedgerow and woodland habitats. A maximum count of 47 individuals was recorded across the site on the fourth survey visit.

Fieldfare	<i>Turdus pilaris</i>					6	Groups recorded across the site in association with arable fields and hedgerows. Groups ranging in size from 40 - 150 individuals recorded during the first and second surveys, with a maximum count of 212 individuals recorded on the second survey. Up to five individuals recorded on the third and fifth surveys in the southern area of the site only.
Song Thrush	<i>Turdus philomelos</i>					0	Individuals recorded across the site in association with hedgerows and woodland. At least one individual was recorded during each survey with a maximum count of six individuals recorded across the site on the fourth survey visit.
Redwing	<i>Turdus iliacus</i>					5.5	Small groups recorded across farmland habitats during all surveys other than the first. Up to 50 individuals recorded across the site during a single survey visit.
Mistle Thrush	<i>Turdus viscivorus</i>					1	Small numbers of individuals recorded across the site during the fourth and fifth surveys. A maximum count of five individuals was recorded during the fifth survey.
Robin	<i>Erithacus rubecula</i>					0	At least 17 individuals recorded across the site on each visit.
Wheatear	<i>Oenanthe oenanthe</i>					1	Two individuals recorded in the central area of the site during the third and fourth survey visits and two individuals recorded in the northern area of the site during the fourth survey visit.
Duncock	<i>Prunella modularis</i>					0	Up to 15 individuals recorded in association with hedgerows across the site during all survey visits.
House Sparrow	<i>Passer domesticus</i>					0	Six individuals recorded in the west of the site during the second survey visit and two individuals recorded in the south of the site during the third survey visit.
Pied Wagtail	<i>Motacilla alba</i>					1	Small groups and individuals recorded across the site during all surveys, with up to 29 individuals recorded on a single survey.
Chaffinch	<i>Fringilla coelebs</i>					0	Up to 110 individuals recorded across the site on each survey visit.
Bullfinch	<i>Pyrrhula pyrrhula</i>					1	Three individuals recorded on the first survey visit only located in the central and southern areas of the site.
Greenfinch	<i>Carduelis chloris</i>					0	Up to four individuals recorded across the site during the majority of survey visits.
Linnet	<i>Carduelis cannabina</i>					1	Up to 29 individuals recorded across the site during all survey visits. This species was recorded most consistently in the northern area of the site in association with hedgerows, but was recorded in all areas of the site at least once.
Goldfinch	<i>Carduelis carduelis</i>					0	Up to 50 individuals recorded across the site on each survey visit.
Siskin	<i>Carduelis spinus</i>					1	Five individuals recorded in the northern area of the site during the third survey visit.
Yellowhammer	<i>Emberiza citrinella</i>					1	A minimum of five individuals recorded across the site during all surveys other than the second. A maximum count of fourteen individuals was recorded during the fifth survey visit.

Reed Bunting	<i>Emberiza schoeniclus</i>					1	Low numbers of individuals recorded in the western areas of the site during the third, fourth and fifth surveys. A maximum count of nine individuals was recorded on the fifth survey.
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\* Index of Breeding Abundance (IBA) values based on latest robust breeding population data (Musgrove et al, 2013) using criteria from JNCC guidance for selection of biological SSSIs (Drewitt et al., 2015).

**Appendix E**  
**Site Evaluation Methodology**

### Site Evaluation Methodology (taken from Drewitt *et al.*, 2015)

Published guidance by the JNCC on the selection of biological SSSI's (Drewitt *et al.*, 2015) provides a method for evaluating assemblages of breeding birds. Sites are eligible for selection as SSSI's if they support an especially good range of bird species characteristic of the habitat.

Lists of breeding bird assemblages of different habitats can be found below. Each species listed is given an index of breeding abundance (IBA) from 0 to 6, which refers to the current total number of breeding pairs in Britain (Musgrove *et al.*, 2013) as follows:

Breeding Pairs	IBA
>1 million	0
100,000 - 1,000,000	1
10,000 - 100,000	2
1,000 – 10,000	3
100 – 1,000	4
10 – 100	5
1 – 10	6

Where the population of a species falls on the border of two classes, an intermediate value may be given (e.g. 2.5).

The species list for each habitat is made up as follows. All species characteristic of the habitat and with indices of abundance of 4 to 6 (i.e. with a total British population less than 1,000 pairs) are included. Also included are more abundant species which are either primarily associated with this habitat or are associated with more than one habitat, some of which are particularly threatened by habitat change (for example drainage of wetlands or loss of heath or scrub). All species of index 0 (i.e. with more than 1 million pairs) are omitted from the lists.

The index value for a site is calculated by summing the indices of abundance for species breeding in it. A species may be included if it has been recorded as probably breeding in the majority of recent years for which information is available. Species regularly using a site for essential activities (such as feeding) while breeding may be included even if they nest outside the site. To qualify under section 3.8, the index value for a site should exceed the threshold value given for the relevant habitat.

The threshold values were derived as follows. For each habitat, the theoretical maximum score which could be obtained for those species with indices of 1 to 4 was calculated. Those species with scores of 5 and 6 were excluded, as these species with British populations of less than 100 pairs are generally very restricted in geographical distribution. In fact, this also applies to many species with an index of 3 or 4. Although species with indices of 5 and 6 are excluded in the calculation of site threshold values, any such species must be included in the calculation of a site index, as few, if any, will be present at

any one site and inclusion allows the required added importance to be given to the sites used by these rarer species (such sites might also qualify under section 3.2). Even with these rare species included, it is most unlikely that the theoretical maximum score would be achieved at any site because species from all parts of Britain and all subdivisions of the general habitat category concerned are included in its calculation. For most habitats, a site reaching half the theoretical maximum as calculated above would be an especially good example of the breeding bird community. Thus this half-maximum value is the threshold given for each habitat.

The differences in distribution patterns shown by birds make the provision of national values difficult. For some habitats, different values are given for different parts of Britain to make some allowance for this. Even if a single threshold level is given, this may allow for the absences of some species in some parts of the country. It is impracticable to make the very fine geographical divisions which biological purists might suggest. No list is provided for certain habitats (for example cliffs). In these cases, it is envisaged that sites selected on the basis of other criteria (for example see sections 3.2 or 3.5) should provide for adequate population coverage.

#### *Mixed habitats*

It is clearly impracticable to give lists for each possible combination of habitats within a site, although it is recognised that many bird species depend on a combination of habitats. Several approaches are possible:

- (i) if one (or more) of the composite habitats reaches the threshold value for that habitat, the whole site may be selected if the other habitats clearly form integral parts of the site;
- (ii) if two habitats are included in one well-defined site, the indices for species which are on both habitat lists and have been recorded for the site should be double-counted; other species score in the usual way; for the site to qualify on this basis, its total score should exceed the qualifying threshold value for the two habitats combined (for example for a woodland and lowland scrub combination  $39 + 14 = 53$ ).

In all cases, local knowledge of the site and its context is essential.

**Tables of breeding bird assemblage index values of different habitats – see above text for explanation.**

#### **Lowland scrub (excluding heath)**

Turtle Dove	2	Grasshopper Warbler	2
Cuckoo	2.5	Nightingale	3
Long-eared Owl	3	Linnet	1
Willow Tit	3	Lesser Redpoll	1
Long-tailed Tit	1	Bullfinch	1
Garden Warbler	1	Yellowhammer	1
Lesser Whitethroat	2	Cirl Bunting	4

#### *Site threshold values*

14 (this does not readily apply to Wales, Scotland or Northern England)

### **Lowland Farmland**

Grey Partridge	2	Cuckoo	2.5
Quail	4	Barn Owl	3
Marsh Harrier	4	Magpie	1
Montagu's Harrier	5	Rook	1
Buzzard	2	Swallow	1
Kestrel	2	Tree Sparrow	1
Hobby	3	Yellow Wagtail	2
Corncrake	3	Pied Wagtail	1
Stone-curlew	4	Linnet	1
Lapwing	1	Yellowhammer	1
Curlew	2	Cirl Bunting	4
Crane	5	Reed Bunting	1
Stock Dove	1	Corn Bunting	2.5
Turtle Dove	2		

#### *Site threshold values*

S and E England: 26

Wales: 17.5

Rest of Britain: 22

### **Woodland**

Grey Heron	2	Crested Tit	3
Little Egret	4	Coal Tit	1
Honey-buzzard	5	Willow Tit	3
Red Kite	3	Marsh Tit	2
Goshawk	4	Long-tailed Tit	1
Sparrowhawk	2	Wood Warbler	3
Buzzard	2	Garden Warbler	1
Osprey	4	Nuthatch	1
Hobby	3	Treecreeper	1
Black Grouse	3	Fieldfare	6
Capercaillie	4	Redwing	5.5
Woodcock	2	Spotted Flycatcher	2
Stock Dove	1	Nightingale	3
Cuckoo	2.5	Pied Flycatcher	2
Tawny Owl	2	Redstart	1.5
Long-eared Owl	3	Tree Pipit	1.5
Wryneck	6	Siskin	1
Green Woodpecker	2	Lesser Redpoll	1
Great Spotted Woodpecker	1	Common Crossbill	2
Lesser Spotted Woodpecker	3	Scottish Crossbill	2.5
Jay	1	Bullfinch	1
Raven	3	Hawfinch	4
Firecrest	4		

#### *Site threshold values*

Northern Scotland: 33.5

Wales: 37.5

Rest of Britain: 39

# **Appendix 8 Reptile Survey Report**

**MILTON KEYNES EAST**

**REPTILE SURVEY REPORT**

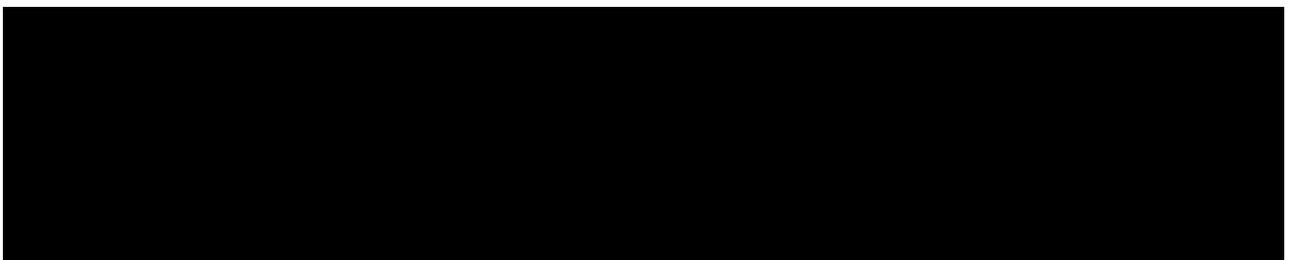
**Prepared for St James**

**by**

**Hankinson Duckett Associates**

**HDA ref: 2090.52**

**February 2020**



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## **APPENDICES**

A Reptile Survey Summary Plan

# 1 INTRODUCTION

## 1.1 Site location and summary description

1.1.1 This report describes the results of a reptile survey conducted on approximately 362ha of land at Newport Pagnell, Buckinghamshire hereinafter referred to as 'the site'. The site can be located by National Grid Reference SP893419. The study was commissioned by St James in July 2018.

1.1.2 The site is located to the south of Newport Pagnell, on the north-eastern edge of Milton Keynes, Buckinghamshire. The site is dominated by agricultural land comprising intensively managed arable and grazed grassland fields with associated farmyards, agricultural buildings and residential farm houses. Field boundaries generally consist of hedgerows, treelines and fencing with occasional ponds and parcels of woodland, and the River Ouzel flows from south to north through the western part of the site. The site is bordered to the north by a construction site for residential development and the A422 beyond which lies the town of Newport Pagnell; to the east by arable farmland; to the west by the Pineham Nature Reserve and the M1 Motorway beyond which lies the town of Milton Keynes; and to the south by arable farmland.

1.1.3 The location and boundary of the site are shown in *Appendix A*. Detailed descriptions of the habitats within the site are given in the Ecological Appraisal (HDA, 2020).

## 1.2 Background and legislative context

1.2.1 Four species of reptile are widespread in England, Grass Snake *Natrix natrix*, Slow-worm *Anguis fragilis*, Common Lizard *Zootoca vivipara* and Adder *Vipera berus*. The Sand Lizard *Lacerta agilis* and Smooth Snake *Coronella austriaca* are restricted to certain sand dune and heathland sites.

1.2.2 Reptiles can be found in a range of habitats and typically require a mosaic of vegetation types. Habitat interfaces are important with reptiles requiring woodland, scrub or hedgerow for shelter, with adjacent longer vegetation for hunting and patches of sheltered short turf, bare ground or log piles for basking areas. Areas which catch the sun (i.e. those with a southerly aspect) are preferred over those where direct sunlight is absent for most of the day. In addition, Grass Snakes favour damp habitats such as those associated with still and running water, grazing marshes, mires etc.

1.2.3 All species of reptile are protected through Sections 9(1) and 9(5) of the 1981 Wildlife and Countryside Act (as amended). It is an offence to:

- Intentionally kill or injure any reptile; and
- Sell, offer for sale, possess or transport for the purposes of sale or publish advertisements to buy or sell any reptile.

Due to their rarity, Sand Lizards and Smooth Snakes have additional protection.

1.2.4 Reptiles across the UK have undergone significant declines in recent years and all species of reptile within the UK are now listed under Section 41 of the 2006 NERC Act as Species of Principal Importance. This requires planning authorities to regard these species as a material consideration in the planning process.

### **1.3 Development proposals**

1.3.1 Proposals for the site include mixed use development with associated landscaping and infrastructure.

### **1.4 Scope and purpose of the report**

1.4.1 During an initial walkover survey undertaken by HDA in 2012, habitats within and adjacent to the site were identified as suitable for use by reptiles in the form of woodland parcels, waterbodies and field margins comprising hedgerow bases and associated rough grassland, scrub and tall ruderal vegetation. A reptile survey was subsequently undertaken in 2012 which confirmed the presence of a very low population of Grass Snake within areas of suitable habitat across the site.

1.4.2 In recognition of the confirmed presence of reptiles in 2012, the time that has passed since the 2012 reptile survey was undertaken, the continued presence of suitable habitat for reptiles and the legislative context set out in *Section 1.2* above, an updated reptile survey was undertaken in 2018 to identify the continued presence/ likely absence of reptiles within the site. This is the subject of this report. Specifically, the aims of the updated reptile survey were:

- i. To establish the continued presence/ probable absence of reptiles;
- ii. To assess the relative importance of different parts of the survey area for reptiles; and
- iii. To predict likely impacts potentially arising from the proposed development of the site on reptiles and give recommendations for impact avoidance, minimisation and mitigation.

## **2 METHODOLOGY**

2.1 The methodology has been devised to accord with the requirements of all relevant legislation and good practice guidance, including the Herpetofauna Worker's Manual (JNCC, 1999) and Reptile Survey guidance (Froglife, 1999).

2.2 The site was surveyed on a total of six occasions by Kate Hair and Gerald Selvey of HDA. Surveys were generally carried out during optimum temperature and weather conditions (intermittent or hazy sunshine, temperature between 9°C and 20°C and low

winds). Dates of survey visits, with survey timings and weather conditions, are shown in *Table 1* below:

**Table 1:** Survey times and weather conditions

Survey visit	Date	Time of visit	Weather conditions	Temp (°C)
1	28.08.2018	9:00 -17:10	Dry, 100% cloud cover, calm.	16 - 20
2	03.09.2018	8:30 – 4.10	Dry 100% cloud cover, calm	14 – 25
3	11.09.2018	7:00 – 15:45	Light drizzle, 100% cloud, cool breeze	13 – 23
4	18.09.2018	9:00 – 15:45	Occasional showers, sunny spells, 40-100% cloud cover and strong breeze.	16 - 25
5	24.09.2018	9:05 – 17:05	Sunny warm, dry, 0-5% cloud cover, and calm.	9 – 20
6	1.10.2018	9:20 – 16:00	Sunny, dry, clear, breezy	10 - 15
6	2.10.2018	9:30 – 14:25	100% cloud, dry, breezy	10

- 2.3 Two methods of surveying were used. Firstly, artificial refugia (squares of roofing felt 0.5m x 0.5m) were placed, in advance of the survey commencing, at potential basking areas throughout the survey area. A total of 1,500 refugia were placed across the site, giving a total density of 4 refugia per hectare. Although this is below the recommended density of 5 to 10 refugia per hectare, the majority of the site comprises intensively farmed fields which were generally considered unsuitable for reptiles. The actual extent of potential reptile habitat forms only a small proportion of the site and therefore the actual density of refugia per hectare of suitable habitat considerably exceeded the recommended 5 to 10 refugia per hectare, thereby allowing a robust assessment of the presence/likely absence of reptiles and their distribution where suitable habitat occurs.
- 2.4 During each of the six visits, each refugium was inspected for any reptiles basking on the upper side, then lifted and checked for sheltering animals before being carefully replaced. A different route was taken each time to ensure that there was no bias due to time of survey.
- 2.5 The second survey method involved transect searches across suitable habitats within the site. This ensured that all areas were represented in the survey, and that the survey was not biased towards those reptiles more likely to use refugia. Transect searches involve walking slowly around the survey area, visually searching potential basking areas and marking the locations of any reptiles observed on a map. Potential reptile refuges already present within the survey area such as fallen deadwood were also lifted to check for the presence of animals.
- 2.6 The following information was recorded for each reptile survey: species seen, number of animals seen, location, date, start and finish times, temperature and weather.

## 2.7 Limitations

2.7.1 The reptile surveys were carried out at an appropriate time of year during suitable weather conditions. On a minority of occasions temperatures exceeded 20°C but it has been HDA's experience that minor exceedances do not significantly change rates of detection, and in some instances may improve detection of reptiles. Additionally, prior to the second survey visit approximately a third of the artificial refugia throughout the site had been destroyed. This is not considered a significant limitation however, as the number of 'settled' refugia across the site was maintained at above the recommended matting density of suitable habitat throughout the course of the survey and the rest of the mats remained undisturbed until completion of the survey. It is therefore considered that no significant limitations were encountered during the survey and the survey findings allow a robust assessment of the likely effects of the proposed development on reptiles.

## 3 RESULTS

### 3.1 Habitat assessment

3.1.1 The majority of the site comprises unsuitable reptile habitat, being dominated by intensively managed farmland. Suitable reptile habitat is limited to areas of woodland edge habitat, hedgerow bases, the banks of watercourses and the network of field margins comprising rough grassland, ditch, tall ruderal vegetation and scrub habitats.

### 3.2 Refugia and visual searches

3.2.1 Slow-worm and Grass Snake were recorded within the site during the reptile survey. The full survey results are summarised in *Table 2* below and the locations at which reptiles were recorded are shown in *Appendix A*.

**Table 2:** Reptiles recorded at the site

Date of survey	Reptiles observed
28.08.2018	1 x Grass snake (1 adult) 1 x Slow-worm (1 Juvenile)
03.09.2018	No reptiles recorded
11.09.2018	No reptiles recorded
18.09.2018	No reptiles recorded
24.09.2018	No reptiles recorded
1.10.2018	No reptiles recorded
2.10.2018	No reptiles recorded

#### *Slow-worm*

3.2.2 During the course of the survey a maximum count of one juvenile Slow-worm was recorded on any one visit. The Slow-worm was recorded from the base of a hedgerow in the south of the site.

### *Grass Snake*

- 3.2.3 During the course of the survey a maximum count of one adult Grass Snake was recorded on any one visit. No juvenile or sub-adult Grass Snakes were recorded. The record of Grass Snake was also associated with rough grassland and tall ruderal vegetation along a hedgerow base on the south-eastern site boundary.

## **4 SITE EVALUATION**

- 4.1 A number of guidelines are used to evaluate the importance of a site for reptiles, based on both the population density and number of species present, in addition to historical factors.
- 4.2 The Guidelines for Biological Selection of SSSIs (JNCC, 1989) gives a scoring system for the evaluation of sites on the basis of their reptile population. It suggests that for the commoner species of reptile, the best localities in which three or more species occur should be selected as potential SSSIs.
- 4.3 The Herpetofauna Workers' Manual (JNCC, 1998) suggests that sites falling outside of the SSSI selection criteria should be designated as Sites of Importance for Nature Conservation (SINCs) if they meet the following criteria:
- Any site with a large population of a single species;
  - Any site with a moderate population of two species;
  - Any site at the edge of the geographical range of a species; and
  - Any site with a long documented history.
- 4.4 The Key Reptile Site register is a mechanism designed to promote the safeguard of important reptile sites. To qualify for the register, the site in question must meet at least one of the following criteria (Froglife, 1999):
- Supports three or more reptile species;
  - Supports two snake species;
  - Supports an exceptional population of at least one species (Table 2);
  - Supports an assemblage of species scoring at least 4 (Table 2); and
  - Does not satisfy the above criteria but is of particular regional importance due to local rarity (e.g. in the East Midlands, Adders are very rare so even "low" populations should be designated as Key Sites).
- 4.5 The criteria for scoring populations of the four common reptile species for the purposes of the Key Reptile Register are given in *Table 3* below.

**Table 3:** Population parameters for the Key Reptile Sites register

Reptile species	Low population Score 1	Good population Score 2	Exceptional population Score 3
Adder	<5	5-10	>10
Grass Snake	<5	5-10	>10
Common Lizard	<5	5-20	>20
Slow-worm	<5	5-20	>20

*Figures in the table refer to maximum number of adults seen by observation and/or under tins (placed at a density of up to 10 per hectare) by one person in one day.*

4.6 Using these criteria, the survey area supports 'low' populations of Slow-worm and Grass Snake with a maximum count of one for each of these species. However, due to the high density of reptile refugia placed at the site, relative to the suitable habitat available, it is likely that the results have been exaggerated to indicate a higher population of Grass Snake and Slow-worm, and that a 'very low' population of both species is more likely to be present. As only two species of reptile were recorded within the site, which are both considered to be present in only very low numbers, the site does not qualify as a SSSI, SINC or Key Reptile Site.

4.7 Grass Snakes and Slow-worm are a common and widespread reptile species and suitable habitat for these species is relatively abundant in the wider area. The site is therefore considered in its entirety to be of no more than low local value for Grass Snake and Slow-worm.

4.8 Although the Grass Snake and Slow-worm recorded were associated with hedgerow bases on field margins in the southern area of the site, it is conceivable that these species also occur in very low numbers in other areas of suitable habitat across the site including woodland edges, pond/ watercourse margins, and field margins including hedgerow bases, rough grassland, tall ruderal and scrub habitats. This is reflected in the findings of the 2012 reptile survey which also recorded low numbers of Grass Snake in the north, east and west of the site (see *Appendix A*).

## 5 RECOMMENDATIONS

5.1 The site is considered to support 'very low' numbers of Slow-worm and Grass Snake and as such does not qualify as a SSSI, SINC or Key Reptile Site. The site is considered to be of no more than low local value for reptiles as the species recorded are all common and widespread and similar habitat for these species is relatively abundant in the wider area. Notwithstanding this, all reptiles should be afforded the protection provided under the 1981 Wildlife and Countryside Act (as amended). In addition, development proposals

for the site should also seek to maintain and, where possible, enhance opportunities for this group in accordance with the 2006 NERC Act and planning policy and guidance. Measures by which this can be achieved are identified below.

## **5.2 Sensitive Approach to Site Clearance**

5.2.1 Although Slow-worm and Grass Snake were associated with the field margins comprising hedgerow bases and associated rough grassland and tall ruderal vegetation it is conceivable that these species also occur in very low numbers in other areas of suitable habitat across the site. Where it is unavoidable that areas of suitable reptile habitat are lost as a result of the proposed development, measures to protect reptiles should be implemented.

5.2.2 In view of the limited number and distribution of Slow-worm and Grass Snake recorded, assuming that management of the survey area remains the same and that the distribution or character of habitats does not change significantly prior to construction a full reptile translocation exercise is not currently recommended in this instance prior to development commencing (see *paragraph 5.2. below*).

5.2.3 Instead, it is recommended that a controlled approach is taken to site clearance in those areas where potential habitat is to be lost in order to displace any reptiles present into retained areas of contiguous habitat within the site and/ or wider area. This would require the following:

- Firstly, vegetation cover should be reduced to minimum height of 150mm. This would ideally take place at a time avoiding the bird breeding season (typically between March and August inclusive) or otherwise be preceded by a check of suitable habitat for active nests immediately prior to commencement of works by a suitably qualified ecologist.
- Where potential for reptiles to be present remains, a minimum period of 5 days with daytime temperatures of >12°C should then be allowed to pass prior to the second stage of vegetation clearance (see below).
- The second stage would involve clearance of all suitable vegetation to ground level (i.e. <75mm) by hand during mild temperatures (>14°C) at a suitable time of year when reptiles are likely to be active (generally mid-March to early October inclusive). At this time any potential hibernacula or refugia encountered should be carefully dismantled by hand. This stage of clearance should be undertaken under the supervision of a suitably qualified ecologist who would capture and relocate any reptiles encountered to areas of retained habitat on the margins of the site.
- Where potential for reptiles to be present still remains, a further 5 days with daytime temperatures of >12°C should then be allowed to elapse to enable any

remaining reptiles to disperse from the area of works, prior to the destructive search.

- Following clearance of vegetation to ground level and removal of any refugia by hand, no suitable reptile habitat would remain and it is expected that any remaining reptiles would disperse from the area of works into adjacent habitat on their own accord.
- In order to be certain that no reptiles are present within the area of works, where any potential for reptiles to be present still remains a destructive search should be carried out. This would involve the progressive stripping of topsoil from the area of works under the supervision of a suitably qualified ecologist.
- In the event that the destructive search is delayed, vegetation should be maintained at ground level until the destructive search is carried out. Similarly, following the destructive search, the land should be maintained as unsuitable for the recolonisation of reptiles prior to and throughout the construction works.

5.2.4 It is recommended that the approach to mitigation outlined above is reviewed at an appropriate stage prior to works commencing in order to allow consideration of:

- Development design. The above approach assumes that only relatively limited areas of suitable reptile habitat are affected at any given time and that where habitat is lost contiguous areas of suitable reptile habitat will be retained or created in advance of works commencing into which reptiles can be displaced. In the event that large isolated areas of habitat are affected then translocation may be required.
- Any changes to management of habitats at the site which may have affected their ability to support reptiles since this report was produced.

5.2.5 It is recommended that the measures to protect and maintain the site's reptile population form the basis of a detailed Reptile Mitigation Method Statement to be agreed with Natural England and/or the Local Planning Authority at an appropriate stage.

### **5.3 Maintaining & Enhancing Opportunities for Reptiles**

5.3.1 In accordance with the 2019 National Planning Policy Framework (NPPF) and 2006 NERC Act, development proposals should seek to maintain and where possible enhance opportunities for reptiles at the site. This could be achieved through the retention, enhancement and creation of reptile habitats as part of the landscape strategy for the site. Consideration should be given to:

- Enhancement of woodland/hedgerow edge habitats through creation of ecotones (a gradation from woodland/hedgerow to scrub to rough grassland habitats);
- Creation of new waterbodies in order to provide improved habitats favoured by Grass Snake;

- Inclusion of other high quality reptile habitats within the landscape scheme in the form of rough and meadow grasslands, scrub, wetland and woodland habitats;
- Provision of opportunities for hibernation and refuge through provision of log/brush piles and purpose built hibernaculum; and
- Securing the long-term integrity of new and retained reptile habitat through inclusion within a long-term management plan.

## 6 CONCLUSION

6.1 Subject to the implementation of the measures outlined above to protect individual reptiles and ensure that suitable habitat remains following development at the site, the proposed development is unlikely to result in adverse effects on the local reptile population. Furthermore, through habitat retention, enhancement, creation and management, development at the site could in fact provide opportunities to safeguard and enhance its value for reptiles in the long-term in accordance with the 2019 National Planning Policy Framework and the 2006 NERC Act.

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## HDA Document Control and Quality Assurance Record

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Document Title: Reptile Survey Report  
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Issue	Description	Date of Issue	Signed
1	Reptile Survey Report	February 2020	AM

	Personnel	Position
Author	Shannon Davies	Assistant Ecologist
Approved for issue	Adrian Meurer MCIEEM	Director

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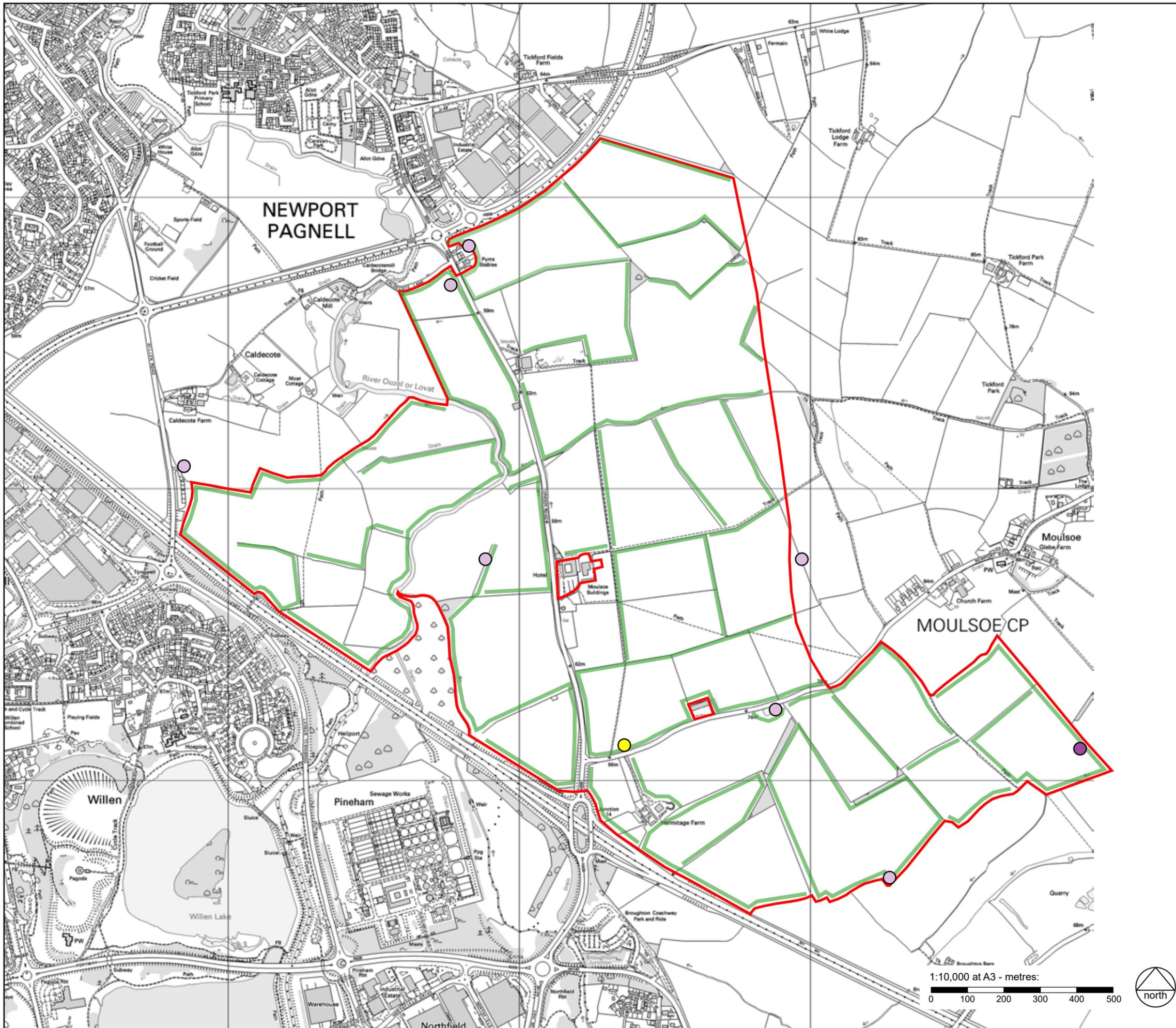
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**APPENDIX A**

**Reptile Survey Summary Plan**



- KEY**
- Site Boundary
  - Reptile mat locations
  - Slow-worm record
  - Grass Snake record
  - 2012 Grass Snake record

CLIENT:  
St James

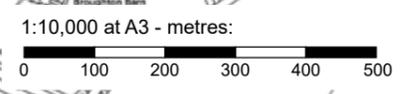
PROJECT:  
Milton Keynes East

TITLE:  
Reptile Survey Summary Plan

SCALE AT A3: 1:10,000      DATE: February 2020

2090.52 / 11

Based on Ordnance Survey mapping with permission of Her Majesty's Stationery Office  
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# **Appendix 9 Great Crested Newt HSI and eDNA Survey Report**



**MILTON KEYNES EAST**

**GREAT CRESTED NEWT SURVEY REPORT**

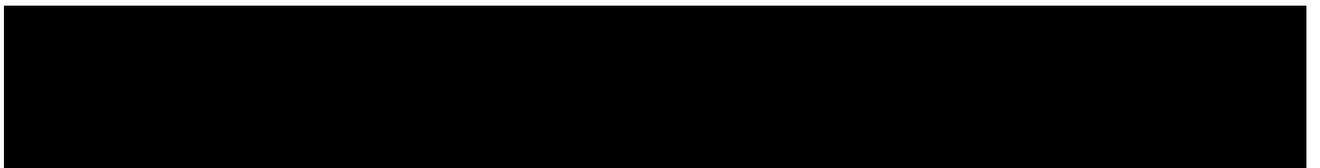
**Prepared for St James**

**by**

**Hankinson Duckett Associates**

**HDA ref: 2090.52**

**February 2020**



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HDA Document Control and Quality Assurance Record

## **APPENDICES**

A	Great Crested Newt Survey Summary Plan
B	Full HSI assessment results
C	eDNA sampling analysis results
D	Population estimate survey results
E	Waterbody photographs
F	Great Crested Newt Mitigation Plan

# 1 INTRODUCTION

## 1.1 Site location and summary description

1.1.1 This report describes Great Crested Newt surveys carried out on waterbodies associated with approximately 362ha of land at Newport Pagnell, Buckinghamshire hereinafter referred to as 'the site'. The centre of the site is located by National Grid Reference SP 893419. The study was commissioned by St James in June 2018.

1.1.2 The site is located to the south of Newport Pagnell, on the north-eastern edge of Milton Keynes, Buckinghamshire. The site is dominated by agricultural land comprising intensively managed arable and grazed grassland fields with associated farmyards, agricultural buildings and residential farm houses. Field boundaries generally consist of hedgerows, treelines and fencing with occasional ponds and parcels of woodland, and the River Ouzel flows from south to north through the western part of the site. The site is bordered to the north by a construction site for residential development and the A422 beyond which lies the town of Newport Pagnell; to the east by arable farmland; to the west by the Pineham Nature Reserve and the M1 Motorway beyond which lies the town of Milton Keynes; and to the south by arable farmland.

1.1.3 The location and boundary of the site are shown in *Appendix A*. Detailed descriptions of the habitats within the site are given in the Ecological Appraisal (HDA, 2020).

## 1.2 Background and legislative context

1.2.1 Five species of amphibian are widespread in England: Common Frog *Rana temporaria*, Common Toad *Bufo bufo*; Smooth Newt *Lissotriton vulgaris*; Palmate Newt *Lissotriton helveticus*; and Great Crested Newt *Triturus cristatus*. A sixth species of amphibian, the Natterjack Toad *Bufo calamita*, also occurs in England but this species has special habitat requirements that limit its range to certain sand dune and heathland sites.

1.2.2 Amphibians require aquatic habitat within which to breed and suitable terrestrial habitat to forage and hibernate. Suitable breeding ponds are usually well vegetated with still, shallow water that is not heavily shaded or very exposed. Terrestrial habitat includes woodland, scrub, field edges and gardens. Hibernation can occur under stone or log piles, in crevices or leaf litter and under the soil. Occasionally amphibians may be found hibernating in their breeding pools.

1.2.3 Over the last few decades all amphibians have suffered a decline in numbers. This is due to a combination of many factors, which include habitat destruction and fragmentation, loss of breeding pools through unsympathetic management and neglect, introduction of fish (which eat amphibian larvae) and pollution.

- 1.2.4 The Great Crested Newt is protected under the 2019 Conservation of Habitats and Species (Amendment) (EU Exit) Regulations. The 2019 Regulations make it an offence to:
- Deliberately capture, injure or kill any wild animal of an EPS;
  - Deliberately disturb wild animals of any such species, in particular any disturbance which is likely to: (i) impair their ability to survive, to breed or reproduce, or to rear or nurture their young; or to hibernate or migrate; (ii) affect significantly the local distribution or abundance of the species to which they belong;
  - Damage or destroy a breeding site or resting place of such an animal; or
  - To (a) be in possession of, or to control; (b) to transport any live or dead animal or any part of an animal; (c) to sell or exchange or (d) offer for sale or exchange any live or dead animal or part of an animal of an EPS.
- 1.2.5 In addition, Great Crested Newts are protected under the 1981 Wildlife and Countryside Act (as amended). The Great Crested Newt is listed on Schedule 5 of the Act and is subject to the provisions of Sections 9.4b and 9.4c, which make it an offence to:
- Intentionally or recklessly disturb a Great Crested Newt while it is occupying a structure or place which it uses for shelter or protection; or
  - Intentionally or recklessly obstruct access to any structure or place used for shelter or protection by a Great Crested Newt.
- 1.2.6 Where works are planned that may result in an offence under the legislation then works should be carried out under an appropriate licence from Natural England.
- 1.2.7 Great Crested Newts and Common Toads are also identified as a Species of Principal Importance under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act. Section 40 of the Act requires that these species are a material consideration in the planning process.
- 1.3 Development proposals**
- 1.3.1 Proposals for the site include mixed use development with associated landscaping and infrastructure.
- 1.4 Scope and purpose of the report**
- 1.4.1 During an initial site walkover by HDA, five waterbodies were identified within the site which could provide suitable breeding habitat for Great Crested Newts indicating that this species could be breeding at the site. In addition, the areas of grassland, woodland and field margins comprising hedgerow bases, scrub and tall ruderal vegetation provide suitable for Great Crested Newts during terrestrial phases. A review of the OS 1:10,000 scale map and aerial photographs of the site's surrounds also identified the presence of multiple waterbodies within the Pineham Nature Reserve to the immediate southwest of the site and a further 11 waterbodies located within 300m of the site.

- 1.4.2 In view of the above it was considered possible that Great Crested Newts could be present at the site and a series of Great Crested Newt surveys were subsequently undertaken in order to:
- i. Establish the suitability of waterbodies within the site and within 300m of the site for Great Crested Newts;
  - ii. Establish the presence/ likely absence of Great Crested Newts in suitable waterbodies within 300m of the site;
  - iii. Where appropriate, establish the size of any Great Crested Newt population potentially associated with the site; and
  - iv. To predict likely impacts of the proposed development on Great Crested Newts and give recommendations for impact avoidance, minimisation and/ or mitigation.

## **2 METHODOLOGY**

### **2.1 Great Crested Newt Habitat Suitability Index (HSI) Assessment**

2.1.1 HSI assessments provide a mechanism by which the suitability of a pond to support Great Crested Newts can be objectively assessed in order to assist in the identification of ponds potentially supporting this species (Oldham *et al.*, 2000).

2.1.2 For the HSI assessment the locations of waterbodies within a 300m radius of the site were identified from online aerial photographs, a 1:10,000 scale Ordnance Survey map and from other waterbodies encountered during the survey. Where necessary, relevant landowners were contacted in advance of the survey in order to gain access to off-site waterbodies. Use of a 300m radius reflects the findings of studies into the movement of Great Crested Newts during terrestrial phases which indicate that the maximum routine migratory distance of Great Crested Newts away from breeding ponds during terrestrial phases is less than 250m (Cresswell and Whitworth, 2004).

2.1.3 The HSI assessment was conducted by Shannon Davies of Hankinson Duckett Associates on 26<sup>th</sup> and 28<sup>th</sup> June 2018. All accessible waterbodies identified within the survey area were visited and, where appropriate, assessed against each of the following ten suitability indices:

- i. Geographic location;
- ii. Pond area;
- iii. Pond permanence;
- iv. Water quality;
- v. Shading;
- vi. Presence of waterfowl;
- vii. Presence of fish;
- viii. Pond density in the area;
- ix. Terrestrial habitat quality; and
- x. Macrophyte cover in pond.

2.1.4 Details of the pond characteristics (depth, margin profile, etc.) and bankside, marginal and aquatic vegetation were also recorded during the assessment.

## 2.2 Great Crested Newt Environmental DNA (eDNA) Survey

2.2.1 Great Crested Newt eDNA sampling surveys were conducted on all accessible waterbodies that had been identified as having suitability to support Great Crested Newts during the HSI survey. The eDNA survey methodology is recognised by Natural England as a reliable technique for determining the presence/ likely absence of Great Crested Newts within a pond through detection of traces of Great Crested Newt DNA within the water.

2.2.2 The eDNA sampling survey was conducted by Shannon Davies of HDA on 26<sup>th</sup> and 28<sup>th</sup> June 2018. The field survey involved taking samples of pond water at each of the surveyed waterbodies in line with the recognised methodology established by Biggs *et. al.* (2014). The samples were then despatched to a recognised laboratory for polymerase chain reaction (qPCR) analysis.

## 2.3 Great Crested Newt population estimate survey

2.3.1 Full Great Crested Newt population estimate surveys were conducted on all accessible waterbodies that had been identified as supporting Great Crested Newts during the eDNA sampling survey, and on ponds immediately adjacent to waterbodies that had proved positive for this species.

2.3.2 The population estimate survey methodology has been devised to accord with the requirements of all relevant legislation, guidelines and good practice guidance, including the 1981 Wildlife and Countryside Act (as amended), the Herpetofauna Worker's Manual (Gent and Gibson, 1998), the Great Crested Newt Mitigation Guidelines (English Nature, 2001) and subsequent research (Cresswell and Whitworth, 2004). The survey was conducted by Adrian Meurer MCIEEM and Hayley Snowdon GradCIEEM of HDA, assisted by Shannon Davies, Anna Potter and Gerald Selvey, between April and early-June 2019.

2.3.3 Waterbodies were surveyed on 6 separate visits in suitable climatic conditions. Dates of survey visits, weather conditions and personnel are shown in the table below:

**Table 1:** Survey Times and weather conditions

Date	Weather conditions	Personnel
25.04.2019	Clear, calm and dry	Hayley Snowdon and Shannon Davies
01.05.2019	Mild, calm and overcast	Hayley Snowdon and Gerald Selvey
13.05.2019	Clear and overcast	Hayley Snowdon and Gerald Selvey
15.05.2019	Clear, calm and dry	Hayley Snowdon and Shannon Davies
29.05.2019	Calm and dry	Adrian Meurer, Hayley Snowdon and Anna Potter

03.06.2019	60% Cloud cover, light wind and dry	Hayley Snowdon and Gerald Selvey
------------	-------------------------------------	----------------------------------

2.3.4 A combination of two population estimate survey methods were used in accordance with Natural England guideline:

- i. Torch surveys: These were carried out after dark using 1,000,000 candlepower torches. Each waterbody was circumnavigated and searched by torchlight for amphibians
- ii. Bottle trapping: Traps, assembled from bamboo canes and plastic bottles, were placed overnight around waterbody margins with a survey effort of one every 2m of shoreline and checked early the following morning for the presence of newts.

2.3.5 Submerged and floating vegetation and leaf litter, and artificial egg strips installed in selected waterbodies prior to the survey commencing, were also inspected for newt eggs at each waterbody to determine whether newts were likely to be breeding.

2.3.6 The size of amphibian populations within the waterbodies surveyed was estimated using the scoring system given in the Herpetofauna Workers Manual (Gent and Gibson, 1998).

### 3 RESULTS

3.1 Five waterbodies suitable for supporting Great Crested Newts are located within the site, and multiple off-site waterbodies are located within 300m of the site boundary. The locations of the waterbodies are shown in *Appendix A* and photographs are provided in *Appendix E*.

3.2 The results of the HSI assessment, eDNA survey and population estimate survey, together with descriptions of the surveyed waterbodies and any limitations encountered, are provided below. Full findings of the HSI assessment, the laboratory results from the eDNA analysis and population estimate survey results are given in *Appendices B, C* and *D*, respectively.

#### 3.3 Waterbody 2

*Location: Approximately 200m to the south of the site.*

*HSI assessment: 0.760*

3.3.1 Waterbody 2 (*Photo 1*) is located within the Pineham Nature Reserve beneath a bridge on top of which is the M1 Motorway. The waterbody is approximately 90m<sup>2</sup> and generally has steep banks. The majority of the waterbody is bordered by bare earth however the northern and southern margins, either side of the bridge, are bordered by rough grassland, scrub and tall ruderal vegetation, the adjacent terrestrial habitat for Great Crested Newts is

therefore considered to be of 'moderate' quality. The waterbody's location beneath a bridge results in 85% shading of the waterbody perimeter and aquatic and marginal vegetation are therefore limited to the northern and southern margins. Plant species present include Floating Sweet-grass, Iris and Water Plantain. The water quality was assessed as moderate and it is assumed the waterbody never dries and, together with the location of the pond within the floodplain of the River Ouzel, it is considered fish may be present.

3.3.2 The HSI score for Waterbody 2 was calculated as 0.760, which indicates that the pond has 'good' suitability for Great Crested Newts.

3.3.3 An eDNA sampling survey of Waterbody 2 was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a positive result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly likely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.

3.3.4 Presence of Great Crested Newts was confirmed during the population estimate survey. The survey of Waterbody 2 recorded a maximum count of 12 adult Great Crested Newts. Other amphibian species recorded included Smooth Newt and Common Frog.

3.3.5 On two occasions the waterbody was found to contain Dewsbury Traps which had been set by another consultancy working on a different project. In order to avoid adversely affecting their survey results and given the proven efficacy of torch survey in identifying newts in this waterbody over bottle trapping, it was decided not to bottle trap on these occasions. No other limitations were otherwise encountered.

### **3.4 Waterbody 3**

*Location: Approximately 245m to the south of the site.*

*HSI assessment: 0.424*

3.4.1 Waterbody 3 (*Photo 2*) is located within the Pineham Nature Reserve and comprises a 50m<sup>2</sup> waterbody located under the M1 bridge. The waterbody generally has steep banks with a deeply silted base. The margins of the waterbody are bordered by bare earth which is considered 'poor' terrestrial habitat for Great Crested Newts, however either side of the bridge is rough grassland, scrub and tall ruderal vegetation. The waterbody's location beneath the bridge results in 95% shading of the pond perimeter, and aquatic and marginal vegetation was limited to Fools Watercress on the southern margin. The water quality was assessed as poor and fish were present.

3.4.2 The HSI score for Waterbody 3 was calculated as 0.424, which indicates that the pond has 'poor' suitability for Great Crested Newts.

- 3.4.3 An eDNA sampling survey of Waterbody 3 was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a positive result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly likely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.
- 3.4.4 No further evidence of Great Crested Newts was recorded during the population estimate survey. Other amphibian species recorded within Waterbody 3 included Smooth Newt.
- 3.4.5 Following the fourth survey visit the waterbody dried out and was thereafter unsuitable for Great Crested Newts.

### **3.5 Waterbody 4**

*Location: Approximately 230 to the south of the site.*

*HSI assessment: 0.418*

- 3.5.1 Waterbody 4 (*Photo 3*) is located within the Pineham Nature Reserve and comprises a 14m<sup>2</sup> waterbody located under the M1 bridge. The waterbody generally has steep banks with a deeply silted base. The margins of the waterbody are bordered by bare earth which is considered 'poor' terrestrial habitat for Great Crested Newts, however either side of the bridge is rough grassland, scrub and tall ruderal vegetation. The waterbody's location beneath a bridge results in 95% shading of the pond perimeter, and no aquatic and marginal vegetation was recorded during the survey. The water quality was assessed as poor and fish were present.
- 3.5.2 The HSI score for Waterbody 4 was calculated as 0.418, which indicates that the pond has 'poor' suitability for Great Crested Newts.
- 3.5.3 An eDNA sampling survey of Waterbody 4 was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a positive result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly likely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.
- 3.5.4 Presence of Great Crested Newts was confirmed during the population estimate survey. The survey of Waterbody 4 recorded a maximum count of 1 adult Great Crested Newt. Other amphibian species recorded included Common Frog.

3.5.5 During the last two surveys the waterbody became too shallow to bottle trap. However, torch surveys could still be carried out, and in view of the water clarity and shallow depth this is not thought to have significantly affected the survey findings.

### **3.6 Waterbody 5**

*Location: Approximately 90m to the south of the site.*

*HSI assessment: 0.549*

3.6.1 Waterbody 5 is located within the Pineham Nature Reserve and comprises a 35m<sup>2</sup> pond surrounded by rough grassland, tall ruderal vegetation and scrub considered to provide 'good' quality terrestrial habitat for Great Crested Newts. Bankside trees shaded approximate 20% of the pond's perimeter and aquatic and marginal vegetation was limited. The waterbody was dry in 2018 but held water throughout the 2019 surveys.

3.6.2 The HSI score for Waterbody 5 was calculated as 0.549, which indicates that the pond is 'below average' suitability for Great Crested Newts.

3.6.3 An eDNA sampling survey of Waterbody 5 was not carried out as the waterbody was dry in June 2018 when the eDNA survey was undertaken.

3.6.4 Presence of Great Crested Newts was confirmed during the 2019 population estimate survey. The survey of Waterbody 5 recorded a maximum count of 2 adult Great Crested Newts. Other species recorded included Smooth Newt and Common Frog.

3.6.5 No limitations were encountered during the survey of Waterbody 5

### **3.7 Waterbody 8**

*Location: Approximately 80m to the south of the site.*

*HSI assessment: 0.684*

3.7.1 Waterbody 8 (*Photo 4*) is located within the Pineham Nature Reserve and comprises a 25m<sup>2</sup> pond surrounded by rough grassland, tall ruderal vegetation and scrub considered to provide 'good' quality terrestrial habitat for Great Crested Newts. Bankside trees and scrub shade approximately 40% of the pond's margin, and Common Reed dominated the surface of the waterbody with the occasional Water Plantain. The water quality was assessed as good and it appears that the waterbody rarely dries out.

3.7.2 The HSI score for Waterbody 8 was calculated as 0.684, which indicates that the pond has 'average' suitability for Great Crested Newts.

3.7.3 An eDNA sampling survey of Waterbody 8 was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a

positive result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly likely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.

3.7.4 No evidence of Great Crested Newts was recorded during the population estimate survey. Amphibian species recorded within Waterbody 8 included Smooth Newt and Common Frog.

3.7.5 Following the fourth survey visit the waterbody dried out and was thereafter unsuitable for Great Crested Newts.

### **3.8 Waterbody 9**

*Location: Approximately 90m to the south of the site.*

*HSI assessment: 0.741*

3.8.1 Waterbody 9 (*Photo 5*) is located within the Pineham Nature Reserve and comprises a 150m<sup>2</sup> pond surrounded by rough grassland, tall ruderal vegetation and scrub considered to provide 'good' quality terrestrial habitat for Great Crested Newts. Bankside willow shaded approximately 30% of the pond's margin. Aquatic and marginal vegetation covered 80% of the ponds surface and included Spike Rush, Bulrush and Water Plantain. The water quality was assessed as good and it appears that the waterbody rarely dries out.

3.8.2 The HSI score for Waterbody 9 was calculated as 0.741, which indicates that the pond has 'good' suitability for Great Crested Newts.

3.8.3 An eDNA sampling survey of Waterbody 9 was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a positive result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly likely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.

3.8.4 No evidence of Great Crested Newts was recorded during the population estimate survey. Amphibian species recorded within Waterbody 9 included Smooth Newt and Common Frog.

3.8.5 No limitations were encountered during the survey of Waterbody 9.

### **3.9 Waterbody 10**

*Location: Approximately 40m to the south of the site.*

*HSI assessment: 0.902*

- 3.9.1 Waterbody 10 (*Photo 6*) is located within the Pineham Nature Reserve and comprises a 800m<sup>2</sup> pond surrounded by rough grassland, tall ruderal vegetation and scrub considered to provide 'good' quality terrestrial habitat for Great Crested Newts. Bankside willow scrub shades approximately 60% of the pond's margin. Aquatic and marginal vegetation covered 90% of the ponds surface and included Floating Sweet-grass, Rushes and Water Plantain. The water quality was assessed as good and it appears that the waterbody rarely dries out. Fish were recorded within the waterbody.
- 3.9.2 The HSI score for Waterbody 10 was calculated as 0.902, which indicates that the pond has 'excellent' suitability for Great Crested Newts.
- 3.9.3 An eDNA sampling survey of Waterbody 10 was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a positive result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly likely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.
- 3.9.4 Great Crested Newts were recorded during the population estimate survey. The survey of Waterbody 10 recorded a maximum count of 1 adult Great Crested Newt. Other amphibian species recorded included Smooth Newt and Common Frog.
- 3.9.5 No limitations were encountered during the survey of Waterbody 10.

### **3.10 Waterbody 11**

*Location: Approximately 60m to the south of the site.*

*HSI assessment: 0.852*

- 3.10.1 Waterbody 11 (*Photo 7*) is located within the Pineham Nature Reserve and comprises a 900m<sup>2</sup> pond surrounded by rough grassland, tall ruderal vegetation and scrub considered to provide 'good' quality terrestrial habitat for Great Crested Newts. The banks of the waterbody are gently sloping and bankside willow scrub shaded approximately 40% of the pond's margin. Aquatic and marginal vegetation covered approximately 60% of the pond's surface and included Floating Sweet-grass, Common Reed, Reed Canary-grass and Water Plantain. The water quality was assessed as moderate and it appears that the waterbody sometimes dries out.
- 3.10.2 The HSI score for Waterbody 11 was calculated as 0.852, which indicates that the pond has 'excellent' suitability for Great Crested Newts.
- 3.10.3 An eDNA sampling survey of Waterbody 11 was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a

positive result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly likely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.

3.10.4 Evidence of Great Crested Newts was recorded during the population estimate survey. The survey of Waterbody 11 recorded Great Crested Newt eggs, however no individual Great Crested Newts were recorded. Other amphibian species recorded within Waterbody 11 included Smooth Newt and Common Frog.

3.10.5 Following the fourth survey visit the waterbody dried out and was thereafter unsuitable for Great Crested Newts.

### **3.11 Waterbody 12**

*Location: Approximately 20m to the south of the site.*

*HSI assessment: 0.583*

3.11.1 Waterbody 12 is located within the Pineham Nature Reserve and comprises an 8m<sup>2</sup> pond surrounded by rough grassland, tall ruderal vegetation and scrub considered to provide 'good' quality terrestrial habitat for Great Crested Newts. The waterbody has moderately steep banks with little shading of the margin. Aquatic and marginal vegetation covered approximately 90% of the pond's surface and included Common Reed and Floating Sweet-grass, Reed Canary-grass and Water Plantain. The water quality was assessed as good and it appears likely that the waterbody dries out annually.

3.11.2 The HSI score for Waterbody 12 was calculated as 0.583, which indicates that the pond has 'below average' suitability for Great Crested Newts.

3.11.3 An eDNA sampling survey of Waterbody 12 was not carried out as the waterbody was dry in June 2018 when the eDNA survey was undertaken.

3.11.4 No evidence of Great Crested Newts was recorded during the 2019 population estimate survey. Amphibian species recorded within Waterbody 12 included Smooth Newt.

3.11.5 Following the third survey visit the waterbody dried out and was thereafter unsuitable for Great Crested Newts. It is unlikely that this waterbody contains sufficient water for breeding Great Crested Newts in any given year.

### **3.12 Waterbody 13**

*Location: Approximately 30m to the south of the site.*

*HSI assessment: 0.818*

- 3.12.1 Waterbody 13 is located within the Pineham Nature Reserve and comprises a 300m<sup>2</sup> pond surrounded by rough grassland, tall ruderal vegetation and scrub considered to provide 'good' quality terrestrial habitat for Great Crested Newts. Bankside willow scrub shades approximately 70% of the pond's margin. Aquatic and marginal vegetation covered approximately 70% of the pond's surface and included Bulrush, Soft Rush and Reed Canary-grass. The water quality was assessed as moderate and it appears likely that the waterbody regularly dries out.
- 3.12.2 The HSI score for Waterbody 13 was calculated as 0.818, which indicates that the pond has 'excellent' suitability for Great Crested Newts.
- 3.12.3 An eDNA sampling survey of Waterbody 13 was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a positive result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly likely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.
- 3.12.4 No evidence of Great Crested Newts or other amphibian species was recorded during the population estimate survey.
- 3.12.5 Following the first survey visit the waterbody dried out and was thereafter unsuitable for Great Crested Newts.

### **3.13 Waterbody 14**

*Location: Approximately 30m to the south of the site.*

*HSI assessment: 0.650*

- 3.13.1 Waterbody 14 is located within the Pineham Nature Reserve and comprises a 24m<sup>2</sup> pond surrounded by rough grassland, tall ruderal vegetation and scrub considered to provide 'good' quality terrestrial habitat for Great Crested Newts. The waterbody has gently sloping banks, comprising bankside willow scrub which shaded approximately 20% of the pond's margin. Aquatic and marginal vegetation covered approximately 50% of the pond's surface and included Soft Rush and Common Reed. The water quality was assessed as moderate and it appears likely that the waterbody sometimes dries out.
- 3.13.2 The HSI for Waterbody 14 was calculated as 0.650, which indicates that the pond has 'average' suitability for Great Crested Newts.
- 3.13.3 An eDNA sampling survey of Waterbody 14 was not carried out as the waterbody was dry in June 2018 when the eDNA survey was undertaken.

3.13.4 No evidence of Great Crested Newts was recorded during the population estimate survey. Amphibian species recorded within Waterbody 14 included Smooth Newt.

3.13.5 No limitations were encountered during the survey of Waterbody 14.

### **3.14 Waterbody 15**

*Location: Approximately 60m to the south of the site.*

*HSI assessment: 0.565*

3.14.1 Waterbody 15 is located within the Pineham Nature Reserve and comprises a 48m<sup>2</sup> pond surrounded by rough grassland, tall ruderal vegetation and scrub considered to provide 'good' quality terrestrial habitat for Great Crested Newts. The pond has gently sloping banks and was approximately 30cm deep at the start of the surveys. Bankside willow scrub and a tree that has fallen over the pond shaded approximately 20% of the pond's margin. Aquatic and marginal vegetation was limited to approximately 10% of the pond's surface and included Common Reed. The water quality was assessed as poor and it appears likely that the waterbody sometimes dries out.

3.14.2 The HSI score for Waterbody 15 was calculated as 0.565, which indicates that the pond has 'below average' suitability for Great Crested Newts.

3.14.3 An eDNA sampling survey of Waterbody 15 was not carried out as the waterbody was dry in June 2018 when the eDNA survey was undertaken.

3.14.4 No evidence of Great Crested Newts was recorded during the population estimate survey. Other amphibian species recorded within Waterbody 15 included Smooth Newt and Common Frog.

3.14.5 No limitations were encountered during the survey of Waterbody 15.

### **3.15 Waterbody 18**

*Location: Approximately 50m to the south of the site.*

*HSI assessment: 0.593*

3.15.1 Waterbody 18 is located within the Pineham Nature Reserve and comprises an 18m<sup>2</sup> pond surrounded by rough grassland, tall ruderal vegetation and scrub considered to provide 'good' quality terrestrial habitat for Great Crested Newts. Bankside willow scrub shades approximately 70% of the pond's margin. Aquatic and marginal vegetation covered approximately 50% of the pond's surface and included Soft Rush, Water Plantain and Floating Sweet-grass. The water quality was assessed as moderate and it appears likely that the waterbody sometimes dries out. Fish were recorded present within the waterbody.

- 3.15.2 The HSI score for Waterbody 18 was calculated as 0.593, which indicates that the pond has 'below average' suitability for Great Crested Newts.
- 3.15.3 An eDNA sampling survey of Waterbody 18 was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a negative result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly unlikely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.
- 3.15.4 No evidence of Great Crested Newts was recorded during the population estimate survey. Amphibian species recorded within Waterbody 18 included Smooth Newt and Common Frog.
- 3.15.5 Following the fourth survey visit the waterbody dried out and was thereafter unsuitable for Great Crested Newts.

### **3.16 Waterbody 1A**

*Location: On-site waterbody*

*HSI assessment: 0.559*

- 3.16.1 Waterbody 1A (*Photo 8*) comprises a 1200m<sup>2</sup> pond surrounded by scattered trees, hedgerow and scrub beyond which is arable farmland considered to provide 'moderate' quality terrestrial habitat for Great Crested Newts. The pond has gently sloping banks with bankside willow and Ash trees which shaded approximately 30% of the pond's margin. The waterbody was densely covered by Duckweed however other aquatic and marginal vegetation was limited to 20% of the pond's surface and included Water Lily and Flag Iris. The water quality was assessed as good and it is assumed the waterbody never dries out and therefore fish may be present within the waterbody.
- 3.16.2 The HSI score for Waterbody 1A was calculated as 0.559, which indicates that the pond has 'below average' suitability for Great Crested Newts.
- 3.16.3 An eDNA sampling survey of Waterbody 1A was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a negative result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly unlikely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.
- 3.16.4 No limitations were encountered during the survey of Waterbody 1A.

### **3.17 Waterbody 2A**

*Location: Onsite waterbody*

*HSI assessment: 0.494*

- 3.17.1 Waterbody 2A (*Photo 9*) comprises a 35m<sup>2</sup> pond surrounded by trees, tall ruderal vegetation and grazed grassland considered to provide 'moderate' quality terrestrial habitat for Great Crested Newts. The pond has steep sloping banks and the bankside willow trees shaded approximately 80% of the pond's margin. Duckweed and Blanket weed dominated the waterbody however other aquatic and marginal vegetation covered approximately 30% of the pond's surface and included Floating Sweet-grass and willowherb. The water quality was assessed as poor and it is assumed the waterbody sometimes dries out.
- 3.17.2 The HSI score for Waterbody 2A was calculated as 0.494, which indicates that the pond has 'poor' suitability for Great Crested Newts.
- 3.17.3 An eDNA sampling survey of Waterbody 2A was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a negative result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly unlikely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.
- 3.17.4 No limitations were encountered during the survey of Waterbody 2A.

### **3.18 Waterbody 3A**

*Location: On-site waterbody*

*HSI assessment: 0.640*

- 3.18.1 Waterbody 3A (*Photo 10*) comprises a 700m<sup>2</sup> pond located near a farmyard. The pond is immediately surrounded by tall ruderal vegetation with occasional scattered trees considered to provide 'moderate' quality terrestrial habitat for Great Crested Newts. The pond has steeply sloping banks and the bankside willow trees shade approximately 10% of the pond's margin. Duckweed dominates the waterbody surface and marginal vegetation was limited and included Sedges and Common Nettle. The water quality was assessed as poor and it is assumed the waterbody sometimes dries.
- 3.18.2 The HSI score for Waterbody 3A was calculated as 0.640, which indicates that the pond has 'average' suitability for Great Crested Newts.
- 3.18.3 An eDNA sampling survey of Waterbody 3A was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a negative result for Great Crested Newt eDNA which indicates that Great Crested Newts are

highly unlikely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.

3.18.4 No limitations were encountered during the survey of Waterbody 3A.

### **3.19 Waterbody 11A**

*Location: Approximately 230m to the south of the site.*

*HSI assessment: 0.372*

3.19.1 Waterbody 11A (*Photo 12*) comprises a 50m<sup>2</sup> pond located within a residential garden. The pond is surrounded by trees and amenity grassland considered to provide 'poor' quality terrestrial habitat for Great Crested Newts. The pond has steep sloping banks and the bankside Elder and fruit trees shade approximately 80% of the pond's margin. Duckweed dominates the waterbody and other aquatic and marginal vegetation is limited to approximately 5% of the ponds surface and included Floating Sweet-grass, Hard Rush and Creeping Buttercup. The water quality was assessed as moderate and it is assumed the waterbody sometimes dries out.

3.19.2 The HSI score for Waterbody 11A was calculated as 0.372, which indicates that the pond has 'poor' suitability for Great Crested Newts.

3.19.3 An eDNA sampling survey of Waterbody 11A was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a negative result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly unlikely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.

3.19.4 No limitations were encountered during the survey of Waterbody 11A.

### **3.20 Waterbody 14A**

*Location: Approximately 270m to the south of the site.*

*HSI assessment: 0.755*

3.20.1 Waterbody 14A (*Photo 13*) comprises a 500m<sup>2</sup> pond within a residential housing estate. The pond is immediately surrounded by rough grassland, amenity grassland and scattered trees considered to provide 'poor' quality terrestrial habitat for Great Crested Newts. Bankside willow trees shade approximately 50% of the pond's margin. Aquatic and marginal vegetation covered 75% of the pond's surface and included Bulrush, Soft Rush and Water Plantain. The water quality was assessed as good and it is assumed likely that the waterbody never dries out and fish maybe present within the waterbody.

- 3.20.2 The HSI score for Waterbody 14A was calculated as 0.755, which indicates that the pond has 'good' suitability for Great Crested Newts.
- 3.20.3 An eDNA sampling survey of Waterbody 14A was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a positive result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly likely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.
- 3.20.4 Great Crested Newts were recorded during the population estimate survey. The survey of Waterbody 14A recorded a maximum count of 1 adult Great Crested Newt. Other amphibian species recorded included Smooth Newt.
- 3.20.5 No limitations were encountered during the survey of Waterbody 14A.

### **3.21 Waterbody 15A**

*Location: On-site waterbody*

*HSI assessment: 0.486*

- 3.21.1 Waterbody 15A (*Photo 14*) comprises a 50m<sup>2</sup> pond located within the corner of an arable field. The pond is immediately surrounded by hedgerows, scattered trees and tall ruderal vegetation considered to provide 'moderate' quality terrestrial habitat for Great Crested Newts. The pond has steeply sloping banks and the bankside Ash, willow and Hawthorn trees shaded approximately 75% of the pond's margin. Aquatic and marginal vegetation covered approximately 15% of the pond's surface and included Water Lilly, Yellow Flag Iris and willowherb. The water quality was assessed as moderate and it is assumed likely that the waterbody sometimes dries out. Minor wildfowl disturbance was recorded within the waterbody.
- 3.21.2 The HSI score for Waterbody 15A was calculated as 0.486, which indicates that the pond has 'poor' suitability for Great Crested Newts.
- 3.21.3 An eDNA sampling survey of Waterbody 15A was subsequently carried out and the samples were sent to the Surescreen Scientifics laboratory for analysis. The analysis returned a negative result for Great Crested Newt eDNA which indicates that Great Crested Newts are highly unlikely to have been present within the waterbody at the time of survey. The results of the eDNA analysis are provided in *Appendix C*.
- 3.21.4 No limitations were encountered during the survey of Waterbody 15A.

### **3.22 Waterbodies 1, 6, 16 and 17**

*HSI assessment: N/A (as waterbodies dry)*

3.22.1 Waterbodies 1, 6, 7, 16 and 17 are located within the Pineham Nature Reserve to the south of the site. All had earth bases with a mixture of steep and gently sloping banks. These waterbodies were dry at the time of both the 2018 and 2019 surveys and the bases of the waterbodies were becoming colonised by grasses. These waterbodies are therefore unsuitable for breeding Great Crested Newts and were not subject to further survey.

### **3.23 Waterbodies 9A and 10A**

*HSI assessment: N/A (as waterbodies dry)*

3.23.1 Waterbody 9A (*Photo 11*) is located on the north western site boundary and Waterbody 10A is located 250m north-east of the site. Waterbodies 9A and 10A had an earth base with gently sloping banks and are located within hedgerows which shade the majority of the ponds:

- Waterbody 9A, located on the northern site boundary, was dry at the time of the 2018 HSI and eDNA survey and has been observed to be dry on all previous and subsequent site visits<sup>1</sup>. This waterbody was subsequently not subject to further survey and is considered unsuitable for Great Crested Newts.
- Waterbody 10A, located 250m north-east of the site, was dry at the time of the 2018 HSI and eDNA survey. Research has identified that the maximum routine migratory distance of Great Crested Newts away from ponds during terrestrial phases is 250m and more recent studies suggest that 95% of newt summer refuges are within 63m of breeding ponds (Cresswell and Whitworth, 2004). At a distance of 250m from the site, in the event that this waterbody now contains water it is highly unlikely that any newts present would use the site during terrestrial phases.

### **3.24 Waterbodies 4A, 5A, 6A, 7A, 8A, 12A, 13A and 16A**

*HSI assessment: N/A (no access granted)*

3.24.1 Access to Waterbodies 4A, 5A, 6A, 7A, 8A, 12A, 13A and 16A was not granted during the 2018 and 2019 HSI and eDNA surveys:

- Waterbody 12A is located 230m to the south-east of the site and from aerial photographs appears to be along a field margin and has been infilled. Although this pond appears to no longer exist, in the unlikely event that Great Crested Newts are present in this pond these are unlikely to use the site during terrestrial phases as:
  - Research has identified that the maximum routine migratory distance of Great Crested Newts away from ponds during terrestrial phases is 250m (Cresswell and Whitworth, 2004). At a distance of 230m from the site, Waterbody 12A is located towards the outer extremity of this range.

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<sup>1</sup> One exception being following a period of heavy rain in 2012 when this pond was flooded by the River Ouzel.

- The interlying habitat between Waterbody 12A and the site is dominated by intensively managed arable farmland which provides limited opportunities for this species.
- Waterbody 16A is located 250m to the east of the site within a residential garden and appears to be densely shaded by trees. As identified above, this pond lies at the maximum routine migratory distance of Great Crested Newts away from ponds during terrestrial phases and it is unlikely that any newts associated with this pond use the site during terrestrial phases.
- Waterbodies 4A, 5A, 6A, 7A, 8A and 13A are located 390m, 290m, 260m, 250m, 130m and 260m, respectively. In addition to the majority of these ponds being the located beyond the maximum routine migratory distance of Great Crested Newts away from ponds during terrestrial phases, waterbodies to the north of the site were subject to Great Crested Newt presence/ absence surveys carried out by HDA in 2012 in accordance with the methodology in the Great Crested Newt Mitigation Guidelines (English Nature, 2001). No ponds were found to support Great Crested Newts and it is considered unlikely that Great Crested Newts have colonised these ponds in the intervening period.

## 4 SUMMARY

4.1 The results of the Great Crested Newt survey are summarised in *Table 2* below, with recorded amphibians and lifestage shown and the findings are summarised on the plan in *Appendix A*.

**Table 2:** Summary of Great Crested Newt survey results

Waterbodies*	Great Crested Newt	Smooth Newt	Common Frog
<b>Waterbody 2</b>	eDNA, Adults and Juveniles	Adults and juvenile	Adult
<b>Waterbody 3</b>	eDNA	Adults and juvenile	-
<b>Waterbody 4</b>	eDNA, Adult	-	Adults and juveniles
<b>Waterbody 5</b>	Adults and Juveniles**	Adults	Adult and juvenile
<b>Waterbody 8</b>	eDNA	Adults	Adult
<b>Waterbody 9</b>	eDNA	Adults	Adult
<b>Waterbody 10</b>	eDNA, Adult	Adults and juveniles	Adults
<b>Waterbody 11</b>	eDNA, Eggs	Adults	Adult
<b>Waterbody 12</b>	-**	Adult	-
<b>Waterbody 13</b>	eDNA	-	-
<b>Waterbody 14</b>	-**	Adults	-
<b>Waterbody 15</b>	-	Adults	Juvenile
<b>Waterbody 18</b>	-***	Adults	Adult

Waterbodies*	Great Crested Newt	Smooth Newt	Common Frog
Waterbody 14A	eDNA, Adults	Adults	-

\* Waterbodies 1, 6, 7, 12, 16, 17, 9A and 10A comprises dry waterbodies which were discounted for their potential to support breeding Great Crested Newts and subsequently not subject to further survey.

\*\* Environmental DNA (eDNA) was not collected as these waterbodies were dry during the 2018 survey.

\*\*\* Great Crested Newts were recorded absent by eDNA but due to the proximity to other ponds with Great Crested Newt eDNA present, the waterbody was subject to survey.

4.2 Although no Great Crested Newts were recorded from waterbodies within the site, Great Crested Newts were recorded from ten off-site waterbodies. Evidence for Great Crested Newts for Waterbodies 3, 8, 9 and 13 is limited to eDNA only, despite population estimate surveys being carried out. The majority of the waterbodies supporting Great Crested Newts are located within the Pineham Nature Reserve, within which Waterbody 2 had a maximum count of 12 adult Great Crested Newts; Waterbody 5 had a maximum count of 2 adult Great Crested Newts; and Waterbodies 4 and 10 each had a maximum count of 1 adult Great Crested Newt. In addition, Waterbody 14A within the housing estate approximately 270m south west of the site had a maximum count of 1 adult Great Crested Newt.

4.3 The numbers of Great Crested Newts (excluding newt eggs and larvae) recorded from each pond during torching or bottle trapping can be used to estimate population size. The number of adult newts recorded from each of these waterbodies is given in *Table 3* below. Where applicable, the maximum count for each survey method is indicated by shaded boxes.

**Table 3:** Maximum counts of adult Great Crested Newts

Date	Waterbody 2*		Waterbody 4*		Waterbody 5	
	Torch survey	Bottle trap survey	Torch survey	Bottle trap survey	Torch survey	Bottle trap survey
25.04.2019	12	1	0	0	1	1
01.05.2019	9	0	0	0	0	2
13.05.2019	8	1	0	0	0	0
15.05.2019	5	0	0	0	0	0
29.05.2019	10	0	1	-	0	1
03.06.2019	7	0	0	-	0	0

Date	Waterbody 10*		Waterbody 14A*	
	Torch survey	Bottle trap survey	Torch survey	Bottle trap survey
25.04.2019	0	0	1	0
01.05.2019	1	0	1	0
13.05.2019	0	0	0	0
15.05.2019	0	0	0	1
29.05.2019	0	0	1	0
03.06.2019	0	0	1	0

\* Great Crested Newt presence recorded during eDNA survey.

- 4.4 The population size class assessment criteria given in the Great Crested Newt Mitigation Guidelines (English Nature, 2001) suggests that maximum counts of up to 10 individuals constitute a 'small' population of Great Crested Newts; 11-100 individuals constitutes a 'medium' population and counts over 100 individuals constitutes a 'large' population.
- 4.5 All waterbodies surveyed were subject to 6 separate visits except where waterbodies dried out prior to the final visits. Waterbody 2, had a maximum count of 12 adult individuals recorded by any one population estimate survey method, therefore indicating a low-end 'medium' population. Waterbody 4, 5, 10 and 14A had maximum counts of 2 or less adult individuals, indicating 'small' populations.
- 4.6 The evidence for Great Crested Newt presence in Waterbodies 3, 8, 9 and 13 is limited to eDNA only, even after population estimate survey. It is therefore considered that each of these waterbodies support only a 'very low' population, possibly using the waterbodies on an infrequent or occasional basis.
- 4.7 No evidence of Great Crested Newts was recorded from any other waterbodies subject to survey.
- 4.8 The majority of waterbodies subject to survey also supported Smooth Newt populations (Waterbodies 2, 3, 5, 8, 9, 10, 11, 12, 14, 15, 18 and 14A). Smooth Newts are a common and widespread native amphibian species in England. Based on the scoring system given in the Herpetofauna Worker's Manual (Gent and Gibson, 1998), Waterbodies 8, 9, 10, 11, 12, 14, 15, 18 and 14A support a 'low' population of Smooth Newts and Waterbodies 2, 3 and 5 support a 'medium' population of Smooth Newts.
- 4.9 Many of the waterbodies subject to survey also supported Common Frog populations. Common Frogs are common and widespread native amphibian species in England. Based on the scoring system given in the Herpetofauna Worker's Manual (Gent and Gibson, 1998), Waterbodies 2, 4, 5, 8, 9 and 18 support a 'low' population of Common Frog.

## **5 EVALUATION**

- 5.1 Although no Great Crested Newts were recorded from within the site, Great Crested Newts were recorded within 10 waterbodies within the wider survey area (Waterbodies 2, 3, 4, 5, 8, 9, 10, 11, 13 and 14A). A low-end moderate population of Great Crested Newts was recorded from waterbodies within the Pineham Nature Reserve to the south-west of the site and a very low population was recorded from Waterbody 14A located 270m to the south of the site beyond the M1 Motorway.

- 5.2 A maximum routine migratory range of 250m from breeding ponds has been estimated for Great Crested Newts during terrestrial phases, and more recent studies suggest that 95% of newt summer refuges are within 63m of breeding ponds (Cresswell and Whitworth, 2004).
- 5.3 Waterbody 14A is located approximately 270m from the site, within a sub-urban housing estate, and a number of roads including the M1 Motorway lie between Waterbody 14A and the western site boundary. It is considered highly unlikely that individual newts from the low population supported by this waterbody use the site during terrestrial phases.
- 5.4 Waterbodies within Pineham Nature Reserve vary from 20m to 230m from the southern site boundary<sup>2</sup> and these were found to support a low-end medium population of this species. Great Crested Newts usually exist in metapopulations, using clusters of ponds with cross dispersal of individuals between them. This decreases the vulnerability of local populations to habitat changes (e.g. individual ponds drying) thereby maintaining long-term population viability. Therefore, the network of ponds within Pineham Nature Reserve should all be regarded as potential Great Crested Newt breeding habitat in its entirety as newts may use different ponds in different years according to their suitability.
- 5.5 The western area of the site, within 250m of the Pineham Nature Reserve, is dominated by arable fields and grazed semi-improved grassland fields which provide limited opportunities for Great Crested Newts during terrestrial phases. These are however complimented by a network of hedgerows, scattered trees, rough grassland/ tall ruderal field margins and a small area of broadleaved woodland which provide moderate to high quality habitat for terrestrial phase newts. Despite the presence of the River Ouzel and the Broughton Brook between the Pineham Nature Reserve and the site, which may to some extent act as a barrier to dispersal, it is therefore likely that some Great Crested Newts from the Pineham Nature Reserve use the site during terrestrial phases.
- 5.6 Notwithstanding the likely use of the western area of the site within 250m of the Pineham Nature Reserve by Great Crested Newts during terrestrial phases, the site is unlikely however to form a key area of terrestrial habitat for this population as:
- The waterbodies are immediately connected to good quality terrestrial habitat within the Pineham Nature Reserve itself. These habitats are likely to form the core terrestrial habitat for the newts associated with the ponds.
  - The River Ouzel and Broughton Brook may provide partial (but not complete) barriers to movement of newts between the Pineham Nature Reserve and the site;

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<sup>2</sup> Six waterbodies within Pineham Nature reserve are within 63m of the site, from 3 of which evidence of Great Crested Newts was recorded in the form of eDNA, eggs or individual newts.

- The Pineham Nature Reserve supports only a low-end medium population of Great Crested Newts, thereby reducing pressure for newts to disperse away from the terrestrial habitat in the immediate vicinity of the ponds; and
- Some ponds supporting Great Crested Newts within the Pineham Nature Reserve are located beyond 250m from the site, with other ponds located towards the outer edge of this range.

5.7 Although the western area of the site within 250m of the Pineham Nature Reserve is considered to be of limited importance for the local Great Crested Newt population, due to the potential for this area to support low numbers of Great Crested Newts during terrestrial phases a Natural England licence would need to be obtained prior to works potentially affecting Great Crested Newts commencing. Unless otherwise agreed with Natural England, this would require implementation of measures to protect individual Great Crested Newts during construction and maintenance of opportunities at the site and/or its surrounds for this species in the long-term. Outline measures to avoid adverse effects on individual Great Crested Newts and to maintain the favourable conservation status of the local population in accordance with UK and European legislation, along with measures to enhance the overall value of the site and/or its surrounds for Great Crested Newts in accordance with the 2019 National Planning Policy Framework (NPPF) and 2006 NERC Act, are therefore provided in *Section 6* below.

## **6 MITIGATION AND SITE SAFEGUARDING**

### **6.1 Introduction**

6.1.1 This section identifies measures to be implemented during development of the site in order to avoid and mitigate potential impacts on Great Crested Newts. In addition, measures for enhancement of the site for Great Crested Newts are recommended in accordance with the 2019 NPPF and the 2006 NERC Act.

6.1.2 The results of the field surveys indicate low numbers of Great Crested Newts may be present within the western area of the site within 250m of the Pineham Nature Reserve during terrestrial phases. Unless otherwise agreed with Natural England it would therefore be necessary to:

- Protect individual Great Crested Newts through removal and exclusion from the site prior to and during construction works; and
- Provision of replacement habitat within the landscape scheme of the proposed development to ensure that opportunities remain at the site for Great Crested Newts, thereby protecting the favourable conservation status of the local population in the long-term.

6.1.3 These works would need to be carried out under a Natural England licence. It is anticipated that the outline mitigation strategy described below would provide the basis for a detailed Method Statement to be submitted to Natural England as part of a licence application unless an alternative approach is agreed with Natural England at an appropriate stage.

6.1.4 The extent of the recommended mitigation measures is shown in *Appendix F*.

## **6.2 Great Crested Newt capture and translocation**

6.2.1 Proposals for the site include mixed use development with associated landscaping and infrastructure. Where this affects substantial areas of suitable terrestrial habitat within 250m of the Pineham Nature Reserve (see *Appendix F*) in order to protect individual Great Crested Newts in accordance with nature conservation legislation it will be necessary to translocate to a receptor area prior to the commencement of works:

### *Identification and preparation of the receptor site*

- A suitable receptor area should be identified to receive translocated Great Crested Newts from the development area. Priority should be given to the sourcing and use of potential receptor areas within or in close vicinity to the site.
- In order to ensure the receptor area has capacity to support the translocated Great Crested Newts it may be necessary to carry out further survey and habitat enhancement works to the receptor area to increase its capacity to support Great Crested Newts.
- Measures to maintain the long-term integrity of the receptor site should also be secured.
- The receptor area could be located within the site or within the wider area and should comprise habitats of high value to Great Crested Newts such as scrub, rough grassland, tall ruderal and woodland habitats. In addition, it should include features suitable for hibernation such as purpose built hibernacula and refuge piles, and where possible waterbodies suitable for breeding. Any new wildlife ponds should be sensitively designed to provide high quality aquatic habitat through provision of gently shelving margins and native aquatic and marginal planting. The receptor area should be connected to Pineham Nature Reserve and other areas of suitable habitat in the wider area.

6.2.2 The Pineham Nature Reserve would be an ideal location for a receptor site as this is the focus of the local breeding population and is already dominated by high quality terrestrial habitat.

6.2.3 Should this not be feasible, the emerging proposals indicate the retention of the semi-improved grassland along the River Ouzel and creation of wetland habitats within an area of informal public open space. In addition to its potential use as a receptor area to receive

translocated newts, it is recommended that this area comprises a selection of rough and meadow grassland and shrub habitats to mitigate for the areas of suitable terrestrial habitat lost to development (see *Section 6.5*). These works would be expected to enhance this area of the site and it is expected that this could form the receptor habitat for translocated Great Crested Newts.

6.2.4 In order to allow for translocation of Great Crested Newts from areas of works within the western area of the site within 250 of the Pineham Nature Reserve, and prevent newts from dispersing into such areas during construction, exclusion fencing should firstly be erected around the boundary of affected habitat prior to the commencement of works. Pitfall traps should then be installed at 10m intervals along the inside of the fencing and artificial refugia placed along the fenceline and within suitable terrestrial habitat (rough grass, hedgerow bases etc.) within the interior of the exclusion zone at a density of 50-100 refugia per hectare. Trapping and translocation should follow the general methodology set out below:

*Installation of fencing and pitfall traps*

- Fencing and pitfall traps should only be installed under the supervision of a suitably qualified ecologist at a time of year when night time temperatures are consistently above 5°C;
- The proposed fence line should first be searched and cleared of amphibians. Any amphibians found should be translocated to the receptor site outside of the exclusion area (detailed above);
- Any vegetation that requires removal for fence installation should be removed using hand tools in a two stage cutting regime (firstly cut down to 15cm above ground level, followed by a second cut to ground level), taking care to avoid risk of injury to resting amphibians;
- Pitfall traps should be installed flush with the newt fencing and ensure no top lip is present;
- Each pitfall trap should remain closed until the translocation commences; and
- Pitfall traps should be complemented by installation of carpet tile refugia (or similar) along the fence lines and within the interior of the capture area, installed at a density of 50 - 100 mats per hectare of suitable habitat.

*Translocation exercise*

- Translocation works should be carried out in suitable climatic conditions between March and early November inclusive;
- Once the translocation has started, the pitfall traps should be opened and equipped with a mammal ramp, float and vegetation for trapped newts to hide under;
- Each pitfall trap should be checked daily before 11am and weather conditions monitored and traps closed if necessary;

- Refugia should be lifted and any amphibians beneath captured;
- All amphibians captured should be translocated to the pre-established receptor area outside of the exclusion fencing;
- The pitfall trapping and artificial refugia searches should be undertaken for a minimum of 30 nights (with 5 clear days at the end of the translocation) unless trapping results suggest other as appropriate (in agreement with Natural England); and
- Fencing should be monitored on a weekly basis and any damaged repaired until all newts have been cleared from the area of search, after which any drift fencing within the interior of the capture area removed.

6.2.5 Once capture rates decline in any given compartment, vegetation manipulation works described below would commence to encourage capture of any remaining newts. Any remaining naturally occurring refugia should also be dismantled by hand and searched for newts. In the event that vegetation clearance is likely to be counterproductive to the capture of newts (e.g. by encouraging newts to go to ground) this work should not be carried out.

*Vegetation manipulation*

- Vegetation manipulation to encourage capture of newts would require clearance of remaining vegetation to no less than 100mm by hand;
- Vegetation should be cut using hand tools under the supervision of a suitably qualified ecologist;
- Again, any newts encountered within the area of works during vegetation clearance should be captured and moved to the receptor site outside the exclusion area; and
- A further 5 days with night time temperatures of >5°C should then be allowed to elapse to enable capture of any remaining newts prior to a destructive search (see below).

*Destructive search*

- In order to be certain that no newts are present within the area of works, once five suitable trapping nights have passed with no captures from terrestrial habitats, vegetation should be cleared from areas of suitable habitat to ground level and topsoil disturbed by scraping back to a depth of up to 10cm where the possibility of newts being present remains. This should be carried out under the direct supervision of a suitably qualified ecologist where it is expected Great Crested Newts might still be present. Topsoil should not be stripped from the root protection areas of retained trees, scrub and hedgerows, or where translocation results and vegetation clearance to ground level allows satisfactory inspection to confirm likely absence of newts.

- In the event that the destructive search is delayed following newt capture, the vegetation should be maintained at ground level until the destructive search is carried out.

6.2.6 Once the translocation, vegetation clearance and destructive search measures have been completed within any given compartment in accordance with the methodology outlined above, development works would be able to go ahead within the cleared area.

### **6.3 Reasonable Avoidance Measures (RAMs)**

6.3.1 Subject to review and agreement with a suitably qualified ecologist, where only small areas of suitable terrestrial habitat are affected by works (e.g. installation of a bench within an otherwise undisturbed area of habitat, it may be possible to avoid a full translocation. In order to ensure that no Great Crested Newts are present or harmed during such works it is recommended that a two-stage approach to clearance of the affected area is undertaken. This is also in keeping with measures to avoid unlawful killing/ injuring of reptiles which also have potential to be present within similar habitat as described in the Reptile Report (HDA, 2020a). This would involve:

- i. Manipulation of suitable habitat within the construction zone to reduce suitability for newts.
- ii. Destructive search of areas of cleared habitat to ensure the absence of newts.

6.3.2 Each of the above stages is described below:

Vegetation manipulation:

- Vegetation within areas of suitable terrestrial habitat located within the proposed area of works should be cleared using hand held machinery to a height of no less than 100mm in order to reduce suitability of the habitat present to encourage the dispersal of any animals present away from affected areas.
- Vegetation should be cut using handheld tools under the supervision of a suitably qualified ecologist who will inspect affected areas prior to and during works.
- In addition, any refuge opportunities present should be dismantled by hand and searched prior to being removed.
- Vegetation removal works should be carried out at a time of year when amphibians are active (generally March to October inclusive), ideally during the newt breeding season (mid-March to mid-June inclusive) when newts are even less likely to be present at the site.

Destructive search:

- In order to be certain that no amphibians are present within the area of works, once five suitable days/ nights have passed since vegetation manipulation works have been completed, the remaining vegetation would be cleared from areas of

suitable habitat to ground level and where necessary topsoil disturbed by scraping back to a depth of up to 100mm where the possibility of animals being present remains.

- This should be carried out under the direct supervision of a suitably qualified ecologist.
- Topsoil should not be stripped from the root protection areas of retained trees, scrub and hedgerows, or where vegetation clearance to ground level allows satisfactory inspection to confirm likely absence.
- In the event that the destructive search is delayed following vegetation manipulation, the vegetation should be maintained at ground level until the destructive search is carried out.
- Destructive search works should be carried out at a time of year when amphibians are active (generally March to October inclusive), ideally during the newt breeding season (mid-March to mid-June inclusive) when newts are even less likely to be present at the site.

6.3.2 In the unlikely event that during any of the works on site a Great Crested Newt is encountered outside the area covered under the Great Crested Newt licence, works should stop, a suitable qualified ecologist contacted and Natural England consulted.

#### **6.4 Further survey**

6.4.1 It is recommended that the need to update the Great Crested Newt survey work undertaken to date is periodically reviewed by a suitably qualified ecologist in order to ensure effective assessment of effects of the proposed development on this species and to identify appropriate avoidance and mitigation measures. Any updated survey work should also include renewed attempts to survey Waterbodies 4A, 5A, 6A, 7A, 8A, and 13A to confirm continued absence of Great Crested Newts in these off-site ponds.

#### **6.5 Site safeguards and habitat creation**

6.5.1 The exclusion fencing should be retained and maintained until completion of works within the relevant area and the condition of the fencing monitored and repairs made as required. Following the completion of development, the exclusion fencing should be removed allowing newts to disperse back into newly created habitat within the site.

6.5.2 Development proposals should also seek to maintain and where possible enhance opportunities for Great Crested Newts at the site. This could be achieved through the retention, enhancement and creation of Great Crested Newt habitats as part of the landscape strategy for the site in addition to those required for any receptor site provision in relation to the development works. Consideration should be given to:

- Creation of new open water wetland habitats suitable for breeding amphibians planted with a range of native aquatic and marginal vegetation, either as standalone features or as part of the site surface water drainage strategy;
- Inclusion of high quality terrestrial habitats within the landscape scheme in the form of scrub, hedgerows, swales and ditches and rough, meadow and wet grassland;
- Provision of opportunities for hibernation and refuge through provision of log/brush piles and purpose built hibernacula; and
- Securing the long-term integrity of new and retained Great Crested Newt habitats through inclusion within a long-term management plan.

6.5.3 In order to protect any newts entering the entire site during the operational phase of the development, any gully pots within 250m of Pineham Nature Reserve or areas of targeted Great Crested newt habitat creation works should be suitably designed with a stand-off from the kerb and/or through use of 'wildlife friendly' kerbs<sup>3</sup> to avoid entrapment of any newts and other wildlife passing over hard landscaped areas. Consideration should also be given to installation of 'escape ladders' in drains. Where appropriate, dropped kerbs should also be used where Great Crested Newts are likely to cross roads and other areas of hardstanding. Detailed drainage and infrastructure proposals for the development should be reviewed at appropriate design stages by a suitably qualified ecologist.

## 7 CONCLUSION

7.1 The results of the Great Crested Newt surveys recorded a low-end 'medium' sized population of Great Crested Newts present within the waterbodies associated with the Pineham Nature Reserve immediately adjacent to the southern site boundary. The findings of the survey suggest that low numbers of Great Crested Newts from this population may use the site during terrestrial phases.

7.2 In addition a 'low' population of Great Crested Newts was recorded from Waterbody 14A, 270m to the south of the site. However in view of the small size of this population, its distance from the site and the presence of interlying barriers to dispersal (including the M1 Motorway) it is considered unlikely that newts associated with this pond use the site during terrestrial phases.

7.3 The proposed construction and ground works within 250m of the Pineham Nature Reserve have the potential to result in a loss of Great Crested Newt terrestrial habitat and affect any individual newts present, and in absence of mitigation development of this area may constitute an offence under UK and European nature conservation legislation. Measures to maintain the favourable conservation status of the local Great Crested Newt population and avoid direct injury or mortality of individual newts, through sympathetic design of hard

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<sup>3</sup> Wildlife friendly kerbs - [www.wildlifefencing.co.uk/product.php?productid=477&cat=68&page=1](http://www.wildlifefencing.co.uk/product.php?productid=477&cat=68&page=1)

landscaping, maintenance of habitat linkages, approach to works and suitable timing of activities, are subsequently described in *Section 6* of this report. In the event that planning permission is granted, the measures described should form the basis of a detailed Method Statement to accompany an application to Natural England for a licence to permit development works affecting Great Crested Newts.

7.4 Subject to implementation of the proposed mitigation and enhancement works described in *Section 6*, it is considered that the favourable conservation status of the local Great Crested Newt population present can be maintained. This would ensure compliance with the nature conservation objectives of the 2019 Conservation of Habitats and Species (Amendment) (EU Exit) Regulations, the 2006 NERC Act and the guidance underpinning the 2019 National Planning Policy Framework.

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## HDA Document Control and Quality Assurance Record

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Project Title: Milton Keynes East (Newport Pagnell) Ecology  
Project Reference: 2090.52  
Document Title: Great Crested Newt HSI and eDNA Survey Report  
Commissioning Party: St James

Issue	Description	Date of Issue	Signed
1	Great Crested Newt Survey Report	February 2020	AM

	Personnel	Position
Author	Shannon Davies	Assistant ecologist
Approved for issue	Adrian Meurer MCIEEM	Director

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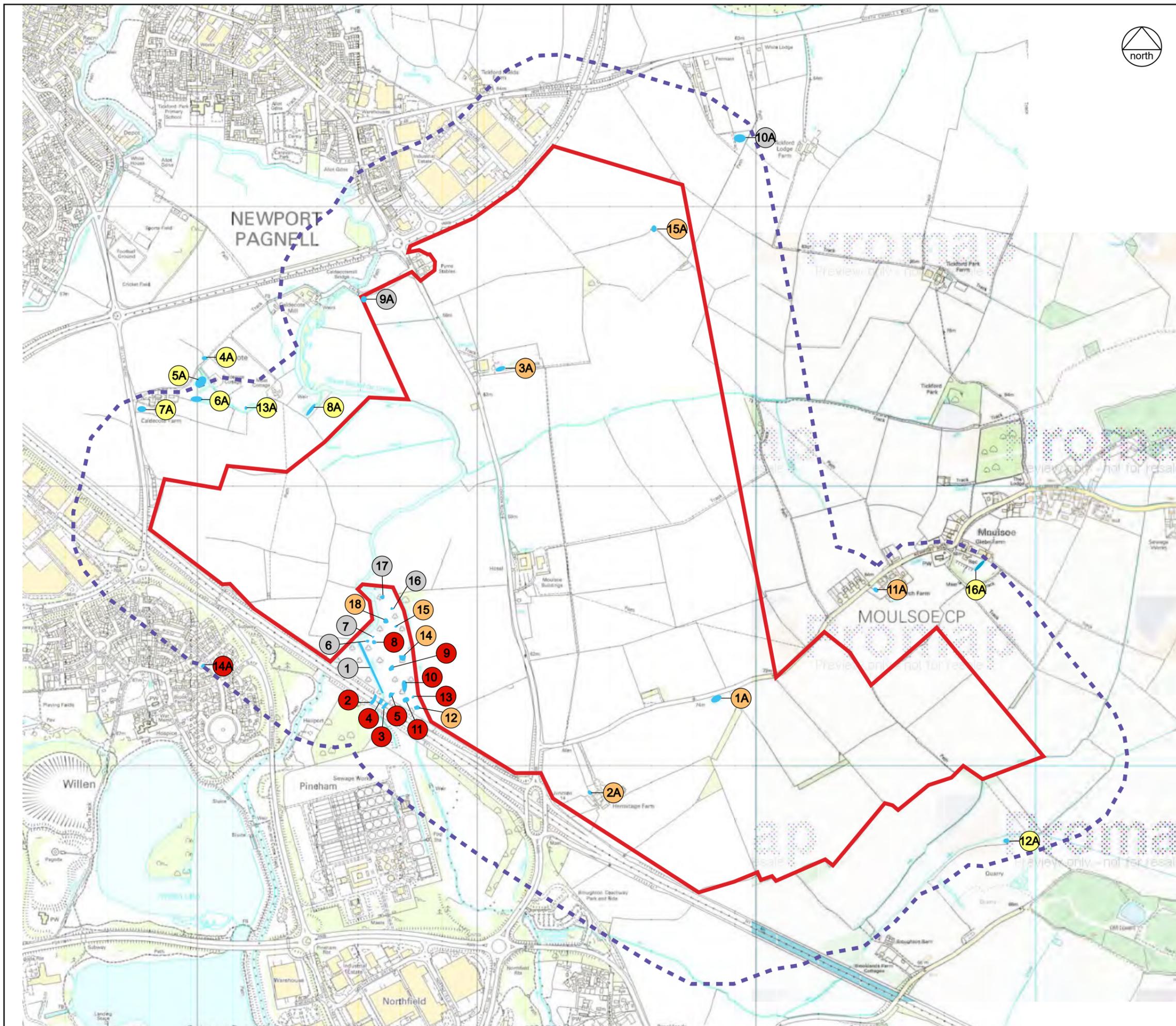
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**APPENDIX A**

**Great Crested Newt Survey Summary Plan**



**KEY**

- Site boundary
- 300m radius of site
- 1 Waterbody reference number
- Great Crested Newt confirmed present by population estimate survey and/or eDNA analysis
- Great Crested Newts confirmed absent by eDNA analysis and/or population estimate survey
- Waterbody dry at the time of survey
- Waterbody inaccessible for survey

CLIENT:  
**St James**  
 PROJECT:  
**Milton Keynes East**  
 TITLE:  
**Great Crested Newt Survey Summary Plan**  
 SCALE AT A3: DATE:  
 Not to Scale February 2020

2090.52/09

Based on Ordnance Survey mapping with permission of Her Majesty's Stationery Office Licence no. AR187372

**hda**

Landscape Architecture  
 Masterplanning  
 Ecology

## **APPENDIX B**

### **Full HSI assessment results**

		Waterbody 2		Waterbody 3		Waterbody 4	
SI Ref	Description of Index	Measure / Comment	SI score	Measure / Comment	SI score	Measure / Comment	SI score
SI1	Geographic location	A	1	A	1	A	1
SI2	Pond area (m <sup>2</sup> )	3x30	0.95	2 x 25	0.1	2 x 7	0.05
SI3	Pond permanence	Rarely	1	Sometimes dries	0.5	Sometimes dries	0.5
SI4	Water quality	Moderate	0.67	Poor	0.33	Poor	0.33
SI5	Shading (%)	85%	0.5	95%	0.3	95%	0.3
SI6	Presence of waterfowl	Absent	1	Absent	1	Absent	1
SI7	Presence of fish	Possible	0.67	Minor	0.33	Possible	0.67
SI8	Pond density in area	6.6	1	6.6	1	6.6	1
SI9	Terrestrial habitat quality	Moderate	0.67	Poor	0.33	Poor	0.33
SI10	Macrophyte cover in pond (%)	15%	0.45	5%	0.35	0%	0.3
	<b>Overall HSI for pond</b>		<b>0.760</b>		<b>0.424</b>		<b>0.418</b>
<b>Overall suitability</b>		<b>Good</b>		<b>Excellent</b>		<b>Poor</b>	

		Waterbody 8		Waterbody 9		Waterbody 10	
SI Ref	Description of Index	Measure / Comment	SI score	Measure / Comment	SI score	Measure / Comment	SI score
SI1	Geographic location	A	1	A	1	A	1
SI2	Pond area (m <sup>2</sup> )	5 x 5	0.05	15 x 10	0.25	40 x 20	0.98
SI3	Pond permanence	Rarely dries	1	Rarely dries	1	Never dries	0.9
SI4	Water quality	Good	1	Good	1	Good	1
SI5	Shading (%)	40%	1	30%	1	60%	1
SI6	Presence of waterfowl	Minor	0.67	Minor	0.67	Minor	0.67
SI7	Presence of fish	Possible	0.67	Minor	0.33	Minor	0.67
SI8	Pond density in area	6.6	1	6.6	1	6.6	1
SI9	Terrestrial habitat quality	Good	1	Good	1	Good	1
SI10	Macrophyte cover in pond (%)	80%	1	60%	0.9	90%	0.9
	<b>Overall HSI for pond</b>		<b>0.684</b>		<b>0.741</b>		<b>0.902</b>
<b>Overall suitability</b>		<b>Average</b>		<b>Good</b>		<b>Excellent</b>	

		Waterbody 11		Waterbody 12		Waterbody 13	
SI Ref	Description of Index	Measure / Comment	SI score	Measure / Comment	SI score	Measure / Comment	SI score
SI1	Geographic location	A	1	A	1	A	1
SI2	Pond area (m <sup>2</sup> )	30 x 30	1	2 x 4	0.05	30x10	0.6
SI3	Pond permanence	Sometimes dries	0.5	Annually dries	0.1	Sometimes dries	0.5
SI4	Water quality	Moderate	0.67	Good	1	Moderate	0.67
SI5	Shading (%)	40%	1	5%	1	20%	1
SI6	Presence of waterfowl	Absent	1	Absent	1	Absent	1
SI7	Presence of fish	Possible	0.67	Absent	1	Possible	0.67
SI8	Pond density in area	6.6	1	6.6	1	6.6	1
SI9	Terrestrial habitat quality	Good	1	Good	1	Good	1
SI10	Macrophyte cover in pond (%)	60%	0.9	90%	0.9	70%	1
	<b>Overall HSI for pond</b>		<b>0.852</b>		<b>0.583</b>		<b>0.818</b>
<b>Overall suitability</b>		<b>Excellent</b>		<b>Below average</b>		<b>Excellent</b>	

		Waterbody 14		Waterbody 18		Waterbody 1A	
SI Ref	Description of Index	Measure / Comment	SI score	Measure / Comment	SI score	Measure / Comment	SI score
SI1	Geographic location	A	1	A	1	A	1
SI2	Pond area (m <sup>2</sup> )	6 x 4	0.05	6x3	0.05	60x20	0.9
SI3	Pond permanence	Sometimes dries	0.5	Sometimes dries	0.5	Never dries	0.9
SI4	Water quality	Moderate	0.67	Moderate	0.67	Good	1
SI5	Shading (%)	20%	1	70%	0.9	30%	1
SI6	Presence of waterfowl	Absent	1	Minor	0.67	Minor	0.33
SI7	Presence of fish	Absent	1	Minor	0.67	Possible	0.67
SI8	Pond density in area	6.6	1	6.6	1	0.9	0.1
SI9	Terrestrial habitat quality	Good	1	Good	1	Poor	0.33
SI10	Macrophyte cover in pond (%)	50%	0.8	50%	0.8	20%	0.5
	<b>Overall HSI for pond</b>		<b>0.650</b>		<b>0.593</b>		<b>0.559</b>
<b>Overall suitability</b>		<b>Average</b>		<b>Below average</b>		<b>Below Average</b>	

		Waterbody 2A		Waterbody 3A		Waterbody 11A	
SI Ref	Description of Index	Measure / Comment	SI score	Measure / Comment	SI score	Measure / Comment	SI score
SI1	Geographic location	A	1	A	1	A	1
SI2	Pond area (m <sup>2</sup> )	15x7	0.2	35x20	1	10x5	0.1
SI3	Pond permanence	Sometimes dries	0.5	Sometimes dries	0.5	Sometimes dries	0.5
SI4	Water quality	Poor	0.33	Poor	0.33	Moderate	0.67
SI5	Shading (%)	80%	0.6	10%	1	80%	0.6
SI6	Presence of waterfowl	Minor	0.33	Minor	0.33	Minor	0.33
SI7	Presence of fish	Minor	0.33	Absent	1	Possible	0.67
SI8	Pond density in area	5.7	1	1.5	0.7	0.95	0.1
SI9	Terrestrial habitat quality	Moderate	0.67	Moderate	0.67	Poor	0.33
SI10	Macrophyte cover in pond (%)	30%	0.6	15%	0.45	5%	0.35
	<b>Overall HSI for pond</b>		<b>0.494</b>		<b>0.640</b>		<b>0.372</b>
<b>Overall suitability</b>		<b>Poor</b>		<b>Average</b>		<b>Poor</b>	

		Waterbody 14A		Waterbody 15A	
SI Ref	Description of Index	Measure / Comment	SI score	Measure / Comment	SI score
SI1	Geographic location	A	1	A	1
SI2	Pond area (m <sup>2</sup> )	20x25	1	10x5	0.1
SI3	Pond permanence	Never dries	0.9	Sometimes dries	0.5
SI4	Water quality	Good	1	Moderate	0.67
SI5	Shading (%)	50%	1	75%	0.7
SI6	Presence of waterfowl	Minor	0.67	Minor	0.33
SI7	Presence of fish	Minor	0.67	Minor	0.33
SI8	Pond density in area	7.3	1	2.8	0.95
SI9	Terrestrial habitat quality	Poor	0.33	Moderate	0.67
SI10	Macrophyte cover in pond (%)	15%	0.45	15%	0.45
	<b>Overall HSI for pond</b>		<b>0.755</b>		<b>0.486</b>
<b>Overall suitability</b>		<b>Good</b>		<b>Poor</b>	

**APPENDIX C**

**eDNA sampling analysis results**

Folio No: E3587  
 Report No: 1  
 Order No: 2090.52  
 Client: HDA  
 Contact: Shannon Davies  
 Contact Details: [REDACTED]  
 Date: 16/07/2018

## TECHNICAL REPORT

### ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS

**Date sample received at Laboratory:** 02/07/2018  
**Date Reported:** 16/07/2018  
**Matters Affecting Results:** None

#### RESULTS

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
0383	3A	-	Pass	Pass	Pass	Negative	0
1372	1A	-	Pass	Pass	Pass	Negative	0
1375	14A	-	Pass	Pass	Pass	Positive	12
1377	15A	-	Pass	Pass	Pass	Negative	0
3532	2	-	Pass	Pass	Pass	Positive	1
3534	18	-	Pass	Pass	Pass	Negative	0
3538	2A	-	Pass	Pass	Pass	Negative	0
3541	11A	-	Pass	Pass	Pass	Negative	0
3542	3	-	Pass	Pass	Pass	Positive	0
3543	10	-	Pass	Pass	Pass	Positive	11
3547	4	-	Pass	Pass	Pass	Positive	1
3548	11	-	Pass	Pass	Pass	Positive	3
3549	8	-	Pass	Pass	Pass	Positive	12

3550		13		-		Pass		Pass		Pass		Positive		10
3551		9		-		Pass		Pass		Pass		Positive		4

## SUMMARY

When Great Crested Newts (GCN); *Triturus cristatus* inhabit a pond, they deposit traces of their DNA in the water as evidence of their presence. By sampling the water, we can analyse these small environmental DNA (eDNA) traces to confirm GCN habitation, or establish GCN absence.

The water samples detailed below were submitted for eDNA analysis to the protocol stated in DEFRA WC1067 (Latest Amendments). Details on the sample submission form were used as the unique sample identity.

## RESULTS INTERPRETATION

Lab Sample No.- When a kit is made it is given a unique sample number. When the pond samples have been taken and the kit has been received back in to the laboratory, this sample number is tracked throughout the laboratory.

Site Name- Information on the pond.

O/S Reference - Location/co-ordinates of pond.

SIC- Sample Integrity Check. Refers to quality of packaging, absence of tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to results errors. Inspection upon receipt of sample at the laboratory. To check if the Sample is of adequate integrity when received. Pass or Fail.

DC- Degradation Check. Analysis of the spiked DNA marker to see if there has been degradation of the kit since made in the laboratory to sampling to analysis. Pass or Fail.

IC- Inhibition Check- PCR inhibitors can cause false results. Inhibitors are analysed to check the quality of the result. Every effort is made to clean the sample pre-analysis however some inhibitors cannot be extracted. An unacceptable inhibition check will cause an indeterminate sample and must be sampled again.

Result- NEGATIVE means that GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as no evidence of GCN presence. POSITIVE means that GCN eDNA was found at or above the threshold level and the presence of GCN at this location at the time of sampling or in the recent past is confirmed. Positive or Negative.

Positive Replicates- To generate the results all of the tubes from each pond are combined to produce one eDNA extract. Then twelve separate analyses are undertaken. If one or more of these analyses are positive the pond is declared positive for the presence of GCN. It may be assumed that small fractions of positive analyses suggest low level presence but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive.

## METHODOLOGY

The laboratory testing adheres to strict guidelines laid down in WC1067 Analytical and Methodological Development for Improved Surveillance of The Great Crested Newt, Version 1.1

The analysis is conducted in two phases. The sample first goes through an extraction process where all six tubes are pooled together to acquire as much eDNA as possible. The pooled sample is then tested via real time PCR (also called q-PCR). This process amplifies select part of DNA allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines PCR amplification and detection into a single step. This eliminates the need to detect products using gel electrophoresis. With qPCR, fluorescent dyes specific to the target sequence are used to label PCR products during thermal cycling. The accumulation of fluorescent signals during the exponential phase of the reaction is measured for fast and objective data analysis. The point at which amplification begins (the Ct value) is an indicator of the quality of the sample. True positive controls, negatives and blanks as well as spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared so they act as additional quality control measures.

The primers used in this process are specific to a part of mitochondrial DNA only found in GCN ensuring no DNA from other species present in the water is amplified. The unique sequence appropriate for GCN analysis is quoted in DEFRA WC 1067 and means there should be no detection of closely related species. We have tested our system exhaustively to ensure this is the case in our laboratory. We can offer eDNA analysis for most other species including other newts.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. Kits are manufactured by SureScreen Scientifics to strict quality procedures in a separate building and with separate staff, adopting best practice from WC1067 and WC1067 Appendix 5. Kits contain a 'spiked' DNA marker used as a quality control tracer (SureScreen patent pending) to ensure any DNA contained in the sampled water has not deteriorated in transit. Stages of the DNA analysis are also conducted in different buildings at our premises for added

SureScreen Scientifics Ltd also participate in Natural England's proficiency testing scheme and we also carry out inter-laboratory checks on accuracy of results as part of our quality procedures.

**Reported by:** Josh Estella

**Approved by:** Derry Hickman

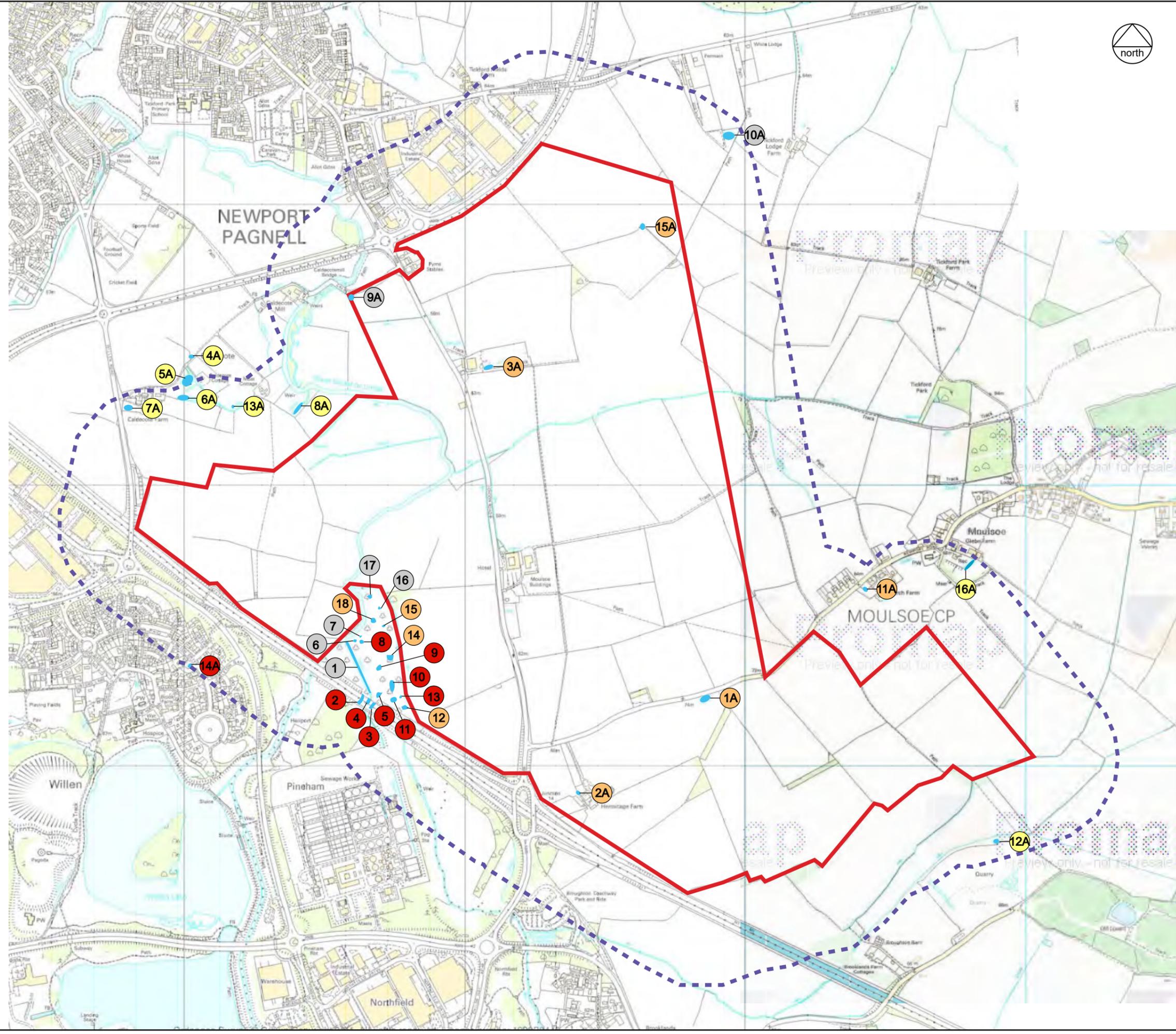
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End Of Report

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## **APPENDIX D**

### **Population estimate survey results**



**KEY**

- Site boundary
- 300m radius of site
- 1 Waterbody reference number
- Great Crested Newt confirmed present by population estimate survey and/or eDNA analysis
- Great Crested Newts confirmed absent by eDNA analysis and/or population estimate survey
- Waterbody dry at the time of survey
- Waterbody inaccessible for survey

CLIENT:  
**St James**  
 PROJECT:  
**Milton Keynes East**  
 TITLE:  
**Great Crested Newt Survey Summary Plan**  
 SCALE AT A3: DATE:  
 Not to Scale February 2020

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2090.52/09

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**Landscape Architecture**  
**Masterplanning**  
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hda

Waterbody*	Date	Air Temp (°C)	Water Temp (°C)	Turbidity	Vegetation cover	Egg search	Netting	Torch survey	Bottle survey	Notes	
<b>Waterbody 2</b>	25.04.2019	10	-	1	1	-	NC	7 Tc male 5 Tc female 4 Lv male 7 Lv female	1 Tc male 11 Lv male		
	01.05.2019	13	-	3	0	-	NC	5 Tc male 4 Tc female 8 Lv female	NC**		
	13.05.2019	15	8.3 (AM)	3	1	-	NC	6 Tc male 2 Tc female 2 Lv male 15 Lv female 1 Rt	1 Tc female		
	15.05.2019	10	11	1	1	-	NC	4 Tc male 1 Tc female 8 Lv male 5 Lv female 1 Rt	NC**		
	29.05.2019	11	-	1	1	-	NC	6 Tc male 3 Tc female 1 Tc juvenile 6 Lv male 13 Lv female	NC		
	03.06.2019	16	13.8	1	1	-	NC	2 Tc male 3 Tc female 2 Tc juvenile 4 Lv male 15 Lv female 1 Lv juvenile 3 Rt	NC		
<b>Waterbody 3</b>	25.04.2019	10	-	2	0	-	NC	9 Lv female	NC	The waterbody was too shallow to use bottle traps.	
	01.05.2019	13	-	3	0	-	NC	2 Lv females	NC		
	13.05.2019	-	-	2	0	-	NC	2 Lv male 14 Lv female	NC		
	15.05.2019	10	-	3	0	-	NC	1 Lv male 10 Lv female 2 Lv juveniles	NC		
	29.05.2019	The waterbody was dry and therefore no further surveys were carried out									
	03.06.2019										

Waterbody*	Date	Air Temp (°C)	Water Temp (°C)	Turbidity	Vegetation cover	Egg search	Netting	Torch survey	Bottle survey	Notes
Waterbody 4	25.04.2019	10	-	3	1	-	NC	4 Rt	1 Rt	
	01.05.2019	13	-	3	1	-	NC	2 Rt	NC	
	13.05.2019	14	8.4 (AM)	3	1	-	NC	-	-	
	15.05.2019	10	10.4	4	1	-	NC	-	2 Rt	
	29.05.2019	-	-	4	1	-	NC	1 Tc male	NC	The waterbody was too shallow to use bottle trap.
	03.06.2019	16	13.7	4	1	-	NC	3 Rt juvenile	NC	
Waterbody 5	25.04.2019	11	-	2	4	-	NC	1 Tc female 7 Lv male 5 Lv female 1 Rt juvenile	1 Tc female 1 Lv female	
	01.05.2019	15	-	3	2	-	NC	1 Lv male 2 Lv female	2 Tc males 4 Lv females	
	13.05.2019	14	12 (AM)	3	2	-	NC	11 Lv male 1 Lv female	5 Lv male 5 Lv female	
	15.05.2019	10	16.2	3	2	-	NC	9 Lv male 8 Lv female 1 Rt	7 Lv male 6 Lv female	
	29.05.2019	11	12.3	3	2	-	NC	10 Lv male 13 Lv female	1 Tc juvenile 1 Lv male 3 Lv female	
	03.06.2019	16	17	1	2	-	NC	3 Lv male 8 Lv female	1 Lv male 3 Lv female	
Waterbody 8	25.04.2019	12	-	0	3	-	NC	2 Lv male 3 Lv female	3 Lv male 3 Lv female	
	01.05.2019	13	-	2	3	-	NC	1 Lv male 1 Rt	-	
	13.05.2019	14	8.6 (AM)	2	3	-	NC	-	-	
	15.05.2019	10	14.9	2	3	-	NC	-	1 Lv female	
	29.05.2019	The waterbody was dry and therefore no further surveys were carried out								
	03.06.2019	The waterbody was dry and therefore no further surveys were carried out								
Waterbody 9	25.04.2019	12	-	1	1	-	NC	2 Lv male 1 Lv female	1 Lv female	
	01.05.2019	12.5	15	1	2	-	NC	2 Lv male 1 Rt		
	13.05.2019	14	12.9 (AM)	1	2	-	NC	-	-	
	15.05.2019	10	17.1	1	2	-	NC	1 Lv female	-	
	29.05.2019	11	13.6	1	2	-	NC	3 Lv female	-	

Waterbody*	Date	Air Temp (°C)	Water Temp (°C)	Turbidity	Vegetation cover	Egg search	Netting	Torch survey	Bottle survey	Notes
	03.06.2019	16	18.3	1	2	-	NC	-	-	
<b>Waterbody 10</b>	25.04.2019	10	-	2	3	-	NC	1 Lv male 6 Lv female	1 Lv male 1 Lv juvenile	
	01.05.2019	13	14.8	1	3	-	NC	1 Tc male 2 Lv male 3 Lv female	-	
	13.05.2019	14	10.2 (AM)	2	3	-	NC	-	-	
	15.05.2019	10	15.4	2	3	-	NC	1 Lv male 1 Rt	1 Lv male	
	29.05.2019	11	12.8	2	3	-	NC	1 Lv female	-	
	03.06.2019	16	17.4	2	3	-	NC	-	-	
<b>Waterbody 11</b>	25.04.2019	11	-	2	4	-	NC	1 Lv male 2 Lv female	-	
	01.05.2019	14	14	2	4	-	NC	-	-	
	13.05.2019	14	8.4 (AM)	2	4	-	NC	-	-	
	15.05.2019	10	15.9	2	4	Tc eggs	NC	1 Rt	-	
	29.05.2019	The waterbody was dry and therefore no further surveys were carried out								
	03.06.2019	The waterbody was dry and therefore no further surveys were carried out								
<b>Waterbody 12</b>	25.04.2019	11	-	1	4	-	NC	-	-	
	01.05.2019	14	13.8	1	4	-	NC	1 Lv female	-	
	13.05.2019	14	-	2	4	-	NC	-	NC	Bottle trapping was not carried out due to shallow water levels
	15.05.2019	The waterbody was dry and therefore no further surveys were carried out								
	29.05.2019	The waterbody was dry and therefore no further surveys were carried out								
	03.06.2019	The waterbody was dry and therefore no further surveys were carried out								
<b>Waterbody 13</b>	25.04.2019	11	-	3	4	-	NC	-	-	
	01.05.2019	The waterbody was dry and therefore no further surveys were carried out								
	13.05.2019	The waterbody was dry and therefore no further surveys were carried out								
	15.05.2019	The waterbody was dry and therefore no further surveys were carried out								
	29.05.2019	The waterbody was dry and therefore no further surveys were carried out								
	03.06.2019	The waterbody was dry and therefore no further surveys were carried out								
<b>Waterbody 14</b>	25.04.2019	12	-	3	3	-	NC	1 Lv male	-	
	01.05.2019	13	14.5	3	3	-	NC	1 Lv male 1 Lv female	-	
	13.05.2019	14	11.6 (AM)	2	3	-	NC	-	-	

Waterbody*	Date	Air Temp (°C)	Water Temp (°C)	Turbidity	Vegetation cover	Egg search	Netting	Torch survey	Bottle survey	Notes
	15.05.2019	10	16.7	2	3	-	NC	2 Lv female	1 Lv female	
	29.05.2019	11	13.7	2	3	-	NC	1 Lv male	-	
	03.06.2019	16	17.6	2	3	-	NC	-	-	
Waterbody 15	25.04.2019	11	-	2	4	-	NC	1 Lv male 2 Lv female	-	
	01.05.2019	13	14	3	4	-	NC	1 Lv male 1 Lv female	-	
	13.05.2019	14	9.6 (AM)	3	4	-	NC	1 Lv male 1 Lv female	-	
	15.05.2019	10	15	3	4	-	NC	-	-	
	29.05.2019	11	14	3	4	-	NC	2 Lv male 3 Lv female	-	
	03.06.2019	16	15.9	3	4	-	NC	1 Rt juvenile	-	
Waterbody 18	25.04.2019	10	-	1	4	-	NC	1Rt	NC	
	01.05.2019	13	-	1	4	-	NC	-	1 Lv male	
	13.05.2019	15	-	1	4	-	NC	1 Lv female	-	
	15.05.2019	10	16.6	1	4	-	NC	-	-	
	29.05.2019	The waterbody was dry and therefore no further surveys were carried out								
	03.06.2019									
Waterbody 14a	25.04.2019	10	-	1	4	-	NC	1 Tc female	-	
	01.05.2019	11	13.5	1	4	-	NC	1 Tc male	-	
	13.05.2019	14	9.2 (AM)	2	4	-	NC	-	-	
	15.05.2019	10	8.1 (AM)	2	4	-	NC	1 Tc male 2 Lv female	1 Tc female	
	29.05.2019	11	13.3	2	4	-	NC	1 Tc male 1 Lv male 1 Lv female	-	
	03.06.2019	16	14.2	2	4	-	NC	1 Tc female	-	

\* Waterbodies 1, 6, 16, 17, 1A, 2A, 3A, 4A, 5A, 6A, 7A, 8A, 9A, 10A, 11A, 12A 13A and 15A were not subject to population estimate surveys due to either the likely absence of Great Crested Newts proved by eDNA survey (Waterbody 1A, 2A, 3A, 11A and 15A) or waterbody assessed as not suitable for breeding Great Crested Newts (Waterbodies 1, 6, 16, 17, 4A, 5A, 6A, 7A, 8A, 9A, 10A, 12A, 13A and 16A).

\*\* The waterbody was found to contain Dewsbury Traps on these occasions which had been set by another consultancy working on a different project. In order to avoid adversely affecting their survey results and given the proven efficacy of torch survey in identifying newts in this waterbody over bottle trapping, it was decided not to bottle trap on these occasions.

Turbidity scale: 0=clear; 5= Very murky

Vegetation cover scale: 0=none, 5=obscured

Species: Great Crested Newt *Triturus cristatus* (Tc), Smooth Newt *Lissotriton vulgaris* (Lv) and Common Frog *Rana temporaria* (Rt)  
NC: Methodology not carried out

## **APPENDIX E**

### **Waterbody photographs**



**Photo 1:**  
Waterbody 2



**Photo 2:**  
Waterbody 3



**Photo 3:**  
Waterbody 4



**Photo 4:**  
Waterbody 8



**Photo 5:**  
Waterbody 9



**Photo 6:**  
Waterbody 10



**Photo 7:**  
Waterbody 11



**Photo 8:**  
Waterbody 1A

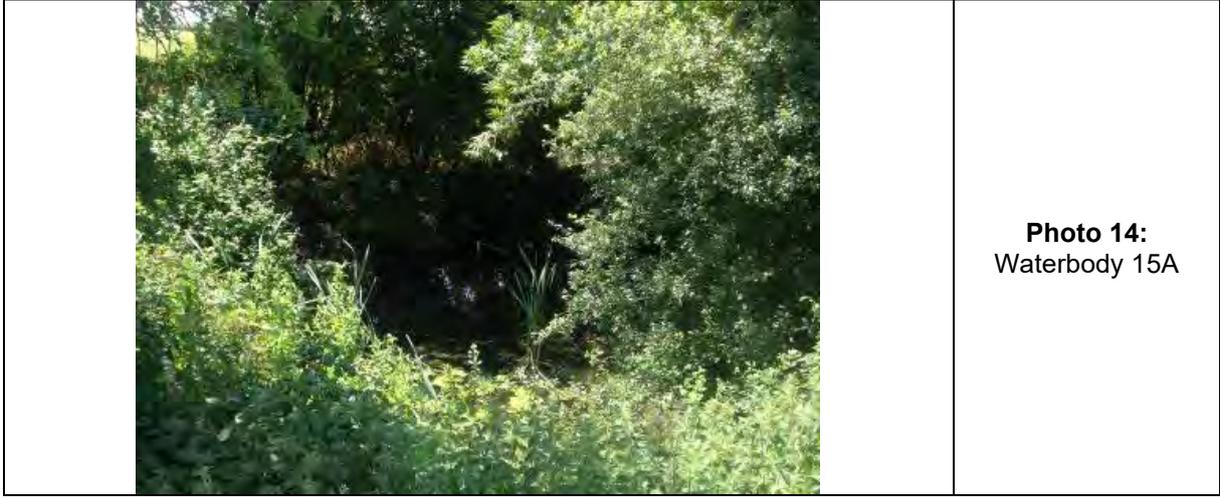


**Photo 9:**  
Waterbody 2A



**Photo 10:**  
Waterbody 3A

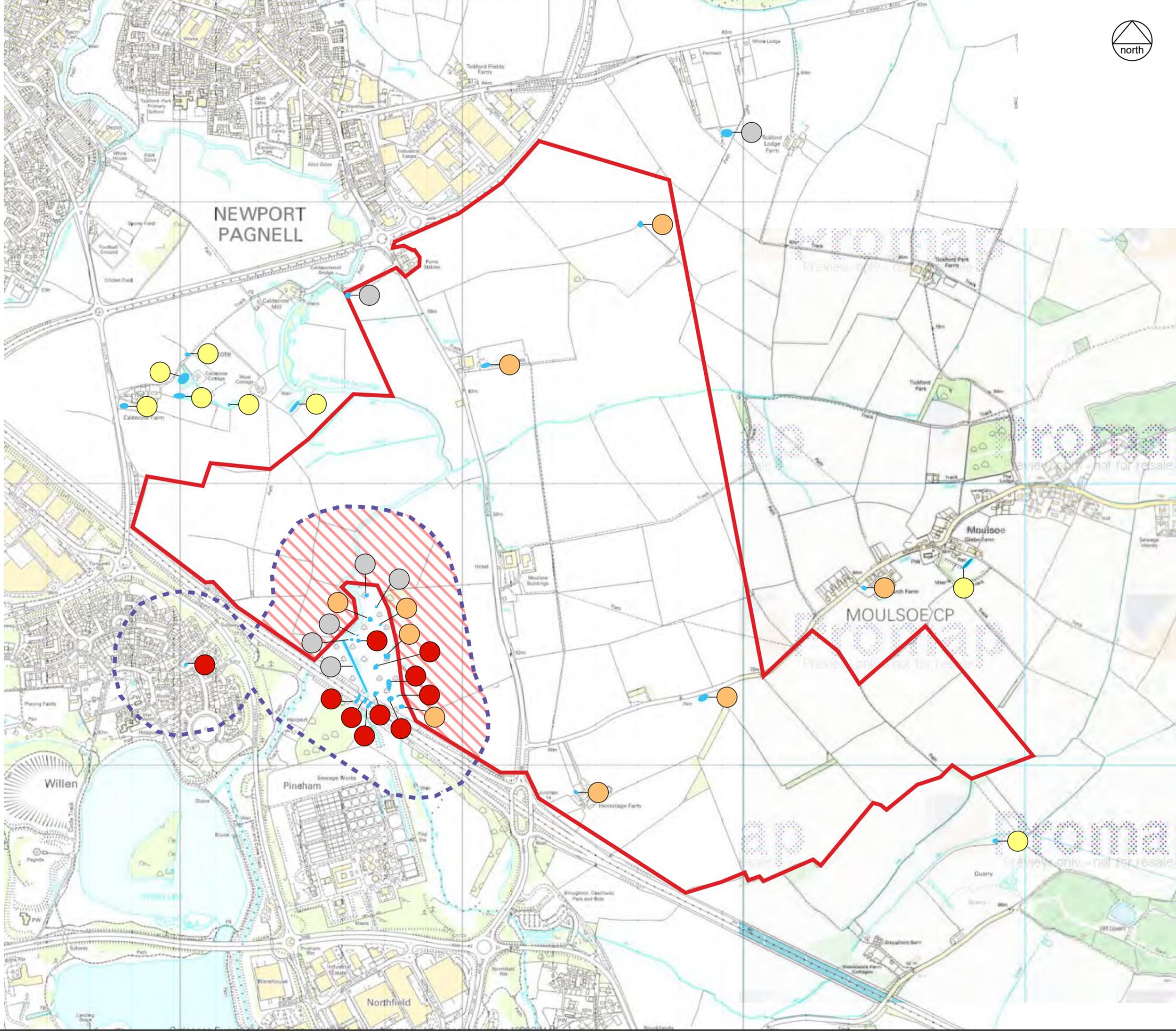
			<p><b>Photo 11:</b> Waterbody 9A</p>
			<p><b>Photo 12:</b> Waterbody 11a</p>
			<p><b>Photo 13:</b> Waterbody 14A</p>



**Photo 14:**  
Waterbody 15A

**APPENDIX F**

**Great Crested Newt Mitigation Plan**



- KEY**
- Site boundary
  - 250m radius from Great Crested Newt Ponds
  - Translocation area
  - Great Crested Newt confirmed present by population estimate survey and/or eDNA analysis
  - Great Crested Newts confirmed absent by eDNA analysis and/or population estimate survey
  - Waterbody dry at the time of survey
  - Waterbody inaccessible for survey

\* Do not scale off this plan

CLIENT:  
**St James**  
 PROJECT:  
**Milton Keynes East**  
 TITLE:  
**Great Crested Newt Mitigation Plan**  
 SCALE AT A3:                      DATE:  
 Not to Scale                      February 2020

2090.52/ 13

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# **Appendix 10 Invertebrate Survey Report**

**Milton Keynes East**  
Invertebrate Surveys

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## Issuing office

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 T: 01433 651869 | W: www.bsg-ecology.com | E: info@bsg-ecology.com

<b>Client</b>	Hankinson Duckett Associates
<b>Project</b>	Milton Keynes East (Newport Pagnell) – Invertebrate Surveys
<b>Version</b>	DRAFT
<b>Project number</b>	P18-395 - Newport Pagnell - Invertebrate Surveys

	<b>Name</b>	<b>Position</b>	<b>Date</b>
<b>Originated</b>	Dr Jim Fairclough	Principal Ecologist	15 October 2018
<b>Reviewed</b>	Kirsty Kirkham	Partner	07 February 2019
<b>Approved for issue to client</b>	Dr Jim Fairclough	Principal Ecologist	10 February 2019
<b>Issued to client</b>	Dr Jim Fairclough	Principal Ecologist	10 February 2019
<b>2019 revision approved for issue to client</b>	Dr Jim Fairclough	Principal Ecologist	21 November 2019
<b>2019 revision Issued to client</b>	Dr Jim Fairclough	Principal Ecologist	21 November 2019
<b>2020 report revised and issued (following client review)</b>	Dr Jim Fairclough	Principal Ecologist	11 March 2020

## Disclaimer

This report is issued to the client for their sole use and for the intended purpose as stated in the agreement between the client and BSG Ecology under which this work was completed, or else as set out within this report. This report may not be relied upon by any other party without the express written agreement of BSG Ecology. The use of this report by unauthorised third parties is at their own risk and BSG Ecology accepts no duty of care to any such third party.

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Any recommendation, opinion or finding stated in this report is based on circumstances and facts as they existed at the time that BSG Ecology performed the work. The content of this report has been provided in accordance with the provisions of the CIEEM Code of Professional Conduct. BSG Ecology works where appropriate to the scope of our brief, to the principles and requirements of British Standard BS42020.

Nothing in this report constitutes legal opinion. If legal opinion is required the advice of a qualified legal professional should be secured. Observations relating to the state of built structures or trees have been made from an ecological point of view and, unless stated otherwise, do not constitute structural or arboricultural advice.

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# 1 Executive Summary

- 1.1 This report describes Invertebrate surveys conducted within approximately 362ha of land at Newport Pagnell, Buckinghamshire, hereinafter referred to as 'the site'. The site centre is located by National Grid Reference SP 893 415. The study was commissioned by Hankinson Duckett Associates (HDA) on behalf of St James, to inform an application for mixed use development and associated infrastructure and landscaping.
- 1.2 A habitat potential assessment and subsequent targeted survey of terrestrial invertebrates was completed in summer and autumn 2018, and late spring / early summer 2019; the targeted survey included a range of survey techniques (pan traps, pitfall traps, window traps, sweep netting, beating and grubbing) to gather samples in the field. Samples were subsequently sorted and identified to enable a preliminary evaluation of the importance of the Site for invertebrates.
- 1.3 Two ponds within the Site were surveyed in August 2018, and macroinvertebrate data were collated and analysed using the Predictive SYstem for Multimetrics (PSYM) tool. This allowed an assessment to be made of whether either or both of the ponds may qualify as a Habitat of Principal Importance.
- 1.4 Aquatic macroinvertebrate sampling of defined reaches of the River Ouzel and Broughton Brook was completed in September 2018 and May 2019. This allowed identification of macroinvertebrate families using these watercourses and assessment of their biological water quality, based on metrics applied to macroinvertebrate families. Other tributaries of the River Ouzel were dry at the times of survey, so could not be sampled.
- 1.5 The results of the targeted surveys provide an indication of the relative species diversity within the targeted groups of invertebrates predicted to be well represented at the Site. Over 400 terrestrial and aquatic species were recorded in total from the surveys. Coleoptera (beetles) was the dominant order recorded from the terrestrial invertebrate surveys. The majority of the species recorded are without a recognised status, being widely distributed and common, and exhibiting little habitat specificity. Nineteen of the species recorded currently have a recognised conservation status.
- 1.6 There is no widely accepted published guidance presently available that provides a clear description of how to evaluate an invertebrate assemblage of a Site; however the professional judgement of the assessor is that the Site as a whole is considered likely to be of District and potentially of County importance for its invertebrate assemblage. This is largely due to the proportion of species with a recognised conservation status associated with the riparian habitat of the River Ouzel and Broughton Brook, a block of mature woodland in the north of the Site, over mature / veteran standard trees associated with hedgerows and sparsely vegetated wide arable field margins in the west of the Site. These habitats, with the exception of the woodland block, are restricted to vegetated linear corridors. The majority of habitats (arable fields and pasture) are of low invertebrate habitat potential.

## 2 Introduction

### Project Background

- 2.1 This report describes a suite of Invertebrate surveys conducted within approximately 362ha of land at Newport Pagnell, Buckinghamshire, hereinafter referred to as 'the site'. The site centre is located by National Grid Reference SP 893 415. The study was commissioned by Hankinson Duckett Associates (HDA) on behalf of St James, to inform an application for mixed use development and associated infrastructure and landscaping.

### Ecological Background

- 2.2 The site is located to the south of Newport Pagnell, on the north-eastern edge of Milton Keynes, Buckinghamshire. The site is dominated by agricultural land comprising intensively managed arable and grazed grassland fields with associated farmyards, agricultural buildings and residential farm houses. Field boundaries generally consist of hedgerows, treelines and fencing with occasional ponds and parcels of woodland, and the River Ouzel flows from south to north through the western part of the site. The site is bordered to the north by a construction site for residential development and the A422 beyond which lies the town of Newport Pagnell; to the east by arable farmland; to the west by the Pineham Nature Reserve and the M1 Motorway beyond which lies the town of Milton Keynes; and to the south by arable farmland.
- 2.3 In 2012 Ecological Survey & Assessment Limited (ECOSA) was contracted by Hankinson Duckett Associates to carry out terrestrial and freshwater invertebrate surveys at the Site. The methods and results of these surveys are documented in the following two reports:
- J ECOSA (2013) Land to the South of Newport Pagnell, Milton Keynes – Terrestrial Invertebrate Scoping Survey.
  - J ECOSA (2013) Land to the South of Newport Pagnell, Milton Keynes – Aquatic Invertebrate Scoping Survey.

### Brief and Objectives

- 2.4 Six years had elapsed since the surveys undertaken by ECOSA were completed; therefore, in July 2018, BSG Ecology was contracted by Hankinson Duckett Associates to update the terrestrial and freshwater invertebrate surveys at the Site over the summer and autumn season. A subsequent instruction was received in May 2019 to undertake terrestrial and aquatic invertebrate surveys during late spring / early summer of that year. The objectives of the work are as follows:
- J Evaluation of habitats present on Site for their potential to support important assemblages of invertebrates;
  - J Undertake survey for terrestrial and freshwater invertebrates using a variety of survey techniques;
  - J List the invertebrate species collected / observed during the course of the survey, including an appraisal of any species of nature conservation value (Species of Principal Importance, nationally scarce or rare species (following IUCN and Red Data Book criteria));
  - J Outline the legislative and/or policy protection afforded to any species of nature conservation value potentially associated with the site;
  - J Assessment of the invertebrate assemblage(s) of the Site using the Pantheon tool developed by Natural England; and
  - J Assessment of the impact of the Project, based on currently available design information, and provide recommendations for mitigation, compensation and enhancement, as appropriate.

### 3 Methods

#### **Invertebrate habitat potential assessment**

- 3.1 The Site was assessed for its potential to support important invertebrate assemblages by Dr Jim Fairclough MCIEEM, an experienced entomologist and Principal Ecologist at BSG Ecology, on 25 and 26 July 2018.
- 3.2 Notes were made regarding the habitats present and features likely to be of greatest value for notable invertebrate assemblages. Such features can include: areas with dense patches of flowering plants; south facing banks; patchy mosaic habitat including aggregations of bare ground; margins of scrub/woodland and substrate containing high organic content; veteran or mature trees, including standing and fallen dead wood; temporary areas of water (e.g. pools and seepages) and associated terrestrial habitat (e.g. marshy grassland).
- 3.3 The distribution and extent of such features informed the nature of targeted terrestrial invertebrate surveys that were subsequently conducted at the Site. These features were documented in a photographic record (Appendix 2). To enable a baseline characterisation of the Site for invertebrates, the habitat assessment included observations of features that might limit invertebrate interest, as well as those which might be of particular value for invertebrates.

#### **Targeted Survey for Terrestrial Invertebrates**

- 3.4 Terrestrial habitats with potential to support important invertebrate assemblages (identified during the habitat potential assessment) were subject to more detailed survey. The main habitats targeted included: woodland (deciduous plantation and semi-natural) and woodland edge, hedgerows and field margins, and the banks of the River Ouzel. Therefore, the survey was designed to target the collection of key indicator groups associated with such habitat. This approach relates to the guidance set out in Drake *et al.* (2007); which lists many of the target taxa of field layer and arboreal assemblages and their value in assessment. Coleoptera (beetles) and Hemiptera (true bugs) are two orders that are strongly represented in such assemblages; therefore these orders were targeted by the surveys. Certain families (and suborders) of the order Diptera (flies) (e.g. Syrphidae (hoverflies) and other families of the larger Brachycera) were also targeted. In suitable habitats such as scrub edge and field layer assemblages, sampling methods also enabled the collection of aculeate Hymenoptera (bees, ants and wasps) and Orthoptera (grasshoppers and crickets). Incidental observations of other invertebrate taxa including butterflies and day-flying moths (Lepidoptera) were also recorded.
- 3.5 The following sampling methods were employed: pan traps, pitfall traps, sweep-netting, beating and grubbing. These methods are described below.

#### ***Pan Traps***

- 3.6 Clusters of three pan (or water) traps were set out in flower-rich areas of the Site on 25 July, 2018, 14 and 27 September, 30 May and 21 June 2019. Their approximate locations are shown on Figure 1 (Appendix 1). The pan traps comprised a mixture of yellow and white plastic trays into which a small amount of water was poured (along with a few drops of detergent to break the surface tension). Such traps mimic large flowers and attract flying insects of many groups' especially aculeate Hymenoptera and certain Diptera, which become trapped in the fluid and can be collected later. The traps were collected in at the end of the following day; therefore were each collecting invertebrates for a period of approximately 36 hours. Photograph 1 shows a pan trap deployed *in situ*.

#### ***Pitfall Traps***

- 3.7 Pitfall traps were set out in clusters of three, at various parcels within the Site (shown on Figure 1). Pitfall trapping involved the use of circular plant pot trays (24 cm diameter x 5 cm depth) sunk into

an excavated circular hole with the tray rims flush with the surrounding ground level. Preserving fluid (and a drop of detergent to break the surface tension) was poured into the trays until they were half full. Lastly, a piece of mesh was secured over the tray to prevent capture of small mammals, amphibians and reptiles. Photograph 2 shows a pitfall trap deployed within the Site. Three clusters of traps were operational during the period from 25 July to 9 August 2018, and four clusters of traps were operational during the period from 14 to 27 September 2018.

### ***Window Flight Interception Traps***

- 3.8 Three window flight interception traps (referred to hereafter as ‘window traps’) were used to target the dead wood fauna of veteran trees along hedgerows and also other winged insects flying along the structural ecotones of woodland and hedgerows. Each trap was composed of four 2 L. plastic drinks bottles, securely locked in place at the base, and so contained within a circular plant pot tray (24 cm diameter x 5 cm depth), which also acted as a roof to shield the trap from excessive rain water. Wire fittings were used to bind the four bottles to the circular tray. An outward facing rectangular hole (the ‘window’) was cut out of each bottle. Each constructed trap was inverted and therefore suspended from its base by hanging it from a branch. Each trap was positioned inside a hollow of a veteran tree (e.g. Photograph 3) or close to standing dead wood of a veteran or mature tree (e.g. Photograph 4). Approximately 30 ml of preserving fluid, comprising 1 part ethylene glycol (antifreeze) to 2 parts water was poured into each bottle via the ‘windows’ made on each bottle.
- 3.9 The traps were operational during the period from 25 July to 27 September 2018. The location of the window traps are illustrated on Figure 1.

### ***Sweep Netting***

- 3.10 Sweep netting was conducted on all survey dates, in July, August and September 2018, and May and June 2019 across various parts of the Site. Sweep netting involved walking at a steady pace through the vegetation and passing an entomologist’s sweep net back and forth through vegetation in a figure of eight motion. Sweep netting was accompanied by ‘spot-sweeping’ where individual invertebrates were targeted and collected via a single sweep. The approximate areas where sweep netting took place (together with beating and grubbing) are shown on Figure 1.

### ***Beating***

- 3.11 Beating is a useful technique for extracting arboreal invertebrates from overhanging branches. This method involves placing a beating tray beneath a branch before delivering several sharp blows to the branch, sending any dislodged invertebrates into the beating tray for inspection. Beating was conducted on all survey dates, in July, August and September 2018, and May and June 2019 across various parts of the Site, targeting hedgerows and lower reaches of woodland canopies. The approximate areas where beating took place (together with sweeping and grubbing) are shown on Figure 1.

### ***Grubbing***

- 3.12 Grubbing is the name generally applied to the extraction of invertebrates by hand from a variety of media such as: dead wood or fungi and under bark; from moist cracked ground in seasonally inundated habitats; from dung; or from dense aggregations of leaf matter and detritus (e.g. base of grass tussocks, fern shuttlecocks and leafy / woody deposits). If appropriate, to assist in the detection of small beetles, material was sieved or placed in a bucket of water to capture invertebrates moving to the surface. All of these media were targeted during all survey dates, in July, August and September 2018, and June 2019, across various parts of the Site, and the approximate areas where grubbing took place (together with beating and sweeping) are shown on Figure 1.

## Targeted Survey for Aquatic Invertebrates

### **Ponds**

- 3.13 Three ponds were investigated during the survey on the 9 August 2018. These ponds are shown on Figure 2. Only two of these ponds held water and were therefore subject to further survey.
- 3.14 Benthic macroinvertebrates were collected at the two ponds using standard 3-minute kick sample methodology (Biggs *et al.*, 1998) using a 1 mm mesh hand net. One minute of hand searching (of rocks, logs, leaf packs and other submerged debris) was then carried out in search of invertebrates (e.g. caddis larvae, pond skaters and whirligig beetles) that might otherwise have been missed during the net sampling.
- 3.15 Invertebrates were separated from detritus and bed material in the field and preserved immediately in 70% Industrial Methylated Spirit (IMS) for subsequent laboratory analysis.
- 3.16 Habitat characteristics of each pond were recorded at the time of the survey, which included for example observations of: water and silt depths; evidence of pollution; presence of waterfowl, fish and amphibians; and likely source water and inflow/outflow points. Basic water chemistry parameters were measured, which included pH and temperature. A photographic record of each of the ponds was also made.
- 3.17 As part of the survey, an appraisal of the composition of the plant community at each pond was made. All aquatic and marginal plants were identified to species-level in the field using the most up-to-date identification keys available. This information is used to inform subsequent analysis of each pond, as described below ('PSYM category analysis – Ponds').

### **Watercourses (Broughton Brook and River Ouzel)**

- 3.18 On 28 September 2018, macroinvertebrates were collected from four locations (survey reaches A1 to A4) which included two on the River Ouzel and two on the Broughton Brook. A standard 3-minute kick sample methodology (BS EN 27828:1994) using a 1 mm mesh hand net was applied. This involved three minutes of net sampling with the time divided equally between all of the mesohabitats present. Stony or sandy substrates were lightly kick-sampled to disturb and capture macroinvertebrate inhabitants on the river bed. Care was taken to avoid deep accumulations of soft sediment since this makes later sorting extremely difficult. Similarly, the netting of large volumes of plant material was avoided. One minute of hand searching (of rocks, logs, leaf packs and other submerged debris, where present) was then carried out in search of invertebrates (e.g. limpets, caddis larvae, pond skaters, riffle and whirligig beetles) that might otherwise have been missed during the net sampling.
- 3.19 Coarse debris was checked for clinging invertebrates before being removed from the net. Samples were preserved immediately in 70% IMS for subsequent laboratory analysis.
- 3.20 This sampling methodology was repeated on 30 May 2019.
- 3.21 The two side ditches running into the River Ouzel were not sampled as they did not contain water at any stage during the surveys conducted in 2018 and 2019. The locations of all the sampling points are shown on Figure 2.

### **Dates and weather conditions and period of survey**

- 3.22 Table 1 below shows the weather conditions on the days of survey. During all survey days the weather conditions did not impede survey. All surveys lasted for between 8 to 10 hours.

**Table 1. Weather Conditions during Surveys**

Survey Date	Survey Type	Weather Conditions
25 July 2018	Habitat potential assessment; targeted terrestrial survey.	Dry with little cloud. Becoming hazy towards end of the day. Light air, max temp. 31 °C. Generally hot and sunny in preceding week.
26 July 2018	Habitat potential assessment; targeted terrestrial survey.	Dry with little cloud. Light breeze, max temp. 33 °C.
09 August 2018	Targeted terrestrial survey; aquatic survey (ponds).	Overcast in morning with patchy rain through the day. Light air, max temp. 17 °C. Generally warm and dry in preceding week.
14 September 2018	Targeted terrestrial survey.	Dry, scattered cloud, moderate breeze, max temp. 21 °C. Mostly dry, warm and sunny, but with occasional wet and overcast days in preceding week.
27 September 2018	Targeted terrestrial survey.	Dry and sunny. Gentle breeze, max temp. 23 °C. Variable, with warm, sunny and cool overcast days (with rain) in preceding week.
28 September 2018	Aquatic survey (rivers); targeted terrestrial survey.	Dry, overcast with sunny spells, moderate breeze, max temp. 18 °C.
30 May 2019	Aquatic survey (rivers); targeted terrestrial survey.	Dry, with cloud varying from scattered cloud to overcast during the day, moderate breeze, max temp 21 °C. Mostly dry, warm and sunny in preceding week. Light rain on previous day.
21 June 2019	Targeted terrestrial survey.	Dry with cloud varying from little cloud to overcast during the day, gentle breeze and max temp. 21 °C. Dry, warm and sunny in preceding week.

### Sample Sorting and Identification

- 3.23 For all terrestrial and aquatic surveys, whilst some species could be identified in the field, the majority of specimens were stored in 70% IMS for later identification, using a stereoscopic microscope with the aid of identification literature. For all target groups identification was taken down to species level.

### Data Analysis

- 3.24 The following results and discussion section places a value on the rare and nationally scarce invertebrates found at the Site, informed by their current national status. Further information on status definitions and criteria of invertebrate groups can be found in Appendix 3.

### *Pantheon Assemblage Analysis*

- 3.25 The list of species derived from the terrestrial and aquatic invertebrate surveys were analysed using the “Pantheon” database tool developed by Natural England and the Centre for Ecology and Hydrology (Webb *et al.*, 2018). For each species recognised by Pantheon, various attributes relating to associated habitats and resources, assemblage types and habitat fidelity scores are placed against them. Reports can then be generated including those that provide:

) information on each individual species entered into the database;

- J a list of species belonging to different feeding guilds (e.g. xylophagous, saprophagous, nectivorous);
- J a list of species with different associations (e.g. to certain groups of plant, fungi or animal);
- J a summary of the number of species within the sample that have a particular score or fidelity and, if relevant an overall score that provides insight into the quality of the site that the sample has come from; and
- J summary tables that assess where species live and what assemblages they are associated with.

- 3.26 In the context of the present assessment, it is the report that Pantheon provides relating to where species live and with which assemblages they are associated, that is most useful in evaluating the relative importance of a site for its invertebrates. This considers the habitats and resources used by an invertebrate species at various hierarchical levels, from broad biotopes (e.g. tree associated, wetland, coastal) at the highest level, down to specific habitats (e.g. tall sward and scrub, decaying wood, arboreal, marshland) at a mid-level, and resources (e.g. sapwood & bark decay, heart-rot and fungal fruiting bodies all associated with the decaying wood habitat) at the finest level. The assessment also considers the “ISIS” (Invertebrate Species-habitat Information System) assemblage types that had previously been developed by Natural England (Drake *et al.*, 2007). The original Specific Assemblage Types (SATs) are therefore carried forward in their original form, although ‘Habitats’ have replaced the ISIS Broad Assemblage Types (BATs).
- 3.27 SATs include only habitat specific species, which are normally faithful to a single habitat or resource, which are often closely associated with sites of higher conservation value. Analysis of SATs is helpful to inform the determination of the nature conservation value of a site for invertebrates; sites with high-scoring SATs are considered to have good quality invertebrate assemblages.
- 3.28 The original role of ISIS was to guide Natural England on assessing the conservation value of SSSIs for their invertebrate assemblages (especially for the purposes of Common Standards Monitoring). This was done by identifying whether an assemblage associated with a site was in a “favourable condition” (i.e. where it was considered to be of sufficient condition to meet the threshold criteria for an assemblage of SSSI-level value). However, whilst the condition assessment function is still retained within Pantheon, it is not the sole use. Accordingly, the analysis may be used in other situations (e.g. by nature reserve managers or those assessing the effects of a development) to help understand which assemblages (SATs) within a site are likely to be important.
- 3.29 A useful measure of the quality of a site for its invertebrate assemblage is to count and assign scores that are more heavily weighted towards the rarer species. The Species Quality Index (SQI) is a numerical scoring system contained within Pantheon that does exactly this. Each species recorded from a sample is given a Species Quality Score (SQS) based on their conservation status. The SQI is the sum of all SQSs divided by the number of species in that sample. This score is multiplied by 100 to give a 3 figure value without decimal places (e.g.100 rather than a 1.00). This SQI score is preferred to the SQS since it eliminates, to a greater extent the effect of recorder effort. Notwithstanding this, sites where little effort has been made to record the common species could result in overly amplified SQI scores. There is presently no published guidance on what SQI score might be classed as ‘good’ or ‘average’ as this might vary between habitats and regions (e.g. northern vs. southern England). However, as a general rule of thumb, based on the experience of the author, a habitat with an SQI score exceeding 125 is likely to be of some value and merit further consideration.

#### **PSYM category analysis - Ponds**

- 3.30 For the two ponds holding water that were surveyed, habitat, water quality, plant and macroinvertebrate data were collated and analysed using the Predictive SYstem for Multimetrics (PSYM) tool developed by Pond Action (2002) in order to assess the biological quality of each of the ponds. The PSYM tool was used to classify the ponds into four categories of biological quality

based on a combined index (Index of Biological Integrity; IBI) which varies between zero and 100%:

- ) 0-25% = very poor,
- ) 26%-50% = poor,
- ) 51%-75% = moderate,
- ) 76%-100% = good.

- 3.31 Biological quality assessment using PSYM relies on species-level plant data and family-level macroinvertebrate data being available and can only be used to assess the biological quality of ponds surveyed between June and August.
- 3.32 Ponds attaining an Index of Biological Integrity of 75% or more are classified as Priority (Habitat of Principal Importance; HPI) Ponds in accordance with the PSYM guidance.
- 3.33 Aquatic macroinvertebrates sampled from the ponds were also identified to species level to determine if any species present are rare or nationally scarce and therefore merit further consideration in the interpretation of results.

### ***Biological Water Quality - Watercourses***

- 3.34 A calculation was made of biological water quality using the Whalley, Hawkes, Paisley and Trigg (WHPT) metric from the macroinvertebrate family list, as well as the Biological Monitoring Working Party (BMWP) index. WHPT supersedes the Biological Monitoring Working Party (BMWP) index (WFD UKTAG, 2014), but may not be being used consistently across Environment Agency regions at present (EA, pers. comm.).
- 3.35 Both metrics give a score to a watercourse based upon the ratio of pollution-tolerant to intolerant families present in the macroinvertebrate community. Macroinvertebrate families which are more susceptible to pollution, including Philopotamidae (caddis fly), Siphonuridae (mayfly) and Taeniopterygidae (stonefly) score highly. Conversely, pollution-tolerant groups score the least points, and include Oligochaeta (worms) and Chironomidae (non-biting midge larvae). Accordingly, high-scoring watercourses have highest biological water quality, whilst polluted watercourses score the lowest. WHPT scores are weighted by abundance of individual families whereas BMWP scores are not.
- 3.36 Both metrics can be expressed as the Number of Taxa (NTAXA), which is the total number of scoring taxa, and the Average Score Per Taxon (ASPT), which is obtained by dividing the WHPT or BMWP score by the number of scoring taxa. The higher the ASPT, the cleaner the watercourse is; in general, ASPT scores over 5 are indicative of good biological quality, and scores below 4 are indicative of poor biological quality.
- 3.37 Aquatic macroinvertebrates sampled from the watercourses were also identified to species level to determine if any species present are rare or nationally scarce and therefore merit further consideration in the interpretation of results.

### **Personnel**

- 3.38 The team for this survey and reporting involved the following personnel:
- ) Dr Jim Fairclough BSc, PhD, MCIEEM: Jim's role in this project was to complete the field survey work (2018) and technical reporting. He studied invertebrates for his PhD and has worked full-time as a professional ecologist since 2003, during which time he has completed invertebrate surveys and assessment at over 100 development sites.
  - ) Sarah Joscelyne, a Senior Ecologist with three years' experience in invertebrate survey, took part in the field surveys in 2018, and led these in 2019.
  - ) Don Stenhouse MSc, FRES: Don completed the identification of invertebrates for the project. He is a fellow of the Royal Entomological Society and Curator of Natural Science at Bolton

Museum. He specialises in invertebrate identification, particularly Coleoptera, and has carried out work for a wide range of clients across the UK over the last 10 years.

- J) This report has been reviewed by Kirsty Kirkham (BSc (Joint Hons) MSc, MCIEEM). Kirsty is a Partner at BSG Ecology with over twenty five years' experience of ecological consultancy including ecological impact assessment for a wide range of sites, including those with elevated invertebrate interest. Kirsty's MSc was research based and focused upon urban invertebrates within the City of Leicester.

#### NOTES AND LIMITATIONS

- 3.39 Surveys conducted between May and September cover the optimal survey period for invertebrates, although extending this to include April and October can yield additional taxa that are mostly active either early or late in the year (e.g. Drake *et al.*, 2007). Accordingly, it is considered that the surveys that were undertaken at the Site during 2018 and 2019 provide a good representation of the invertebrate assemblages likely to be present.
- 3.40 The survey approach has been designed with reference to guidance set out in Drake *et al.* (2007). It should be noted that the confidence in the ISIS / Pantheon analysis of SATs is reduced where survey work does not follow the precise ISIS sampling protocols. Since the objectives of the present survey were to identify a broad a range of invertebrates across target groups in predicted key areas of habitat, the methods employed do vary slightly from the ISIS protocol. In such instances Webb *et al.* (2018) advises that caution is applied when using the SAT assessments, and that confidence in a favourable condition should be considered as 'Medium' for semi-ISIS compliant samples. In the present context, the analysis is considered to be broadly indicative; and may therefore give further steer to help understand which assemblages within the Site are likely to be important.

## 4 Results and Interpretation

### Habitat Potential Assessment

- 4.1 Figure 1 shows the location of the areas assessed for invertebrates, showing those areas of higher likely invertebrate value (subjected to further targeted survey), and the remainder of the Site with predicted lower invertebrate value (these areas are left blank on the plan). The habitat descriptions (below) are accompanied by photographs of features / habitats of note (see Appendix 2).
- 4.2 Overall the Site is characterised by arable and pastoral (intensively grazed) fields, with boundary features comprising several ditches, a brook and main river, and a network of hedgerows, some of these with mature and veteran trees. The arable fields are generally of low suitability for invertebrates. They predominantly have narrow margins, rarely more than 2 m wide and have limited structural and floral species diversity (see Photograph 5). Similarly, the pastoral fields are likely to be of limited value to invertebrates. The majority of fields are intensively grazed, sown as rye-grass ley, and even in the more diverse examples, such as those in the west of the Site, still have low diversity of wildflower species, being dominated by grasses and subject to cutting for example for a hay or silage crop (see Photograph 6).
- 4.3 Features of potential interest for invertebrate assemblages, notably boundary features and wooded copses are described further, below.

### Woodland

- 4.4 There are six woodland blocks within the Site east of the River Ouzel. Five of these blocks are of principally of recent planted origin, which is portrayed by the relatively young age of the trees; that are estimated to be around 40 years old, and a lack of a woodland ground flora and mid-level shrub layer typical of more established woodland. The most frequently occurring and abundant trees that make up the canopy include ash *Fraxinus excelsior*, Norway maple *Acer platanoides* and sycamore *Acer pseudoplatanus*, with pedunculate oak *Quercus robur*, field maple *Acer campestre*, aspen *Populus tremula* and common lime *Tilia cordata* also present in at least two of the woodland blocks. Hawthorn *Crataegus monogyna*, bramble *Rubus fruticosus* agg and young ash saplings are commonly found in the understorey; although larger areas of unvegetated shaded woodland floor are also present. Management of the woodland blocks appears to involve a non-intervention approach, as small to medium diameter fallen dead wood is accumulating. This may provide a useful resource for invertebrates, although is not of sufficient size and age to be truly valuable. One block of plantation, close to the River Ouzel, is entirely dominated by hybrid black poplar *Populus x canadensis* and has an understorey of mostly nettle *Urtica dioica* (Photograph 7). Overall, due to their uniform age and structure, these plantation woodlands are considered likely to be of no more than local interest for invertebrate assemblages.
- 4.5 A single block of woodland in the centre of the Site (east of the River Ouzel) sets itself apart as being of value to invertebrate assemblages, owing to:
- J Size - in comparison to other woodland blocks.
  - J Antiquity - with a large proportion of trees (mostly pedunculate oak) estimated to be in excess of 100 years old (Photograph 8) and there being a moderate amount of standing and fallen dead wood, some of which includes medium diameter branches.
  - J Complexity – with a scrubby opening cut into the woodland in the south east corner; a pond partially surrounded by willow *Salix* species, located at its south west corner; and a series of hollows in the north of the wood (Photograph 9), some of which contain greater pond sedge *Carex riparia*, and are likely to retain water for most of the year (except in summer and early autumn).
  - J Connectivity – to a mature hedgerow to the south, that is separated by a farm track with a wide vegetated strip either side of this, which forms a linear glade between the hedgerow and woodland (Photograph 10). There are a number of mature standard trees along the length of

the hedgerow and southern boundary of the woodland, including ash, white willow *Salix alba* and pedunculate oak.

- 4.6 West of the River Ouzel (and south west of the M1 Motorway), there is a block of off-site plantation woodland associated with Pineham Park. This woodland, like others within the Site, is estimated to be around 40 years old. However, the plantation is mixed, with a coniferous element attributed to the abundance of Scot's pine *Pinus sylvestris*. Silver birch *Betula pendula*, ash and rowan *Sorbus aucuparia* are also frequent in the canopy; whilst the shrub layer is well developed, with field maple, wild cherry *Prunus avium*, dogwood *Cornus sanguinea* and bramble all frequent to locally abundant. There is scattered small to medium diameter fallen dead wood on the woodland floor. The woodland is dissected by a number of parkland roads, and there is a wide glade at the eastern edge; delineating an area of regularly cleared habitat beneath a power line (Photograph 11). Overall, the varied structure of the woodland and additional interest of the Scots pine mean that the woodland is likely to offer some value to invertebrates; although, as with the other plantations across the Site, this is considered to be valued at no more than a local geographical scale.

#### **Hedgerows, trees lines and field margins**

- 4.7 Hedgerows across the Site are variable, ranging from large (ca. 4 m wide x 5 m tall), unmanaged hedgerows such as those in the pastoral areas to the west of the River Ouzel (see Photograph 12); to more compact (ca. 2 m wide x 3 m tall) uniformly managed hedgerows typical of the arable landscape east of the River Ouzel (see Photograph 13). Hawthorn, blackthorn *Prunus spinosa*, English elm *Ulmus procera* and bramble are abundant in most of the hedgerows. Other woody species include crab apple *Malus sylvestris*, elder *Sambucus nigra*, dog rose *Rosa canina* agg and field maple. Mature and semi-mature crack willow *Salix fragilis* and white willow are included as standard trees in many of the hedgerows west of the River Ouzel; whilst east of the river, ash with occasional pedunculate oak and crack willow are the main standard trees. Some of these on the eastern side are mature or veteran, showing clear signs of ageing, with hollows in the trunks and a variety of standing dead wood (e.g. Photographs 14, 15 and 16). In the majority of cases it is considered likely that ageing is premature and has been caused by deep ploughing close to the hedgerow margins, thus damaging tree roots. The more prominent mature and veteran trees are marked on Figure 1.
- 4.8 The hedgerows themselves are likely to be of value to invertebrates, providing places for shelter, hibernation, and sources of food (nectar, pollen, fruit, foliage and prey) in a landscape that is generally considered likely to be of low value to invertebrates. The addition of over mature and veteran trees within the hedgerows (and along river banks), especially specimens with exposed heartwood of the hollowing trunks and flaking bark and bracket fungi is considered likely to elevate the value of the hedgerows further due to the likely associated saproxylic (dead-wood feeding) invertebrate assemblage.
- 4.9 Additional structural and species diversity is provided by the ground flora at the base of the hedgerows, especially where margins extend several metres into the field. Some of the wider margins are indicated on Figure 1. These are characterised by a variety of plant species that are favoured nectar and pollen sources for invertebrates, including common ragwort *Jacobaea vulgaris*, bristly ox-tongue *Helminthotheca echioides*, various thistles *Cirsium* sp., scented mayweed *Matricaria chamomilla*, prickly sow-thistle *Sonchus asper*, cats ear *Hypochaeris radicata*, mugwort *Artemisia vulgaris*, bird's-foot-trefoil *Lotus corniculatus*, white clover *Trifolium repens* and nettle. The shelter on the leeward side hedgerows may also encourage basking and nesting by invertebrates, including aculeate Hymenoptera and butterflies. Some particularly good examples of this are in the west of the Site, associated with the field margins of the arable fields west of the River Ouzel, that appear to be sandy and are also heavily rabbit grazed therefore have greater structural complexity and areas of bare earth that may be favoured by a range of thermophilous (warmth-loving) species of invertebrate (see Photograph 17). These margins were however significantly reduced during ongoing agricultural practice over the course of the 2018/ 2019 survey work.

### **River Ouzel and Broughton Brook**

- 4.10 The River Ouzel (Photograph 18), is the main river that flows through the Site, west of the A509 and this is joined by the Broughton Brook (Photograph 19), also in the west of the Site, which forms a boundary with the former motocross circuit of Pineham Park. These riparian habitats are considered likely to provide an important resource for a wide range of aquatic, semi-aquatic and terrestrial species associated with riparian habitats. For example, the aquatic habitat includes submerged woody debris, a diverse array of submerged, floating and emergent plants (including but not limited to: common club-rush *Schoenoplectus lacustris*, unbranched bur reed *Sparganium emersum*, common arrowhead *Sagittaria sagittifolia*, greater pond sedge, yellow water-lily *Nuphar lutea*, flowering rush *Butomus umbellatus* and watercress *Nasturtium officinale*) a variable range of substrates on the bed (including gravel, silts and clays). The bankside habitat is also varied and includes marginal vegetation (including but not limited to: reed canary grass *Phalaris arundinacea*, reed sweet grass *Glyceria maxima*, branched bur reed *Sparganium erectum*, nettle, various thistles *Cirsium sp.* and Himalayan balsam *Impatiens glandulifera*). overhanging mature willow *Salix* trees and accumulations of decaying leaf litter. Together these features combine to provide important structural diversity and diversity of food plants favoured by invertebrates. The added connectivity contributed by these watercourses is considered likely to make this one of the most important features for invertebrates within the Site.
- 4.11 There are two ditches within the Site that were identified; one feeding into the River Ouzel from the grazed pasture to the west, and the other feeding in from the arable land to the east. Neither of these held any water at any point during the surveys (e.g. Photograph 20), and are therefore likely to be of importance more as boundary features (considered alongside the 'Hedgerows, trees lines and field margins' feature identified above) with seasonal complexity associated with periodical inundation, that may support a different invertebrate assemblage to that of the River Ouzel and Broughton Brook which are permanent watercourses.

### **Ponds**

- 4.12 Three ponds were identified within the Site. These are described below:
- J A large pond in the south east of the Site, located just south of Newport Road (Photograph 21). The pond is surrounded by scrub (mostly willow *Salix sp.*, hawthorn and ash) and has a patchy distribution of marginal vegetation, including but not limited to: lesser pond sedge *Carex acutiformis*, yellow flag iris, white water lily *Nymphaea alba*, great willowherb *Epilobium hirsutum*, common cattail *Typha latifolia* and purple loosestrife *Lythrum salicaria*. These provide local structural diversity and diversity of food plants favoured by a range of invertebrates.
  - J A medium sized pond in the north of the Site, between a farm and the large woodland block previously described (Photograph 22). This pond is very uniform, with a triangular shape, greater pond sedge dominating the margins, and a complete covering of common duckweed *Lemna minor* over the surface of the pond. This invasive species is likely to limit the value for invertebrates owing to the dense shade that it casts preventing light from penetrating into the water.
  - J A small pond in the north east of the Site, at the base of a hedgerow and close to a small block of plantation woodland. This pond was almost dry at the time of the July site visit and completely dry by the time of the site visit in August. Some vegetation associated with the pond includes common duckweed, common cattail and great willowherb.
- 4.13 None of the ponds were considered to be in optimal condition, with the larger two both characterised by deep silt layers that are likely to result in relatively anoxic conditions close to the bed of the ponds. Collectively, as a Site-wide resource, the ponds are considered likely to be of some invertebrate potential; although they are likely to be valued at no more than local level.

### **Terrestrial Invertebrate Species Assemblage**

- 4.14 The results of the targeted invertebrate survey provide an indication of the relative species diversity within the targeted groups of invertebrates. Over 2,900 specimens were collected or recorded over

the course of the survey, allowing 376 species to be identified from the Site. Figure 1 shows the location of the areas sampled for invertebrates, including a description of the sampling method used.

- 4.15 Of the target groups, Coleoptera was the dominant order recorded: 200 species; Hemiptera was represented by 67 species, Hymenoptera was represented by 41 species, Diptera was represented by 31 species and Lepidoptera by 15 species. Other species, which made up the remaining records, included those belonging to (but not limited to): Pulmonata (air-breathing snails), Orthoptera (grasshoppers and crickets), Julida (millipedes) and Isopoda (woodlice).
- 4.16 Of the species recorded, the majority are without any recognised status, being widely distributed and common, and exhibiting little habitat specificity. Sixteen of the species recorded are currently regarded as Nationally Scarce or Rare and one species is listed on Section 41 of the NERC Act as a Species of Principal Importance. The full list of invertebrates recorded within the Site is displayed in tabular format in Appendix 4.
- 4.17 Further information relating to species which were recorded with a recognised status, is provided below.

### COLEOPTERA (BEETLES)

#### **Carabidae (Ground beetles) *Agonum nigrum* - UK Status: Nationally Scarce**

- 4.18 Duff (2012) states that this species has been recorded from '*litter on marshy vegetated soils, especially estuary and streambanks near the sea.*'... and is '*Local in South West England and Wales, very local elsewhere in England*'. The status of this species has recently been reviewed in Telfer (2016).
- 4.19 In Woodland Parcel 1, one specimen was identified from a pitfall trap and one was swept from vegetation, both on 9 August 2018.

#### **Carabidae (Ground beetles) *Amara apricaria* - UK Status: Amber list**

- 4.20 This species has been recorded from under objects such as stones and debris on vegetated disturbed soils (Duff, 2012). It has a widespread distribution in eastern England, and is local to very local elsewhere in Great Britain. The status of this species has recently been reviewed in Telfer (2016). It has been added to the amber list as it may be at risk from extreme fluctuations.
- 4.21 Two specimens were identified from pitfalls traps retrieved from the banks of the River Ouzel on 27 September 2018.

#### **Carabidae (Ground beetles) *Pterostichus anthracinus* - UK Status: Nationally Scarce and Amber list**

- 4.22 Duff (2012) claims the species to be found '*on marshy vegetated soils on lake shores and by fen pools*'... and it is '*Local in East Central and Southern England, very local in North West England, Wales and South West Scotland; scarce*'. The status of this species has recently been reviewed by Telfer (2016), who places the species on the Amber list.
- 4.23 Two beetles were extracted by grubbing and six were captured in a pitfall trap retrieved from Woodland Parcel 1, both on 9 August 2018.

#### **Coccinellidae (Ladybirds) *Hippodamia variegata* - UK Status: Nationally Scarce (Notable B)**

- 4.24 The entry in Hyman & Parsons (1992) reports this species from '*heathland, grassland, parkland, sand dunes, riverbanks and waste ground, although a mainly coastal species. It was noted as found by general sweeping and also noted from thistles, knapweed, broom, gorse and bramble*'. However, the species is now found well inland, is increasing its range distribution and not as scarce as formerly, so not deserving of Notable status and likely to be downgraded in a future review.

- 4.25 Four beetles were identified from sweep netting ruderal vegetation of the sandy arable field margins west of the River Ouzel, on 26 July 2018.

**Curculionidae (True Weevils) *Cryptorhynchus lapathi* - UK Status: Nationally Scarce (Notable B)**

- 4.26 This very distinctive weevil is found on 'willows *Salix sp.*, especially almond willow *S. triandra* and osier *S. viminalis*, rarely on alder and birches'; and is local in England and Wales, and very local in Scotland (Duff, 2016).

- 4.27 One weevil was taken from a pitfall trap set on the banks of the River Ouzel and retrieved on 9 August 2018.

**Curculionidae (True Weevils) *Polydrusus formosus* – UK Status: Nationally Scarce (Notable A)**

- 4.28 Although formerly restricted to the south, this species is now much commoner and widespread (Stenhouse, 2004). There are also many records that are not shown on current distribution maps and it is certainly common in Lancashire and Cheshire for example. It is probably overlooked as it closely resembles several other common weevils. A review will undoubtedly downgrade the species as the number of 10 km squares it has been recorded in greatly exceeds that necessary for Notable A status.

- 4.29 It is a polyphagous species and found on a variety of tree species, including oak (*Quercus* spp.), hazel and fruit trees such as apple, pear and cherry species (Duff, 2016)

- 4.30 One weevil was swept from vegetation in the wide field margins in the south of the Site on 21 June 2019.

**Curculionidae (True Weevils) *Notaris scirpi* - UK Status: Nationally Scarce (Notable B)**

- 4.31 According to Duff (2016) this species is typically found 'on sedges *Carex* and club-rushes *Schoenoplectus* and bulrushes *Typha*, in wetland habitats (larvae in the roots)'. It is locally found in central and south-east England, Wales and Ireland, but is very local in northern England and generally scarce. The current status was accorded in Hyman & Parsons (1992) and may be in need of revision.

- 4.32 One weevil was collected via grubbing and sweeping of bankside vegetation of the River Ouzel on 26 July 2018.

**Melandryidae (False Darkling Beetles) *Anisoxya fuscula* - UK status: Nationally Scarce**

- 4.33 This species is mainly recorded from central and south east England in ancient broad-leaved woodland and suburban gardens. Larvae develop in the dead twigs of ash, willow, beech, field maple and lilac and adults are typically found in the tree canopy (Hyman & Parsons, 1994). It is included on the list of saproxylic species in Alexander (2004). The status of this species has recently been reviewed by Alexander *et al* (2014).

- 4.34 One specimen was taken from a pitfall trap set beneath a mature collapsed willow on the banks of the River Ouzel and retrieved on 9 August 2018.

**Staphylinidae (Rove beetles) *Ilyobates propinquus* – UK Status: Nationally scarce (Notable)**

- 4.35 This beetle is typically found in sandy places such as river banks and sandpits, but has been taken from flood meadows (Hyman & Parsons, 1994).

- 4.36 One specimen was taken from a pitfall trap set on the banks of the River Ouzel and retrieved on 9 August 2018.

**Staphylinidae (Rove beetles) *Quedius truncicola* – UK Status: Nationally scarce (Notable)**

- 4.37 According to Lott & Anderson (2011) this species can be '*found in tree hollows containing moist or wet wood mould and is widespread in England (except for the southwest)*'. It is included on the list of saproxylic species in Alexander (2004).
- 4.38 One beetle was taken from a window trap set over the summer in the hollow of a veteran ash tree near to the River Ouzel, and retrieved on 28 September 2018.

**HEMIPTERA (BUGS)****Lygaeidae (Ground bugs) *Drymus latus* - UK Status: Nationally Scarce (Notable B)**

- 4.39 This species is noted on the British Bugs website as '*A scarce species mainly confined to the south-east of England with a scatter of records north to Yorkshire. The host plants are unclear; it has been recorded from a variety of habitats on both chalk and acid soils. It is mainly associated with sparsely-vegetated sites*' (British Bugs, online).
- 4.40 One bug was recorded from a pitfall trap set at the sandy arable field margins west of the River Ouzel, which was retrieved on 27 September 2018.

**Miridae (Mirid bugs) *Lygus pratensis* - UK Status: Nationally Rare (RDB 3)**

- 4.41 According to Kirby (1992) this species has been recorded from woodland rides and more open situations. Like other *Lygus* species it is known to be polyphagous, but certainly recorded from gorse *Ulex* sp. and heather *Calluna vulgaris*. There are records for all months of the year and it is well distributed, being recorded from southern England to northern Scotland. It is very difficult to separate from other *Lygus* species and there has been a lot of confusion over identification, compounded by variation in colouring. The bug no longer merits RDB status because although '*Previously scarce and confined to southern heaths, this bug has recently undergone a dramatic range expansion. It is now widespread throughout much of southern Britain and is much commoner than its RDB3 status suggests*' (British Bugs, online).
- 4.42 One specimen was taken from a pitfall trap set on the banks of the River Ouzel and retrieved on 27 September 2018.

**HYMENOPTERA (BEES, WASPS AND ANTS)****Chrysididae (cuckoo wasps) *Cleptes nitidulus* - UK Status: Nationally Scarce (Notable A)**

- 4.43 This is understood to be a widespread species recorded from '*Devon to Kent, north to Cumberland and South-west Yorkshire*' and '*has probably declined recently*' (BWARS, online).
- 4.44 The BWARS website goes on to say that it is '*associated with open habitats both inland, e.g. scrub, heathland, calcareous grassland; and coastal, e.g. sand dunes and is found from June to August but mainly during July; rare during May and September*'. It visits '*hogweed and wild carrot and probably other umbellifers (Apiaceae)*' but is a '*parasitoid on the cocoons of tenthredinid sawflies*' of which there are several undetermined species at the Newport Pagnell Site.
- 4.45 One bee was taken from a pan trap set amongst sandy arable field margins west of the River Ouzel, on 30 May 2019.

**Halictidae (Base-banded Furrow Bees) *Lasioglossum malachurum* – UK Status: Nationally Scarce (Notable A)**

- 4.46 This species was regarded as scarce but is now widespread in Southern England and is extending its range distribution into the midlands. It can be very numerous, forming huge colonies along well-trodden paths and sparsely vegetated south facing slope (Falk, 2015). Due to the large number of

recent records, the bee is understood to not deserve its current status and is likely to be downgraded in any future review.

- 4.47 One bee was taken from a pan trap set amongst sandy arable field margins west of the River Ouzel, on 30 May 2019.

**Halictidae (Base-banded Furrow Bees) *Lasioglossum pauxillum* - UK Status: Nationally Scarce (Notable A)**

- 4.48 Although formerly regarded as scarce this small bee is now one of the most common *Lasioglossum* species in southern England (Falk, 2015) and has been recorded as far as Yorkshire.

- 4.49 This species can be found in a range of open habitats, favouring chalk downland and calcareous brownfield sites (Falk, 2015) and visits plants of various families including buttercups, Rape, Asteraceae and Blackthorn. Due to the large number of recent records, the bee does not deserve its current status and is likely to be downgraded in any future review.

- 4.50 Two bees were taken from a pan trap set amongst sandy arable field margins west of the River Ouzel, on 30 May 2019.

**Halictidae (Sweat Bees) *Sphecodes crassus* - UK Status: Nationally Scarce (Notable B)**

- 4.51 This tiny bee is a member of a difficult genus and according to Else and Edwards (2018) '*the difficulty of accurate identification has caused a problem in the assessment of the range of this species within Britain. Formerly considered a scarce but very widely distributed bee, modern records suggest that it is now frequent, at least in southern Britain*'. It is a cleptoparasite of *Lasioglossum nitidiusculum*.

- 4.52 One bee was swept from vegetation on the banks of the River Ouzel on 25 July 2018 and one bee was taken from a pan trap set amongst sandy arable field margins west of the River Ouzel, on 30 May 2019.

**LEPIDOPTERA (BUTTERFLIES AND MOTHS)**

**Nymphalidae (Brush-footed Butterflies) *Coenonympha pamphilus* - UK Status: Near Threatened; Section 41 listed Species of Principal Importance**

- 4.53 *This species can be found in many different habitats, especially those that are more open, such as grassland, heathland, railway embankments, disused quarries, meadows and sand dunes. Wherever it occurs, the adults prefer a shorter grass sward than closely related species* (UK Butterflies, online).

- 4.54 According to Fox *et al* (2010), this butterfly is classed as Near Threatened. Despite a small recovery over the last decade, this butterfly has experienced a long-term decline (Fox *et al.*, 2015).

- 4.55 This butterfly was recorded along wide and more flower rich arable field margins in the east of the Site.

**Pantheon Assemblage Analysis**

- 4.56 As explained in the methodology section, the Pantheon database has been used principally to help understand which terrestrial invertebrate assemblages within the Site are likely to be important. The species list derived from the terrestrial invertebrate surveys was entered into Pantheon. The data output from the analysis is shown in Tables 2 and 3 below which considers invertebrate assemblages at two different levels.

### Broad Biotopes

**Table 2: Summary of Pantheon output for Broad Biotopes (more than 10 species)**

Broad biotope	No. of species	Species with conservation status
open habitats	247	7
tree-associated	57	4
wetland	43	4

4.57 Table 2 shows that there are three broad assemblage types that were covered by the surveys of the Site, which are recognised by Pantheon. The best represented is that belonging to open habitats, which is unsurprising given that much of the survey effort targeted this broad biotope that includes grassland, arable field margin and hedgerow margin habitats. The recording of a good proportion of invertebrates from the tree-associated biotope points towards this being an important feature of the Site, and is likely to be most closely associated with species recorded from window traps set in / near to veteran trees, and from the block of semi-natural woodland in the north of the Site. This is further emphasised by the presence of four species with conservation status from this biotope. The wetland biotope is likely to reflect the peaty habitat of the wet hollows in the semi-natural woodland, and also the riparian fauna sampled from the banks of the River Ouzel and Broughton Brook.

### Habitats

**Table 3: Summary of Pantheon output for Habitats**

Broad biotope	Habitat	No. of species	SQI	Species with conservation status
Open habitats	Tall sward & scrub	192	102	2 ( <i>Hippodamia variegata</i> , <i>Drymus latus</i> )
Open habitats	Short sward & bare ground	49	100	4 ( <i>Lasioglossum malachurum</i> , <i>Lasioglossum pauxillum</i> , <i>Sphecodes crassus</i> , <i>Coenonympha pamphilus</i> )
Wetland	Marshland	25	126	2 ( <i>Pterostichus anthracinus</i> , <i>Notaris scirpi</i> )
Tree-associated	Decaying wood	24	143	2 ( <i>Anisoxya fuscula</i> , <i>Quedius truncicola</i> )
Tree-associated	Arboreal	21	143	3 ( <i>Cryptorhynchus lapathi</i> , <i>Polydrusus formosus</i> , <i>Cleptes nitidulus</i> )
Other habitats	Peatland, running water, saltmarsh, brackish pools & ditches, lake, wet woodland, shaded woodland floor	<15	N/A	1 from peatland habitat ( <i>Agonum nigrum</i> )

4.58 Table 3 adds a finer level of detail to Table 2, sub-dividing broad biotopes into habitats. The most prominent habitat that features is that of 'tall sward scrub' that lies within the broad biotope of open habitats. Whilst belonging to the open habitats biotope, it could be considered as intermediate with the tree-associated biotope, since the definition of this habitat in Pantheon, as 'Areas of dense herbage or partial shade where a humid microclimate is maintained at ground level. Dominance by woody plants is limited by exposure, grazing or cutting of vegetation, but they often form an

*important component of the habitat* leans on the importance of woody plants. The number of species with a recognised conservation status associated with this habitat is very low, with only two such species of the 192 recorded, which is reflected by a low SQI score. Both of these species were recorded from the arable field margins in the west of the Site, where there is a transition from arable to field margin to unmanaged hedgerow.

- 4.59 The short sward and bare ground habitat was represented by 49 species, four of which have a recognised conservation status. *Lasioglossum malachurum*, *L. pauxillum* and *Sphecodes crassus* were taken from sandy arable field margins west of the River Ouzel, whilst *Coenonympha pamphilus* was recorded from the wider and more flower rich arable field margins east of the River Ouzel.
- 4.60 Marshland habitat was represented by 25 species, two of which have a recognised conservation status. One of these species, *Notaris scirpi*, was recorded from the banks of the River Ouzel, whereas the other species, *Pterostichus anthracinus*, was found in the wet hollows of the block of semi-natural woodland in the north of the Site.
- 4.61 Five species with conservation status were recorded from the ‘tree-associated’ biotope (decaying wood and arboreal). The SQI scores for both of the habitats was relatively high, owing to the higher proportions of scarce and rare species taken. One window trap set in a hollow trunk of an ash tree produced *Quedius truncicola*; whilst *Anisoxya fuscula* and *Cryptorhynchus lapathi* were both taken from pitfall traps set beneath mature collapsed willows on the banks of the River Ouzel. *Polydrusus formosus* was taken from vegetation in the wide field margins in the south of the Site and *Cleptes nitidulus* was found in sandy arable field margins west of the River Ouzel. Both have established hedgerows with mature trees associated with them.
- 4.62 A number of other habitats were recognised by Pantheon; although each of these supported fewer than 15 species so are not considered further as they are unlikely to be important for invertebrate assemblages at the Site. Notwithstanding this, it is relevant to recognise that one nationally scarce species were identified from the peatland habitat.

#### **Specific Assemblage Types**

- 4.63 The ‘Favourable’ condition returned for ‘rich flower resource’ suggests that habitats supporting this resource within the Site are important and capable of supporting a range of associated species (especially aculeate Hymenoptera). It is relevant to note that such large flower patches were not prominent during the surveys, due to these being restricted to selected field margins and the river corridors within the Site. Such flower-rich resources can also include those associated with woody species (e.g. ivy, hawthorn, blackthorn, willow) as well as those associated with more typical herbaceous flowering plants (Webb *et al.*, 2018).
- 4.64 It is not appropriate to assess favourable condition of any other SATs identified by Pantheon at the Site. This is because for all other SATs identified, the number of species was below the threshold level (15 species). This is likely to be explained by the fact that the habitats sampled are not of sufficiently high quality to support SATs in a favourable condition.

#### **PSYM category analysis - Ponds**

- 4.65 A total of 15 aquatic macroinvertebrate taxa were recorded from the two ponds. Generally beetles were the most abundant, with 9 unique taxa recorded. Overall, species diversity was very low. No nationally scarce or threatened aquatic invertebrates were identified. A complete list of all the macroinvertebrate taxa recorded from the ponds can be found in Appendix 5.
- 4.66 Pond 1 had a ‘moderate’ PSYM quality category, with an Index of Biological Integrity of 56%; Pond 2 had a ‘poor’ PSYM quality category, with an Index of Biological Integrity of 39%. Neither pond qualifies as a Habitat of Principal Importance.
- 4.67 A complete list of all the macroinvertebrate taxa recorded at the ponds can be found in Appendix 5.

**Biological Water Quality - Watercourses**

- 4.68 A total of 63 species of freshwater invertebrate were recorded from the samples taken from the River Ouzel and Broughton Brook. The families sampled were typical of a lowland river, with strong representation of freshwater shrimps (Gammaridae), pea mussels (Sphaeriidae), bladder snails (Physidae), burrowing mayfly (Ephemeroidea), small square-gill mayfly (Caenidae), broad-winged damselflies (Zygoptera) and riffle beetles (Elmidae). A varied range of caddis fly families (Trichoptera) was also present. A complete list of all the macroinvertebrate taxa recorded at each of the ponds can be found in Appendix 6.
- 4.69 WHPT and BMWP scores were calculated from the family-level macroinvertebrate data and are summarised in Table 4 below. As is normally the case, the WHPT scores were lower than the BMWP scores; however the scores indicated fair to good biological water quality, with the WHPT ASPT ranging between 4.1 and 5.2. The number of scoring taxa was higher in spring (May 2019) for most sampling locations, although WHPT and BMWP scores were broadly similar.

**Table 4: WHPT and BMWP scores**

Sampling location	Autumn (2018)				Spring (2019)			
	WHPT ASPT	WHPT NTAXA	BMWP ASPT	BMWP NTAXA	WHPT ASPT	WHPT NTAXA	BMWP ASPT	BMWP NTAXA
River Ouzel 1	4.73	20	5.40	20	5.2	20	6	17
River Ouzel 2	4.52	13	5.38	13	4.33	28	5	23
River Ouzel 3	5.2	19	5.67	18	4.1	21	4.84	19
Broughton Brook 1	4.71	21	5.15	20	4.77	30	5.05	22
Broughton Brook 2	4.38	19	5.53	19	4.9	30	5.23	26

WHPT: Whalley, Hawkes, Paisley and Trigg metric score  
ASPT: Average Score Per Taxon  
NTAXA: Number of Taxa

- 4.70 One nationally scarce aquatic invertebrate was identified. Further information relating to this species is provided below.

**ODONATA (DRAGONFLIES)****Gomphidae (Clubtail Dragonflies) *Gomphus vulgatissimus* - UK Status: Near Threatened**

- 4.71 This very localised riverine species recorded from southern England and Wales is typically associated with moderate to slow flowing water, which breeds in unpolluted, meandering rivers, which have a depositional nature (Cham *et al.*, 2014). It is threatened by recreational use of rivers and excessive/unsympathetic river dredging and maintenance together with water pollution and habitat loss.
- 4.72 One nymph was taken from the Broughton Brook (sampling location 1) during the survey undertaken in May 2019.

## 5 Evaluation

### Evaluation of Importance of Invertebrate Assemblages

- 5.1 There is no widely accepted published guidance presently available that provides a clear description of how to evaluate an invertebrate assemblage of a site. Various authors (e.g. Plant, undated) have previously proposed that threshold levels of species with a recognised conservation status could be used to distinguish sites of varying levels of importance across a geographical scale (e.g. a site with more than 10 Nationally Scarce species might merit Regional value). However, this relies on relatively comprehensive surveys being undertaken covering a broad range of groups, and the constant state of flux in relation to the status category applied to species compounds the difficulty in applying such an approach. Former English Nature guidance (English Nature, 2005) advised that an appropriate approach is to compare with other sites of similar nature and habitat. So, for example, a site in the South-East of England is of Regional importance if it compares well with other similar sites in the South-East. This however introduces doubt, especially where useful data are unavailable (e.g. poorly recorded areas or where data have not been shared with Local Records Centres).
- 5.2 For the purposes of the present evaluation, it is considered to be more useful to rely on a combination of factors in making a qualitative assessment of the invertebrate value of the Site. This considers the Pantheon output, including the number (and proportion) of species with a recognised conservation status found at the Site during surveys, the SQI scores and number and condition of SATs. It also takes into account the professional judgement of the assessor, based on a knowledge and understanding of the invertebrate importance of sites across the particular geographic region (in this case the South Midlands).
- 5.3 Overall, the Site is considered as a whole to be of District and potentially of County Value for its invertebrate assemblages. The rationale for this evaluation is provided below.
- J The Site supports a diverse invertebrate fauna, which returned over 400 terrestrial and aquatic species from surveys undertaken between 2018 and 2019.
  - J Nineteen species were sampled with recognised conservation status.
  - J The Specific Assemblage Type - rich flower resource - was recognised by the Pantheon tool, indicating that this assemblage type (represented by flower rich field and river bank margins) is of importance. At a broader level of detail, the 'Marshland', 'Arboreal' and 'Decaying Wood' habitats have moderately high SQI scores, indicating a relatively high proportion of scarce and rare species associated with these habitats; which were best represented in the block of mature woodland in the north of the Site, in association with over mature and veteran trees within hedgerows, and along the riparian bankside habitat of the River Ouzel.
  - J The aquatic habitat of the River Ouzel and Broughton Brook had fair to good biological water quality, and included the Near Threatened species – *Gomphus vulgatissimus* – a species associated with rivers of good water quality.
- 5.4 Notwithstanding the above, it should be noted that the vast majority of habitats at the Site, notably the arable fields and pasture are of low invertebrate habitat potential.

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## Appendix 1: Figures

(overleaf)



**LEGEND**

**Site boundary**  
 Site boundary

**Survey location**

- Pan trap (July 2018 and June 2019)
- Pan trap (September 2018)
- Pan trap (September 2018 and May 2019)
- ▲ Pitfall trap (July 2018)
- ▲ Pitfall trap (September 2018)
- ★ Window trap

**Sweep/beating/grub location**

- July 2018
- July 2018 and May 2019
- July 2018 and June 2019
- August 2018
- September 2018
- June 2019

**Feature of Interest**

- ✕ Collapsed mature willow tree
- Mature tree
- 1 Mature/veteran tree (number indicates number of trees)
- Veteran tree
- Broughton Brook
- River Ouzel
- Mature woodland parcel
- Wide field margins

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PROJECT TITLE  
**NEWPORT PAGNELL INVERTEBRATE SURVEY**

DRAWING TITLE  
**Figure 1: Terrestrial Invertebrate Survey Areas and Features of Interest**

DATE: 30.10.2019      CHECKED: SJ      SCALE: 1:10,500  
 DRAWN: COH      APPROVED: JF      VERSION: 1.2

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 Sources: BSG Ecology survey data

C:\Users\clan\Documents\workingfiles\roost\bsp-ecology.com\Newport Pagnell spatial data\1.0\395 Figure 1 Terrestrial Invertebrate Survey.mxd

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community





- LEGEND**
- Site boundary
  - Aquatic Invertebrate Sampling**
  - 1 ■ Broughton Brook
  - 1 ▲ River Ouzel
  - Feature of Interest**
  - ✕ Collapsed mature willow tree
  - Mature tree
  - 1 ● Mature/veteran tree (number indicates number of trees)
  - Veteran tree
  - Broughton Brook
  - River Ouzel
  - Mature woodland parcel
  - P1 ● Pond location

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PROJECT TITLE  
 NEWPORT PAGNELL INVERTEBRATE SURVEY

DRAWING TITLE  
 Figure 2: Aquatic Invertebrate Survey Areas and Features of Interest

DATE: 11.02.2019      CHECKED: JF      SCALE: 1:10,500  
 DRAWN: KW              APPROVED: JF      VERSION: 1.1

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 Sources: BSG Ecology survey data

C:\Users\ian.BSG-ECOLOG\Documents\workingfiles\roost.bsg-ecology.com\New port pagnell\395 Figure 2 Aquatic Invertebrate Survey.mxd

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

## Appendix 2: Photographs

**Photograph 1:** Example of pan trap set near centre of Site



**Photograph 2:** Example of pitfall trap set at base of collapsed willow pollard adjacent to River Ouzel



**Photograph 3:** Window trap placed within hollow of a veteran ash tree near centre of Site



**Photograph 4:** Window trap placed next to exposed dead wood of a collapsed willow pollard adjacent to River Ouzel



**Photograph 5:** Typical example of arable land in east of the Site



**Photograph 6:** Typical example of pasture in west of the Site



**Photograph 7:** Poplar plantation woodland near centre of Site



**Photograph 8:** Mature oak associated with block of semi-natural woodland in north of the Site



**Photograph 9:** Wet hollows associated with block of semi-natural woodland in the north of the Site



**Photograph 10:** Linear glade formed by farm track between the hedgerow and woodland in north of the Site



**Photograph 11:** Wide glade formed by power line easement through plantation woodland in west of Site



**Photograph 12:** Unmanaged hedgerow of pastoral land to the west of the River Ouzel



**Photograph 13:** Uniformly managed hedgerow typical of the arable land east of the River Ouzel



**Photograph 14:** Veteran willow and ash near centre of Site



**Photograph 15:** Prematurely aged ash within hedgerow in south east of Site



**Photograph 16:** Standing dead wood associated with prematurely aged ash



**Photograph 17:** Arable field margins with exposed soil west of the River Ouzel



**Photograph 18:** Typical section of River Ouzel, at centre of Site



**Photograph 19:** Typical section of Broughton Brook, forming boundary to Site in the west



**Photograph 20:** Dried out field drain draining pastoral land in west of Site



**Photograph 21:** Large pond (Pond 1) in south east of Site



**Photograph 22:** Medium-sized pond (Pond 2) in north of Site



### Appendix 3: Further Information on Status Definitions and Criteria of Invertebrate Groups

Much invertebrate conservation evaluation hinges on nationally threatened and scarce species. For many invertebrate groups, species rarity has often been gauged by the number of national 10 km grid squares in which they occur. The fewer “spots on a map”, the rarer it is. This, however, does not exactly equate with how threatened a species is, since some species may be naturally confined to very few localities but are very abundant where they do occur and under no immediate threat of extinction. The matter of how threatened the “rarest” species are has been addressed in a series of Red Data Books (RDB), such as for insects (Shirt, 1987). Here, the listing as RDB1 (Endangered), RDB2 (Vulnerable) and RDB3 (Rare) is an assessment of how threatened or endangered the species is in Britain, rather than how scarce it is in terms of map spot counting.

Over the last decade the RDB categories are slowly being replaced by IUCN red-list categories (Critically Endangered, Endangered and Vulnerable), which use different criteria to those developed for the RDBs. For a full explanation of the revised IUCN criteria see IUCN (2001), IUCN (2012), IUCN Standards and Petitions Subcommittee (2013, 2014) and the IUCN websites (<http://www.iucnredlist.org/>; [www.iucn.org/](http://www.iucn.org/)).

The process of replacing RDB categories with IUCN ones is however slow, and IUCN categories are not available for all groups. Accordingly, wherever IUCN categories have been allocated in the report, these are also shown in preference, ahead of RDB categories.

At the national level, countries are permitted to refine the definitions for the non- threatened categories and to define additional ones of their own, which essentially sit below RDB / IUCN status. Thus, less rare but still significant species can be defined as Nationally Scarce (formerly called Nationally Notable), which is often sub-divided into Na (scarce), Nb (less scarce). These sub-categories were originally devised by Ball (1986) and are based on 10 km square spot counting for the Great Britain grid system. The Na sub-category represents scarce taxa that are thought to occur in 30 or fewer 10 km squares of the Great Britain grid system. The Nb sub-category represents less scarce taxa that occur in 31 to 100 10 km squares. Taxa in the N- sub-category are those listed as ‘Notable’, but not always distinguished into sub-category Na or Nb. These species are thought to occur in 16 to 100 10 km squares of the National Grid but are too poorly known for their status to be more precisely estimated.

IUCN (pre 1994) categories remain relevant to certain taxa if an update has not been forthcoming. These categories are as follows:

- ) IUCN (pre 1994) Rare - taxa with small populations that are not at present Endangered or Vulnerable, but are at risk. In the UK, this was interpreted as species which exist in fifteen or fewer 10km squares. Superseded by new IUCN categories in 1994, but still applicable to lists that have not been reviewed since 1994.
- ) IUCN (pre 1994) Vulnerable - taxa believed likely to move into the Endangered category in the near future if the causal factors continue operating. Superseded by new IUCN categories in 1994, but still applicable to lists that have not been reviewed since 1994.

**Appendix 4: Species Lists (Terrestrial Surveys)**

Order	Family	Taxon	Status
Coleoptera	Apionidae	<i>Eutrichapion vorax</i>	Local
Coleoptera	Apionidae	<i>Hemitrichapion waltoni</i>	Local
Coleoptera	Apionidae	<i>Protapion trifolii</i>	None
Coleoptera	Cantharidae	<i>Cantharis cryptica</i>	None
Coleoptera	Cantharidae	<i>Cantharis flavilabris</i>	None
Coleoptera	Cantharidae	<i>Cantharis lateralis</i>	Local
Coleoptera	Cantharidae	<i>Cantharis pellucida</i>	None
Coleoptera	Cantharidae	<i>Cantharis rustica</i>	None
Coleoptera	Cantharidae	<i>Malthinus seriepunctatus</i>	Local
Coleoptera	Cantharidae	<i>Rhagonycha fulva</i>	None
Coleoptera	Cantharidae	<i>Rhagonycha limbata</i>	None
Coleoptera	Carabidae	<i>Abax parallelepipedus</i>	None
Coleoptera	Carabidae	<i>Agonum emarginatum</i>	Local
Coleoptera	Carabidae	<i>Agonum fuliginosum</i>	None
Coleoptera	Carabidae	<i>Agonum nigrum</i>	NS
Coleoptera	Carabidae	<i>Amara aenea</i>	None
Coleoptera	Carabidae	<i>Amara apricaria</i>	Local
Coleoptera	Carabidae	<i>Amara communis</i>	Local
Coleoptera	Carabidae	<i>Amara familiaris</i>	None
Coleoptera	Carabidae	<i>Amara ovata</i>	None
Coleoptera	Carabidae	<i>Amara similata</i>	None
Coleoptera	Carabidae	<i>Bembidion articulatum</i>	Local
Coleoptera	Carabidae	<i>Bembidion assimile</i>	Local
Coleoptera	Carabidae	<i>Bembidion biguttatum</i>	None
Coleoptera	Carabidae	<i>Bembidion bualei</i>	Local
Coleoptera	Carabidae	<i>Bembidion clarkii</i>	Local
Coleoptera	Carabidae	<i>Bembidion guttula</i>	None
Coleoptera	Carabidae	<i>Bembidion lampros</i>	None
Coleoptera	Carabidae	<i>Bembidion lunulatum</i>	None
Coleoptera	Carabidae	<i>Bembidion obtusum</i>	None
Coleoptera	Carabidae	<i>Bembidion varium</i>	Local
Coleoptera	Carabidae	<i>Calathus fuscipes</i>	None
Coleoptera	Carabidae	<i>Calathus melanocephalus</i>	None
Coleoptera	Carabidae	<i>Calathus rotundicollis</i>	None
Coleoptera	Carabidae	<i>Carabus violaceus</i>	None

Order	Family	Taxon	Status
Coleoptera	Carabidae	<i>Chlaenius nigricornis</i>	Local
Coleoptera	Carabidae	<i>Clivina fossor</i>	None
Coleoptera	Carabidae	<i>Curtonotus aulicus</i>	None
Coleoptera	Carabidae	<i>Demetrias atricapillus</i>	None
Coleoptera	Carabidae	<i>Harpalus affinis</i>	None
Coleoptera	Carabidae	<i>Harpalus rufipes</i>	None
Coleoptera	Carabidae	<i>Leistus ferrugineus</i>	None
Coleoptera	Carabidae	<i>Leistus spinibarbis</i>	Local
Coleoptera	Carabidae	<i>Loricera pilicornis</i>	None
Coleoptera	Carabidae	<i>Metabletus obscuroguttatus</i>	Local
Coleoptera	Carabidae	<i>Nebria brevicollis</i>	None
Coleoptera	Carabidae	<i>Notiophilus biguttatus</i>	None
Coleoptera	Carabidae	<i>Ocys harpaloides</i>	None
Coleoptera	Carabidae	<i>Oxypselaphus obscurus</i>	Local
Coleoptera	Carabidae	<i>Poecilus cupreus</i>	Local
Coleoptera	Carabidae	<i>Pterostichus anthracinus</i>	NS
Coleoptera	Carabidae	<i>Pterostichus madidus</i>	None
Coleoptera	Carabidae	<i>Pterostichus melanarius</i>	None
Coleoptera	Carabidae	<i>Pterostichus niger</i>	None
Coleoptera	Carabidae	<i>Pterostichus nigrita</i>	None
Coleoptera	Carabidae	<i>Pterostichus strenuus</i>	None
Coleoptera	Carabidae	<i>Synuchus vivalis</i>	Local
Coleoptera	Carabidae	<i>Trechus quadristriatus</i>	None
Coleoptera	Cerambycidae	<i>Agapanthia villosoviridescens</i>	Local
Coleoptera	Cerambycidae	<i>Pseudovadonia livida</i>	Local
Coleoptera	Chrysomelidae	<i>Altica lythri</i>	None
Coleoptera	Chrysomelidae	<i>Altica palustris</i>	None
Coleoptera	Chrysomelidae	<i>Aphthona euphorbiae</i>	None
Coleoptera	Chrysomelidae	<i>Bruchus rufimanus</i>	Local
Coleoptera	Chrysomelidae	<i>Cassida rubiginosa</i>	None
Coleoptera	Chrysomelidae	<i>Chaetocnema concinna</i>	None
Coleoptera	Chrysomelidae	<i>Chaetocnema hortensis</i>	None
Coleoptera	Chrysomelidae	<i>Crepidodera plutus</i>	Local
Coleoptera	Chrysomelidae	<i>Gastrophysa polygoni</i>	None
Coleoptera	Chrysomelidae	<i>Longitarsus jacobaeae</i>	None
Coleoptera	Chrysomelidae	<i>Longitarsus luridus</i>	None
Coleoptera	Chrysomelidae	<i>Longitarsus rubiginosus</i>	Local

Order	Family	Taxon	Status
Coleoptera	Chrysomelidae	<i>Phyllotreta astrachanica</i>	Local
Coleoptera	Chrysomelidae	<i>Phyllotreta nemorum</i>	None
Coleoptera	Chrysomelidae	<i>Phyllotreta nigripes</i>	None
Coleoptera	Chrysomelidae	<i>Phyllotreta ochripes</i>	Local
Coleoptera	Chrysomelidae	<i>Psylliodes chrysocephala</i>	Local
Coleoptera	Chrysomelidae	<i>Psylliodes picina</i>	Local
Coleoptera	Chrysomelidae	<i>Sphaeroderma testaceum</i>	None
Coleoptera	Ciidae	<i>Cis bilamellatus</i>	None
Coleoptera	Ciidae	<i>Orthocis alni</i>	Local
Coleoptera	Coccinellidae	<i>Adalia decempunctata</i>	None
Coleoptera	Coccinellidae	<i>Coccidula rufa</i>	None
Coleoptera	Coccinellidae	<i>Coccinella septempunctata</i>	None
Coleoptera	Coccinellidae	<i>Harmonia axyridis</i>	None
Coleoptera	Coccinellidae	<i>Hippodamia variegata</i>	NS
Coleoptera	Coccinellidae	<i>Propylea quatuordecimpunctata</i>	None
Coleoptera	Coccinellidae	<i>Psyllobora vigintiduopunctata</i>	None
Coleoptera	Coccinellidae	<i>Rhyzobius litura</i>	None
Coleoptera	Coccinellidae	<i>Scymnus frontalis</i>	None
Coleoptera	Coccinellidae	<i>Subcoccinella vigintiquatuor punctata</i>	None
Coleoptera	Coccinellidae	<i>Tytthaspis sedecimpunctata</i>	Local
Coleoptera	Cryptophagidae	<i>Cryptophagus pubescens</i>	Local
Coleoptera	Curculionidae	<i>Acalles misellus</i>	Local
Coleoptera	Curculionidae	<i>Ceutorhynchus obstrictus</i>	None
Coleoptera	Curculionidae	<i>Ceutorhynchus pallidactylus</i>	None
Coleoptera	Curculionidae	<i>Cryptorhynchus lapathi</i>	NS
Coleoptera	Curculionidae	<i>Curculio glandium</i>	Local
Coleoptera	Curculionidae	<i>Euophryum confine</i>	None
Coleoptera	Curculionidae	<i>Exomias pellucidus</i>	None
Coleoptera	Curculionidae	<i>Liophloeus tessulatus</i>	None
Coleoptera	Curculionidae	<i>Nedyus quadrimaculatus</i>	None
Coleoptera	Curculionidae	<i>Notaris acridulus</i>	None
Coleoptera	Curculionidae	<i>Notaris scirpi</i>	NS
Coleoptera	Curculionidae	<i>Phyllobius pyri</i>	None
Coleoptera	Curculionidae	<i>Polydrusus formosus</i>	NS
Coleoptera	Curculionidae	<i>Rhinoncus pericarpus</i>	None
Coleoptera	Curculionidae	<i>Sitona hispidulus</i>	None
Coleoptera	Curculionidae	<i>Sitona lineatus</i>	None

Order	Family	Taxon	Status
Coleoptera	Curculionidae	<i>Sitona obsoletus</i>	None
Coleoptera	Elateridae	<i>Agriotes acuminatus</i>	None
Coleoptera	Elateridae	<i>Agriotes obscurus</i>	None
Coleoptera	Elateridae	<i>Athous haemorrhoidalis</i>	None
Coleoptera	Geotrupidae	<i>Geotrupes spiniger</i>	None
Coleoptera	Histeridae	<i>Margarinotus carbonarius</i>	None
Coleoptera	Histeridae	<i>Paromalus flavicornis</i>	Local
Coleoptera	Hydrophilidae	<i>Megasternum concinnum</i>	None
Coleoptera	Hydrophilidae	<i>Sphaeridium lunatum</i>	None
Coleoptera	Hydrophilidae	<i>Sphaeridium scarabaeoides</i>	None
Coleoptera	Kateretidae	<i>Brachypterus glaber</i>	None
Coleoptera	Kateretidae	<i>Brachypterus urticae</i>	None
Coleoptera	Latridiidae	<i>Corticaria impressa</i>	None
Coleoptera	Latridiidae	<i>Corticaria gibbosa</i>	None
Coleoptera	Latridiidae	<i>Enicmus transversus</i>	None
Coleoptera	Leiodidae	<i>Leiodes rufipennis</i>	Local
Coleoptera	Leiodidae	<i>Ptomaphagus medius</i>	Local
Coleoptera	Lucanidae	<i>Dorcus parallelipipedus</i>	Local
Coleoptera	Malachiidae	<i>Cordylepherus viridis</i>	Local
Coleoptera	Malachiidae	<i>Malachius bipustulatus</i>	None
Coleoptera	Melandryidae	<i>Anisoxya fuscula</i>	NS
Coleoptera	Monotomidae	<i>Monotoma picipes</i>	None
Coleoptera	Mycetophagidae	<i>Mycetophagus quadripustulatus</i>	Local
Coleoptera	Nitidulidae	<i>Meligethes aeneus</i>	None
Coleoptera	Nitidulidae	<i>Soronia grisea</i>	Local
Coleoptera	Oedemeridae	<i>Oedemera lurida</i>	Local
Coleoptera	Oedemeridae	<i>Oedemera nobilis</i>	None
Coleoptera	Phalacridae	<i>Olibrus aeneus</i>	None
Coleoptera	Phalacridae	<i>Phalacrus fimetarius</i>	None
Coleoptera	Phalacridae	<i>Stilbus testaceus</i>	None
Coleoptera	Ptinidae	<i>Anobium punctatum</i>	None
Coleoptera	Scarabaeidae	<i>Acrossus luridus</i>	Local
Coleoptera	Scarabaeidae	<i>Acrossus rufipes</i>	None
Coleoptera	Scarabaeidae	<i>Aphodius foetidus</i>	None
Coleoptera	Scarabaeidae	<i>Nimbus contaminatus</i>	None
Coleoptera	Scarabaeidae	<i>Otophorus haemorrhoidalis</i>	None
Coleoptera	Scirtidae	<i>Cyphon laevipennis</i>	Local

Order	Family	Taxon	Status
Coleoptera	Scirtidae	<i>Cyphon padi</i>	Local
Coleoptera	Scirtidae	<i>Microcara testacea</i>	None
Coleoptera	Scirtidae	<i>Prionocyphon serricornis</i>	Local
Coleoptera	Scraptiidae	<i>Anaspis maculata</i>	None
Coleoptera	Scraptiidae	<i>Anaspis pulicaria</i>	None
Coleoptera	Staphylinidae	<i>Acrolocha sulcula</i>	Local
Coleoptera	Staphylinidae	<i>Aleochara curtula</i>	None
Coleoptera	Staphylinidae	<i>Aleochara lanuginosa</i>	None
Coleoptera	Staphylinidae	<i>Aleochara sparsa</i>	None
Coleoptera	Staphylinidae	<i>Aleochara verna</i>	None
Coleoptera	Staphylinidae	<i>Anotylus inustus</i>	None
Coleoptera	Staphylinidae	<i>Anotylus rugosus</i>	None
Coleoptera	Staphylinidae	<i>Anotylus sculpturatus</i>	None
Coleoptera	Staphylinidae	<i>Anotylus tetracarinatus</i>	None
Coleoptera	Staphylinidae	<i>Carpelimus pusillus</i>	None
Coleoptera	Staphylinidae	<i>Drusilla canaliculata</i>	None
Coleoptera	Staphylinidae	<i>Habrocerus capillaricornis</i>	Local
Coleoptera	Staphylinidae	<i>Ilyobates propinquus</i>	NS
Coleoptera	Staphylinidae	<i>Lathrobium fovulum</i>	Local
Coleoptera	Staphylinidae	<i>Lathrobium impressum</i>	Local
Coleoptera	Staphylinidae	<i>Ocypus brunnipes</i>	None
Coleoptera	Staphylinidae	<i>Ocypus olens</i>	None
Coleoptera	Staphylinidae	<i>Ontholestes murinus</i>	None
Coleoptera	Staphylinidae	<i>Othius laeviusculus</i>	Local
Coleoptera	Staphylinidae	<i>Philonthus albipes</i>	Local
Coleoptera	Staphylinidae	<i>Philonthus decorus</i>	None
Coleoptera	Staphylinidae	<i>Philonthus laminatus</i>	None
Coleoptera	Staphylinidae	<i>Philonthus marginatus</i>	None
Coleoptera	Staphylinidae	<i>Philonthus tenuicornis</i>	Local
Coleoptera	Staphylinidae	<i>Philonthus varians</i>	None
Coleoptera	Staphylinidae	<i>Plataraea brunnea</i>	Local
Coleoptera	Staphylinidae	<i>Quedius levicollis</i>	None
Coleoptera	Staphylinidae	<i>Quedius mesomelinus</i>	None
Coleoptera	Staphylinidae	<i>Quedius molochinus</i>	None
Coleoptera	Staphylinidae	<i>Quedius schatzmayri</i>	Local
Coleoptera	Staphylinidae	<i>Quedius semiaeneus</i>	None
Coleoptera	Staphylinidae	<i>Quedius semiobscurus</i>	None

Order	Family	Taxon	Status
Coleoptera	Staphylinidae	<i>Quedius truncicola</i>	NS
Coleoptera	Staphylinidae	<i>Sepedophilus marshami</i>	None
Coleoptera	Staphylinidae	<i>Siagonium quadricorne</i>	Local
Coleoptera	Staphylinidae	<i>Stenus bifoveolatus</i>	None
Coleoptera	Staphylinidae	<i>Stenus bimaculatus</i>	None
Coleoptera	Staphylinidae	<i>Tachinus rufipes</i>	None
Coleoptera	Staphylinidae	<i>Tachyporus dispar</i>	None
Coleoptera	Staphylinidae	<i>Tachyporus hypnorum</i>	None
Coleoptera	Staphylinidae	<i>Tasgius ater</i>	None
Coleoptera	Staphylinidae	<i>Tasgius globulifer</i>	None
Coleoptera	Staphylinidae	<i>Tasgius melanarius</i>	None
Coleoptera	Staphylinidae	<i>Tasgius morsitans</i>	Local
Coleoptera	Staphylinidae	<i>Xantholinus elegans</i>	Local
Coleoptera	Staphylinidae	<i>Xantholinus linearis</i>	None
Coleoptera	Staphylinidae	<i>Xantholinus longiventris</i>	None
Coleoptera	Tenebrionidae	<i>Lagria hirta</i>	None
Coleoptera	Throscidae	<i>Trixagus obtusus</i>	Local
Dermoptera	Forficulidae	<i>Forficula auricularia</i>	None
Diptera	Asilidae	<i>Leptogaster cylindrica</i>	None
Diptera	Bibionidae	<i>Dilophus febrilis</i>	None
Diptera	Conopidae	<i>Thecophora atra</i>	Local
Diptera	Empidae	<i>Empis livida</i>	None
Diptera	Muscidae	<i>Mesembrina meridiana</i>	None
Diptera	Sarcophagidae	<i>Sarcophaga carnaria</i>	None
Diptera	Scathophagidae	<i>Scathophaga stercoraria</i>	None
Diptera	Sciomyzidae	<i>Coremacera marginata</i>	Local
Diptera	Stratiomyidae	<i>Chloromyia formosa</i>	None
Diptera	Syrphidae	<i>Chrysotoxum bicinctum</i>	Local
Diptera	Syrphidae	<i>Episyrphus balteatus</i>	None
Diptera	Syrphidae	<i>Eristalinus sepulchralis</i>	Local
Diptera	Syrphidae	<i>Eristalis arbustorum</i>	None
Diptera	Syrphidae	<i>Eristalis tenax</i>	None
Diptera	Syrphidae	<i>Helophilus pendulus</i>	None
Diptera	Syrphidae	<i>Melanogaster hirtella</i>	None
Diptera	Syrphidae	<i>Melanostoma scalare</i>	None
Diptera	Syrphidae	<i>Metasyrphus luniger</i>	None
Diptera	Syrphidae	<i>Neoascia podagrica</i>	None

Order	Family	Taxon	Status
Diptera	Syrphidae	<i>Pipizella varipes</i>	None
Diptera	Syrphidae	<i>Platycheirus albimanus</i>	None
Diptera	Syrphidae	<i>Platycheirus peltatus</i>	None
Diptera	Syrphidae	<i>Sphaerophoria scripta</i>	None
Diptera	Syrphidae	<i>Syrphus ribesii</i>	None
Diptera	Syrphidae	<i>Syrphus vitripennis</i>	None
Diptera	Syrphidae	<i>Volucella pellucens</i>	None
Diptera	Tachinidae	<i>Tachina fera</i>	None
Diptera	Tipulidae	<i>Nephrotoma appendiculata</i>	None
Diptera	Tipulidae	<i>Nephrotoma quadrifaria</i>	None
Diptera	Tipulidae	<i>Symplecta stictica</i>	None
Diptera	Tipulidae	<i>Tipula paludosa</i>	None
Hemiptera	Anthocoridae	<i>Anthocoris confusus</i>	None
Hemiptera	Anthocoridae	<i>Anthocoris nemorum</i>	None
Hemiptera	Anthocoridae	<i>Anthocoris simulans</i>	Local
Hemiptera	Aphrophoridae	<i>Aphrophora alni</i>	None
Hemiptera	Aphrophoridae	<i>Neophilaenus lineatus</i>	None
Hemiptera	Aphrophoridae	<i>Philaenus spumarius</i>	None
Hemiptera	Cicadellidae	<i>Adarrus ocellaris</i>	None
Hemiptera	Cicadellidae	<i>Agallia consobrina</i>	None
Hemiptera	Cicadellidae	<i>Aphrodes makarovi</i>	None
Hemiptera	Cicadellidae	<i>Eupteryx aurata</i>	None
Hemiptera	Cicadellidae	<i>Euscelis incisus</i>	None
Hemiptera	Cicadellidae	<i>Limotettix striola</i>	Local
Hemiptera	Cicadellidae	<i>Linnavuoriana sexmaculata</i>	None
Hemiptera	Cicadellidae	<i>Macropsis impura</i>	Local
Hemiptera	Cicadellidae	<i>Macropsis scotti</i>	None
Hemiptera	Cicadellidae	<i>Mocydia crocea</i>	None
Hemiptera	Coreidae	<i>Coreus marginatus</i>	None
Hemiptera	Delphacidae	<i>Stenocranus major</i>	Local
Hemiptera	Lygaeidae	<i>Drymus latus</i>	NS
Hemiptera	Lygaeidae	<i>Drymus sylvaticus</i>	None
Hemiptera	Lygaeidae	<i>Heterogaster urticae</i>	None
Hemiptera	Lygaeidae	<i>Ischnodemus sabuleti</i>	None
Hemiptera	Lygaeidae	<i>Kleidocerys resedae</i>	None
Hemiptera	Lygaeidae	<i>Metopoplax ditomoides</i>	Local
Hemiptera	Lygaeidae	<i>Nysius senecionis</i>	None

Order	Family	Taxon	Status
Hemiptera	Lygaeidae	<i>Scolopostethus thomsoni</i>	None
Hemiptera	Miridae	<i>Adelphocoris lineolatus</i>	None
Hemiptera	Miridae	<i>Capsus ater</i>	None
Hemiptera	Miridae	<i>Cyllecoris histrionius</i>	None
Hemiptera	Miridae	<i>Deraeocoris lutescens</i>	None
Hemiptera	Miridae	<i>Deraeocoris ruber</i>	None
Hemiptera	Miridae	<i>Dicyphus epilobii</i>	None
Hemiptera	Miridae	<i>Heterotoma planicornis</i>	None
Hemiptera	Miridae	<i>Leptopterna dolabrata</i>	None
Hemiptera	Miridae	<i>Liocoris tripustulatus</i>	None
Hemiptera	Miridae	<i>Lygus pratensis</i>	NS
Hemiptera	Miridae	<i>Lygus rugulipennis</i>	None
Hemiptera	Miridae	<i>Megacoelum infusum</i>	None
Hemiptera	Miridae	<i>Miridius quadrivirgatus</i>	Local
Hemiptera	Miridae	<i>Miris striatus</i>	None
Hemiptera	Miridae	<i>Notostira elongata</i>	None
Hemiptera	Miridae	<i>Oncotylus viridiflavus</i>	Local
Hemiptera	Miridae	<i>Orius niger</i>	None
Hemiptera	Miridae	<i>Phytocoris varipes</i>	None
Hemiptera	Miridae	<i>Stenodema calcarata</i>	None
Hemiptera	Miridae	<i>Stenodema laevigata</i>	None
Hemiptera	Miridae	<i>Stenotus binotatus</i>	None
Hemiptera	Nabidae	<i>Himacerus major</i>	None
Hemiptera	Nabidae	<i>Himacerus mirmicoides</i>	None
Hemiptera	Nabidae	<i>Nabis ferus</i>	None
Hemiptera	Nabidae	<i>Nabis flavomarginatus</i>	None
Hemiptera	Nabidae	<i>Nabis limbatus</i>	None
Hemiptera	Nabidae	<i>Nabis lineatus</i>	Local
Hemiptera	Nabidae	<i>Nabis rugosus</i>	None
Hemiptera	Pentatomidae	<i>Aelia acuminata</i>	Local
Hemiptera	Pentatomidae	<i>Dolycoris baccarum</i>	None
Hemiptera	Pentatomidae	<i>Elasmostethus interstinctus</i>	None
Hemiptera	Pentatomidae	<i>Elasmucha grisea</i>	None
Hemiptera	Pentatomidae	<i>Eurydema oleracea</i>	Local
Hemiptera	Pentatomidae	<i>Palomena prasina</i>	None
Hemiptera	Rhopalidae	<i>Corizus hyoscyami</i>	Local
Hemiptera	Rhopalidae	<i>Rhopalus subrufus</i>	Local

Order	Family	Taxon	Status
Hemiptera	Rhopalidae	<i>Stictopleurus abutilon</i>	Local
Hemiptera	Rhopalidae	<i>Stictopleurus punctatonervosus</i>	Local
Hemiptera	Tingidae	<i>Physatocheila dumetorum</i>	None
Hemiptera	Tingidae	<i>Tingis cardui</i>	None
Hymenoptera	Andrenidae	<i>Andrena chrysoceles</i>	None
Hymenoptera	Andrenidae	<i>Andrena subopaca</i>	None
Hymenoptera	Apidae	<i>Apis mellifera</i>	None
Hymenoptera	Apidae	<i>Bombus barbutellus</i>	Local
Hymenoptera	Apidae	<i>Bombus hypnorum</i>	None
Hymenoptera	Apidae	<i>Bombus lapidarius</i>	None
Hymenoptera	Apidae	<i>Bombus lucorum / terrestris</i>	None
Hymenoptera	Apidae	<i>Bombus pascuorum</i>	None
Hymenoptera	Apidae	<i>Bombus pratorum</i>	None
Hymenoptera	Apidae	<i>Bombus vestalis</i>	None
Hymenoptera	Apidae	<i>Nomada flava</i>	None
Hymenoptera	Apidae	<i>Nomada flavoguttata</i>	None
Hymenoptera	Apidae	<i>Nomada goodeniana</i>	None
Hymenoptera	Cephididae	<i>Cephus pygmeus</i>	None
Hymenoptera	Chrysididae	<i>Cleptes nitidulus</i>	NS
Hymenoptera	Crabronidae	<i>Ectemnius continuus</i>	None
Hymenoptera	Crabronidae	<i>Pemphredon inornata</i>	None
Hymenoptera	Crabronidae	<i>Trypoxylon attenuatum</i>	None
Hymenoptera	Crabronidae	<i>Trypoxylon figulus</i>	None
Hymenoptera	Formicidae	<i>Lasius fuliginosus</i>	None
Hymenoptera	Formicidae	<i>Lasius niger</i>	None
Hymenoptera	Formicidae	<i>Myrmica rubra</i>	None
Hymenoptera	Formicidae	<i>Myrmica ruginodis</i>	None
Hymenoptera	Halictidae	<i>Halictus rubicundus</i>	None
Hymenoptera	Halictidae	<i>Halictus tumulorum</i>	None
Hymenoptera	Halictidae	<i>Lasioglossum leucopus</i>	None
Hymenoptera	Halictidae	<i>Lasioglossum malachurum</i>	NS
Hymenoptera	Halictidae	<i>Lasioglossum minutissimum</i>	Local
Hymenoptera	Halictidae	<i>Lasioglossum pauxillum</i>	NS
Hymenoptera	Halictidae	<i>Lasioglossum punctatissimum</i>	None
Hymenoptera	Halictidae	<i>Lasioglossum villosulum</i>	None
Hymenoptera	Halictidae	<i>Sphecodes crassus</i>	NS
Hymenoptera	Halictidae	<i>Sphecodes monilicornis</i>	None

Order	Family	Taxon	Status
Hymenoptera	Halictidae	<i>Sphecodes pellucidus</i>	Local
Hymenoptera	Ichneumonidae	<i>Amblyjoppa proteus</i>	None
Hymenoptera	Megachilidae	<i>Hoplitis claviventris</i>	Local
Hymenoptera	Tiphiidae	<i>Tiphia femorata</i>	Local
Hymenoptera	Vespidae	<i>Vespa crabro</i>	None
Hymenoptera	Vespidae	<i>Vespula germanica</i>	None
Hymenoptera	Vespidae	<i>Vespula vulgaris</i>	None
Isopoda	Armadillidiidae	<i>Armadillidium vulgare</i>	None
Isopoda	Oniscidae	<i>Oniscus asellus</i>	None
Isopoda	Philoscidae	<i>Philoscia muscorum</i>	None
Isopoda	Porcellionidae	<i>Porcellio scaber</i>	None
Julida	Julidae	<i>Tachypodoiulus niger</i>	None
Lepidoptera	Hesperiidae	<i>Ochlodes sylvanus</i>	None
Lepidoptera	Hesperiidae	<i>Thymelicus lineola</i>	None
Lepidoptera	Hesperiidae	<i>Thymelicus sylvestris</i>	None
Lepidoptera	Lycaenidae	<i>Aricia agestis</i>	None
Lepidoptera	Lycaenidae	<i>Polyommatus icarus</i>	None
Lepidoptera	Nymphalidae	<i>Aglais urticae</i>	None
Lepidoptera	Nymphalidae	<i>Coenonympha pamphilus</i>	S41
Lepidoptera	Nymphalidae	<i>Maniola jurtina</i>	None
Lepidoptera	Nymphalidae	<i>Pararge aegeria</i>	None
Lepidoptera	Nymphalidae	<i>Pyronia tithonus</i>	None
Lepidoptera	Nymphalidae	<i>Vanessa atalanta</i>	None
Lepidoptera	Pieridae	<i>Pieris brassicae</i>	None
Lepidoptera	Pieridae	<i>Pieris napi</i>	None
Lepidoptera	Pieridae	<i>Pieris rapae</i>	None
Lepidoptera	Zygaenidae	<i>Zygaena trifolii</i>	None
Lithobiomorpha	Lithobiidae	<i>Lithobius forficatus</i>	None
Mecoptera	Panorpidae	<i>Panorpa communis</i>	None
Neuroptera	Chrysopidae	<i>Chrysopa commata</i>	Local
Opiliones	Nemastomatidae	<i>Nemastoma bimaculatum</i>	None
Opiliones	Sclerosomatidae	<i>Leiobunum rotundum</i>	None
Orthoptera	Acrididae	<i>Chorthippus brunneus</i>	None
Orthoptera	Tetrigidae	<i>Tetrix subulata</i>	Local
Orthoptera	Tettigoniidae	<i>Conocephalus fuscus</i>	Local
Orthoptera	Tettigoniidae	<i>Leptophyes punctatissima</i>	None
Orthoptera	Tettigoniidae	<i>Meconema thalassinum</i>	None

Order	Family	Taxon	Status
Orthoptera	Tettigoniidae	<i>Metrioptera roeselii</i>	None
Orthoptera	Tettigoniidae	<i>Pholidoptera griseoptera</i>	None
Pulmonata	Cochlicopidae	<i>Cochlicopa lubrica</i>	None
Pulmonata	Helicidae	<i>Cepaea hortensis</i>	None
Pulmonata	Hygromiidae	<i>Trochulus hispidus</i>	None
Pulmonata	Physidae	<i>Aplexa hypnorum</i>	Local
Pulmonata	Succineidae	<i>Succinea putris</i>	None
Pulmonata	Vitrinidae	<i>Vitrina pellucida</i>	None
S41 = Section 41 NERC Act 2006			
NS = Nationally Scarce			

**Appendix 5: Macroinvertebrate Species Data (Ponds)**

Order	Family	Taxon	P1	P2
Amphipoda & Isopoda (Crustaceans)	Asellidae	<i>Asellus aquaticus</i>	0	28
	Crangonyctidae	<i>Crangonyx pseudogracillis</i>	0	15
Coleoptera (Beetles)	Dryopidae	<i>Dryops sp.</i>	0	1
	Dytiscidae	<i>Liopterus haemorrhoidalis</i>	1	0
	Dytiscidae	<i>Colymbetes fuscus</i>	3	0
	Dytiscidae	<i>Agabus bipustulatus</i>	2	0
	Dytiscidae	<i>Agabus nebulosus</i>		1
	Dytiscidae	<i>Agabus sturmii</i>	1	4
	Halplidae	<i>Halplus sp.</i>	1	0
	Hydrophilidae	Hydrophilidae indet (larvae)	2	1
	Scirtidae (Helodidae)	Helodidae indet (larvae)	59	0
	Diptera (Flies)	Chironomidae	Chironomidae	12
Ptychopteridae		Ptychopteridae indet (larvae)	1	0
Syrphidae		Syrphidae indet (larvae)	1	6
Hemiptera (Bugs)	Gerridae	<i>Gerris odontogaster</i>	1	0

## Appendix 6: Macroinvertebrate Species Data (Watercourses)

Order / Class	Family	Taxon	RO1		RO2		RO3		BB1		BB2	
			2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
Amphipoda	Crangonyctidae	<i>Crangonyx pseudogracilis</i>	7	1	5	29	2	7	6	18	3	0
Amphipoda	Gammaridae	<i>Dikerogammarus villosus</i>	0	0	0	1	0	0	0	0	0	0
Amphipoda	Gammaridae	<i>Gammarus pulex</i>	20	45	7	2	48	4	4	3	0	2
Bivalvia	Sphaeriidae	Sphaeriidae (indet)	17	45	0	10	78	25	22	100-999	20	5
Bivalvia	Unionidae	<i>Anodonta anatina</i>	0	1	0	1	2	0	0	0	0	0
Coleoptera	Dytiscidae	Dytiscidae (indet larvae)	0	0	0	0	0	1	1	0	0	0
Coleoptera	Elmidae	<i>Limnius volkmari</i>	15	0	0	0	61	0	5	0	0	0
Coleoptera	Elmidae	<i>Oulimnius tuberculatus</i>	5	0	0	0	4	0	0	0	0	3
Coleoptera	Halipidae	<i>Halipus laminatus</i>	0	0	0	0	0	0	10	3	0	0
Coleoptera	Halipidae	<i>Halipus lineatocollis</i>	0	0	0	0	0	1	0	0	0	0
Coleoptera	Halipidae	<i>Halipus ruficollis</i>	0	0	0	0	0	0	1	0	0	0
Coleoptera	Halipidae	<i>Halipus sibiricus</i>	0	0	0	1	0	0	0	0	0	0
Coleoptera	Halipidae	<i>Halipus sp.</i>	0	0	0	0	0	0	0	6	0	12
Coleoptera	Helophoridae	<i>Helophorus aequalis</i>	0	0	0	0	0	0	0	0	0	1
Coleoptera	Helophoridae	<i>Helophorus brevialpis</i>	0	0	0	2	0	0	0	0	0	0
Coleoptera	Helophoridae	<i>Helophorus sp.</i>	0	0	0	0	0	0	0	0	0	4
Coleoptera	Hydrophilidae	Hydrophilidae (indet larvae)	0	0	0	3	0	0	0	2	0	9
Decapoda	Astacidae	<i>Pacifastacus leniusculus</i>	1	1	1	0	0	2	0	0	0	1
Diptera	Chironomidae	Chironomidae (indet larvae)	19	0	1	100-999	51	0	12	100-999	12	100-999
Diptera	Chironomidae	Chironomidae (indet pupae)	0	0	0	99	0	10	0	100-999	0	90
Diptera	Dixidae	Dixidae (indet pupae)	0	0	0	12	0	0	0	24	0	29
Diptera	Empididae	Empididae (Indet larvae)	0	0	0	0	0	0	0	4	0	2
Diptera	Psychodidae	Psychodidae (indet larvae)	0	0	0	1	0	0	1	3	0	0
Diptera	Simuliidae	Simuliidae (indet larvae)	12	0	0	0	0	0	2	0	0	0
Diptera	Tipulidae	Tipulidae (indet larvae)	0	3	0	0	0	0	0	2	0	1
Ephemeroptera	Baetidae	<i>Baetis sp.</i> (indet nymph)	2	1	1	8	1	1	5	100-999	0	31
Ephemeroptera	Caenidae	<i>Caenis luctuosa / macrura</i>	100	12	0	10	43	1	54	100-999	61	100-999
Ephemeroptera	Ephemeridae	<i>Ephemera vulgata</i>	100-999	11	21	9	74	5	20	17	2	7
Gastropoda	Ancylidae	<i>Ancylus fluviatilis</i>	31	4	1	2	17	11	1	1	0	0
Gastropoda	Bithyniidae	<i>Bithynia leachii</i>	0	0	0	0	3	0	0	0	0	0
Gastropoda	Bithyniidae	<i>Bithynia tentaculata</i>	1	6	0	59	0	2	8	100-999	12	100-999
Gastropoda	Hydrobiidae	<i>Potamopyrgus antipodarum</i>	2	25	2	2	17	14	0	1	0	1
Gastropoda	Lymnaeidae	<i>Lymnaea peregra</i>	0	0	0	6	0	0	0	5	0	17
Gastropoda	Lymnaeidae	<i>Lymnaea stagnalis</i>	0	0	0	0	0	0	0	0	1	0
Gastropoda	Lymnaeidae	<i>Lymnaea truncatula</i>	0	0	0	0	0	100-999	0	0	0	0
Gastropoda	Lymnaeidae	<i>Radix auricularia</i>	0	0	0	0	0	0	3	0	4	0
Gastropoda	Lymnaeidae	<i>Stagnicola palustris</i>	0	27	0	0	0	0	0	0	0	0

			RO1		RO2		RO3		BB1		BB2	
Order / Class	Family	Taxon	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
Gastropoda	Neritidae	<i>Theodoxus fluviatilis</i>	0	0	0	0	0	0	0	0	0	1
Gastropoda	Physidae	<i>Physa fontinalis</i>	92	11	19	100-999	34	100-999	0	11	1	5
Gastropoda	Planorbidae	<i>Gyraulus albus</i>	0	1	0	0	0	1	0	0	2	0
Gastropoda	Valvatidae	<i>Valvata piscinalis</i>	0	0	0	0	0	0	0	2	0	0
Gastropoda	Viviparidae	<i>Viviparus viviparus</i>	1	0	0	14	0	0	0	0	0	0
Hemiptera	Corixidae	Corixidae (indet nymph)	0	0	0	5	0	4	0	2	0	0
Hemiptera	Corixidae	<i>Hesperocorixa sahlbergi</i>	1	0	0	0	0	0	0	0	0	0
Hemiptera	Corixidae	<i>Sigara falleni</i>	2	0	0	0	0	0	0	0	0	0
Hemiptera	Gerridae	<i>Gerris lacustris</i>	5	0	1	0	0	0	2	0	0	0
Hemiptera	Gerridae	<i>Gerris sp.</i> (indet nymph)	8	0	2	0	0	0	0	0	0	0
Hemiptera	Nepidae	<i>Ranatra linearis</i>	1	0	0	0	0	0	0	0	0	0
Hemiptera	Notonectidae	<i>Notonecta glauca</i>	5	0	0	0	0	0	1	0	1	0
Hemiptera	Notonectidae	<i>Notonecta maculata</i>	0	0	0	0	1	0	0	0	0	1
Hemiptera	Notonectidae	<i>Notonecta marmorea subsp. viridis</i>	3	0	3	0	0	0	1	0	4	0
Hemiptera	Notonectidae	<i>Notonecta sp.</i> (indet nymph)	0	0	0	8	0	0	0	0	0	0
Hemiptera	Pleidae	<i>Plea minutissima</i>	0	0	0	0	0	2	0	0	1	1
Hemiptera	Veliidae	<i>Velia sp.</i> (indet nymph)	0	0	0	3	0	0	0	4	0	9
Hirudinea	Erpobdellidae	<i>Erpobdella octoculata</i>	0	0	0	0	0	0	0	4	0	0
Hirudinea	Erpobdellidae	<i>Erpobdella testacea</i>	0	0	0	0	0	0	0	5	0	1
Hirudinea	Glossiphoniidae	<i>Glossiphonia complanata</i>	0	0	0	0	0	0	0	0	1	0
Hirudinea	Glossiphoniidae	<i>Alboglossiphonia heteroclita</i>	0	0	0	1	0	0	0	1	0	1
Isopoda	Asellidae	<i>Asellus aquaticus</i>	0	0	1	100-999	3	9	3	100-999	15	99
Mysida	Mysidae	<i>Hemimysis anomala</i>	1	0	0	0	0	0	0	0	0	0
Odonata	Aeshidae	<i>Anax imperator</i>	0	0	1	3	0	0	0	0	0	0
Odonata	Calopterygidae	<i>Calopteryx splendens</i>	100-999	8	36	20	55	0	20	18	5	4
Odonata	Coenagrionidae	Coenagrionidae (indet nymph)	0	0	0	6	0	0	0	0	0	0
Odonata	Coenagrionidae	<i>Ischnura elegans</i>	0	0	0	2	0	0	0	0	0	0
Odonata	Gomphidae	<i>Gomphus vulgatissimus</i>	0	0	0	0	0	0	0	1	0	0
Odonata	Platycnemididae	<i>Platycnemis pennipes</i>	0	0	0	0	0	0	14	51	4	32
Oligochaetae	unknown	unknown	0	0	0	2	0	2	0	0	0	2
Trichoptera	Brachycentridae	<i>Brachycentrus subnubilus</i>	0	3	0	0	1	0	0	0	0	0
Trichoptera	Hydropsychidae	<i>Hydropsyche angustipennis</i>	0	0	0	0	0	0	1	1	0	0
Trichoptera	Hydropsychidae	<i>Hydropsyche pellucidula</i>	1	0	3	0	0	0	3	0	0	0
Trichoptera	Hydropsychidae	<i>Hydropsyche sp.</i>	0	3	0	0	0	0	0	0	0	0
Trichoptera	Leptoceridae	<i>Athripsodes aterrimus</i>	1	0	0	0	0	0	0	0	0	0
Trichoptera	Leptoceridae	<i>Athripsodes cinereus</i>	8	2	0	0	0	0	0	0	0	0
Trichoptera	Leptoceridae	Indet larvae	3	0	0	0	8	0	0	10	0	2
Trichoptera	Leptoceridae	<i>Mystacides longicornis</i>	0	0	0	0	0	1	0	0	0	0
Trichoptera	Leptoceridae	<i>Mystacides nigra</i>	8	0	0	0	5	0	0	0	3	0
Trichoptera	Limnephilidae	<i>Anabolia nervosa</i>	0	2	0	0	0	0	0	2	0	3

			RO1		RO2		RO3		BB1		BB2	
Order / Class	Family	Taxon	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
Trichoptera	Limnephilidae	Limnephilidae (indet larvae)	0	0	0	0	12	0	0	5	0	0
Trichoptera	Limnephilidae	<i>Limnephilus lunatus</i>	0	1	0	0	0	0	0	0	0	1
Trichoptera	Molannidae	<i>Molanna angustata</i>	0	0	0	0	0	0	0	0	1	3
Trichoptera	Phryganeidae	<i>Phryganea grandis</i>	0	0	0	0	0	0	11	0	12	0
Trichoptera	Polycentropodidae	<i>Polycentropus flavomaculatus</i>	0	0	0	0	2	0	0	0	0	0
Trichoptera	Polycentropodidae	<i>Polycentropus irroratus</i>	0	0	0	1	0	0	0	3	0	0
Trichoptera	unknown	<i>Indet larvae</i>	0	6	0	0	0	2	0	0	0	0

# **Appendix 11 Hedgerow survey Report**



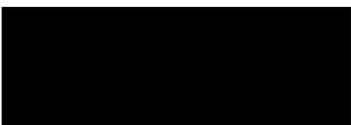
# Newport Pagnell Hedgerow Assessment

July 2011

# QUALITY MANAGEMENT

Issue/revision	Issue 1	Revision 1	Revision 2	Revision 3
Remarks	DRAFT for Comment	Final		
Date	29/7/11	1/8/11		
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# EXECUTIVE SUMMARY

- WSP Environmental Limited (WSPE) was instructed by Berkeley Strategic in July 2011 to undertake a Hedgerow Assessment of 85 hedgerows across an area of land to the south of Newport Pagnell, Milton Keynes (central Ordnance Survey Grid Reference: SP 888 422).
- 52 of the 85 surveyed hedgerows meet at least one of the criteria classifying them as Important.
- It is recommended that where possible hedgerows identified as Important are retained. Where impacts are unavoidable the proposed landscape strategy should be amended to minimise these impacts i.e. removal of only necessary sections of Important hedgerow, and minimise the number of breaches. Existing breaches should be utilised where possible. Alternatively, sections dominated by only a single species should be targeted to avoid loss of species-rich sections. In all instances the removal of standard trees should be avoided; should breaches be required these should avoid standard trees.
- Where breaches or loss of hedgerow sections are unavoidable this should be mitigated for by the creation of new hedgerows. The proposed landscape strategy should also aim to prevent fragmentation of the hedgerow network across the site and maintain as many connecting hedgerows and features i.e. woodlands and ponds, as possible.

# 1 INTRODUCTION

## 1.1 Project background

1.1.1 WSP Environmental Limited (WSPE) was instructed by Berkeley Strategic in July 2011 to undertake a Hedgerow Assessment of 85 hedgerows across an area of land to the south of Newport Pagnell, Milton Keynes (central Ordnance Survey Grid Reference: SP 888 422), hereafter referred to as 'the Site'.

1.2.1 The aim of the survey was to undertake an appraisal of the hedgerows that may be impacted as part of a proposed development to ascertain the following:

- Whether the hedgerows could be classed as important according to the definitions listed in the Hedgerows Regulations, 1997;
- Which mitigation measures would need to be employed to satisfy legislative and planning requirements.

## 1.2 Site description

1.2.1 The site consists of a number of arable and semi-improved grassland fields divided by hedgerows and lines of trees. The River Ouzel bisects the site from north to south. The village of Newport Pagnell lies immediately to the north with the M1 forming the south-western boundary of the site beyond which lies the city of Milton Keynes.

1.2.2 A site location plan is provided as Figure 1.

## 1.3 Proposed work

1.3.1 The Site is being promoted as a strategic employment park. This report has been produced in order to inform the masterplan development.

# METHODOLOGY

## 1.4 Desk Study

1.4.1 Buckinghamshire & Milton Keynes Environmental Records Centre (BMKERC) were contacted for records of protected and notable species within a 2 kilometre radius of the site. This included records of floral and faunal species that are protected under the Wildlife and Countryside Act 1981 (and amendments), categorised as 'endangered,' 'extinct,' 'rare,' or 'vulnerable' in Britain, and of bird species that are categorised as a declining breeder.

1.4.2 For a hedgerow to be classed as important it needs to be at least 30 years of age and meet at least one of the criteria set out by the Hedgerows Regulations. As such the age of the hedgerow needs to be determined. In accordance with the Hedgerow Regulations the following information on the historical significance of the hedgerow was obtained from the Centre for Buckinghamshire Studies (CBS):

- Whether the hedgerow marks a pre-1850 parish or township boundary;
- If it marks the boundary of, or is visibly related to a building or feature on, a pre-1600 estate or manor;
- If it forms an integral part of a field system pre-dating the Inclosure Acts (i.e. before 1845 whether an Inclosure Act exists for the area in question or not).

1.4.3 The following information on the archaeological significance of the hedgerow (see Appendix A) was also obtained from English Heritage (2011):

- Whether it incorporates an archaeological feature;
- Whether it is part of, or associated with, an archaeological site and is associated with a monument or feature on that site.

2.1.4 Additionally, the Multi-Agency Geographical Information for the Countryside (MAGIC) web-resource (MAGIC, 2011) was also consulted to determine if the hedgerows are adjacent to a bridleway or footpath, a road used as a public path, or a byway open to all traffic.

## 1.5 Field Survey

2.2.1 The field survey was conducted from the 20<sup>th</sup> to the 22<sup>nd</sup> July 2011 by a Senior Ecologist from Keystone Environmental Ltd acting on behalf of WSPEE who are acting as consultants to Berkeley Strategic.

2.2.2 In accordance with the Hedgerows Regulations 1997 a hedgerow is measured from the point or points where it meets another hedgerow or hedgerows or where there is a gap of more than 20 metres between the end of the hedgerow and the nearest line of hedge. Gaps within a hedgerow are included in the total length as long as they are 20 metres or less in length.

2.2.3 Each hedgerow was assigned a unique reference in accordance with the methodology described in paragraph 2.2.2.

2.2.4 Notes were made on the following in accordance with the criteria outlined in Schedule 1 of the Hedgerows Regulations 1997 (see Appendix A):

- Evidence of certain categories of species of birds, animals or plants listed in Schedules 1, 5 and 8 of the Wildlife and Countryside Act or the Joint Nature Conservation Committee (JNCC) publications such as British Red Data Books;
- Number of woody species, on average, in a 30 metre length;
- Presence of rare tree species such as Black Poplar, Large-leaved Lime and Small-leaved Lime and Wild Service Tree;
- Number of standard trees within each 50 metre section;
- Extent of gaps in the hedge (as a percentage of hedgerow length);
- Presence of ground woodland floral species listed in Schedule 2 of the Hedgerow Regulations;

- Presence of ditches, banks or walls;
- Number of connections with other hedgerows, ponds or woodland;
- Presence of parallel hedges within 15 metres of the hedge;
- Presence of bridleways, footpaths, byways or public paths.

2.2.5 The number of woody species present per 30 metre stretch was recorded in the following manner:

- Where the length of the hedgerow did not exceed 30 metres, the total number of woody species present in the hedgerow was recorded;
- Where the hedgerow was between 30 metres and 100 metres, the number of woody species present in the central 30 metre stretch was recorded;
- Where its length was between 100 metres and 200 metres, the number of woody species present in the central 30 metre stretches of the two halves of the hedgerow were recorded and the mean of the two calculated;
- Where the length of the hedgerow was over 200 metres, the number of woody species present in the central 30 metre stretch within each third of the hedgerow was recorded and the mean of the three calculated.

2.2.6 During the field survey further details, not required under the regulations, were recorded, such as hedgerow height, width, integrity, structure, and management history.

2.2.7 Additionally, lines of trees were also included within the hedgerow assessment.

2.2.8 Two 1 metre by 2 metre quadrats of ground flora were also undertaken, per each stretch of hedgerow surveyed (one at the base of the hedgerow, and the second 1 metre out from the base of the hedgerow) and details of any veteran trees including whether these support; dead wood, loose/split/missing/dead bark, bark sap runs, tears/splits/scars/lightning strikes, hollow trunks or major limbs, and major rot site, were also recorded in accordance with the Hedgerow Survey handbook (2nd Edition) (DEFRA, 2007).

## 2.3 [Assessment](#)

2.3.1 To be classified as important under The Hedgerow Regulations 1997, a hedgerow must be at least 30 years old and meet at least one of the eight criteria set out in Schedule 1 of The Hedgerow Regulations 1997 summarised in Appendix 1.

## 2.4 [Nomenclature](#)

2.4.1 The English name only of flora and fauna species is given in the main text of this report.

## 2.5 [Limitations](#)

2.5.1 The results of the survey and assessment work undertaken by Keystone Environmental are representative at the time of surveying. Certain plant species are only evident at specific times of the year and so some plant species may have gone undetected.

2.5.2 Keystone Environmental staff and their sub-consultants will endeavour to identify the presence of protected species wherever possible on-site, where this falls within the agreed scope of works.

2.5.3 Current standard methodologies will be used, which are accepted by Natural England and other statutory conservation bodies. No responsibility will be accepted where these methodologies fail to identify all species on-site. Keystone Environmental cannot take responsibility where Government, national bodies or industry subsequently modify standards.

2.5.4 Keystone Environmental cannot accept responsibility for data collected from third parties.

2.5.5 Due to the number of hedgerows surveyed only one side of each hedgerow was subject to survey.

2.5.6 The classification of hedgerows present on field boundaries pre-Inclosures Act should be viewed with caution due to the difficulty of overlaying historic and current maps.

2.5.7 Information/maps were not available to identify whether any hedgerows marked the boundary of, or were associated with, a pre-1600 estate or manor.

2.5.8 Information/maps were missing for parts of the site which related to the Inclosure Acts.

2.5.9 The majority of protected species records are from 4 figure grid references so cannot be specifically associated with an individual hedgerow.

2.5.10 Protected species records have only been taken from BMKERC and do not include the findings of ecological surveys previously undertaken across the site.

## 2 LEGISLATION AND ECOLOGY

### 2.1 Legislation

1.4.1 All hedgerows are protected by the Hedgerows Regulations 1997. Under the Regulations it is against the law to remove or destroy certain hedgerows without permission from the local planning authority. These regulations do not apply to any hedgerow within the curtilage of, or marking the boundary of the curtilage of, a dwelling house.

1.4.2 Consent from the Local Planning Authority (LPA) is required before removing hedgerows that are at least 20 metres in length and over 30 years old. The LPA will assess the importance of the hedgerow(s) using criteria set out in Schedule 1 of the Regulations.

1.4.3 Hedgerows in areas covered by a Historic Landscape Characterisation are often protected on the basis of historic importance and their wildlife value.

1.4.4 Planning Policy Statement 9 (PPS9): Biodiversity and Geological Conservation (ODPM, 2005) states that:

*'The aim of planning decisions should be to prevent harm to biodiversity and geological conservation interests. Where granting planning permission would result in significant harm to those interests, local planning authorities will need to be satisfied that the development cannot reasonably be located on any alternative sites that would result in less or no harm. In the absence of any such alternatives, local planning authorities should ensure that, before planning permission is granted, adequate mitigation measures are put in place. Where a planning decision would result in significant harm to biodiversity and geological interests which cannot be prevented or adequately mitigated against, appropriate compensation measures should be sought. If that significant harm cannot be prevented, adequately mitigated against, or compensated for, then planning permission should be refused.'*

1.4.5 Under PPS9, Local Planning Authorities have a responsibility to ensure that Internationally, Nationally, Regionally and Locally Important Sites, Ancient Woodlands, other Important Natural Habitats\* and Networks of These Habitats<sup>1</sup> are not lost or degraded as a result of development unless the need for and benefits of the development outweigh the impacts that it is likely to have. Local Planning Authorities should use conditions and/or planning obligations to mitigate harm and ensure conservation/enhancement of the site's biological or geological interest.

1.4.6 The UK Biodiversity Action Plan (2007) defines a hedgerow as any boundary line of trees or shrubs over 20 metres long and less than 5 metres wide, and where any gaps between the trees or shrub species are less than 20 metres wide. All hedgerows consisting predominantly (*i.e.* 80% or more cover) of at least one woody UK native species are covered by this Priority Habitat.

1.4.7 Hedgerows are not currently listed as a Priority Habitats on the Milton Keynes Local Biodiversity Action Plan (Natural England, 2011).

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<sup>1</sup> Habitat types originally identified in the Countryside and Rights of Way Act 2000 section 74 list, as being of principal importance for the conservation of biodiversity which has since been updated by The England Biodiversity List, all of which make up the UK BAP Priority Habitats.

# 3 RESULTS AND ASSESSMENT

## 3.1 Results and Assessment

3.1.1 The results of the desk and field study have been assessed within the following tables, with each hedgerow being shown on Figure 1. Complete field notes are presented within Appendix 2.

3.1.2 The network of hedgerows across the site is characterised by species-poor hedgerows which form the boundaries of field systems intermixed with the occasional older species-rich hedgerows and line of trees. The majority of these appear to be flailed annually and have formed a dense structure. Occasionally these support standard trees which have developed a secondary canopy above the hedgerow. The ground flora throughout the base of the hedgerows is sparse and typically dominated by common habitats such as improved grassland, tall ruderal, or bare ground.

3.1.3 To be classified as important, a hedgerow must be at least 30 years old and meet at least 1 of the 8 criteria set out by The Hedgerows Regulations 1997 summarised in Appendix 1. All hedgerows on site are believed to be over 30 years old.

3.1.4 52 of the 85 surveyed hedgerows meet at least one of the criteria classifying them as Important.

3.1.5 As information/maps were not available to identify whether the hedgerows mark the boundary of, or are associated with, a pre-1600 estate or manor and some of the Inclosure maps were missing, it cannot be determined with absolute certainty that the hedgerows which do not meet any of the other criteria are not Important.

3.1.6 No significant ground flora was identified from the quadrats, with the base of hedgerows being dominated by common habitats such as improved grassland, tall ruderal, or bare ground. In most instances there was only a limited band of regularly mown ground flora.

3.1.7 Although a number of mature and semi-mature standards occur within the hedgerows, these are generally well maintained with only a small number being found to exhibit features classifying them as veteran. In the majority of instances the classifying feature was that the trees supported dead limbs, splits or hollows within decaying trunks.

Criteria	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13	H14	H15
1 - Marks a pre-1850 parish or township boundary	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2 - Incorporates an archaeological feature	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3 - Is part of, or associated with, an archaeological site	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4 - Marks boundary of, or is associated with, a pre-1600 estate or manor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 - Forms an integral part of a field system pre-dating the Inclosure Acts	✓	X	✓	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X
6 - Contains species protected by Schedules 1, 5 or 8 of the Wildlife and Countryside Act or listed on relevant JNCC publications	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7 - Contains 7 woody species	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8 - Contains 6 woody species and 3 associated features	X	X	X	X	X	X	X	X	X	✓	✓	X	X	X	X
9 - Contains 5 woody species and 4 associated features	X	X	X	X	X	X	X	X	X	✓	✓	X	X	X	X
10 - Runs along a bridleway, footpath, road or byway, contains 4 woody species and 2 features	✓	X	✓	X	X	X	X	X	✓	✓	✓	X	✓	X	X
<b>Important Hedgerow</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>No</b>								

Criteria	H16	H17	H18	H19	H20	H21	H22	H23	H24	H25	H26	H27	H28	H29	H30
1 - Marks a pre-1850 parish or township boundary	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2 - Incorporates an archaeological feature	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3 - Is part of, or associated with, an archaeological site	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4 - Marks boundary of, or is associated with, a pre-1600 estate or manor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 - Forms an integral part of a field system pre-dating the Inclosure Acts	X	✓	X	X	X	X	X	X	X	X	X	X	✓	X	X
6 - Contains species protected by Schedules 1, 5 or 8 of the Wildlife and Countryside Act or listed on relevant JNCC publications	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7 - Contains 7 woody species	X	X	X	X	X	X	X	X	X	X	X	X	X	X	✓
8 - Contains 6 woody species and 3 associated features	X	X	X	X	X	X	X	X	X	X	X	X	X	X	✓
9 - Contains 5 woody species and 4 associated features	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10 - Runs along a bridleway, footpath, road or byway, contains 4 woody species and 2 features	X	X	X	✓	X	X	X	X	X	X	X	X	X	X	✓
<b>Important Hedgerow</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>							

Criteria	H31	H32	H33	H34	H35	H36	H37	H38	H39	H40	H41	H42	H43	H44	H45
1 - Marks a pre-1850 parish or township boundary	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2 - Incorporates an archaeological feature	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3 - Is part of, or associated with, an archaeological site	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4 - Marks boundary of, or is associated with, a pre-1600 estate or manor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 - Forms an integral part of a field system pre-dating the Inclosure Acts	X	X	X	X	X	✓	X	X	X	X	X	X	✓	✓	✓
6 - Contains species protected by Schedules 1, 5 or 8 of the Wildlife and Countryside Act or listed on relevant JNCC publications	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7 - Contains 7 woody species	✓	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8 - Contains 6 woody species and 3 associated features	✓	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9 - Contains 5 woody species and 4 associated features	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10 - Runs along a bridleway, footpath, road or byway, contains 4 woody species and 2 features	✓	X	X	✓	X	✓	X	X	✓	✓	X	X	✓	X	X
<b>Important Hedgerow</b>	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>

Criteria	H46	H47	H48	H49	H50	H51	H52	H53	H54	H55	H56	H57	H58	H59	H60
1 - Marks a pre-1850 parish or township boundary	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2 - Incorporates an archaeological feature	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3 - Is part of, or associated with, an archaeological site	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4 - Marks boundary of, or is associated with, a pre-1600 estate or manor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 - Forms an integral part of a field system pre-dating the Inclosure Acts	✓	✓	✓	✓	✓	✓	X	X	✓	✓	✓	✓	X	✓	X
6 - Contains species protected by Schedules 1, 5 or 8 of the Wildlife and Countryside Act or listed on relevant JNCC publications	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7 - Contains 7 woody species	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8 - Contains 6 woody species and 3 associated features	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9 - Contains 5 woody species and 4 associated features	X	X	X	X	X	X	X	X	X	✓	✓	✓	X	X	X
10 - Runs along a bridleway, footpath, road or byway, contains 4 woody species and 2 features	X	X	X	X	X	X	X	X	✓	X	X	X	X	X	X
<b>Important Hedgerow</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>

Criteria	H61	H62	H63	H64	H65	H66	H67	H68	H69	H70	H71	H72	H73	H74	H75
1 - Marks a pre-1850 parish or township boundary	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2 - Incorporates an archaeological feature	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3 - Is part of, or associated with, an archaeological site	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4 - Marks boundary of, or is associated with, a pre-1600 estate or manor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5 - Forms an integral part of a field system pre-dating the Inclosure Acts	X	X	✓	X	X	✓	✓	✓	✓	✓	✓	✓	✓	X	X
6 - Contains species protected by Schedules 1, 5 or 8 of the Wildlife and Countryside Act or listed on relevant JNCC publications	X	X	✓	X	X	X	X	X	X	X	X	X	X	X	X
7 - Contains 7 woody species	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8 - Contains 6 woody species and 3 associated features	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9 - Contains 5 woody species and 4 associated features	X	✓	✓	X	X	X	X	X	X	X	X	X	X	X	✓
10 - Runs along a bridleway, footpath, road or byway, contains 4 woody species and 2 features	X	✓	X	X	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	X
<b>Important Hedgerow</b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>								

Criteria	H76	H77	H78	H79	H80	H81	H82	H83	H84	H85
1 - Marks a pre-1850 parish or township boundary	X	X	X	X	X	X	X	X	X	X
2 - Incorporates an archaeological feature	X	X	X	X	X	X	X	X	X	X
3 - Is part of, or associated with, an archaeological site	X	X	X	X	X	X	X	X	X	X
4 - Marks boundary of, or is associated with, a pre-1600 estate or manor	-	-	-	-	-	-	-	-	-	-
5 - Forms an integral part of a field system pre-dating the Inclosure Acts	X	X	X	X	X	X	X	X	X	X
6 - Contains species protected by Schedules 1, 5 or 8 of the Wildlife and Countryside Act or listed on relevant JNCC publications	X	X	X	X	X	X	X	X	X	X
7 - Contains 7 woody species	X	X	X	X	X	X	X	X	X	X
8 - Contains 6 woody species and 3 associated features	X	X	X	X	X	X	X	X	X	X
9 - Contains 5 woody species and 4 associated features	X	X	X	X	X	X	X	X	X	X
10 - Runs along a bridleway, footpath, road or byway, contains 4 woody species and 2 features	✓	✓	X	X	✓	X	✓	✓	✓	X
<b>Important Hedgerow</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>	<b>No</b>	<b>Yes</b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>No</b>

# 4 DISCUSSION AND RECOMMENDATIONS

## 4.1 Impacts

4.1.1 As the project is in the early stages of planning, it is unclear as to the specific impacts of the proposed development. However, the proposed development is likely to involve the clearance of/disturbance to habitats. Therefore, the following potential impacts have been identified:

- Loss of Important hedgerows and veteran trees;
- Breaching of Important hedgerows; and
- Disturbance to Important hedgerows and veteran trees from adjacent works.

### 4.1.2 Recommendations

4.1.3 It is recommended that where possible hedgerows identified as Important are retained. Where impacts are unavoidable the proposed landscape strategy should be amended to minimise these impacts *i.e.* removing only necessary sections of Important hedgerow, and minimising the number of breaches. Existing breaches should be utilised where possible. Alternatively, sections dominated by only a single species should be targeted to avoid loss of species-rich sections. In all instances removal of standard trees should be avoided; should breaches be required these should be located to avoid standard trees.

4.1.4 Where breaches or loss of hedgerow sections are unavoidable this should be mitigated for by the creation of new hedgerows. The proposed landscape strategy should also aim to prevent fragmentation of the hedgerow network across the site and maintain as many connecting hedgerows and features *i.e.* woodlands and ponds, as possible.

4.1.5 Species composition of the new hedgerows should be based on existing hedgerows in the area, and planted with native whips of local provenance, with stock-proof barriers where these are to edge fields. A mix of: Hawthorn 50%, Field Maple 20%, Blackthorn 15%, and other species 15% selected from Dogwood, Wayfaring Tree, Buckthorn, Guelder Rose, Hazel, Spindle, Dog Rose, Privet, and Holly is recommended. Elder and more vigorous Willow species should not be included as they tend to dominate their position and suppress other species. Trees should also be included at 40-60 metre intervals with Ash and Oak species dominating, and with lesser amounts of Field Maple, Wild Cherry, Crab Apple, Holly and Alder in wetter areas. Horse Chestnut, Sweet Chestnut, and Beech should be avoided in large numbers as they cast a heavy shade that will suppress the hedgerow. Hedgerow ground flora should also be encouraged either through seeding or by the translocation of higher quality topsoil from the base of hedgerows which are to be lost (Gilbert & Anderson, 1998).

4.1.6 A band of 1-2 metres from the hedgerow base should be maintained with light mowing in September once every 2 years. Hedgerows should be maintained on rotation, with one third flailed each year in September to allow a diverse structure to develop but prevent the hedgerows from becoming too tall and woody (Gilbert & Anderson, 1998). Hedgerows which are to be retained across the site should also be managed in a similar manner and enhanced *i.e.* through planting of gaps, laying of tall and woody sections etc, where necessary.

4.2.5 Protection fencing should be installed to protect retained hedgerows and trees during construction in accordance with BS5837:2005 standards.

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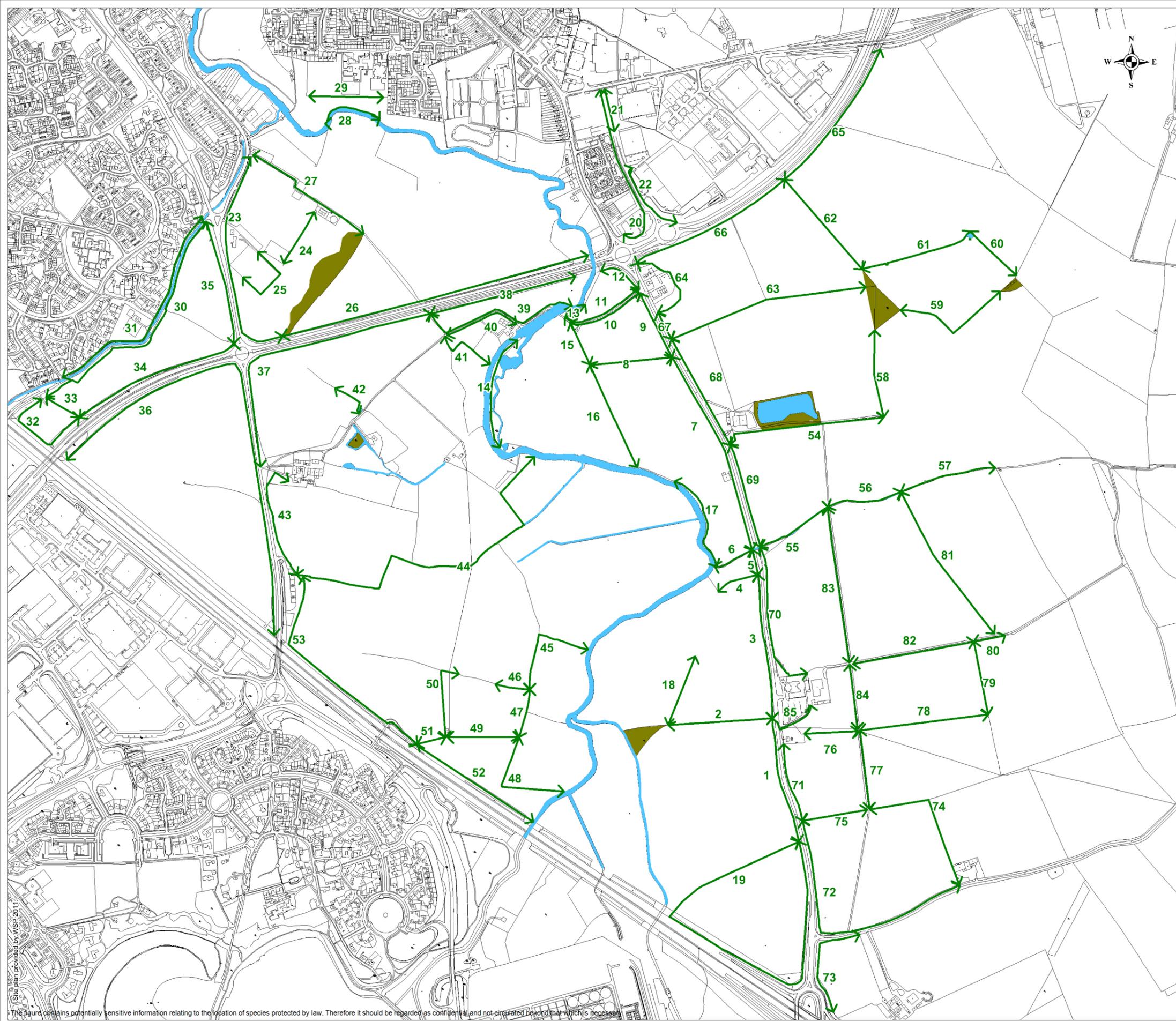
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# 6 FIGURES

**Figure 1**      **Site plan**





Key:

-  Hedge
-  Woodland
-  Waterbody or flowing water



Drn	Description	Rev	App
DI	Hedgerow Assessment	0	DA

**Newport Pagnell**

Drawing Title:  
**Site Plan**

Client Name: Berkeley Strategic  
 Scale: 1:10,000 @ A3    Date: 01/08/11  
 Drawing Number: 111275/1/10/wor1



Site plan provided by WSP 2011

The figure contains potentially sensitive information relating to the location of species protected by law. Therefore it should be regarded as confidential and not circulated beyond that which is necessary.

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# 7 APPENDICES

**Appendix A**                      **Criteria for Classifying Important Hedgerows**

**Appendix B**                      **Field Survey Notes**

# Appendix A Criteria for Classifying Important Hedgerows

Subject to regulation 8 (4), hedgerows are important for the purposes of The Hedgerows Regulations 1997 if:

- They have been in existence for 30 years or more and
- They satisfy at least one of the criteria set out in Part II of Schedule 1 to the Regulations.

The criteria set out in Part II of Schedule 1 of the Hedgerows Regulations (1997) are as follows:

1. The hedgerow marks a boundary, or part of a boundary, of a pre-1850 parish or township.
2. The hedgerow incorporates an archaeological feature which is included in the schedule of monuments under section 1 of the Ancient Monuments and Archaeological Areas Act 1979 or recorded in a Sites and Monuments Record.
3. The hedgerow is situated wholly or partly within an archaeological site included or recorded as mentioned above or on land adjacent to and associated with such a site and is associated with any monument or feature on that site.
4. The hedgerow marks the boundary of a pre-1600 estate or manor or is visibly related to any building or feature of such an estate or manor.
5. The hedgerow is an integral part of a field system pre-dating the Inclosure Acts or is part of, or visibly related to, any building or feature associated with such a system.
6. The hedgerow contains floral or faunal species that are protected under the Wildlife and Countryside Act (1981), categorised as 'endangered,' 'extinct,' 'rare,' or 'vulnerable' in Britain or bird species that are categorised as a declining breeder.
7. The hedgerow includes one of the following:
  - At least 7 woody species listed in Schedule 3 of the Regulations
  - At least 6 woody species and has at least 3 of the associated features specified below.
  - At least 6 woody species including Black Poplar, Large-leaved Lime, Small-leaved Lime or Wild Service Tree.
  - At least 5 woody species and has at least 4 of the associated features specified below
  - In counties of northern England the number of woody species required to meet this criterion is reduced by one.
8. The hedgerow is adjacent to a bridleway or footpath, a road used as a public path, or a byway open to all traffic and includes at least 4 woody species and has at least 2 of the features specified below.

The associated features are as follows:

- A bank or wall which supports the hedgerow at least one half of its length
- Gaps which in aggregate do not exceed 10% of the length of the hedgerow
- At least an average of one standard tree per 50 m of hedgerow. A standard tree, in the case of a single stemmed tree, is defined as one with a diameter of at least 20 cm measured at a point 1.3 m above natural ground level, or for a multi-stemmed tree, one with at least two stems whose diameters are at least 15 cm measured at a point 1.3 m above natural ground level.
- At least 3 ground flora woodland species (listed in Schedule 2 of the Regulations) within 1 m, in any direction, of the outermost edges of the hedgerow.
- A ditch along at least one half of the length of the hedgerow.

- Connections scoring four points or more, where a connection with another hedgerow counts as one and where a connection with a woodland, in which the majority of the trees are broad-leaved, or a pond counts as two.
- A parallel hedge within 15 m of the hedgerow.

## Appendix B Field Survey Notes

Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 885, 415
Hedge Reference:	1	Length (m):	335
Photo No:	1507		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	1.5	Average width of vegetation (m)	1.5
Side surveyed			W

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>1</sup>			4
No. Standard tree / 50m			0

Connectivity <sup>2</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	0
		Connections to ponds	0

Additional Criteria		
Bank <sup>3</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>1</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>2</sup> Connections within 10m in line with hedge

<sup>3</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 890, 416
Hedge Reference:	2	Length (m):	276
Photo No:	1508		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	1.5	Average width of vegetation (m)	1.5
Side surveyed	S		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>4</sup>			4
No. Standard tree / 50m			0

Connectivity <sup>5</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	2
Connections to ponds	0		

Additional Criteria		
Bank <sup>6</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>4</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>5</sup> Connections within 10m in line with hedge

<sup>6</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 890, 418
Hedge Reference:	3	Length (m):	381
Photo No:	1509		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	1.5	Average width of vegetation (m)	1.5
Side surveyed		W	

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>7</sup>			
No. Standard tree / 50m			
			4   2   4   Av. 3
			0

Connectivity <sup>8</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	0
		Connections to ponds	0

Additional Criteria		
Bank <sup>9</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>7</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>8</sup> Connections within 10m in line with hedge

<sup>9</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 889, 420
Hedge Reference:	4	Length (m):	95
Photo No:	15010		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary					
Average height of vegetation (m)	1.5	Average width of vegetation (m)	1.5	Side surveyed	S

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape				
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>	
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>	

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)			
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input checked="" type="checkbox"/>	
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>	
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>	
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>	
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>	

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>10</sup>		3					Av.
No. Standard tree / 50m		0					

Connectivity <sup>11</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds		0	

Additional Criteria		
Bank <sup>12</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 20 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>10</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>11</sup> Connections within 10m in line with hedge

<sup>12</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 890, 420
Hedge Reference:	5	Length (m):	68
Photo No:	1511		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary					
Average height of vegetation (m)	1.5	Average width of vegetation (m)	1.5	Side surveyed	W

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape				
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>	
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>	

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input checked="" type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees								
	<30m	>30m<100m	>100m <200m	>200m				Av.
Number of woody Species <sup>13</sup>		1						
No. Standard tree / 50m		0						

Connectivity <sup>14</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	
		Connections to ponds	

Additional Criteria		
Bank <sup>15</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 0 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>13</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>14</sup> Connections within 10m in line with hedge

<sup>15</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 889, 420
Hedge Reference:	6	Length (m):	98
Photo No:	1512 & 1513		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)		Average width of vegetation (m)	
		Side surveyed	S

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input checked="" type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other: Trees <input checked="" type="checkbox"/>

Hedgerow Base Management: None

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input checked="" type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>16</sup>		2	
No. Standard tree / 50m		4	

Connectivity <sup>17</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	0
		Connections to ponds	0

Additional Criteria		
Bank <sup>18</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input checked="" type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input checked="" type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input checked="" type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input checked="" type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>16</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>17</sup> Connections within 10m in line with hedge

<sup>18</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 889, 424
Hedge Reference:	7	Length (m):	554
Photo No:	1514		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	1.5	Average width of vegetation (m)	1.5
Side surveyed			W

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>19</sup>			2    4    3    Av. 3
No. Standard tree / 50m			1

Connectivity <sup>20</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	0
		Connections to ponds	0

Additional Criteria		
Bank <sup>21</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>19</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>20</sup> Connections within 10m in line with hedge

<sup>21</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 886, 425
Hedge Reference:	8	Length (m):	219
Photo No:	1515		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	1.5	Average width of vegetation (m)	1.5
Side surveyed	S		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>22</sup>			3 2 3 Av. 2.5
No. Standard tree / 50m			1

Connectivity <sup>23</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>24</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>22</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>23</sup> Connections within 10m in line with hedge

<sup>24</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 887, 427
Hedge Reference:	9	Length (m):	188
Photo No:	1516		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	1.5	Average width of vegetation (m)	1.5
Side surveyed		W	

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>25</sup>			3 4 Av. 3.5
No. Standard tree / 50m			0

Connectivity <sup>26</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	0
		Connections to ponds	0

Additional Criteria		
Bank <sup>27</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>25</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>26</sup> Connections within 10m in line with hedge

<sup>27</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 886, 427
Hedge Reference:	10	Length (m):	210
Photo No:	1517		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	10	Average width of vegetation (m)	2.5
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input checked="" type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other (trees) <input checked="" type="checkbox"/>

Hedgerow Base Management: None

#### Adjacent land use / Management (can be more than one)

Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input checked="" type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input checked="" type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other

Woody species/ trees	<30m	>30m<100m	>100m <200m	>200m			
Number of woody Species <sup>28</sup>				4	7	7	Av. 6
No. Standard tree / 50m				6			

#### Connectivity<sup>29</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)

Connections to hedges	4	Connections to woodland	0	Connections to ponds	0
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#### Additional Criteria

Bank <sup>30</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

#### Veteran Tree Features

Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input checked="" type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>28</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>29</sup> Connections within 10m in line with hedge

<sup>30</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 886, 427
Hedge Reference:	11	Length (m):	222
Photo No:	1517		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	10	Average width of vegetation (m)	2.5
Side surveyed	S		

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other: Trees <input checked="" type="checkbox"/>

Hedgerow Base Management: None

**Adjacent land use / Management (can be more than one)**

Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input checked="" type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input checked="" type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>31</sup>					4	7	7
No. Standard tree / 50m					6		

**Connectivity<sup>32</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)**

Connections to hedges	4	Connections to woodland	0	Connections to ponds	0
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**Additional Criteria**

Bank <sup>33</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

**Veteran Tree Features**

Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input checked="" type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>31</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>32</sup> Connections within 10m in line with hedge

<sup>33</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 887, 428
Hedge Reference:	12	Length (m):	124
Photo No:	1518		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	2.5
Side surveyed		W	

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input checked="" type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input checked="" type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>34</sup>			
No. Standard tree / 50m			

Connectivity <sup>35</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds			0

Additional Criteria		
Bank <sup>36</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>34</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>35</sup> Connections within 10m in line with hedge

<sup>36</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 886, 427
Hedge Reference:	13	Length (m):	65
Photo No:	1519 & 1520		



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Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	3
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input checked="" type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input checked="" type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other: Trees <input checked="" type="checkbox"/>

Hedgerow Base Management: None

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input checked="" type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input checked="" type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>37</sup>		5	
No. Standard tree / 50m		5	

Connectivity <sup>38</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>39</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input checked="" type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input checked="" type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input checked="" type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>37</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>38</sup> Connections within 10m in line with hedge

<sup>39</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 883, 425
Hedge Reference:	14	Length (m):	312
Photo No:	1538		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	20	Average width of vegetation (m)	15
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input checked="" type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other: Trees <input checked="" type="checkbox"/>

Hedgerow Base Management: None

**Adjacent land use / Management (can be more than one)**

Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input checked="" type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input checked="" type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other

Woody species/ trees								
	<30m	>30m<100m	>100m <200m		>200m			
Number of woody Species <sup>40</sup>					4	5	3	Av. 4
No. Standard tree / 50m					5			

**Connectivity<sup>41</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)**

Connections to hedges	3	Connections to woodland	0	Connections to ponds	0
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**Additional Criteria**

Bank <sup>42</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 15 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

**Veteran Tree Features**

Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input checked="" type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>40</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>41</sup> Connections within 10m in line with hedge

<sup>42</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 886, 426
Hedge Reference:	15	Length (m):	120
Photo No:	1521		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary					
Average height of vegetation (m)	1.5	Average width of vegetation (m)	1.5	Side surveyed	E

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape				
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>	
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>	

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)			
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input checked="" type="checkbox"/>	
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>	
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>	
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>	
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>	

Woody species/ trees							
	<30m	>30m<100m	>100m <200m			>200m	
Number of woody Species <sup>43</sup>			4	7	Av. 5.5		
No. Standard tree / 50m			1				

Connectivity <sup>44</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)					
Connections to hedges	4	Connections to woodland	0	Connections to ponds	0

Additional Criteria			
Bank <sup>45</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>	
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %	
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>	

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>43</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>44</sup> Connections within 10m in line with hedge

<sup>45</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 887, 423
Hedge Reference:	16	Length (m):	297
Photo No:	1522		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	1.5	Average width of vegetation (m)	1.5
Side surveyed			E

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input checked="" type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>46</sup>			5
No. Standard tree / 50m			1

Connectivity <sup>47</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds			0

Additional Criteria		
Bank <sup>48</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>46</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>47</sup> Connections within 10m in line with hedge

<sup>48</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 889, 421
Hedge Reference:	17	Length (m):	276
Photo No:	1523		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	10	Average width of vegetation (m)	5
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input checked="" type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other: Trees <input checked="" type="checkbox"/>

Hedgerow Base Management: None

#### Adjacent land use / Management (can be more than one)

Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input checked="" type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>49</sup>			2
No. Standard tree / 50m			6

#### Connectivity<sup>50</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)

Connections to hedges	1	Connections to woodland	0	Connections to ponds	0
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#### Additional Criteria

Bank <sup>51</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input checked="" type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 10 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

#### Veteran Tree Features

Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input checked="" type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>49</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>50</sup> Connections within 10m in line with hedge

<sup>51</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 889, 417
Hedge Reference:	18	Length (m):	194
Photo No:	1524		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	15	Average width of vegetation (m)	1.5
Side surveyed		W	

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input checked="" type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other: Trees <input checked="" type="checkbox"/>

Hedgerow Base Management: Cut

#### Adjacent land use / Management (can be more than one)

Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input checked="" type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees	<30m	>30m<100m	>100m <200m	>200m
Number of woody Species <sup>52</sup>				2    4    2    Av. 3
No. Standard tree / 50m				3

#### Connectivity<sup>53</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)

Connections to hedges	1	Connections to woodland	2	Connections to ponds	0
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#### Additional Criteria

Bank <sup>54</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 10 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

#### Veteran Tree Features

Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>52</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>53</sup> Connections within 10m in line with hedge

<sup>54</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 891, 409
Hedge Reference:	19	Length (m):	1166
Photo No:	1525		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	2	Average width of vegetation (m)	1.5
Side surveyed			N

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>55</sup>			
No. Standard tree / 50m			

Connectivity <sup>56</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	1	Connections to woodland	0
Connections to ponds			0

Additional Criteria		
Bank <sup>57</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>55</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>56</sup> Connections within 10m in line with hedge

<sup>57</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 887, 429
Hedge Reference:	20	Length (m):	457
Photo No:	1526		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	2	Average width of vegetation (m)	1
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input checked="" type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input checked="" type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other: Industrial

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>58</sup>			5 4 3 Av. 4
No. Standard tree / 50m			0

Connectivity <sup>59</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	0	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>60</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 10 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>58</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>59</sup> Connections within 10m in line with hedge

<sup>60</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 886, 432
Hedge Reference:	21	Length (m):	115
Photo No:	1526		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	2	Average width of vegetation (m)	1
Side surveyed		W	

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input checked="" type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input checked="" type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other: Industrial

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>61</sup>			5 4 3 Av. 4
No. Standard tree / 50m			0

Connectivity <sup>62</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	0	Connections to woodland	0
Connections to ponds			0

Additional Criteria		
Bank <sup>63</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 10 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>61</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>62</sup> Connections within 10m in line with hedge

<sup>63</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 887, 430
Hedge Reference:	22	Length (m):	209
Photo No:	1526		



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Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	2	Average width of vegetation (m)	1
Side surveyed		W	

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input checked="" type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input checked="" type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other: Industrial

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>64</sup>			
No. Standard tree / 50m			
			5 4 3 Av. 4
			0

Connectivity <sup>65</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	0	Connections to woodland	0
		Connections to ponds	0

Additional Criteria		
Bank <sup>66</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 10 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>64</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>65</sup> Connections within 10m in line with hedge

<sup>66</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 876, 429
Hedge Reference:	23	Length (m):	594
Photo No:	1527		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	15	Average width of vegetation (m)	1
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other: Trees <input checked="" type="checkbox"/>

Hedgerow Base Management: None

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other: Playing field

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>67</sup>			
No. Standard tree / 50m			
			2   1   0   Av. 1
			6

Connectivity <sup>68</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	2
		Connections to ponds	0

Additional Criteria		
Bank <sup>69</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 15 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>67</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>68</sup> Connections within 10m in line with hedge

<sup>69</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 878, 428
Hedge Reference:	24	Length (m):	159
Photo No:	1529		



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Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	15	Average width of vegetation (m)	1
Side surveyed			E

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input checked="" type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other: Trees <input checked="" type="checkbox"/>

Hedgerow Base Management: Mown

#### Adjacent land use / Management (can be more than one)

Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other: Playing fields

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>70</sup>			2 1 0 Av. 1
No. Standard tree / 50m			6

#### Connectivity<sup>71</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)

Connections to hedges	0	Connections to woodland	0	Connections to ponds	0
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#### Additional Criteria

Bank <sup>72</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 15 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

#### Veteran Tree Features

Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>70</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>71</sup> Connections within 10m in line with hedge

<sup>72</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 877, 427
Hedge Reference:	25	Length (m):	223
Photo No:	1527		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	1
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input checked="" type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other: Trees <input checked="" type="checkbox"/>

Hedgerow Base Management: Mown

#### Adjacent land use / Management (can be more than one)

Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other: Playing Fields

Woody species/ trees	<30m	>30m<100m	>100m <200m	>200m
Number of woody Species <sup>73</sup>				0   0   0   Av. 0
No. Standard tree / 50m				6

#### Connectivity<sup>74</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)

Connections to hedges	0	Connections to woodland	0	Connections to ponds	0
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#### Additional Criteria

Bank <sup>75</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

#### Veteran Tree Features

Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>73</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>74</sup> Connections within 10m in line with hedge

<sup>75</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 881, 427
Hedge Reference:	26	Length (m):	834
Photo No:	1528		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input checked="" type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut/mown

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>76</sup>			
No. Standard tree / 50m			

Connectivity <sup>77</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	1	Connections to woodland	2
Connections to ponds	0		

Additional Criteria		
Bank <sup>78</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>76</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>77</sup> Connections within 10m in line with hedge

<sup>78</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 878, 430
Hedge Reference:	27	Length (m):	371
Photo No:	1530		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	2.5	Average width of vegetation (m)	1.5
Side surveyed	S		

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Mown

**Adjacent land use / Management (can be more than one)**

Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other: Amenity Grass

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>79</sup>			2   1   3   Av. 2
No. Standard tree / 50m			0

**Connectivity<sup>80</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)**

Connections to hedges	1	Connections to woodland	2	Connections to ponds	0
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**Additional Criteria**

Bank <sup>81</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

**Veteran Tree Features**

Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>79</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>80</sup> Connections within 10m in line with hedge

<sup>81</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 879, 432
Hedge Reference:	28	Length (m):	178
Photo No:	1531		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	15	Average width of vegetation (m)	1
Side surveyed			N

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input checked="" type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other: Trees <input checked="" type="checkbox"/>

Hedgerow Base Management: Mown

**Adjacent land use / Management (can be more than one)**

Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input checked="" type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other: Amenity Grassland

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>82</sup>			1 1 Av. 1
No. Standard tree / 50m			6

**Connectivity<sup>83</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)**

Connections to hedges	0	Connections to woodland	0	Connections to ponds	0
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**Additional Criteria**

Bank <sup>84</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 15 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

**Veteran Tree Features**

Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input checked="" type="checkbox"/>	Hollow trunks or hollow major limbs <input checked="" type="checkbox"/>	Major rot sites, any more than 15cm across <input checked="" type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>82</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>83</sup> Connections within 10m in line with hedge

<sup>84</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	20/07/11
Client:	WSP	OS Grid Reference:	SP 879, 432
Hedge Reference:	29	Length (m):	195
Photo No:	1531		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	15	Average width of vegetation (m)	1
Side surveyed		S	

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input checked="" type="checkbox"/>	Shrubby with line of trees <input checked="" type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other: Trees <input checked="" type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other: Amenity Grassland & Housing

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>85</sup>			1 1 Av.1
No. Standard tree / 50m			6

Connectivity <sup>86</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	0	Connections to woodland	0
Connections to ponds			0

Additional Criteria		
Bank <sup>87</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 15 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input checked="" type="checkbox"/>	Hollow trunks or hollow major limbs <input checked="" type="checkbox"/>	Major rot sites, any more than 15cm across <input checked="" type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>85</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>86</sup> Connections within 10m in line with hedge

<sup>87</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 875, 427
Hedge Reference:	30	Length (m):	609
Photo No:	1532		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	15	Average width of vegetation (m)	3
Side surveyed	S		

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input checked="" type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input checked="" type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: None

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input checked="" type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other Housing

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>88</sup>			7 9 10 Av. 9
No. Standard tree / 50m			6

Connectivity <sup>89</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	0	Connections to woodland	0
Connections to ponds		0	

Additional Criteria		
Bank <sup>90</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input checked="" type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>88</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>89</sup> Connections within 10m in line with hedge

<sup>90</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 875, 427
Hedge Reference:	31	Length (m):	688
Photo No:	1532		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	15	Average width of vegetation (m)	3
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input checked="" type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input checked="" type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: None

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input checked="" type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>91</sup>			9
No. Standard tree / 50m			6

Connectivity <sup>92</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>93</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input checked="" type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>91</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>92</sup> Connections within 10m in line with hedge

<sup>93</sup> Along at least half length of hedgerow







Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 872, 424
Hedge Reference:	33	Length (m):	103
Photo No:	1533		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input checked="" type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>1</sup>				Av.	3	1	2
No. Standard tree / 50m					0		

Connectivity <sup>2</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>3</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>1</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>2</sup> Connections within 10m in line with hedge

<sup>3</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 876, 426
Hedge Reference:	34	Length (m):	458
Photo No:	1534		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	15	Average width of vegetation (m)	5
Side surveyed			N

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input checked="" type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other: Trees <input checked="" type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>4</sup>				Av.	5	5	6
No. Standard tree / 50m					5		

Connectivity <sup>5</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	0
Connections to ponds			0

Additional Criteria		
Bank <sup>6</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>4</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>5</sup> Connections within 10m in line with hedge

<sup>6</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 876, 427
Hedge Reference:	35	Length (m):	329
Photo No:	1535		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	3
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input checked="" type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>7</sup>				Av.	1	2	3
No. Standard tree / 50m					0		

Connectivity <sup>8</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>9</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>7</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>8</sup> Connections within 10m in line with hedge

<sup>9</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 874, 424
Hedge Reference:	36	Length (m):	1247
Photo No:	1542		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	1.5
Side surveyed		N&E	

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other: Quarry

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>10</sup>				Av.	4	2	7
No. Standard tree / 50m					1		

Connectivity <sup>11</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	0	Connections to woodland	0
Connections to ponds			0

Additional Criteria		
Bank <sup>12</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>10</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>11</sup> Connections within 10m in line with hedge

<sup>12</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 877, 426
Hedge Reference:	37	Length (m):	772
Photo No:	1541		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	1.5	Average width of vegetation (m)	1.5
Side surveyed	S		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>13</sup>				Av.	3	1	3
No. Standard tree / 50m					0		

Connectivity <sup>14</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>15</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>13</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>14</sup> Connections within 10m in line with hedge

<sup>15</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 884, 427
Hedge Reference:	38	Length (m):	394
Photo No:	1541		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	1.5	Average width of vegetation (m)	1.5
Side surveyed	S		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>16</sup>				Av.	3	1	3
No. Standard tree / 50m					0		

Connectivity <sup>17</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>18</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>16</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>17</sup> Connections within 10m in line with hedge

<sup>18</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 884, 427
Hedge Reference:	39	Length (m):	438
Photo No:	1537 & 1539		



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Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	7.5	Average width of vegetation (m)	3
Side surveyed	S		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input checked="" type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: None

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input checked="" type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>19</sup>			Av. 6 5 3 Av. 5
No. Standard tree / 50m			3

Connectivity <sup>20</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>21</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>19</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>20</sup> Connections within 10m in line with hedge

<sup>21</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 883, 426
Hedge Reference:	40	Length (m):	203
Photo No:	1537 & 1539		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	7.5	Average width of vegetation (m)	3
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input checked="" type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: None

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input checked="" type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other: Amenity Grassland

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>22</sup>				Av.	6	5	3
No. Standard tree / 50m					3		

Connectivity <sup>23</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>24</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>22</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>23</sup> Connections within 10m in line with hedge

<sup>24</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 882, 426
Hedge Reference:	41	Length (m):	172
Photo No:	1540		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	3
Side surveyed		W	

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input checked="" type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)			
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>	
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>	
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>	
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>	
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other: Amenity Grassland	

Woody species/ trees							
	<30m	>30m<100m	>100m <200m	>200m			
Number of woody Species <sup>25</sup>			Av.	3	4	3	Av. 3
No. Standard tree / 50m				3			

Connectivity <sup>26</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	1	Connections to woodland	0
Connections to ponds			0

Additional Criteria		
Bank <sup>27</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>25</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>26</sup> Connections within 10m in line with hedge

<sup>27</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 879, 424
Hedge Reference:	42	Length (m):	108
Photo No:	1536		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	5
Side surveyed			W

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input checked="" type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input checked="" type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input checked="" type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>28</sup>			3 3 Av. 3
No. Standard tree / 50m			3

Connectivity <sup>29</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	0	Connections to woodland	2
		Connections to ponds	2

Additional Criteria		
Bank <sup>30</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 15 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input checked="" type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>28</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>29</sup> Connections within 10m in line with hedge

<sup>30</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 877, 421
Hedge Reference:	43	Length (m):	337
Photo No:	1543		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	1.5
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>31</sup>			Av. 1 7 7 Av. 5
No. Standard tree / 50m			1

Connectivity <sup>32</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>33</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input checked="" type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>31</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>32</sup> Connections within 10m in line with hedge

<sup>33</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 882, 420
Hedge Reference:	44	Length (m):	944
Photo No:	1544		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	4	Average width of vegetation (m)	1
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: None

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>34</sup>				Av.	2	4	5
No. Standard tree / 50m					1		

Connectivity <sup>35</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>36</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>34</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>35</sup> Connections within 10m in line with hedge

<sup>36</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 885, 418
Hedge Reference:	45	Length (m):	284
Photo No:	1546		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	1.5
Side surveyed		W	

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m	>200m			
Number of woody Species <sup>37</sup>			Av.	3	7	4	Av. 4.5
No. Standard tree / 50m				0			

Connectivity <sup>38</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds			0

Additional Criteria		
Bank <sup>39</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>37</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>38</sup> Connections within 10m in line with hedge

<sup>39</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 884, 417
Hedge Reference:	46	Length (m):	91
Photo No:	1546		



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Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	1.5
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees								
	<30m	>30m<100m	>100m <200m		>200m			
Number of woody Species <sup>40</sup>				Av.	3	7	4	Av. 4.5
No. Standard tree / 50m					0			

Connectivity <sup>41</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>42</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>40</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>41</sup> Connections within 10m in line with hedge

<sup>42</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 884, 416
Hedge Reference:	47	Length (m):	129
Photo No:	1547		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed		W	

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>43</sup>				Av.	3	4	4
No. Standard tree / 50m					1		

Connectivity <sup>44</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	0
Connections to ponds			0

Additional Criteria		
Bank <sup>45</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>43</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>44</sup> Connections within 10m in line with hedge

<sup>45</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 883, 414
Hedge Reference:	48	Length (m):	303
Photo No:	1547		



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Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>46</sup>				Av.	3	4	4
No. Standard tree / 50m					1		

Connectivity <sup>47</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>48</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>46</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>47</sup> Connections within 10m in line with hedge

<sup>48</sup> Along at least half length of hedgerow







Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 882, 417
Hedge Reference:	50	Length (m):	223
Photo No:	1597		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>52</sup>			Av. 3 4 4 Av. 4
No. Standard tree / 50m			1

Connectivity <sup>53</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>54</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5%
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>52</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>53</sup> Connections within 10m in line with hedge

<sup>54</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 882, 415
Hedge Reference:	51	Length (m):	77
Photo No:	1597		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	S		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)			
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>	
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>	
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>	
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>	
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>	

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>55</sup>				Av.	3	4	4
No. Standard tree / 50m					1		

Connectivity <sup>56</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>57</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>55</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>56</sup> Connections within 10m in line with hedge

<sup>57</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 881, 415
Hedge Reference:	52	Length (m):	371
Photo No:	1548		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>58</sup>				Av.	3	2	3
No. Standard tree / 50m					1		

Connectivity <sup>59</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>60</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>58</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>59</sup> Connections within 10m in line with hedge

<sup>60</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 878, 418
Hedge Reference:	53	Length (m):	619
Photo No:	1548		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input checked="" type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>61</sup>				Av.	3	2	3
No. Standard tree / 50m					1		

Connectivity <sup>62</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>63</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>61</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>62</sup> Connections within 10m in line with hedge

<sup>63</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 890, 423
Hedge Reference:	54	Length (m):	432
Photo No:	1549		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	3
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input checked="" type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: None

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input checked="" type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input checked="" type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input checked="" type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>64</sup>				Av.	5	3	5
No. Standard tree / 50m					3		

Connectivity <sup>65</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	2
Connections to ponds	2		

Additional Criteria		
Bank <sup>66</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input checked="" type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>64</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>65</sup> Connections within 10m in line with hedge

<sup>66</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 891, 421
Hedge Reference:	55	Length (m):	211
Photo No:	1550		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	1.5
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input checked="" type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>67</sup>				Av.	5	4	6
No. Standard tree / 50m					1		

Connectivity <sup>68</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>69</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input checked="" type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input checked="" type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>67</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>68</sup> Connections within 10m in line with hedge

<sup>69</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 893, 422
Hedge Reference:	56	Length (m):	201
Photo No:	1550		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	1.5
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input checked="" type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>70</sup>				Av.	5	4	6
No. Standard tree / 50m					1		

Connectivity <sup>71</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>72</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input checked="" type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input checked="" type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>70</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>71</sup> Connections within 10m in line with hedge

<sup>72</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 895, 422
Hedge Reference:	57	Length (m):	258
Photo No:	1550		



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Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	1.5
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input checked="" type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>73</sup>				Av.	5	4	6
No. Standard tree / 50m					1		

Connectivity <sup>74</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>75</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input checked="" type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input checked="" type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>73</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>74</sup> Connections within 10m in line with hedge

<sup>75</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 893, 425
Hedge Reference:	58	Length (m):	232
Photo No:	1551		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	2	Average width of vegetation (m)	1
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>76</sup>				Av.	3	6	3
No. Standard tree / 50m					0		

Connectivity <sup>77</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	1	Connections to woodland	2
Connections to ponds	0		

Additional Criteria		
Bank <sup>78</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>76</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>77</sup> Connections within 10m in line with hedge

<sup>78</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 895, 427
Hedge Reference:	59	Length (m):	341
Photo No:	1552		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	2	Average width of vegetation (m)	1
Side surveyed		S	

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m	>200m			
Number of woody Species <sup>79</sup>			Av.	3	6	3	Av. 4
No. Standard tree / 50m				0			

Connectivity <sup>80</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	0	Connections to woodland	4
Connections to ponds	0		

Additional Criteria		
Bank <sup>81</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>79</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>80</sup> Connections within 10m in line with hedge

<sup>81</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 897, 428
Hedge Reference:	60	Length (m):	164
Photo No:	1553		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	1.5	Average width of vegetation (m)	1.5
Side surveyed	S		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>82</sup>				Av.	4	3	3
No. Standard tree / 50m					1		

Connectivity <sup>83</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	2
Connections to ponds	2		

Additional Criteria		
Bank <sup>84</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input checked="" type="checkbox"/>	Major rot sites, any more than 15cm across <input checked="" type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>82</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>83</sup> Connections within 10m in line with hedge

<sup>84</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 895, 428
Hedge Reference:	61	Length (m):	315
Photo No:	1553		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	1.5	Average width of vegetation (m)	1.5
Side surveyed	S		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees								
	<30m	>30m<100m	>100m <200m		>200m			
Number of woody Species <sup>85</sup>				Av.	4	3	3	Av. 3
No. Standard tree / 50m					1			

Connectivity <sup>86</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	1	Connections to woodland	2
Connections to ponds	2		

Additional Criteria		
Bank <sup>87</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input checked="" type="checkbox"/>	Major rot sites, any more than 15cm across <input checked="" type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>85</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>86</sup> Connections within 10m in line with hedge

<sup>87</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 892, 429
Hedge Reference:	62	Length (m):	313
Photo No:	1554		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed		W	

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees								
	<30m	>30m<100m	>100m <200m		>200m			
Number of woody Species <sup>88</sup>				Av.	6	5	4	Av. 5
No. Standard tree / 50m					1			

Connectivity <sup>89</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	2
Connections to ponds			0

Additional Criteria		
Bank <sup>90</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input checked="" type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>88</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>89</sup> Connections within 10m in line with hedge

<sup>90</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 892, 427
Hedge Reference:	63	Length (m):	536
Photo No:	1555		



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Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>91</sup>			Av. 4 4 7 Av. 5
No. Standard tree / 50m			1

Connectivity <sup>92</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	2
Connections to ponds	0		

Additional Criteria		
Bank <sup>93</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input checked="" type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input checked="" type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**  
Grass Snake

<sup>91</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>92</sup> Connections within 10m in line with hedge

<sup>93</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 888, 428
Hedge Reference:	64	Length (m):	243
Photo No:	1556		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input checked="" type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees								
	<30m	>30m<100m	>100m <200m		>200m			
Number of woody Species <sup>94</sup>				Av.	0	0	0	Av. 0
No. Standard tree / 50m					6			

Connectivity <sup>95</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>96</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>94</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>95</sup> Connections within 10m in line with hedge

<sup>96</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 892, 432
Hedge Reference:	65	Length (m):	429
Photo No:	1556		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	S		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>1</sup>				Av.	4	4	4
No. Standard tree / 50m					1		

Connectivity <sup>2</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>3</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>1</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>2</sup> Connections within 10m in line with hedge

<sup>3</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 889, 429
Hedge Reference:	66	Length (m):	453
Photo No:	1556		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	S		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>4</sup>				Av.	4	4	4
No. Standard tree / 50m					1		

Connectivity <sup>5</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>6</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>4</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>5</sup> Connections within 10m in line with hedge

<sup>6</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 888, 426
Hedge Reference:	67	Length (m):	79
Photo No:	1556		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>7</sup>				Av.	4	4	4
No. Standard tree / 50m					1		

Connectivity <sup>8</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>9</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>7</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>8</sup> Connections within 10m in line with hedge

<sup>9</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 889, 424
Hedge Reference:	68	Length (m):	320
Photo No:	1556		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>10</sup>				Av.	4	4	4
No. Standard tree / 50m					1		

Connectivity <sup>11</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>12</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>10</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>11</sup> Connections within 10m in line with hedge

<sup>12</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 890, 422
Hedge Reference:	69	Length (m):	281
Photo No:	1556		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>13</sup>				Av.	4	4	4
No. Standard tree / 50m					1		

Connectivity <sup>14</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>15</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>13</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>14</sup> Connections within 10m in line with hedge

<sup>15</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 891, 419
Hedge Reference:	70	Length (m):	408
Photo No:	1556		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>16</sup>				Av.	4	4	4
No. Standard tree / 50m					1		

Connectivity <sup>17</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	0	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>18</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>16</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>17</sup> Connections within 10m in line with hedge

<sup>18</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 891, 414
Hedge Reference:	71	Length (m):	210
Photo No:	1556		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

**Adjacent land use / Management (can be more than one)**

Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees								
	<30m	>30m<100m	>100m <200m		>200m			
Number of woody Species <sup>19</sup>				Av.	4	4	4	Av. 4
No. Standard tree / 50m					1			

**Connectivity<sup>20</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)**

Connections to hedges	2	Connections to woodland	0	Connections to ponds	0
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**Additional Criteria**

Bank <sup>21</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

**Veteran Tree Features**

Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>19</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>20</sup> Connections within 10m in line with hedge

<sup>21</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 892, 410
Hedge Reference:	72	Length (m):	694
Photo No:	1556		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>22</sup>				Av.	4	4	4
No. Standard tree / 50m					1		

Connectivity <sup>23</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>24</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>22</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>23</sup> Connections within 10m in line with hedge

<sup>24</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	21/07/11
Client:	WSP	OS Grid Reference:	SP 892, 409
Hedge Reference:	73	Length (m):	298
Photo No:	1556		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input checked="" type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>25</sup>				Av.	4	4	4
No. Standard tree / 50m					1		

Connectivity <sup>26</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	1	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>27</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>25</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>26</sup> Connections within 10m in line with hedge

<sup>27</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	22/07/11
Client:	WSP	OS Grid Reference:	SP 895, 413
Hedge Reference:	74	Length (m):	393
Photo No:	1560		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed		W	

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>28</sup>				Av.	5	5	5
No. Standard tree / 50m					1		

Connectivity <sup>29</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	0
Connections to ponds			0

Additional Criteria		
Bank <sup>30</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>28</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>29</sup> Connections within 10m in line with hedge

<sup>30</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	22/07/11
Client:	WSP	OS Grid Reference:	SP 892, 413
Hedge Reference:	75	Length (m):	173
Photo No:	1560		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>31</sup>				Av.	5	5	5
No. Standard tree / 50m					1		

Connectivity <sup>32</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>33</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>31</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>32</sup> Connections within 10m in line with hedge

<sup>33</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	22/07/11
Client:	WSP	OS Grid Reference:	SP 892, 416
Hedge Reference:	76	Length (m):	141
Photo No:	1558		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed			N

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>34</sup>				Av.	3	5	4
No. Standard tree / 50m					0		

Connectivity <sup>35</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	0
Connections to ponds			0

Additional Criteria		
Bank <sup>36</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>34</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>35</sup> Connections within 10m in line with hedge

<sup>36</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	22/07/11
Client:	WSP	OS Grid Reference:	SP 893, 414
Hedge Reference:	77	Length (m):	207
Photo No:	1558 & 1559		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed		W	

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees								
	<30m	>30m<100m	>100m <200m		>200m			
Number of woody Species <sup>37</sup>				Av.	4	4	3	Av. 4
No. Standard tree / 50m					1			

Connectivity <sup>38</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	5	Connections to woodland	0
Connections to ponds			0

Additional Criteria		
Bank <sup>39</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input checked="" type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input checked="" type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input checked="" type="checkbox"/>	Hollow trunks or hollow major limbs <input checked="" type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>37</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>38</sup> Connections within 10m in line with hedge

<sup>39</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	22/07/11
Client:	WSP	OS Grid Reference:	SP 895, 416
Hedge Reference:	78	Length (m):	341
Photo No:	1561		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	SW		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

#### Adjacent land use / Management (can be more than one)

Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input checked="" type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees								
	<30m	>30m<100m	>100m <200m		>200m			
Number of woody Species <sup>40</sup>				Av.	3	5	4	Av. 4
No. Standard tree / 50m					0			

#### Connectivity<sup>41</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)

Connections to hedges	4	Connections to woodland	0	Connections to ponds	0
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#### Additional Criteria

Bank <sup>42</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

#### Veteran Tree Features

Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>40</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>41</sup> Connections within 10m in line with hedge

<sup>42</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	22/07/11
Client:	WSP	OS Grid Reference:	SP 896, 417
Hedge Reference:	79	Length (m):	195
Photo No:	1561		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	W		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees								
	<30m	>30m<100m	>100m <200m		>200m			
Number of woody Species <sup>43</sup>				Av.	3	5	4	Av. 4
No. Standard tree / 50m					0			

Connectivity <sup>44</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>45</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>43</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>44</sup> Connections within 10m in line with hedge

<sup>45</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	22/07/11
Client:	WSP	OS Grid Reference:	SP 897, 418
Hedge Reference:	80	Length (m):	85
Photo No:	1561		



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Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>46</sup>				Av.	3	5	4
No. Standard tree / 50m					0		

Connectivity <sup>47</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	3	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>48</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>46</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>47</sup> Connections within 10m in line with hedge

<sup>48</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	22/07/11
Client:	WSP	OS Grid Reference:	SP 895, 420
Hedge Reference:	81	Length (m):	447
Photo No:	1563		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	W		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input checked="" type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees								
	<30m	>30m<100m	>100m <200m		>200m			
Number of woody Species <sup>49</sup>				Av.	5	6	4	Av. 5
No. Standard tree / 50m					1			

Connectivity <sup>50</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>51</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>49</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>50</sup> Connections within 10m in line with hedge

<sup>51</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	22/07/11
Client:	WSP	OS Grid Reference:	SP 895, 418
Hedge Reference:	82	Length (m):	324
Photo No:	1561		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	N		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>52</sup>				Av.	3	5	4
No. Standard tree / 50m					0		

Connectivity <sup>53</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	4	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>54</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>52</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>53</sup> Connections within 10m in line with hedge

<sup>54</sup> Along at least half length of hedgerow



### Hedgerow Survey Record

Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	22/07/11
Client:	WSP	OS Grid Reference:	SP 892, 420
Hedge Reference:	83	Length (m):	410
Photo No:	1564		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)			
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>	

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	E		

Hedgerow Type			
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>	

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)			
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>	
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>	
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>	
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>	
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>	

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>55</sup>			Av.	5	5	3	Av. 4
No. Standard tree / 50m				0			

Connectivity <sup>56</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	2	Connections to woodland	0
Connections to ponds	0		

Additional Criteria			
Bank <sup>57</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>	
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %	
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>	

Veteran Tree Features			
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>	
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>	

**Comments (Inc. Limitations & Protected species):**

<sup>55</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>56</sup> Connections within 10m in line with hedge

<sup>57</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	22/07/11
Client:	WSP	OS Grid Reference:	SP 893, 416
Hedge Reference:	84	Length (m):	170
Photo No:	1361		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	3	Average width of vegetation (m)	1.5
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input checked="" type="checkbox"/>	Line of trees <input type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input checked="" type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other <input type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input checked="" type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other <input type="checkbox"/>

Woody species/ trees							
	<30m	>30m<100m	>100m <200m		>200m		
Number of woody Species <sup>58</sup>				Av.	3	5	4
No. Standard tree / 50m					0		

Connectivity <sup>59</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	5	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>60</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input checked="" type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>58</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>59</sup> Connections within 10m in line with hedge

<sup>60</sup> Along at least half length of hedgerow



Hedgerow Survey Record			
Project Code:	111275	Surveyor Name:	DA
Site Name:	Newport Pagnell	Date:	22/07/11
Client:	WSP	OS Grid Reference:	SP 891, 416
Hedge Reference:	85	Length (m):	111
Photo No:	1562		



Hedgerow Criteria (If hedge fulfils either criteria above and is not curtilage, proceed)		
Hedge >20m or <20 m but junctions at both ends <input checked="" type="checkbox"/>	Not curtilage of residential <input checked="" type="checkbox"/>	Hedge has been in existence for 30 years or more <input checked="" type="checkbox"/>

Hedgerow Summary			
Average height of vegetation (m)	5	Average width of vegetation (m)	1
Side surveyed	E		

Hedgerow Type		
Shrubby hedgerow <input type="checkbox"/>	Line of trees <input checked="" type="checkbox"/>	Shrubby with line of trees <input type="checkbox"/>

Hedgerow Shape			
Trimmed & dense <input type="checkbox"/>	Intensively managed <input type="checkbox"/>	Untrimmed <input type="checkbox"/>	Tall & leggy <input type="checkbox"/>
Untrimmed, with outgrowth <input type="checkbox"/>	Recently laid <input type="checkbox"/>	Recently coppiced <input type="checkbox"/>	Other: Trees <input checked="" type="checkbox"/>

Hedgerow Base Management: Cut

Adjacent land use / Management (can be more than one)		
Arable - crop <input type="checkbox"/>	Arable – Un-cropped margin <input type="checkbox"/>	Improved Grass <input type="checkbox"/>
Semi-improved Grass <input type="checkbox"/>	Unimproved Grass <input type="checkbox"/>	Woodland - Young <input type="checkbox"/>
Woodland - Semi-mature <input type="checkbox"/>	Woodland - Mature <input type="checkbox"/>	Road (Major / Minor) <input type="checkbox"/> / <input type="checkbox"/>
Track / Footpath / Bridleway <input type="checkbox"/> / <input type="checkbox"/> / <input type="checkbox"/>	Rail <input type="checkbox"/>	Canal <input type="checkbox"/>
River / Stream <input type="checkbox"/> / <input type="checkbox"/>	Lake / Pond <input type="checkbox"/> / <input type="checkbox"/>	Other: Amenity Grassland

Woody species/ trees			
	<30m	>30m<100m	>100m <200m
Number of woody Species <sup>61</sup>			Av. 0
No. Standard tree / 50m			6

Connectivity <sup>62</sup> (hedge connection = 1 pt, wood or pond connection = 2pts)			
Connections to hedges	0	Connections to woodland	0
Connections to ponds	0		

Additional Criteria		
Bank <sup>63</sup> (inc height) <input type="checkbox"/>	Parallel hedge (within 15m) <input type="checkbox"/>	Protected species (add details to comments) <input type="checkbox"/>
Ditch <sup>3</sup> (wet) <input type="checkbox"/>	Black poplar, lime or service tree <input type="checkbox"/>	Gaps as % of length 5 %
Ditch <sup>3</sup> (Dry) <input type="checkbox"/>	Veteran trees <input type="checkbox"/>	At least 3 Woodland species (within 1m of hedge) <input type="checkbox"/>

Veteran Tree Features		
Dead wood attached to the tree, any piece more than 1m long and 8cm in diameter <input type="checkbox"/>	Loose split, missing and dead bark, any piece more than 30cm long <input type="checkbox"/>	Bark sap runs <input type="checkbox"/>
Tears, splits, scars, lightning strikes more than 30 cm long <input type="checkbox"/>	Hollow trunks or hollow major limbs <input type="checkbox"/>	Major rot sites, any more than 15cm across <input type="checkbox"/>

**Comments (Inc. Limitations & Protected species):**

<sup>61</sup> If hedge < 30m - count woody spp along entire length. If >30m <100m count woody spp in central 30m section. If >100m <200m divide hedge in two and count woody species in central 30m section of each half. If hedge > 200m divide hedge into 3 and count woody species in central 30m section of each third.

<sup>62</sup> Connections within 10m in line with hedge

<sup>63</sup> Along at least half length of hedgerow



# **Appendix 12 Botanical Survey Technical Note**

Site: Milton Keynes East  
Client: St James  
Project ref: 2090.52  
Date: February 2020

#### **ASSESSMENT OF GRASSLAND HABITAT WEST OF THE RIVER OUZEL AT MILTON KEYNES EAST**

The table below provides the results of a Phase 2 botanical assessment of grassland habitat associated with two grassland fields located to the west of the River Ouzel within 362ha of land proposed for development at Milton Keynes East, previously identified as relatively species-rich semi-improved neutral grassland during Phase 1 Habitat Survey work for the Ecological Appraisal (HDA, 2020). The remainder of the grassland within the wider site comprises either heavily grazed species-poor semi-improved grassland, heavily grazed improved grassland or amenity grassland and has therefore been excluded from the detailed assessment. This technical note has been prepared to present the findings of the Phase 2 botanical survey and provide an assessment of its likely nature conservation value.

The survey took the form of a walkover of the grassland fields following the approach given in Natural England's Technical Information Note TIN110 for assessment of whether grassland is a Biodiversity Action Plan (BAP) Priority Habitat (or Habitat of Principal Importance under the 2006 NERC Act). The species present were recorded together with their abundance and general distribution within each field/area. A full list of plant species recorded at the site is included in *Appendix B*. Regular stop samples were made to ensure that smaller species were not being overlooked and to record cover of rye-grasses and White Clover, cover of wildflowers and sedges (excluding White Clover, Creeping Buttercup and injurious weeds); and total number of species within 1m<sup>2</sup> samples, these results are provided in the table below. Locations at which 1m<sup>2</sup> samples were taken are shown on the Botanical Survey Quadrat Locations plan accompanying this technical note, provided in *Appendix A*. Additional observations in relation to aspect, soil type and drainage were also made. Consideration was also given to grassland assemblage in line with the National Vegetation Classification (NVC) (Rodwell, 1992). The field survey was led by Hayley Snowdon GradCIEEM, Adrian Meurer MCIEEM and Shannon Davies of Hankinson Duckett Associates on the 29th May 2019 and 20th August 2019. Weather conditions were overcast with occasional showers during the first survey and were generally warm, dry and sunny on the second survey. No significant limitations were encountered during the survey; all relevant areas were accessible and the survey was carried out at optimal times of year to allow assessment of the plant assemblages of the grassland habitats subject to survey.

The information relating to the grassland gathered through the field survey was assessed in two ways. Firstly the conservation status of individual species was assessed by reference to the following criteria:

- Species specially protected under Annex I and IV of the EC Habitats Directive (as transposed into UK law by the 2019 Conservation of Habitats and Species (Amendment) (EU Exit) Regulations);
- Species specially protected under Schedule 8 of the 1981 Wildlife and Countryside Act (as amended);
- Species included on 'A Vascular Plant Red List for England' (BSBI, 2014); and
- Species listed under Section 41 of the 2006 NERC Act and included on the UK Biodiversity Action Plan.

Secondly, the species assemblage of the grassland was compared to Natural England guidance on the assessment of whether the grassland qualifies as BAP Priority Habitat as provided in Technical Information Note 110 (TIN110) (Natural England, 2012). Appendix 2 of the guidance provides a sequential approach to the assessment of the quality of grassland habitat based on the balance of plant species/ groups and the presence/ absence of species indicative of habitat quality. Consideration was also given to grassland assemblage in line with the NVC (Rodwell, 1992).

Details of the survey and assessment of each area are given below. Quadrat locations are shown on the 'Botanical Survey Quadrat Locations' plan accompanying this technical note. In summary, no protected or notable plant species were recorded during the survey. Using the criteria set out in TIN110 the grassland within the site has been identified as being dominated by 'Species-poor Semi-natural' grassland with low species richness with localised areas of Species-poor Semi-improved grassland, Semi-natural Grassland of Moderate Species-richness and Species-poor Improved grassland. The area of grassland surveyed therefore does not meet criteria for consideration as Biodiversity Action Plan (BAP) quality grassland or for consideration as a 'Habitat of Principal Importance' under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act. Notwithstanding this, the grassland is relatively species rich in comparison to that occurring elsewhere in the site and in some areas has characteristics of MG4 *Alopecurus pratensis* - *Sanguisorba officinalis* grassland community, which is a regionally characteristic grassland type of floodplain grassland managed by cutting with aftermath grazing.

In conclusion, the grassland is not a high quality representative of the MG4 *Alopecurus pratensis* - *Sanguisorba officinalis* grassland community, nor qualifies for consideration as a BAP Priority Habitat or a 2006 NERC Act Habitat of Principal Importance. Notwithstanding this, the grassland is relatively species rich in comparison to that occurring elsewhere in the site and also appears to have potential to be restored to a higher quality. The grassland is subsequently considered as a whole to be of moderate local value in its own right.

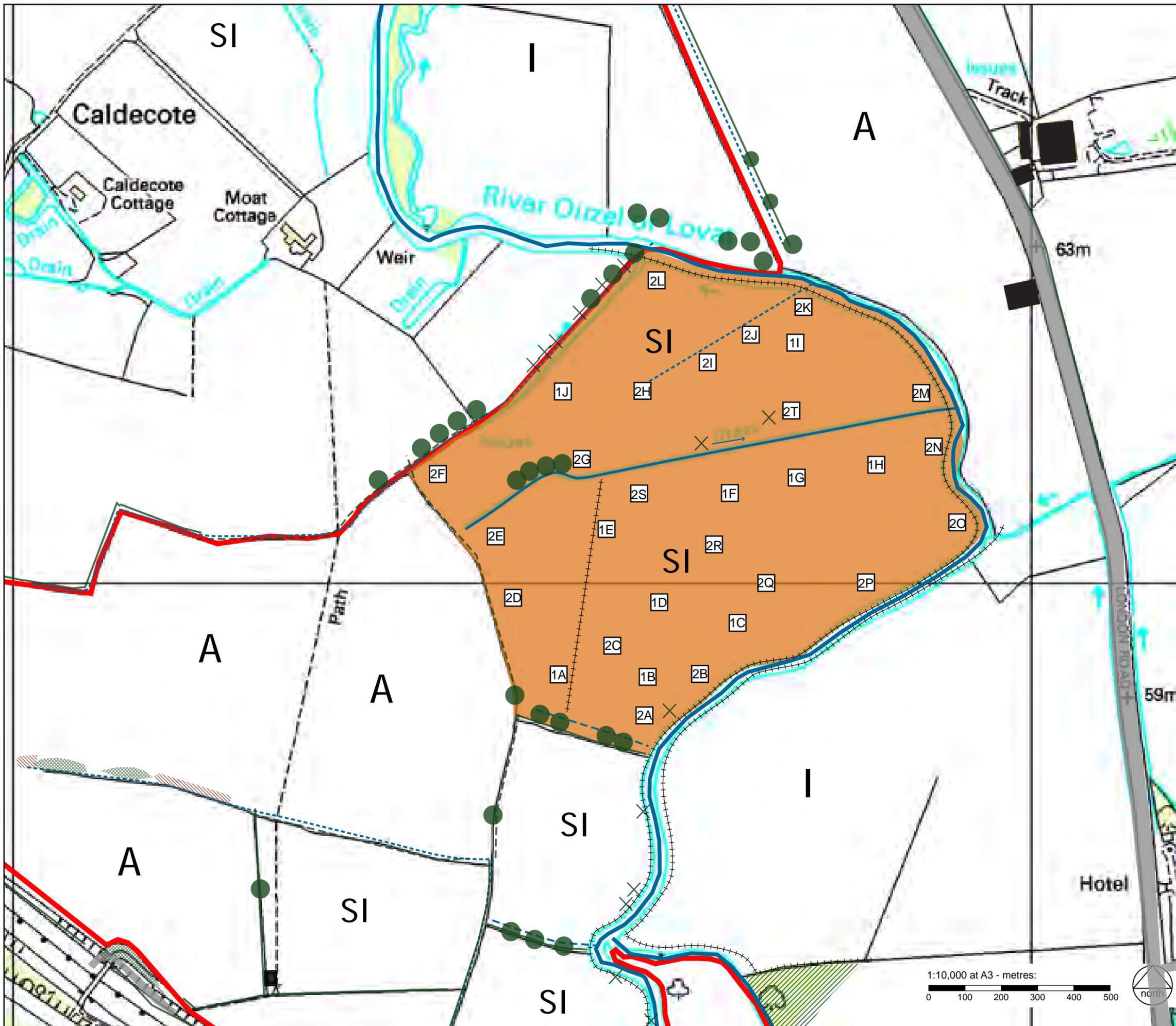


<b>ASSESSMENT</b>	<p><b>BAP/ NERC Act Status:</b> The area of grassland surveyed is classified as 'Species Poor Semi-Natural grassland' under Key 2b of TIN110 and therefore does not qualify for consideration as Biodiversity Action Plan (BAP) quality grassland or for consideration as a 'Habitat of Principal Importance' under Section 41 of the 2006 Natural Environment and Rural Communities (NERC) Act.</p>
	<p><b>Presence of Notable Species:</b> All species recorded are identified as being of 'Least Concern' in the BSBI's 2014 'A Vascular Plant Red List for England'. No BAP or Species of Principal Importance were recorded. No protected plant species were recorded.</p>
	<p><b>Notes on flora:</b> The botanical interest of the grassland is relatively limited and the grassland is generally heavily dominated by common grasses (notably Red Fescue and Yorkshire Fog). Bryophytes are scarce and lichens are absent. The majority of quadrats met 'SPSN' (Species-poor Semi-natural) level with low species richness. Quadrats supporting SNMR (Semi-natural Grassland of Moderate Species Richness), SPSI (Species-poor Semi-improved grassland) and I (Species-poor improved grassland) were also recorded across the survey area. Species diversity ranged from poor &lt;9 spp/m<sup>2</sup> to moderately species-rich 9-15 spp/m<sup>2</sup> for these habitat types. No areas sampled met 'Species Rich' criteria. Seven indicators of semi-improved grassland were identified within the sward during the quadrat surveys, with 5 of these species recorded as 'occasional'. Two indicator species of lowland meadow were present, although both species were recorded as 'rare' within the sward. Notwithstanding this, the grassland is relatively species rich in comparison to that occurring elsewhere in the site and in some areas has characteristics of MG4 <i>Alopercus pratensis</i> - <i>Sanguisorba officinalis</i> grassland community, which is a regionally characteristic grassland type typical of floodplain grassland managed by cutting with aftermath grazing. Species-richness is generally greatest on higher ground along the western margin of the fields where evidence of ridge and furrow is present.</p>
	<p><b>Concluding remarks:</b> The grassland is not a high quality representative of the MG4 <i>Alopercus pratensis</i> - <i>Sanguisorba officinalis</i> grassland community, nor qualifies for consideration as a BAP Priority Habitat or a 2006 NERC Act Habitat of Principal Importance. No red list or protected plant species were recorded. Indicators of higher quality grassland are limited in number and abundance. Using Natural England guidance the majority of the quadrats recorded within the grassland key out as 'Species Poor Semi-Natural Grassland' with low species richness. Notwithstanding this, the grassland is relatively species rich in comparison to that occurring elsewhere in the site and also appears to have potential to be restored to a higher quality. The grassland is subsequently considered as a whole to be of moderate local value in its own right.</p>

\* Indicators reflect those used for identification of BAP priority grasslands (Natural England Technical Information Note TIN110, June 2012)

\*\* Status determined in accordance with Key 2a Natural England Technical Information Note TIN110, June 2012. SNMR = Semi-natural Grassland of Moderate Species Richness, SPSN = Species-poor Semi-natural Grassland, SPSI = Species-poor Semi-improved grassland and I = Species-poor improved grassland

**DAFOR = D:** Species is the most common plant by far, in well over 3/4 of the square. **A:** Species very common in many parts of the square. For most species, thousands of individual plants present. **F:** Species in several places in the square and usually more than just a few individuals in each of these places. Also use F if the plant was only present in one part of the square but was very common in that part, with many individuals and covered a substantial area (e.g. between 1/8 and 1/4 of the area of the whole square). **O:** Species occurs in several places within the square that occupied just a small area (e.g. less than 1/8 of the area of the whole square). **R:** Species occurs as a small number of individuals in the square.



**KEY**

- Site boundary
- A Quadrat location

**Phase 1 habitat survey results (HDA, 2020)\***

- Semi-natural broadleaved woodland
- Broadleaved planted woodland
- Mixed planted woodland
- Scattered trees
- Intact hedgerow
- Defunct hedgerow
- Dense scrub
- x x Scattered scrub
- Tall ruderals
- SI Species-rich, semi-improved neutral grassland
- SI Species-poor semi-improved grassland
- I Improved grassland
- A Amenity grassland
- A Arable land
- Watercourse and direction of flow
- Dry / seasonally wet ditch
- Standing water
- Fence
- Hardstanding
- Buildings

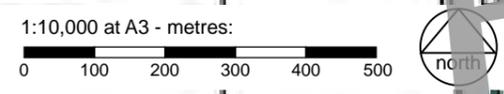
\* This plan focuses on the area of the site subject to the botanical survey. Further habitats are present within the wider site.

CLIENT:  
St James  
PROJECT:  
Milton Keynes East  
TITLE:  
Botanical Survey Quadrat Locations  
SCALE AT A3:                      DATE:  
Not to scale                      February 2020

2090.52/23

Based on Ordnance Survey mapping with permission of Her Majesty's Stationery Office Licence no. AR187372

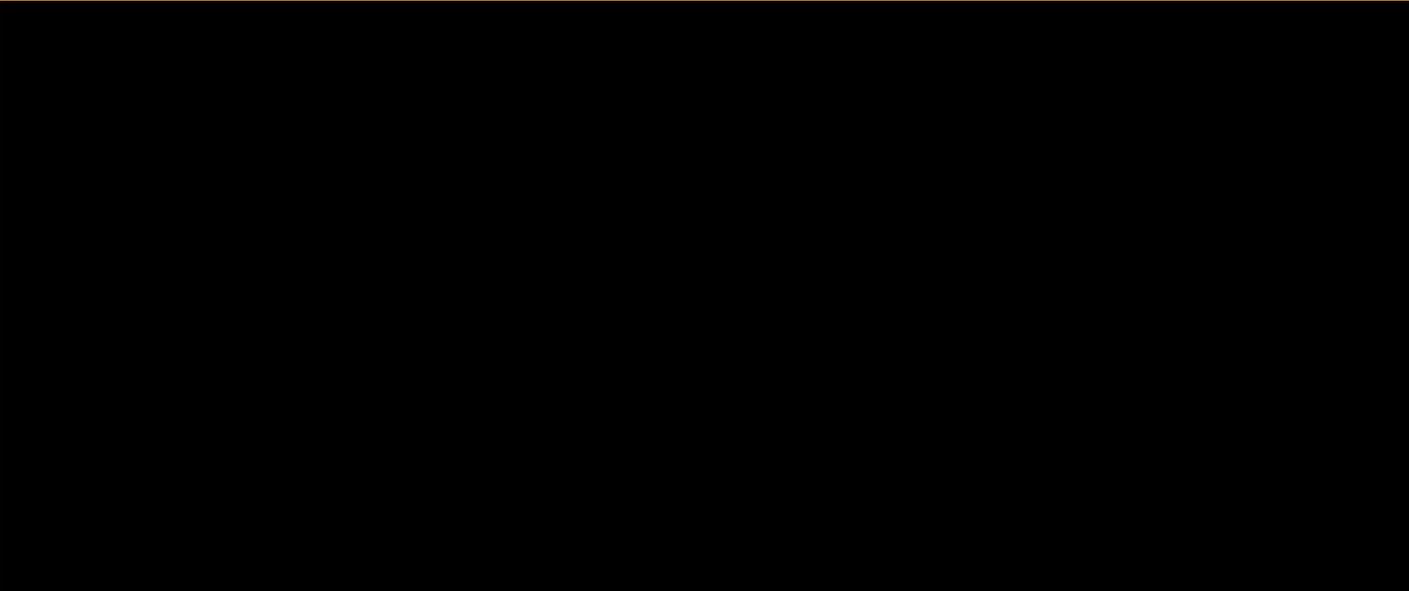
Landscape Architecture  
Masterplanning  
Ecology



## Full Species List

<b>Common name</b>	<b>Scientific name</b>
Amphibious bistort	<i>Persicaria amphibia</i>
Bristly Ox-tongue	<i>Helminthotheca echioides</i>
Broad-leaved Dock	<i>Rumex obtusifolius</i>
Bulbous Buttercup	<i>Ranunculus bulbosus</i>
Cocksfoot	<i>Dactylis glomerata</i>
Common Mouse-ear	<i>Cerastium fontanum</i>
Common Nettle	<i>Urtica dioica</i>
Common Sorrel	<i>Rumex acetosa</i>
Common Bent	<i>Agrostis capillaris</i>
Creeping Bent	<i>Agrostis stolonifera</i>
Creeping Buttercup	<i>Ranunculus repens</i>
Creeping cinquefoil	<i>Potentilla reptans</i>
Creeping Thistle	<i>Cirsium arvense</i>
Crested Dogs-tail	<i>Cynosurus cristatus</i>
Cuckoo Flower	<i>Cardamine pratensis</i>
Curled Dock	<i>Rumex crispus</i>
Cut-leaved Cranesbill	<i>Geranium dissectum</i>
Downy Oat-grass	<i>Avenula pubescens</i>
Dandelion	<i>Taraxacum officinale</i>
False Oat-grass	<i>Arrhenatherum elatius</i>
Field Woodrush	<i>Luzula campestris</i>
Germander Speedwell	<i>Veronica chamaedrys</i>
Great Burnet	<i>Sanguisorba officinalis</i>
Ground Ivy	<i>Glechoma hederacea</i>
Hairy Sedge	<i>Carex hirta</i>
Hedgerow Cranesbill	<i>Geranium pyrenaicum</i>
Hogweed	<i>Heracleum sphondylium</i>
Lady's Bedstraw	<i>Galium verum</i>
Lesser Stitchwort	<i>Stellaria graminea</i>
Lesser Trefoil	<i>Trifolium dubium</i>
Meadow Buttercup	<i>Ranunculus acris</i>
Meadow Barley	<i>Hordeum secalinum</i>
Meadow Foxtail	<i>Alopecurus pratensis</i>
Meadow Oat-grass	<i>Avenula pratensis</i>
Meadow Vetchling	<i>Lathyrus pratensis</i>
Perennial Rye-grass	<i>Lolium perenne</i>
Pignut	<i>Conopodium majus</i>
Red Clover	<i>Trifolium pratense</i>
Red Fescue	<i>Festuca rubra</i>
Rough Meadow-grass	<i>Poa trivialis</i>
Sheep's Fescue	<i>Festuca ovina</i>
Smaller cat's-tail	<i>Phleum bertolonii</i>
Smooth Meadow-grass	<i>Poa pratensis</i>
Soft Brome	<i>Bromus hordeaceus</i>
Spear Thistle	<i>Cirsium vulgare</i>
Sweet Vernal-grass	<i>Anthoxanthum odoratum</i>
Tall Fescue	<i>Festuca arundinacea</i>
Timothy	<i>Phleum pratense</i>
Tormentil	<i>Potentilla erecta</i>
Tufted Hair-grass	<i>Deschampsia cespitosa</i>
Yarrow	<i>Achillea millefolium</i>
Yorkshire Fog	<i>Holcus lanatus</i>





**By Email: [elizabeth.verdegem@milton-keynes.gov.uk](mailto:elizabeth.verdegem@milton-keynes.gov.uk)**

Elizabeth Verdegem  
Team Leader  
Development Management - West Team  
Milton Keynes Council  
Civic Offices  
1 Saxon Gate East  
Milton Keynes  
MK9 3EJ

**Date:** 10 November 2020

**Our ref:** 12491/04/NM/AB/19054332v1

**Your ref:** 20/02484/EIASCO

Dear Elizabeth

## **The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 – Updated Scoping Boundary**

### **Milton Keynes East**

On behalf of our client, St James Group Limited, we are writing to Milton Keynes Council (MKC) to amend a scoping boundary relating to a current request for formal opinion on the scope of an Environmental Impact Assessment ('EIA') (ref: 20/02484/EIASCO).

The scoping request was made to MKC on 2 October 2020 and included a plan at Appendix 1 of the Scoping Report detailing the scoping boundary drawing ref: MKE-WSP-ZZ-ZZ-C-SK-0017 Rev P06. Following further review by the team, additional areas have been identified which may now be subject to works. For completeness the scoping boundary has been extended to include these additional areas.

Following a meeting with MKC on 6<sup>th</sup> November where this was discussed, we are writing to formally update the scoping boundary. We enclose with this letter an updated scoping boundary drawing ref: MKE-WSP-ZZ-ZZ-C-SK-0017 Rev P07.

The additional areas include:

- the parks trust car park just to the south of the M1;
- all the roundabout in the south-west corner; and
- on the main site 1 building that was previously inset.

The works in those areas are expected to be extremely minor in scale.

The changes to the boundary have been reviewed by the technical team and no new significant environmental effects are anticipated. The changes do not impact on any of the conclusions we reached in the scoping report.

We would appreciate if you could please take the updated scoping boundary into account when preparing the Council's scoping opinion due on 27 November.

**LICHFIELDS**

Please contact me, or my colleagues Martin Taylor or Alison Bembenek, if you require any further information or wish to discuss this further.

Yours sincerely



**Nicki Mableson**  
Planning and EIA Director  
Enc

# Appendix B2

## EIA Scoping Opinion

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Reply to Elizabeth Verdegem  
Call 01908 252462 Ref 20/02484/EIASCO  
E-mail elizabeth.verdegem@milton-keynes.gov.uk

Monday 30<sup>th</sup> November 2020

Nicki Mableson  
Lichfields  
The Minster Building  
21 Mincing Lane  
London  
EC34 7AG  
Dear Mr Robinson

**Reference: 20/002484/EIASCO**

**Location: Land To The West And East of, London Road, Moulsoe**

**Proposal: EIA Scoping opinion for proposed development to the east of the M1 motorway, south of Newport Pagnell, to provide a sustainable urban extension to Milton Keynes**

**The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended)**

I refer to your request for an EIA Scoping Opinion regarding the development set out above, received 2<sup>nd</sup> October 2020 and amended 10<sup>th</sup> November 2020 under Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended). The documents considered are as follows:

- MKE-WSP-ZZ-ZZ-C-SK-0017 Rev P07, Environmental Statement Scoping – Redline Boundary, dated: 04/11/2020, received: 10/11/2020.
- Environmental Impact Assessment Scoping Report by Lichfields, dated: October 2020, received: 02/10/2020

This letter constitutes Milton Keynes Council's opinion on the proposed scope of the Environment Statement that would be required to accompany any planning application for the above development. This is the Council's opinion at the current time, which may be subject to change based on significant changes to the proposal or wider circumstances.

In addition, it should be made clear that there are likely to be additional planning requirements which do not form part of this Scoping Opinion which should be discussed separately.

### **The Site**

The application site is approximately 435 hectares south of the A422, broadly east of Milton Keynes and the M1, south of Newport Pagnell and west of Moulsoe. The area defined for this scoping opinion includes some land to the west of the M1, including relevant road junctions

---

**From:** Crank, Nick  
**Sent:** 28 October 2020 17:38  
**To:** Verdegem, Elizabeth  
**Subject:** RE: Planning Consultation/Notification from Milton Keynes Council regarding 20/02484/EIASCO

Dear Elizabeth

Archaeology has the potential to be a significant issue on this allocation if not dealt with appropriately prior to the application stage. With this in mind it is good to see that EIA will be carried out.

In relation to the scoping report provided I have the following comments:

*Current Conditions*

I agree that the possible 'Early Medieval Fortification' identified by the geophysical survey is of likely national importance, though further field assessment of this feature (by supplementary geophysical survey and/or trial trenching) is still necessary to be certain of the interpretation of this heritage asset and to better understand its significance.

The possible 'deserted Medieval village' identified by geophysical survey and lying to the south of the 'fortification' just to the north of the hotel may also be of national importance and therefore also requires further field assessment (by supplementary geophysical survey and/or trial trenching) to be certain of the interpretation of this heritage asset and to better understand its significance.

*Methodological Approach*

This is already defined in the adopted development framework (2.9, p27), and in addition to the techniques stated in the Scoping Report produced by the applicant should also include trial trenching carried out prior to the submission of a planning application and forming part of the EIA baseline studies.

Additionally, I am concerned that the version of Plan:MK cited is the draft rather than the current adopted version.

*Anticipated Effects / Potential Mitigation*

I agree that the development is likely to lead to harm to non-designated archaeological remains of local to regional importance and that areas of archaeology including the possible 'Early Medieval Fortification' may be of such significance that the development should be designed in such a way as to allow for their preservation in situ. However, as indicated above, the significance of the identified areas is not yet sufficiently understood and, subject to the results of further field assessment as detailed above it may be necessary for this approach to be extended to include e.g. the possible 'deserted Medieval village'.

Finally, just for clarity, while the inclusion of fieldwalking and metal detecting survey in the scoping report is welcomed, a programme of trial trenching carried out as part of the EIA is, in my view more necessary.

Regards

Nick

**Nick Crank MCI(A)**

Senior Archaeological Officer, Conservation & Archaeology Team

T: 01908 254259

Milton Keynes Council | Civic Offices | 1 Saxon Gate East | Milton Keynes | MK9 3EJ

<https://www.milton-keynes.gov.uk>

Elizabeth Verdegem  
Milton Keynes Council  
Development Management  
Civic Offices  
1 Saxon Gate East  
Central Milton Keynes  
MK9 3EJ

Plant Protection  
Cadent  
Block 1; Floor 1  
Brick Kiln Street  
Hinckley  
LE10 0NA  
E-mail: [plantprotection@cadentgas.com](mailto:plantprotection@cadentgas.com)  
Telephone: +44 (0)800 688588

**National Gas Emergency Number:**  
**0800 111 999\***

**National Grid Electricity Emergency Number:**  
**0800 40 40 90\***

\* Available 24 hours, 7 days/week.  
Calls may be recorded and monitored.

[www.cadentgas.com](http://www.cadentgas.com)

**Date:** 27/10/2020

**Our Ref:** EM\_GE3A\_3NWP\_026263

**Your Ref:** 20/02484/EIASCO (JP)

**RE: Formal Planning Application, MK16 0JB Land To The West And East of London Road Moulsoe**

Thank you for your enquiry which was received on 26/10/2020.  
Please note this response and any attached map(s) are valid for 28 days.

An assessment has been carried out with respect to Cadent Gas Limited, National Grid Electricity Transmission plc's and National Grid Gas Transmission plc's apparatus. Please note it does not cover the items listed in the section "Your Responsibilities and Obligations", including gas service pipes and related apparatus.

For details of Network areas please see the Cadent website (<http://cadentgas.com/Digging-safely/Dial-before-you-dig>) or the enclosed documentation.

### **Are My Works Affected?**

**Searches based on your enquiry have identified that there is apparatus in the vicinity of your enquiry which may be affected by the activities specified.**

**Can you please inform Plant Protection, as soon as possible, the decision your authority is likely to make regarding this application.**

If the application is refused for any other reason than the presence of apparatus, we will not take any further action.

Please let us know whether Plant Protection can provide you with technical or other information that may be of assistance to you in the determination of the application.

Due to the presence of Cadent and/or National Grid apparatus in proximity to the specified area, the contractor should contact Plant Protection before any works are carried out to ensure the apparatus is not affected by any of the proposed works.

## Your Responsibilities and Obligations

The "Assessment" Section below outlines the detailed requirements that must be followed when planning or undertaking your scheduled activities at this location.

It is your responsibility to ensure that the information you have submitted is accurate and that all relevant documents including links are provided to all persons (either direct labour or contractors) working for you near Cadent and/or National Grid's apparatus, e.g. as contained within the Construction (Design and Management) Regulations.

This assessment solely relates to Cadent Gas Limited, National Grid Electricity Transmission plc (NGET) and National Grid Gas Transmission plc (NGGT) and apparatus. This assessment does **NOT** include:

- | Cadent and/or National Grid's legal interest (easements or wayleaves) in the land which restricts activity in proximity to Cadent and/or National Grid's assets in private land. You must obtain details of any such restrictions from the landowner in the first instance and if in doubt contact Plant Protection.
- | Gas service pipes and related apparatus
- | Recently installed apparatus
- | Apparatus owned by other organisations, e.g. other gas distribution operators, local electricity companies, other utilities, etc.

It is **YOUR** responsibility to take into account whether the items listed above may be present and if they could be affected by your proposed activities. Further "Essential Guidance" in respect of these items can be found on either the [National Grid](#) or [Cadent](#) website.

This communication does not constitute any formal agreement or consent for any proposed development work; either generally or with regard to Cadent and/or National Grid's easements or wayleaves nor any planning or building regulations applications.

Cadent Gas Limited, NGGT and NGET or their agents, servants or contractors do not accept any liability for any losses arising under or in connection with this information. This limit on liability applies to all and any claims in contract, tort (including negligence), misrepresentation (excluding fraudulent misrepresentation), breach of statutory duty or otherwise. This limit on liability does not exclude or restrict liability where prohibited by the law nor does it supersede the express terms of any related agreements.

If you require further assistance please contact the Plant Protection team via e-mail ([click here](#)) or via the contact details at the top of this response.

Yours faithfully

Plant Protection Team

# ASSESSMENT

## Affected Apparatus

The apparatus that has been identified as being in the vicinity of your proposed works is:

- | Low or Medium pressure (below 2 bar) gas pipes and associated equipment. (As a result it is highly likely that there are gas services and associated apparatus in the vicinity)

## Requirements

### BEFORE carrying out any work you must:

- | Carefully read these requirements including the attached guidance documents and maps showing the location of apparatus.
- | Contact the landowner and ensure any proposed works in private land do not infringe Cadent and/or National Grid's legal rights (i.e. easements or wayleaves). If the works are in the road or footpath the relevant local authority should be contacted.
- | Ensure that all persons, including direct labour and contractors, working for you on or near Cadent and/or National Grid's apparatus follow the requirements of the HSE Guidance Notes HSG47 - 'Avoiding Danger from Underground Services' and GS6 – 'Avoidance of danger from overhead electric power lines'. This guidance can be downloaded free of charge at <http://www.hse.gov.uk>
- | In line with the above guidance, verify and establish the actual position of mains, pipes, cables, services and other apparatus on site before any activities are undertaken.

# GUIDANCE

## **Excavating Safely - Avoiding injury when working near gas pipes:**

[http://www.nationalgrid.com/NR/rdonlyres/2D2EEA97-B213-459C-9A26-18361C6E0B0D/25249/Digsafe\\_leaflet3e2finalamends061207.pdf](http://www.nationalgrid.com/NR/rdonlyres/2D2EEA97-B213-459C-9A26-18361C6E0B0D/25249/Digsafe_leaflet3e2finalamends061207.pdf)

## **Standard Guidance**

### **Essential Guidance document:**

<http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=8589934982>

### **General Guidance document:**

<http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=35103>

### **Excavating Safely in the vicinity of gas pipes guidance (Credit card):**

<http://www.nationalgrid.com/NR/rdonlyres/A3D37677-6641-476C-9DDA-E89949052829/44257/ExcavatingSafelyCreditCard.pdf>

### **Excavating Safely in the vicinity of electricity cables guidance (Credit card):**

<http://www.nationalgrid.com/NR/rdonlyres/35DDEC6D-D754-4BA5-AF3C-D607D05A25C2/44858/ExcavatingSafelyCreditCardelectricitycables.pdf>

Copies of all the Guidance Documents can also be downloaded from the [National Grid](#) and [Cadent](#) websites.



ID: EM\_GE3A\_3NWP\_026263  
 USER: James.Parker  
 DATE: 27/10/2020  
 DATA DATE: 26/10/2020  
 REF: 20/02484/EIASCO (JP)  
 MAP REF: SP8942  
 CENTRE: 489167, 242236

View extent: 2890m, 3670m

LP MAINS ————  
 MP MAINS ————  
 IP MAINS ————  
 LHP MAINS ————  
 NHP MAINS ————

0m ———— 200m  
 Approximate scale 1:10000  
 on A3 Colour Portrait

**Do not proceed without further consultation**

This plan shows those pipes owned by Cadent Gas Limited in its role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc., are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Cadent Gas Limited or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue.

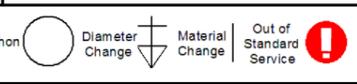
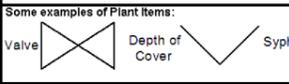
Map 1 of 1 (GAS)

MAPS Plot Server Version 1.11.0

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Requested by: Milton Keynes Council

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SP8942E2  
 The soil found in current owner index. Other owners' assets may be present in this area.

SP8942E3  
 The soil found in current owner index. Other owners' assets may be present in this area.

SP8942E4  
 The soil found in current owner index. Other owners' assets may be present in this area.

# ENQUIRY SUMMARY

## Received Date

26/10/2020

## Your Reference

20/02484/EIASCO (JP)

## Location

Centre Point: 489167, 242236

X Extent: 1335

Y Extent: 1475

Postcode: MK16 0JB

Location Description: MK16 0JB Land To The West And East of London Road Moulsoe

## Map Options

Paper Size: A3

Orientation: PORTRAIT

Requested Scale: 10000

Actual Scale: 1:10000 (GAS)

Real World Extents: 2890m x 3670m (GAS)

## Recipients

pprsteam@cadentgas.com

## Enquirer Details

Organisation Name: Milton keynes Council

Contact Name: Elizabeth Verdegem

Email Address: elizabeth.verdegem@Milton-keynes.gov.uk

Telephone: 01908 252358

Address: Development Management, Civic Offices, 1 Saxon Gate East, Central Milton Keynes, MK9 3EJ

## Description of Works

PA EIA Scoping opinion for proposed development to the east of the M1 motorway, south of Newport Pagnell, to provide a sustainable urban extension to Milton Keynes SP

## Enquiry Type

Formal Planning Application

## Development Types

Development Type: Development for use by General Public

## Pinder, Helen

---

**From:** National Planning Function <NationalPlanning.Function@canalrivertrust.org.uk>  
**Sent:** 20 October 2020 09:37  
**To:** DC Admin  
**Cc:** Verdegem, Elizabeth  
**Subject:** [EXT] RE: Planning Consultation/Notification from Milton Keynes Council regarding 20/02484/EIASCO

Dear Ms Verdegem,

The Canal & River Trust is a statutory consultee under the Town and Country Planning (Development Management Procedure) (England) Order 2015. The current notified area applicable to consultations with us, in our capacity as a Statutory Consultee was issued to Local Planning Authorities in 2011 under the organisations former name, British Waterways. The 2011 issue introduced a notified area for household and minor scale development and a notified area for EIA and major scale development.

This application falls outside the notified area for its application scale. We are therefore returning this application to you as there is no requirement for you to consult us in our capacity as a Statutory Consultee.

We are happy to comment on particular applications that fall outside the notified areas if you would like the Canal & River Trust's comments in specific cases, but this would be outside the statutory consultation regime and must be made clear to us in any notification letter you send.

Should you have a query in relation to consultation or notification of the Canal & River Trust on planning applications, please email us at [planning@canalrivertrust.org.uk](mailto:planning@canalrivertrust.org.uk)

Regards,

Sarah Steele  
Planning and Data Support Technician

*My working days are Monday, Tuesday and Friday*

E [planning@canalrivertrust.org.uk](mailto:planning@canalrivertrust.org.uk)



**Canal & River Trust**

Fradley Junction, Alrewas, Burton-upon-Trent, Staffordshire DE13 7DN

[canalrivertrust.org.uk](http://canalrivertrust.org.uk)



**Canal &  
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Making life better by water

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### **Cadw mewn cysylltiad**

Cofrestrwch i dderbyn e-gylchlythyr Glandŵr Cymru <https://canalrivertrust.org.uk/newsletter>

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Mae'r e-bost hwn a'i atodiadau ar gyfer defnydd y derbynnydd bwriedig yn unig. Os nad chi yw derbynnydd bwriedig yr e-bost hwn a'i atodiadau, ni ddylech gymryd unrhyw gamau ar sail y cynnwys, ond yn hytrach dylech eu dileu heb eu copïo na'u hanfon ymlaen a rhoi gwybod i'r anfonwr eich bod wedi eu derbyn ar ddamwain. Mae unrhyw farn neu safbwynt a fynegir yn eiddo i'r awdur yn unig ac nid ydynt o reidrwydd yn cynrychioli barn a safbwyntiau Glandŵr Cymru.

Mae Glandŵr Cymru yn gwmni cyfyngedig drwy warant a gofrestrwyd yng Nghymru a Lloegr gyda rhif cwmni 7807276 a rhif elusen gofrestredig 1146792. Swyddfa gofrestredig: First Floor North, Station House, 500 Elder Gate, Milton Keynes MK9 1BB.

# Development Management

## Central Bedfordshire Council

Priory House, Monks Walk  
Chicksands, Shefford  
Bedfordshire SG17 5TQ  
www.centralbedfordshire.gov.uk



Ms E Verdegem  
Milton Keynes Council  
Civic  
1 Saxon Gate East  
Milton Keynes  
MK9 3EJ

**Contact** Debbie Quinn  
**Dire** [REDACTED]  
**Di** [REDACTED]  
**Email**  
**Your Ref** 20/02484/EIASCO  
**Date** 09 November 2020

Dear Ms Verdegem,

**MK Application No.** 20/02484/EIASCO  
**CBC Application No:** CB/20/03689/OAC  
**Location:** Land East of the M1 motorway, South of Newport Pagnell  
**Proposal:** Other Authority Consultation: EIA scoping opinion for proposed development

Thank you for your letter of 14 October 2020 regarding the Scoping Opinion request as shown above. I apologise for the delay in replying.

Central Bedfordshire Council welcome this continued engagement and consultation in respect of the MK East proposals and would like to stress the importance of this engagement continuing as the proposals evolve and the development makes its way through the stages of the planning process. We would also like to reiterate the importance of consulting CBC Parish Councils and residents, including those in Cranfield, Salford and Hulcote at appropriate stages of the process.

CBC has the following comments on the Scoping Opinion request.

### Highways

The proposed development site boundary lies approximately 2.5km west of the Central Bedfordshire Council (CBC) boundary. The site would straddle Newport Road, which becomes known as Cranfield Road within CBC and leads to the settlement of Cranfield (also within CBC). The development for 4,000 dwellings and 85ha of employment, amongst other land uses, proposes some significant alterations to highway infrastructure. The build out is said to be 26 years, expected to between 2022 and 2048. The development appears to include realignment of the A509 north of its connection to M1 Junction 14, such that it forms something akin to an eastern bypass around the proposed development before reconnecting with the A422. Newport Road's connection with the A509 would be relocated and Newport Road would be realigned to suit. A new bridge over the M1 is also proposed from within the development. These highway infrastructure changes all fall within MKC.

The methodology for the EIA with respect to transportation, which would be largely separate from the scope and content of the envisaged Transport Assessment (TA), is generally considered to be appropriate. The applicant proposes to use the strategic Milton Keynes Multi-Modal Model (MKMMM) as well as a Paramics microsimulation model for M1 J14. I am not aware of the geographical coverage of MKMMM, but use of a strategic model such as this for the scale of the proposed development would be expected.

Forming part of a wider allocation, it isn't clear whether assessments within the EIA will consider the wider allocation which could deliver a total of 5,000 dwellings and 105ha of employment, since reference is made to committed developments only being considered where developments are already under construction or have planning consent. The Scoping Report also discusses at para 4.4 how a sensitivity test for a further 10-15% increase in development both at their site (4,400 - 4,600 dwellings) and the wider allocation (5,500 - 5,750 dwellings) would be undertaken, which is in relation to 'uncertainty around the future mass rapid transit scheme'. However, the Transportation chapter, with respect to Assessment Scenarios (para 5.26), doesn't appear to list scenarios whereby additional impacts of the wider allocation or of the said sensitivity tests could be determined. If there is scope for up to a 15% increase in trips associated with the proposed development, then I would expect such a sensitivity test to be included.

I would draw the applicant's attention, both for the EIA work and TA, to routes towards Cranfield. Cranfield is acknowledged within the EIA Scoping Report as the location of 'a large cluster of knowledge intensive business activity, including Cranfield airfield with associated aerospace business, Cranfield university and the Cranfield Technology Park'. Cranfield is therefore likely to be a significant draw of trips from the proposed development and as such Newport Road / Cranfield Road and North Crawley Road / Crawley Road should be explicitly considered. Indeed, there would appear to be an opportunity for the development's mitigation strategy to deliver sustainable transport connections to Cranfield, perhaps linking also to the larger Milton Keynes urban area. Pedestrian, cycling and public transport links should be investigated. With respect to highways, the Cranfield Road / University Way roundabout is likely to require assessment; the Crawley Road / Astwood Road / College Road staggered priority-controlled junction is known to experience capacity issues; and the potential for intensification of use of the un-named road to Wharley End as an alternative, quicker route to using University Way should also be considered. With respect to the staggered junction mentioned, the AirParks proposal at Cranfield is required to upgrade this junction to a roundabout but of course there is no guarantee that development and therefore the upgrade will proceed.

In addition, the Marston Gate Expansion at M1 Junction 13 (CBC draft Local Plan Policy SE2) could deliver a further 35ha of employment at this existing employment area and represent a further draw of trips from the proposed development. These trips would likely be a one-junction 'hop' along the M1. Any assessment of M1 J13 or adjacent junctions should also take account of a CBC draft Local Plan allocation at Marston Vale (Policy SA2) for 5,000 dwellings, for which a planning application is currently under consideration. East-West Rail also has the potential to draw trips from the proposed development into this area of CBC.

### Landscape

This major urban expansion would urbanise the wider setting of Cranfield and the hamlets of Salford and Hulcote. To help limit the sense of settlement coalescence, MKE would need to provide extensive green infrastructure and provide wooded screening to help integrate the proposals and safeguard the character of the remaining intervening countryside.

A key concern are the "secondary" impacts of a development at this scale. The additional highway traffic would put additional pressure on the narrow, hedged lanes of Salford and Hulcote and Wharley Road at Cranfield - the potential need for traffic calming is an issue likely to affect character as is the erosion of verges and damage to hedgerows and hedgerow trees.

It is acknowledged that night-time impact can be minimised by modern techniques but there is still a concern about the lighting impact, especially that associated with largescale buildings and the highways required to serve employment areas.

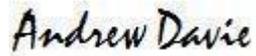
The LVIA has identified two viewpoints from Cranfield and Husborne Crawley and also one

from nearby Astwick. These are considered unlikely to have clear views of the development as intervening vegetation and the landform will limit views. However, the theoretical zone of influence is fairly extensive with the site potentially visible from Cranfield, Hulcote and Salford, Aspley Guise and Husborne Crawley.

The development provides great opportunities for landscape scale enhancement and CBC's Landscape Officer would welcome early discussion with regard to creating green infrastructure linkages between the new settlement and sites within the Forest of Marston Vale, in order to strengthen landscape character, benefit ecology and informal recreation.

CBC's Landscape Officer can be contacted on 

Yours sincerely,



**Andrew Davie**  
**Assistant Director - Development Infrastructure**

## Halsey, Thomas

---

**From:** [REDACTED]  
**Sent:** 29 October 2020 10:17  
**To:** Halsey, Thomas  
**Subject:** [EXT] RE: [EXT] info required - 20/02484/EIASCO - Dummy Upn London Road Warrington

Dear Thomas

We agree with the assessments that are being undertaken. We have been working with the developer/consultants with regard flood risk. We look forward to being consulted on the formal EIA submissions.

Kind regards

### Neville Benn

Senior Planning Advisor  
Sustainable Places  
East Anglia Area (West)

[REDACTED] pton, Huntingdon, Cambs. PE28 4NE



---

**From:** Halsey, Thomas [mailto:Thomas.Halsey@milton-keynes.gov.uk]

**Sent:** 14 October 2020 13:48

[REDACTED]  
**Subject:** RE: [EXT] info required - 20/02484/EIASCO - Dummy Upn London Road Warrington

Hi Benn

Find attached

We are having to work with indexing all files from a backlog as we couldn't index originally, so they should be available online at some point eventually

Thanks

Thomas Halsey  
Development Services Officer  
Planning Service  
01908 254794

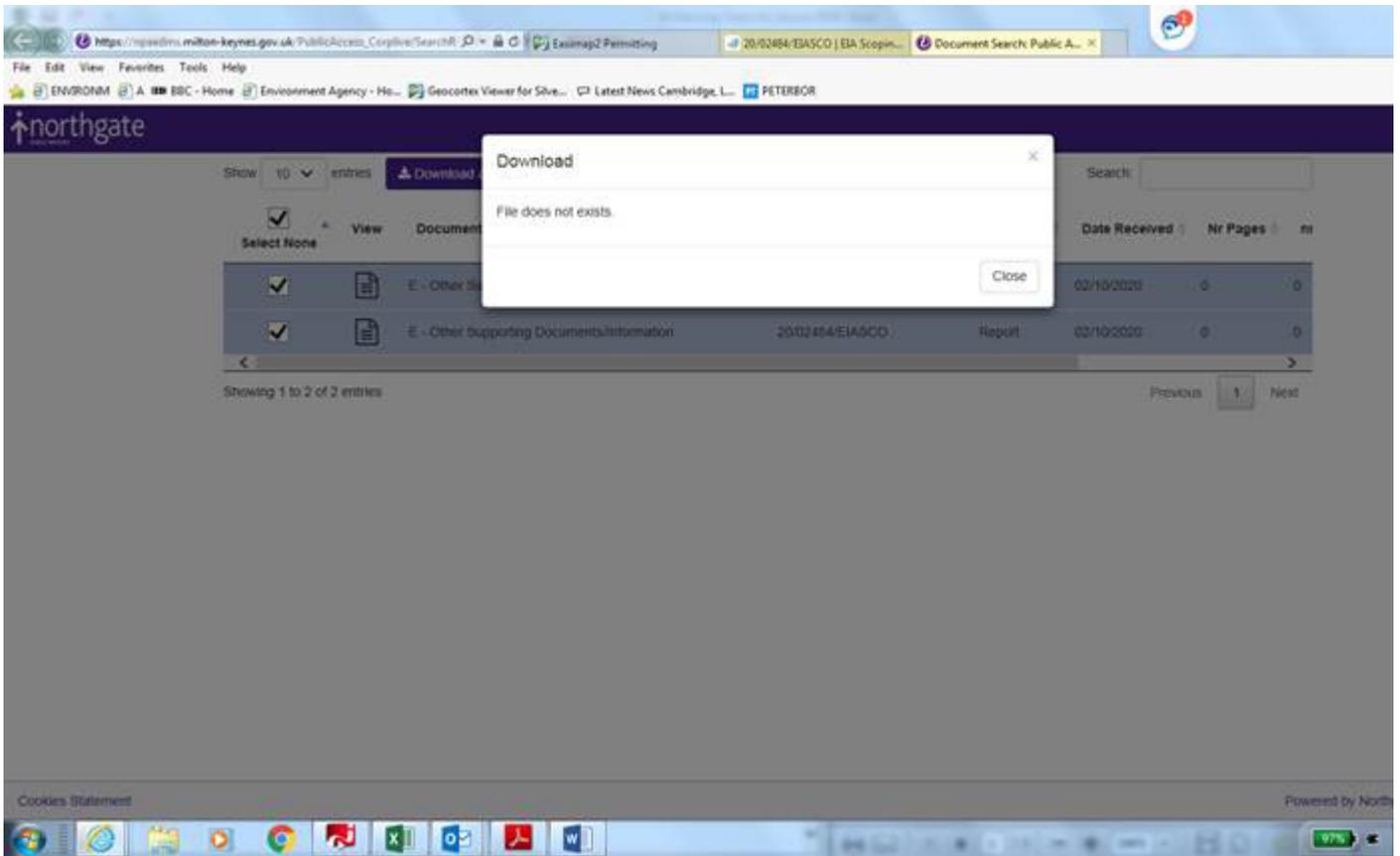
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**From:** Benn, Neville [REDACTED]  
**Sent:** 14 October 2020 07:29  
**To:** Halsey, Thomas <[Thomas.Halsey@milton-keynes.gov.uk](mailto:Thomas.Halsey@milton-keynes.gov.uk)>  
**Subject:** [EXT] info required - 20/02484/EIASCO - Dummy Upn London Road Warrington

Hi Thomas

I am unable to download the info.



Kind regards

**Neville Benn**  
Senior Planning Advisor  
Sustainable Places  
East Anglia Area (West)

[REDACTED] on, Huntingdon, Cambs. PE28 4NE

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Ms Elizabeth Verdegem  
Milton Keynes Council  
Civic Offices  
1 Saxon Gate East  
Central Milton Keynes  
MK9 3EJ

Direct Dial: -

Our ref: PL00721522

2 November 2020

Dear Ms Verdegem

**1. Request for an Environmental Impact Assessment Scoping Opinion relating to proposed development at:  
(address) Dummy Uprnin accordance with the Town and Country Planning EIA Regulations 2017.**

**Application No : 20/02484/EIASCO**

Thank you for your letter of 13th of October 2020 notifying Historic England of the proposed planning consultation relating to the above site. Our specialist staff have considered the information received and we do not wish to offer any comments on this occasion.

### **Recommendation**

**This application should be determined in accordance with national and local policy guidance, and on the basis of your expert conservation advice.**

It is not necessary for us to be consulted again on this application. However, if you would like further advice, please contact us to explain your request. We can then let you know if we are able to help further and agree a timetable with you.

- 2. Town and Country Planning (Environmental Impact Assessment) Regulations 2017: Regulation 6 (Request for Screening Opinion) - Proposal for the Dummy Uprn**
  
- 3. Request for an Environmental Impact Assessment (Land Drainage Improvement Works) Regulations (1999).**



4TH FLOOR, CANNON BRIDGE HOUSE, 25 DOWGATE HILL, LONDON EC4R 2YA

Telephone 020 7973 3700  
HistoricEngland.org.uk





## 1. Application Ref: Romsey Flood Alleviation Scheme

Thank you for your letter of 13th of October notifying Historic England of the proposed works relating to the above site. Our specialist staff have considered the information received and we do not wish to offer any comments on this occasion.

### Recommendation

**This application should be determined in accordance with national and local policy guidance, and on the basis of your expert conservation advice.**

It is not necessary for us to be consulted again on this application. However, if you would like further advice, please contact us to explain your request. We can then let you know if we are able to help further and agree a timetable with you.

Yours sincerely,

Isaac Smith  
Business Officer



## DEVELOPMENT MANAGEMENT CONSULTATION

From: Elizabeth Woodhouse, Senior Landscape Architect

Application no: 20/02484/EIASCO

**Proposal:** EIA Scoping opinion for proposed development to the east of the M1 motorway, south of Newport Pagnell, to provide a sustainable urban extension to Milton Keynes (to include 4,000 new homes, 85 hectares of employment land, schools, access and infrastructure)

**At:** MK East urban extension, Land At Willen Road, Newport Pagnell

**Application Type:** EIASCO – Scoping Opinion

**RETURN TO:** Elizabeth Verdegem

**DEADLINE STATED:** 3<sup>rd</sup> November 2020

**CONSULTEE SCOPING OPINION ADVICE - Based on the information provided.**

### RELEVANT POLICY

Schedule 4 of the Town & Country Planning (Environmental Impact Assessment) Regulations 2017, sets out the necessary information to assess impacts on the natural environment to be included in an ES.

### KEY CONSIDERATIONS (Related to specialist area of advice and in bullet point form as a summary)

- Designated Landscapes and Landscape Character (LVIA)
- Access and Recreation
- Soil and Agricultural Land Quality
- Contribution to local environmental initiatives and priorities (links into Policy NE4 Green Infrastructure)
- Cumulative and in-combination effects

### DETAILED CONSULTEE ASSESSMENT

The advice by Natural England on the scope of the Environmental Impact Assessment (EIA) for this development provided in its response letter dated 28<sup>th</sup> October 2020 (attached to our consultee response email) is fully supported and in particular the following sections of its attachment Annex A – Advice Related to EIA Scoping Requirements:

Section 3. Designated Landscapes and Landscape Character (LVIA)

Section 4. Access and Recreation

Section 5. Soil and Agricultural Land Quality

Section 8. Contribution to local environmental initiatives and priorities (links into Policy NE4 Green Infrastructure)

Section 9. Cumulative and in-combination effects

I would suggest that Section 9 advice highlights the importance of considering the cumulative impact of the whole development of the MK East extension even though this scoping request is only considering a selected area of the total MK East extension area. Preferably, the cumulative impact of the whole development of the MK East extension should be considered by a single Environmental Statement. Alternatively the ES should include an impact assessment to identify, describe and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out as part of the MK East extension. The scoping report doesn't state clearly that the cumulative impact of the whole development of the MK East extension will be considered.

Comments and queries on the LVIA have been raised separately by email with the consultant Landscape



## DEVELOPMENT MANAGEMENT CONSULTATION

Architects a copy of which is provided alongside this consultation response form for ease of reference.

Date response sent:	03/11/2020
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**From:** Woodhouse, Elizabeth  
**Sent:** 22 October 2020 16:07  
**To:** Nick Thomas  
**Cc:** Verdegem, Elizabeth; Liz Simes; Ashley Spearing  
**Subject:** RE: D2065 Milton Keynes - Landscape Scoping

Hi,  
Agreed on the points below.

In terms of additional VVMs worth considering from your suggestions and based on my notes from yesterday:  
- Location 5 - I can see why you would consider this as the development will be visible from Moulsoe so sensitive for residents although there is already harm from existing development in the long distance so its not a sensitive view from a landscape character perspective.  
- Location 10 or 11 – I had 10 down as a possible as looking down slope you would see development with countryside in the foreground. 11 is a long view with existing impact of warehouse sheds visible; I had this down as a no.

I meant to ask in my email yesterday which classification of VVM do you intend to provide in terms of the level of render applied? An example of a past project would be good to see so we know what to expect.

Kind Regards

Elizabeth Woodhouse  
Senior Landscape Architect CMLI  
T: 01908-25-2815  
E: [elizabeth.woodhouse@milton-keynes.gov.uk](mailto:elizabeth.woodhouse@milton-keynes.gov.uk)  
Milton Keynes Council | Placemaking | Planning, Strategic Transport and Placemaking | Civic Offices | 1 Saxon Gate East | Milton Keynes | MK9 3EJ

---

**From:** Nick Thomas <[REDACTED]>  
**Sent:** 22 October 2020 15:16  
**To:** Woodhouse, Elizabeth <Elizabeth.Woodhouse@milton-keynes.gov.uk>  
**Cc:** Verdegem, Elizabeth <Elizabeth.Verdegem@milton-keynes.gov.uk>; Liz Simes <[REDACTED]>; Ashley Spearing <[REDACTED]>  
**Subject:** [EXT] RE: D2065 Milton Keynes - Landscape Scoping

Elizabeth

Many thanks for your input. I have a couple of comments/ queries:

- I agree views 6,7 and 14 on the second plan Page 53 should be dismissed.
- You make some comments on the third plan Page 89 – the photographs show that the Site isn't visible from any of these locations due to the long distance and intervening features – would it be reasonable to dismiss these too?
- For the VVM's – I'm grateful that you've limited the number of locations to four, however there are a couple of other views that we think would be helpful for the assessment. Location 5 (Plan Page 19, Photograph Page 5) which would take in the site seen from the eastern side of Moulsoe (the employment may be visible in this view); Location 10 or 11 (Plan Page 53, Photographs pages 73-79), which take in the eastern edge of the proposed application site. Would you agree that these locations would be worth considering?

We hope to get the VVM work up and running this week so I would be grateful if you could come back to me on the points of clarification.

Best wishes  
Nick

**Nick Thomas**  
Technical Director Landscape Planning & Masterplanning



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**From:** Woodhouse, Elizabeth <[Elizabeth.Woodhouse@milton-keynes.gov.uk](mailto:Elizabeth.Woodhouse@milton-keynes.gov.uk)>  
**Sent:** 21 October 2020 18:23  
**To:** Nick Thomas <[redacted]>  
**Cc:** Verdegem, Elizabeth <[Elizabeth.Verdegem@milton-keynes.gov.uk](mailto:Elizabeth.Verdegem@milton-keynes.gov.uk)>; Liz Simes <[redacted]>  
**Subject:** RE: D2065 Milton Keynes - Landscape Scoping

Elizabeth,  
I note the views at Appendix 2 of the Scoping Report are superseded by the 'Draft LVIA Site and Key Views Photographs' document provided before the meeting held on 13<sup>th</sup> October 2020. My comments refer to this document.

On the second plan there are 3 viewpoints which should be dismissed as key views, these are:  
6 – this is located on the designated development land for Tickford Fields and the view towards the site is well screened by the foreground off-site topography and existing vegetation. The site isn't visible from this viewpoint.  
7 – the view towards the site is well screened by the foreground off-site topography and existing vegetation. The site isn't visible from this viewpoint.  
14 – the view towards the site is well screened by the foreground off-site vegetation and Magna Park sheds. The site isn't visible from this viewpoint.

On the third plan  
3 – falls outside of the 8km study area  
6 – falls outside of the ZTV  
7 – is near Cranfield which is beyond the local authority boundary and is therefore irrelevant to the application  
8 – falls outside of the 8km study area and the local authority boundary

I request plans show the local authority boundary for easy reference please.

For the Verified Visual Montages (VVM) I think the locations: 2, 3, 4, and 9 on the first plan are important.

Please note the viewpoint numbers on the plan don't match the photo numbers which is confusing so I suggest the documents are updated and sent back to me to double check my selection.

Also, please note that my consideration of the VVM is based on the development framework for the site as I don't have any provisional layouts and I can't recall what was presented at the TEAMS meeting which was viewed in small scale on a small laptop screen.

I generally don't comment on the methodology as every practice has a different methodology based on their tried and tested experience. If there is something specific where the LVIA methodology won't follow the best practice guidance in GLVIA it can be highlighted to me and I may be able to offer an opinion.

Thank you for your consultation.

Kind Regards

Elizabeth Woodhouse  
Senior Landscape Architect CMLI  
T: 01908-25-2815  
E: [elizabeth.woodhouse@milton-keynes.gov.uk](mailto:elizabeth.woodhouse@milton-keynes.gov.uk)  
Milton Keynes Council | Placemaking | Planning, Strategic Transport and Placemaking | Civic Offices | 1 Saxon Gate East | Milton Keynes | MK9 3EJ

---

**From:** Woodhouse, Elizabeth  
**Sent:** 16 October 2020 11:37  
**To:** Nick Thomas <[REDACTED]>  
**Cc:** Verdegem, Elizabeth <[Elizabeth.Verdegem@milton-keynes.gov.uk](mailto:Elizabeth.Verdegem@milton-keynes.gov.uk)>; Liz Simes <[REDACTED]>  
**Subject:** RE: D2065 Milton Keynes - Landscape Scoping

Thanks Nick I will take a look next week.

Kind Regards

Elizabeth Woodhouse  
Senior Landscape Architect CMLI  
T: 01908-25-2815  
E: [elizabeth.woodhouse@milton-keynes.gov.uk](mailto:elizabeth.woodhouse@milton-keynes.gov.uk)  
Milton Keynes Council | Placemaking | Planning, Strategic Transport and Placemaking | Civic Offices | 1 Saxon Gate East | Milton Keynes | MK9 3EJ

---

**From:** Nick Thomas <[REDACTED]>  
**Sent:** 16 October 2020 10:58  
**To:** Woodhouse, Elizabeth <[Elizabeth.Woodhouse@milton-keynes.gov.uk](mailto:Elizabeth.Woodhouse@milton-keynes.gov.uk)>  
**Cc:** Verdegem, Elizabeth <[Elizabeth.Verdegem@milton-keynes.gov.uk](mailto:Elizabeth.Verdegem@milton-keynes.gov.uk)>; Liz Simes <[liz@fabrikuk.com](mailto:liz@fabrikuk.com)>  
**Subject:** [EXT] D2065 Milton Keynes - Landscape Scoping

Dear Elizabeth

I hope you are well.

I understand you should have received a copy of the EIA scoping report compiled by Lichfield's. Landscape and Views are covered at Section 6 page 30 and our proposed Key Views and Methodology is at Appendix 2 page 102. Please note the views at Appendix 2 of the Scoping Report are superseded by the 'Draft LVIA Site and Key Views Photographs' document that you have.

When you come back to us next week regarding key views and VVM's, we would also be very grateful if you could also comment on the proposed scope of our inputs and methodology.

If you are not in receipt of any of the documents, please do let me know and I will send over the relevant sections.

Best regards  
Nick

**Nick Thomas**

Technical Director Landscape Planning & Masterplanning



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**MILTON KEYNES COUNCIL LLFA statutory response to LPA**

**Attention: Elizabeth Verdegem**

**Date: 03/11/2020**  
**Ref: 20/02484/EIASCO**

Dear Team

**Subject: 20/02484/EIASCO - Dummy Uprrn, London Road, Warrington**

**EIA Scoping opinion for proposed development to the east of the M1 motorway, south of Newport Pagnell, to provide a sustainable urban extension to Milton Keynes**

The Environmental Impact Assessment Scoping Report submitted includes information of the water environment proposals. The principles of surface water drainage outlined within the scoping report are acceptable, however as LLFA we expect a full flood risk assessment and/or surface water drainage strategy to be submitted to support any planning application, which must include:

- i. How the proposed surface water drainage scheme has been determined following the drainage hierarchy
- ii. Pre-development run-off rates
- iii. Post-development run-off rates with associated storm water calculations
- iv. Discharge location(s)
- v. Drainage calculations to support the design of the system
- vi. Drawings of the proposed surface water drainage scheme including sub-catchment breakdowns where applicable
- vii. Maintenance and management plan of the surface water drainage system (for the lifetime of the development) including details of future adoption

The applicant should, as part of the surface water strategy, demonstrate that the requirements of any local surface water drainage planning policies have been met and the recommendations of the relevant Strategic Flood Risk Assessment and Surface Water Management Plan have been considered.

Policies FR1 – FR3 of Plan:MK includes locally specific strategic flood risk management policies to maintain and continue the exemplar sustainable drainage model of Milton Keynes which prohibits development within the floodplain and seeks flood management and drainage infrastructure to be provided as strategically as possible and as part of a maintained, multi-functional blue-green infrastructure.

**In order to assist developers with the preparation of surface water strategies Milton Keynes Council has prepared a guidance document which is available to view [here](#).**

**We also offer a pre-application service which enables developers to discuss their drainage proposals with the LLFA Officers prior to submission of a formal application.**

**MILTON KEYNES COUNCIL LLFA statutory response to LPA**

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Date: 28 October 2020  
Our ref: 331985  
Your ref: 20/02484/EIASCO



Milton Keynes Council  
**BY EMAIL ONLY**

Customer Services  
Hombeam House  
Crewe Business Park  
Electra Way  
Crewe  
Cheshire  
CW1 6GJ

T 0300 060 3900

Dear Thomas Halsey

**Environmental Impact Assessment Scoping consultation (Regulation 15 (4) of the EIA Regulations 2017):** for urban extension to include 4,000 new homes, 85 hectares of employment land, schools, access and infrastructure.

**Location:** Milton Keynes East.

Thank you for seeking our advice on the scope of the Environmental Statement (ES) in your consultation dated 13 October 2020 which we received on the same day.

Natural England is a non-departmental public body. Our statutory purpose is to ensure that the natural environment is conserved, enhanced, and managed for the benefit of present and future generations, thereby contributing to sustainable development.

Case law<sup>1</sup> and guidance<sup>2</sup> has stressed the need for a full set of environmental information to be available for consideration prior to a decision being taken on whether or not to grant planning permission. Annex A to this letter provides Natural England's advice on the scope of the Environmental Impact Assessment (EIA) for this development.

Should the proposal be amended in a way which significantly affects its impact on the natural environment then, in accordance with Section 4 of the Natural Environment and Rural Communities Act 2006, Natural England should be consulted again.

We would be happy to comment further should the need arise but if in the meantime you have any queries please do not hesitate to contact us. For any queries relating to the specific advice in this letter only please contact Ellen Satchwell on 07899902408. For any new consultations, or to provide further information on this consultation please send your correspondences to [consultations@naturalengland.org.uk](mailto:consultations@naturalengland.org.uk).

Yours sincerely,

Ellen Satchwell  
Sustainable development Lead Advisor  
Thames Solent Team

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<sup>1</sup> Harrison, J in *R. v. Cornwall County Council ex parte Hardy* (2001)

<sup>2</sup> *Note on Environmental Impact Assessment Directive for Local Planning Authorities* Office of the Deputy Prime Minister (April 2004) available from <http://www.ebarchive.nationalarchives.gov.uk/+http://www.communities.gov.uk/planningandbuilding/planning/sustainability/environmental/environmentalimpactassessment/noteenvironmental/>

## **Annex A – Advice related to EIA Scoping Requirements**

### **1. General Principles**

Schedule 4 of the Town & Country Planning (Environmental Impact Assessment) Regulations 2017, sets out the necessary information to assess impacts on the natural environment to be included in an ES, specifically:

- A description of the development – including physical characteristics and the full land use requirements of the site during construction and operational phases.
- Expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation, etc.) resulting from the operation of the proposed development.
- An assessment of alternatives and clear reasoning as to why the preferred option has been chosen.
- A description of the aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the interrelationship between the above factors.
- A description of the likely significant effects of the development on the environment – this should cover direct effects but also any indirect, secondary, cumulative, short, medium and long term, permanent and temporary, positive and negative effects. Effects should relate to the existence of the development, the use of natural resources and the emissions from pollutants. This should also include a description of the forecasting methods to predict the likely effects on the environment.
- A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment.
- A non-technical summary of the information.
- An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information.

It will be important for any assessment to consider the potential cumulative effects of this proposal, including all supporting infrastructure, with other similar proposals and a thorough assessment of the 'in combination' effects of the proposed development with any existing developments and current applications. A full consideration of the implications of the whole scheme should be included in the ES. All supporting infrastructure should be included within the assessment.

### **2. Biodiversity and Geology**

#### **2.1 Ecological Aspects of an Environmental Statement**

Natural England advises that the potential impact of the proposal upon features of nature conservation interest and opportunities for habitat creation/enhancement should be included within this assessment in accordance with appropriate guidance on such matters. Guidelines for Ecological Impact Assessment (EclA) have been developed by the Chartered Institute of Ecology and Environmental Management (CIEEM) and are available on their website.

EclA is the process of identifying, quantifying and evaluating the potential impacts of defined actions on ecosystems or their components. EclA may be carried out as part of the EIA process or to support other forms of environmental assessment or appraisal.

The National Planning Policy Framework sets out guidance in S. 174-177 on how to take account of biodiversity interests in planning decisions and the framework that local authorities should provide to assist developers.

#### **2.2 Internationally and Nationally Designated Sites**

The ES should thoroughly assess the potential for the proposal to affect designated sites. European sites (e.g. designated Special Areas of Conservation and Special Protection Areas) fall within the scope of the Conservation of Habitats and Species Regulations 2017 (as amended). In addition paragraph 176 of the National Planning Policy Framework requires that potential Special

Protection Areas, possible Special Areas of Conservation, listed or proposed Ramsar sites, and any site identified as being necessary to compensate for adverse impacts on classified, potential or possible SPAs, SACs and Ramsar sites be treated in the same way as classified sites.

Under Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended) an appropriate assessment needs to be undertaken in respect of any plan or project which is (a) likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and (b) not directly connected with or necessary to the management of the site.

Should a Likely Significant Effect on a European/Internationally designated site be identified or be uncertain, the competent authority (in this case the Local Planning Authority) may need to prepare an Appropriate Assessment, in addition to consideration of impacts through the EIA process.

### **2.3 Regionally and Locally Important Sites**

The EIA will need to consider any impacts upon local wildlife and geological sites. Local Sites are identified by the local wildlife trust, geoconservation group or a local forum established for the purposes of identifying and selecting local sites. They are of county importance for wildlife or geodiversity. The Environmental Statement should therefore include an assessment of the likely impacts on the wildlife and geodiversity interests of such sites. The assessment should include proposals for mitigation of any impacts and if appropriate, compensation measures. Contact the local wildlife trust, geoconservation group or local sites body in this area for further information.

### **2.4 Protected Species - Species protected by the Wildlife and Countryside Act 1981 (as amended) and by the Conservation of Habitats and Species Regulations 2017 (as amended)**

The ES should assess the impact of all phases of the proposal on protected species (including, for example, great crested newts, reptiles, birds, water voles, badgers and bats). Natural England does not hold comprehensive information regarding the locations of species protected by law, but advises on the procedures and legislation relevant to such species. Records of protected species should be sought from appropriate local biological record centres, nature conservation organisations, groups and individuals; and consideration should be given to the wider context of the site for example in terms of habitat linkages and protected species populations in the wider area, to assist in the impact assessment.

The conservation of species protected by law is explained in Part IV and Annex A of Government Circular 06/2005 *Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System*. The area likely to be affected by the proposal should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES.

In order to provide this information there may be a requirement for a survey at a particular time of year. Surveys should always be carried out in optimal survey time periods and to current guidance by suitably qualified and where necessary, licensed, consultants. Natural England has adopted [standing advice](#) for protected species which includes links to guidance on survey and mitigation.

### **2.5 Habitats and Species of Principal Importance**

The ES should thoroughly assess the impact of the proposals on habitats and/or species listed as 'Habitats and Species of Principal Importance' within the England Biodiversity List, published under the requirements of S41 of the Natural Environment and Rural Communities (NERC) Act 2006. Section 40 of the NERC Act 2006 places a general duty on all public authorities, including local planning authorities, to conserve and enhance biodiversity. Further information on this duty is available here <https://www.gov.uk/guidance/biodiversity-duty-public-authority-duty-to-have-regard-to-conserving-biodiversity>.

Government Circular 06/2005 states that Biodiversity Action Plan (BAP) species and habitats, 'are capable of being a material consideration...in the making of planning decisions'. Natural England therefore advises that survey, impact assessment and mitigation proposals for Habitats and Species of Principal Importance should be included in the ES. Consideration should also be given to those

species and habitats included in the relevant Local BAP.

Natural England advises that a habitat survey (equivalent to Phase 2) is carried out on the site, in order to identify any important habitats present. In addition, ornithological, botanical and invertebrate surveys should be carried out at appropriate times in the year, to establish whether any scarce or priority species are present. The Environmental Statement should include details of:

- Any historical data for the site affected by the proposal (e.g. from previous surveys);
- Additional surveys carried out as part of this proposal;
- The habitats and species present;
- The status of these habitats and species (e.g. whether priority species or habitat);
- The direct and indirect effects of the development upon those habitats and species;
- Full details of any mitigation or compensation that might be required.

The development should seek if possible to avoid adverse impact on sensitive areas for wildlife within the site, and if possible provide opportunities for overall wildlife gain.

The record centre for the relevant Local Authorities should be able to provide the relevant information on the location and type of priority habitat for the area under consideration.

## **2.6 Contacts for Local Records**

Natural England does not hold local information on local sites, local landscape character and local or national biodiversity priority habitats and species. We recommend that you seek further information from the appropriate bodies (which may include the local records centre, the local wildlife trust, local geoconservation group or other recording society and a local landscape characterisation document).

### **Local Record Centre (LRC) in Buckinghamshire please contact:**

Buckinghamshire & Milton Keynes Environmental Records Centre

erc@buckscc.gov.uk

## **3. Designated Landscapes and Landscape Character**

### **Landscape and visual impacts**

Natural England would wish to see details of local landscape character areas mapped at a scale appropriate to the development site as well as any relevant management plans or strategies pertaining to the area. The EIA should include assessments of visual effects on the surrounding area and landscape together with any physical effects of the development, such as changes in topography.

The EIA should include a full assessment of the potential impacts of the development on local landscape character using [landscape assessment methodologies](#). We encourage the use of Landscape Character Assessment (LCA), based on the good practice guidelines produced jointly by the Landscape Institute and Institute of Environmental Assessment in 2013. LCA provides a sound basis for guiding, informing and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character, as detailed proposals are developed.

Natural England supports the publication *Guidelines for Landscape and Visual Impact Assessment*, produced by the Landscape Institute and the Institute of Environmental Assessment and Management in 2013 (3rd edition). The methodology set out is almost universally used for landscape and visual impact assessment.

In order to foster high quality development that respects, maintains, or enhances, local landscape character and distinctiveness, Natural England encourages all new development to consider the

character and distinctiveness of the area, with the siting and design of the proposed development reflecting local design characteristics and, wherever possible, using local materials. The Environmental Impact Assessment process should detail the measures to be taken to ensure the building design will be of a high standard, as well as detail of layout alternatives together with justification of the selected option in terms of landscape impact and benefit.

The assessment should also include the cumulative effect of the development with other relevant existing or proposed developments in the area. In this context Natural England advises that the cumulative impact assessment should include other proposals currently at Scoping stage. Due to the overlapping timescale of their progress through the planning system, cumulative impact of the proposed development with those proposals currently at Scoping stage would be likely to be a material consideration at the time of determination of the planning application.

The assessment should refer to the relevant [National Character Areas](#) which can be found on our website. Links for Landscape Character Assessment at a local level are also available on the same page.

### **Heritage Landscapes**

You should consider whether there is land in the area affected by the development which qualifies for conditional exemption from capital taxes on the grounds of outstanding scenic, scientific or historic interest. An up-to-date list may be obtained at [www.hmrc.gov.uk/heritage/lbsearch.htm](http://www.hmrc.gov.uk/heritage/lbsearch.htm).

### **4. Access and Recreation**

Natural England encourages any proposal to incorporate measures to help encourage people to access the countryside for quiet enjoyment. Measures such as reinstating existing footpaths together with the creation of new footpaths and bridleways are to be encouraged. Links to other green networks and, where appropriate, urban fringe areas should also be explored to help promote the creation of wider green infrastructure. Relevant aspects of local authority green infrastructure strategies should be incorporated where appropriate.

### **Rights of Way, Access land, Coastal access and National Trails**

The EIA should consider potential impacts on access land, public open land, rights of way and coastal access routes in the vicinity of the development. Appropriate mitigation measures should be incorporated for any adverse impacts. We also recommend reference to the relevant Right of Way Improvement Plans (ROWIP) to identify public rights of way within or adjacent to the proposed site that should be maintained or enhanced.

### **5. Soil and Agricultural Land Quality**

Impacts from the development should be considered in light of the Government's policy for the protection of the best and most versatile (BMV) agricultural land as set out in paragraph 170 of the NPPF. We also recommend that soils should be considered in the context of the sustainable use of land and the ecosystem services they provide as a natural resource, as also highlighted in paragraph 170 of the NPPF.

Soil is a finite resource that fulfils many important functions and services (ecosystem services) for society, for example as a growing medium for food, timber and other crops, as a store for carbon and water, as a reservoir of biodiversity and as a buffer against pollution. It is therefore important that the soil resources are protected and used sustainably.

The applicant should consider the following issues as part of the Environmental Statement:

1. The degree to which soils are going to be disturbed/harmed as part of this development and whether 'best and most versatile' agricultural land is involved.

This may require a detailed survey if one is not already available. For further information on the availability of existing agricultural land classification (ALC) information see [www.magic.gov.uk](http://www.magic.gov.uk).

Natural England Technical Information Note 049 - [Agricultural Land Classification: protecting the best and most versatile agricultural land](#) also contains useful background information.

2. If required, an agricultural land classification and soil survey of the land should be undertaken. This should normally be at a detailed level, eg one auger boring per hectare, (or more detailed for a small site) supported by pits dug in each main soil type to confirm the physical characteristics of the full depth of the soil resource, ie 1.2 metres.
3. The Environmental Statement should provide details of how any adverse impacts on soils can be minimised. Further guidance is contained in the [Defra Construction Code of Practice for the Sustainable Use of Soil on Development Sites](#).

As identified in the NPPF new sites or extensions to new sites for peat extraction should not be granted permission by Local Planning Authorities or proposed in development.

## **6. Air Quality**

Air quality in the UK has improved over recent decades but air pollution remains a significant issue; for example over 97% of sensitive habitat area in England is predicted to exceed the critical loads for ecosystem protection from atmospheric nitrogen deposition ([England Biodiversity Strategy](#), Defra 2011). A priority action in the England Biodiversity Strategy is to reduce air pollution impacts on biodiversity. The planning system plays a key role in determining the location of developments which may give rise to pollution, either directly or from traffic generation, and hence planning decisions can have a significant impact on the quality of air, water and land. The assessment should take account of the risks of air pollution and how these can be managed or reduced. Further information on air pollution impacts and the sensitivity of different habitats/designated sites can be found on the Air Pollution Information System ([www.apis.ac.uk](http://www.apis.ac.uk)). Further information on air pollution modelling and assessment can be found on the Environment Agency website.

## **7. Climate Change Adaptation**

The [England Biodiversity Strategy](#) published by Defra establishes principles for the consideration of biodiversity and the effects of climate change. The ES should reflect these principles and identify how the development's effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained. The NPPF requires that the planning system should contribute to the enhancement of the natural environment 'by establishing coherent ecological networks that are more resilient to current and future pressures' ([NPPF](#) Para 174), which should be demonstrated through the ES.

## **8. Contribution to local environmental initiatives and priorities**

Natural England advises that local initiatives are taken into consideration, these may include the following:

- Natural Environment Partnership (NEP) Green Infrastructure Opportunities Mapping
- NEP Forward to 2020: Biodiversity Action Plan

## **9. Cumulative and in-combination effects**

A full consideration of the implications of the whole scheme should be included in the ES. All supporting infrastructure should be included within the assessment.

The ES should include an impact assessment to identify, describe and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out. The following types of projects should be included in such an assessment, (subject to available information):

- a. existing completed projects;
- b. approved but uncompleted projects;

- c. ongoing activities;
- d. plans or projects for which an application has been made and which are under consideration by the consenting authorities; and
- e. plans and projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects.

### **Ancient Woodland – addition to the S41 NERC Act paragraph**

The S41 list includes six priority woodland habitats, which will often be ancient woodland, with all ancient semi-natural woodland in the South East falling into one or more of the six types.

Information about ancient woodland can be found in Natural England's standing advice [http://www.naturalengland.org.uk/Images/standing-advice-ancient-woodland\\_tcm6-32633.pdf](http://www.naturalengland.org.uk/Images/standing-advice-ancient-woodland_tcm6-32633.pdf).

Ancient woodland is an irreplaceable resource of great importance for its wildlife, its history and the contribution it makes to our diverse landscapes. Local authorities have a vital role in ensuring its conservation, in particular through the planning system. The ES should have regard to the requirements under the NPPF (Para. 175)<sup>2</sup> which states:

When determining planning applications, local planning authorities should apply the following principles:

- a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts);
- c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists.

## Pinder, Helen

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**From:** Patrick Donovan [REDACTED]  
**Sent:** 02 November 2020 15:21  
**To:** DC Admin  
**Subject:** [EXT] Planning Applications

Our TPEM Committee discussed the following planning application on 28 October 2020:

### ITEM 5 OCT 2020/TP: PLANNING APPLICATIONS

**5.1** **There were no objections** to the following applications providing the materials used were in keeping with the existing buildings, and any tree preservation orders had been cleared by the Tree Officer and that any refurbishments to listed buildings conform to the Listed Buildings Officer and Conservation Officers' remits:

- |                        |  |
|------------------------|--|
| <b>20/02425/NMA</b>    | Non material amendment to planning application 19/00111/FUL (to add a new obscure glazed window in the side elevation serving the bathroom), 9 Shipley Road            |
| <b>20/02441/FUL</b>    | Garage conversion and replacement of rear window with glazed double doors, 4 Elthorne Way  |
| <b>20/02350/FUL</b>    | Single storey side extension, Pavillion, Willen Road Sports Ground   |
| <b>20/02324/FUL</b>    | Single storey rear extension, side extension and front porch extension including demolition of garage; attached store/utility and detached outbuilding, 16 Willen Road |
| <b>20/02465/FUL</b>    | Construction of 2 semi-detached dwellings, Land to The Rear of 26 High Street  |
| <b>20/02479/FUL</b>    | Two storey side extension, 9 Thomas Drive  |
| <b>20/02484/EIASCO</b> | EIA Scoping opinion for proposed development to the east of the M1 motorway, south of Newport Pagnell  |
| <b>20/02490/FUL</b>    | First floor side extension above garage and change side door to a window, 56 Westbury Lane   |
| <b>20/02493/CLUP</b>   | Certificate of lawfulness for proposed loft conversion with rear dormer and 3no. front roof lights, 16 Annesley Road   |
| <b>20/02530/FUL</b>    | Demolition of existing conservatory and single storey rear extension. Proposed single storey front and rear extensions including new porch, 23 Eliot Close             |
| <b>20/02531/FUL</b>    | Extension to garage and conversion into an office, 17 Hopton Grove   |
| <b>20/02535/CLUP</b>   | Certificate of Lawfulness for the garage conversion, 17 Hopton Grove   |
| <b>20/02544/FUL</b>    | First floor side extension above existing converted garage, 24 Little Linford Lane   |
| <b>20/02557/FUL</b>    | Proposed replacement single storey rear extension, 5 Lovat Street  |
| <b>20/02573/FUL</b>    | Proposed two storey extension and single storey rear extension, 45 Tabard Gardens  |

**5.1.1** **20/02550/FUL - Rear extension to garage and conversion into utility room, w/c and office/snug, 31 Tennyson Drive** - The Committee had no objections in principle to this application but noted that a window in the new extension would be facing No.8 Browning Close and in relatively close proximity to that property. The Committee therefore asked that obscure glazing be used in this window, or alternatively a rooflight added, to overcome the privacy issue.

Patrick Donovan  
Deputy Clerk  
Newport Pagnell Town Council



## DEVELOPMENT MANAGEMENT CONSULTATION

To: Development Plans  
Level 2 Civic Offices  
1 Saxon Gate East  
Central Milton Keynes  
MK9 3EJ

My ref: 20/02484/EIASCO

Date: 13th October 2020

### **Application Type: Other**

**EIA Scoping opinion for for proposed development to the east of the M1 motorway, south of Newport Pagnell, to provide a sustainable urban extension to Milton Keynes  
At: Dummy Upn, London Road, Warrington**

Milton Keynes Council have received the above planning application and would be grateful for any comments you may have. If you have any comments, please provide these electronically by **3rd November 2020**. If for any reason a reply is not possible within this period of time, please make the Case Officer aware should you wish to make any comments, otherwise it will be assumed that you have no comments to make.

Please note, comments should only be made in regards to the material planning considerations of the application. Comments should relate to your specialist area of advice and make reference to the policies and guidance outlined in National Policy, Planning Legislation, the Development Plan, which includes Plan:MK and relevant Neighbourhood Plan (if any), and Supplementary Planning Documents.

The documents relating to this application can be accessed online using the Public Access for Planning webpages ([www.milton-keynes.gov.uk/publicaccess](http://www.milton-keynes.gov.uk/publicaccess)), or by using the Information@Work system.

From: **Elizabeth Verdegem**  
Elizabeth.Verdegem@milton-keynes.gov.uk

## DEVELOPMENT MANAGEMENT CONSULTATION

From: Luke Gledhill, Planning Officer – Development Plans	Our Ref: 20/02484/EIASCO
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**Application no: 20/02484/EIASCO**

**Proposal: EIA Scoping opinion for for proposed development to the east of the M1 motorway, south of Newport Pagnell, to provide a sustainable urban extension to Milton Keynes**

**At: Dummy Upn, London Road, Warrington, ,**

**PLEASE COMPLETE THE BELOW FORM AND RETURN TO:**

**Elizabeth.Verdegem@milton-keynes.gov.uk**

### CONSULTEE ADVICE

Based on the information provided (please tick one):

No Objection

Comments Only

Objection\*

\* Where the Consultee believes their objection cannot be overcome by any amendments or additional information.

**RELEVANT POLICY (if known – Comments should relate to the policies and guidance outlined in National Policy, Planning Legislation, the Development Plan, which includes Plan:MK and relevant Neighbourhood Plan (if any), and the Supplementary Planning Documents)**

**Plan:MK (2019)**

Policy SD10 – Delivery of Strategic Urban Extensions

Policy SD12 – Milton Keynes East Strategic Urban Extension

**Milton Keynes East Development Framework Supplementary Planning Document (MKE Development Framework SPD) (2020)**

**KEY CONSIDERATIONS (These should relate solely to your specialist area of advice and be in bullet point form as a summary)**

Which planning matters should the EIA Scoping Opinion and Environmental Statement address
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### CONSULTEE ASSESSMENT (Detailed Consultee assessment)

The application site is part of the wider mixed-use Milton Keynes East (MKE) land allocation within Plan:MK: refer to Policy SD12 in Plan:MK for more details of the allocation.
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Paragraph 6.1.3 of the MKE Development Framework SPD states “It is likely that any planning
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## DEVELOPMENT MANAGEMENT CONSULTATION

application will need to be supported by an Environmental Impact Assessment. Developers are encouraged to seek a Screening Opinion from the local planning authority in advance of submitting a planning application.”

As such, it is considered the issue of an EIA Scoping Opinion at this time fits in with the delivery timelines set out in the MKE Development Framework SPD.

The Development Plans team has no comments on the likely environmental impacts of the proposed development. It is recommended that the case officer consults specialist officers within the council, such as (but not limited to) the Council’s Ecologist and Lead Local Flood Authority officers, and external consultees such as (but not limited to) the Environment Agency and Natural England who will be better placed to advise on the likely environmental impacts of the development and what information should be supplied with any future planning application. It is a matter of professional judgement for the case officer to decide who should be consulted on the EIA Scoping Opinion.

In line with prior advice from the Council’s Strategic Lead for Transport Policy and Planning it is advised that Council Highways Development Control officers should be consulted for their view on the likely traffic impact of the proposals.

While it is considered acceptable to issue an EIA Scoping Opinion, the applicant should bear in mind a requirement of policies SD10 and SD12 that development of the application site can only commence once the necessary strategic infrastructure required to make the site deliverable is funded and is being delivered. At this moment in time, a funding stream for the cross-M1 bridge to the site has been secured from central government. It is understood that parties are engaged in pre-application discussions regarding the design and delivery of the strategic highway infrastructure to inform a future planning application for such infrastructure.

**RECOMMENDATION (Please draft any suggested reasons for refusal or suggested conditions including reference to relevant Planning Policy. If amendments or additional information is required please make your requirements clear)**

It is considered that now is an appropriate time to issue an EIA Scoping Opinion. It is recommended that the Highways Development Control team and other statutory and non-statutory consultees are consulted as necessary for their specialist views of the likely environmental impacts of the proposed development. The applicant should also consider the timelines for delivery of strategic infrastructure at the site while planning when to submit future planning applications for development on the site.

Date response sent:	30.10.2020
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**From:** Blandamer, David  
**Sent:** 26 October 2020 15:59  
**To:** Verdegem, Elizabeth  
**Cc:** Urban Design  
**Subject:** RE: Planning Consultation/Notification from Milton Keynes Council regarding 20/02484/EIASCO

Elizabeth

I don't have any comments to make on this application.

Regards  
David

David Blandamer  
Senior Urban Designer  
T: 01908 254836

Milton Keynes Council | UDLA | Placemaking | Planning, Strategic Transport and Placemaking | Civic Offices | 1 Saxon Gate East | Milton Keynes | MK9 3EJ Please Note: My working days are Monday, Tuesday, Wednesday, and Thursday

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-----Original Message-----

**From:** Verdegem, Elizabeth <Elizabeth.Verdegem@milton-keynes.gov.uk>  
**Sent:** 13 October 2020 15:05  
**To:** Urban Design <Urban.Design@Milton-keynes.gov.uk>  
**Subject:** Planning Consultation/Notification from Milton Keynes Council regarding 20/02484/EIASCO

Please find attached a planning consultation from Milton Keynes Council Planning Department regarding Dummy Upn London Road Warrington

and park land. The land is otherwise bounded to the south-west by the M1 and to the north by A422/A509. It is bisected by London Road (A509), and the River Ouzel flows through the western half of the site. The areas is mostly agricultural land, peppered with clusters of farm buildings, including the listed Holiday Inn building (Grade II).

The agricultural land is designated as grade 3, and the land is mostly arable fields, defined by hedgerows, there are small areas of woodland and other vegetation across the site. Most of the site is in Floodzone 1, with Floodzone 2 and 3 forming a floodplain near the River Ouzel to the west side of the site. In addition to the Holiday Inn building, there are further listed buildings within Moulsoe, including Grade 1 Church of St Mary.

The River Ouzel and adjacent land buffer form a wildlife corridor, and the area is a mixture of green, amber and red risk zones for Great Crested Newts. There is a small Local Wildlife Site to the east of London Road (approx. 450 metres south of A509), but aside from evidence of protected species records, there are no other wildlife designations within the application site.

The site forms part of the Milton Keynes East (MKE) site allocation which is allocated to deliver around 5000 homes, employment, schools, local centres, green infrastructure, public transport infrastructure, and other associated infrastructure.

## **The Proposal**

It is understood that the figures provided in the applicant's Scoping Report are to be considered maximums, with further refinement on the figure to be conducted during the pre-application work and defined at the application stage. The Environmental Statement will therefore include assessment based on the following proposal:

- Approximately 4,000 homes (within 10-15% of this figure);
- Approximately 85 hectares of employment land (including B2 and B8);
- A community hub including a range of shops and services;
- other facilities within the site such as allotments and burial space;
- A 10FE secondary school;
- 3 x 2/3FE primary schools;
- A linear park along the River Ouzel corridor;
- New redways, pedestrian and cycle routes including a number of grade separated crossings;
- Strategic highway infrastructure, including a new bridge over the M1 motorway, a new bridge over the River Ouzel floodplain and a new bridge over the River Ouzel on Tongwell Street;
- Access roads and other transport infrastructure, including buses, connecting into Milton Keynes;
- The diversion of some existing Public Rights of Way and the Stopping Up of some lengths of Public Highway to facilitate development and delivery of the strategic highway infrastructure;
- A new bridge over the M1 motorway, access route and other transport infrastructure connecting into Milton Keynes; and
- Associated infrastructure, drainage and other works.

The proposal is likely to come forward in the form of a hybrid planning application, with road infrastructure in detail, and the remaining parcels of development in outline form. It is understood that construction is likely to take approximately 26 years (2022 to 2048).

### **Scoping Opinion**

This Scoping Opinion is issued under The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended). The Council has consulted the consultation bodies as described in Regulation 2(1), and required under Part 4, Regulation 15 (4):

Natural England  
Environment Agency

The following officers/organisations have also been consulted:

MKC Archaeological Officer  
MKC Conservation Officer  
MKC Landscape Architect  
MKC Environmental Health Officer  
MKC Highways Officer  
MKC Countryside Officer (Ecology)  
MKC Urban Design  
MKC Flood and Water Management (LLFA)  
MKC Development Plan (Planning Policy)  
Historic England  
Highways England  
Anglian Water  
Bedford Group of Internal Drainage Boards  
Central Bedfordshire Council

In addition, the following parties have been notified of the Scoping Opinion request:

Moulsoe Parish Council  
Newport Pagnell Town Council  
Great Linford Parish Council  
Campbell Park Parish Council  
Ward councillors for Newport Pagnell South ward  
Ward councillors for Broughton ward  
Ward councillors for Olney ward

### **Considerations**

Notwithstanding the submitted information and following comments, the Environmental Statement must include the information required by Schedule 4 of The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (as amended).

The following topic areas have been identified by the applicant as requiring inclusion and assessment in the Environmental Statement:

### Transport

The cumulative impacts on traffic and transport infrastructure as part of the MKE allocation are considered to be significant. Significant modelling and transport assessment work has already been undertaken, and continues to develop during the pre-application stages, which is supported by the Council's Highways Officers.

It is noted that formal comments have not been received by Highways England, although it is understood that discussions between the applicants and Highways England are ongoing regarding the transport modelling and impact on the strategic highway network. Given the strategic importance and likely impact of the site, the Council will continue to seek Highways England's formal view, and will forward this on once received. Consideration should also be given to the comments received from Central Bedfordshire Council, in relation to the assessment of routes towards Cranfield.

Subject to the above the approach set out in the Scoping Report is accepted.

### Landscape and Views

The cumulative and standalone introduction of 4000 homes and associated infrastructure amongst the rest of the MKE allocation within the rural area is considered likely to give rise to significant landscape and visual impacts. MKE is likely to be visible from various vantage points due to the topography of the land either side of the M1, and have a significant impact on the character of the area. The Council's Landscape Architect notes that the cumulative impact of the MKE allocation must be considered as part of a Landscape Visual Impact Assessment (LVIA).

Detailed discussions regarding the scope of the LVIA have been ongoing during the pre-application stage regarding the appropriate views. Subject to the above comments, and the continued discussions at the pre-application stage regarding the detail of the LVIA, the approach set out in the Scoping Report is accepted.

### Ecology/Biodiversity

The assessments to be undertaken on the existing ecology on the site is agreed. Use of the survey work to inform the masterplanning and location-based mitigation is agreed, as is the provision of a green infrastructure strategy for the site. The strategy must demonstrate a biodiversity offsetting approach to show a net gain using the appropriate biodiversity impact assessment metric and follow the mitigation hierarchy. Consideration and protection of ecology and biodiversity habitats during the construction phase will also be required.

It is recommended that you consider the advice provided by Natural England in their consultation response for additional advice on the extent of information included in the ES.

Any further discussions regarding detailed mitigation should continue as part of pre-application discussions with the Council's Ecology Officer.

#### Air Quality, Noise and Vibration

The approach to air quality, odour and noise assessments are supported, both for operational and construction phases of the development.

#### Ground Conditions and Contamination

The approach for the assessment of ground conditions is agreed.

#### Historic built environment

The approach for the Heritage Assessment, in particular taking into account the listed buildings in Moulsoe and the Grade II listed Holiday Inn building, is agreed. The potential impacts on those assets should be considered as part of the LVIA work, and further discussions should continue with the Council's Conservation Officer.

#### Archaeology

Comments from the Council's Archaeological Officer set out some concerns with the approach proposed as part of the Scoping Report, though it is understood that discussions are ongoing between parties to agree this approach. Provided that the comments from Archaeological Officer are taken into account, it is considered that the approach to archaeology within the ES (and as part of the application submission) can be agreed.

#### Flood Risk Drainage

The Lead Local Flood Authority (LLFA) and Environment Agency consider the approach to flood risk and drainage as outlined to be acceptable. It is recommended you consider the detailed advice provided by the LLFA, for the extent of information required as part of the ES and application submission.

#### Socio-Economic

The approach to baseline considerations and assessment as set out in the Scoping Report is agreed. As the proposal is part of MKE which is to effectively become a separate settlement in the borough, any considerations of socio-economic factors should be considered in light of the rest of the MKE allocation, and should consider integration between the developments being brought forward by the separate landowners/developers. Planning policy should be complied with in terms of mix, tenure and type of housing, and some coordination should be had between parties on the masterplanning work. Evidence should be provided within the application that the education/local centre and other services provision proposed is sufficient for the likely future demographic make-up of the site, with consideration of the provision proposed in the remainder of MKE.

## Climate Change and Resilience

The Council has made a commitment to reducing the borough's contribution to climate change and encouraging sustainability throughout the borough. Therefore, issues of sustainability, carbon neutrality and climate change are considered important topics that should be fully assessed, and the approach outline in the Scoping Report is agreed. Further information on the Sustainability Strategy should be covered elsewhere in the application submission.

## Waste

The approach to the assessment of waste impacts and potential mitigation is agreed.

## Other Matters

The approach to the other topics listed (pages 84-86 ) in the Scoping Report is agreed, in that they do not require inclusion with the ES, but can be included in the remainder of the application submission.

## **Conclusion**

In taking account of the information provide, considering the specific characteristics of the development and the environmental features likely to be significantly affected by the development, it is considered that the key environmental issues have been identified within the Scoping Report submitted, and that no additional topics require covering in the Environmental Statement. The approach to the Environment Statement to be submitted with the planning application is therefore considered acceptable.

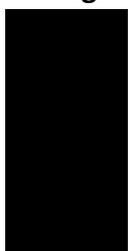
Further discussions regarding the other supporting information required for the application (in accordance with the Council's Local Validation List and other national validation requirements) can be discussed during pre-application discussions. You are encouraged to review the consultee comments received, which contain specific and generic advice, and are available on the Council's public access website.

Yours faithfully,

**Elizabeth Verdegem**

Team Leader - West Team  
Development Management

**Countersigned by**



**Paul Keen**

Team Leader - East Team

Development Management

**For and on behalf of the Head of Planning**