Crow Ecology

Creating a Nest for your Project & Nature

Preliminary Ecological Appraisal Report

Site: Proposed Housing development with associated gardens and access – Land south of 'The Drove' Osbournby, NG34 0DH

Client: Y6 Architectural Ltd. on behalf of their client

Date of Survey: 31st October 2022

Prepared by Chris Crow BSc (Hons), ACIEEM.

NE Bat License No: 2015-11015-CLS-CLS
NE Great Crested Newt License No: 2015-18094-CLS-CLS
NE Barn Owl License No: CL29/00149

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Validity of survey data and report. The findings of this report are valid for 24 months from the date of survey. If work has not commenced within this period, an updated survey by a suitably qualified ecologist will be required.

Contents

1. Summary

Crow Ecology was commissioned by Y6 Architectural Ltd. on behalf of their client to undertake a Preliminary Ecological Appraisal (PEA). The purpose of the PEA survey is to identify the habitats and species present; evaluate the ecological value of the survey area and determine the ecological impacts if necessary. PEA provides an ecological baseline from which further recommendations/surveys can be highlighted.

The survey is required to inform a proposed planning application which is to be lodged with the local planning authority, in this case North Kesteven District Council.

The project site is a parcel of land to the south of 'the Drove' Osbournby, NG34 0DH. Copies of the proposed development were provided by: Y6 Architectural, 22 Low Road, Worlaby. North Lincs, DN20 0LX.
The proposed development is:

Proposed housing development of 19 plots with associated gardens and access.

The PEA survey was undertaken on the 31/10/22 in suitable weather conditions for this type of survey.

A desktop study was performed to review the site using data from the Greater Lincolnshire Nature Partnership (GLNP). Google maps were used to review the site.

There are no statutory designated sites, no non-statutory designated sites and no forms of Priority Habitat within a 1km radius of the project site. The project site has no designations.

The site consists of eight different habitats: Intact Hedge – Native species-rich, Hedge and Tree – Species-poor, Hedge and Tree – Dry ditch, Woodland – Broad-leaved – Semi-natural, Parkland.scattered trees – Broad-leaved, Tall ruderal, Poor semi-improved Grassland and Scrub – Dense/continuous. Intact Hedge – Native species-rich and Hedge and Tree – Species-poor are UKBAP and LBAP priority habitats. None of the plant species present are protected or notable.

No further surveys are required.

The following recommendations have been made; measures include:

- Breeding bird survey (only if clearing/felling is scheduled to take place between 1st March – 31st August)
- Lighting Specifications if applicable
- PWMS for Mammals
- PWMS for Dry-ditch

Biodiversity Enhancement Recommendations include:

- Enhanced amenity grassland turfing/sowing
- Native tree planting
- Swale enhancement
- Dry-ditch enhancement
- Integrated Bat boxes
- Tree-mounted bat box
- Integrated bird boxes
- Hedgehog highways

2. Introduction

Crow Ecology was commissioned by Y6 Architectural Ltd. on behalf of their client to undertake a Preliminary Ecological Appraisal (PEA). The PEA survey took place on the 31st October 2022 by Chris Crow ACIEEM. The purpose of the PEA survey is to identify the habitats and species present; evaluate the ecological value of the survey area and determine the ecological impacts if necessary. PEA provides an ecological baseline from which further recommendations/surveys can be highlighted[1].

Recommendations for mitigation and/or further survey work can be made to reduce the impact on these habitats and species and therefore potential constraints to any development which might take place.

2.1 - Site Location

The project site is a parcel of land to the south of 'the Drove' Osbournby, NG34 0DH. Grid Reference TF072381[2].

The surrounding landscape and land use is mixed. Immediately, in North, East and western bearings is the village of Osbournby with its associated residential properties and private gardens. A number of these gardens have planted trees/shrubs. Beyond the village, in all bearings are agricultural fields with associated hedgerows and drains. There are numerous parcels of woodland most notably within the surrounding countryside to thew NW and SE of the project site. A small number of waterbodies are scattered within the surrounding landscape.

Figure 2.1 - Aerial view with project site illustrated within the wider landscape (not to scale). Source – Google Maps 2022[3].

2.2 - Site Description

The project site is approximately 0.7 hectares (ha). The northern boundary is an Intact species-rich hedgerow. The eastern and southern boundaries are a Species-poor Hedge and Tree habitat. The western boundary is timber-panelled fencing of the neighbouring properties of 'Pinfold close'. Adjacent to the eastern and southern boundary is a dry-ditch. Surrounding the southern dry-ditch northern bank and eastern boundary western bank are likely self-seeded trees/shrubs. Tall ruderal vegetation borders the SE section of the likely self-seeded trees and shrubs. Tall ruderal vegetation also borders the western

boundary. In the NE and SW section of the site is Semi-improved grassland and the remaining habitat; the largest by area is dense/continuous scrub.

Figure 2.2 - Aerial view of project site illustrated and the development boundary (not to scale or accuracy). Source – Google Maps 2022[3].

Within the development boundary there are 8 habitats:

- Intact-Species-rich hedgerow
- Species-poor Hedge and Tree
- Dry ditch
- Semi-natural broad-leaved woodland
- Broad-leaved scattered trees
- Tall ruderal vegetation
- Semi-improved neutral grassland
- Dense/continuous scrub

Please see appendix 1 for the existing layout of the site.

2.3 - Site Proposal

The planning application is:

- Proposed housing development of 19 plots with associated gardens and access.

Please see appendix 2 for the proposed layout of the site.

3. Methods

This report has been written following the guidelines below:

JNCC Handbook for Phase 1 habitat survey - A technique for environmental audit[1]
Great Crested Newt Mitigation Guidelines (2001) by English Nature[4]
The Bat Conservation Trust: Bat Surveys for Professional Ecologists - Good Practice Guidelines (3rd edition 2016)[5]
Wild birds: Advice for making planning decisions Crown Copyright (2022)[6]
Badgers: Advice for making planning decisions Crown Copyright (2022)[7]
Reptile mitigation guidelines Natural England Technical Information Note TIN 102 Natural England (2011)[8]
Strachan et al (2011) Water Vole Conservation Handbook – 3rd Edition[9]
The Code of Professional Conduct and guidelines as laid down by the Chartered Institute of Ecology & Environmental Management (CIEEM).

3.1 - Phase 1 Habitat Survey

The site was surveyed on the 31st October 2022 using the JNCC methodology (2010)[1] to produce a report, phase 1 habitat map and a species list of what is on the site. Target notes, with supplementary information were created to highlight the potential for protected species and areas of ecological value within the site and surrounding area.

The Phase 1 map was digitised using QGIS software.

This method involves an analytical walk around the site and each habitat type was drawn onto a blank base map of the site and coded using the JNCC standard codes. The dominant species in each habitat were coded and target notes were made when areas of ecological interest where encountered.

3.2 - Desktop Study

A desktop study was performed to review the site using data from the Greater Lincolnshire Nature Partnership (GLNP)[10]. This data search includes designated sites, priority habitats and protected and/or notable species. The search included all records within 1km of the site from the centre of the project site located at grid reference TF072381[2]. Google maps were also used to review and map the site[3].

3.3 - Method Justification

A Preliminary Ecological Appraisal (PEA) was undertaken as the project site has habitats that may support protected or notable species. A 1km data search radius was selected as the proposed development is small and staying within the property boundary. Therefore, if there are ecological impacts to consider, this impact would only be localised.

3.4 - Survey Personnel

Chris Crow BSc (Hons) has over 10 years of surveying experience and holds the following Natural England (NE) licences;

Bat Licence No: 2015-11015-CLS-CLS
Great Crested Newt Licence No: 2015-18094-CLS-CLS
Barn Owl Licence No: CL29/00149

4. Survey Results

4.1 - Desktop Study (Data Search)

4.1.1 – Statutory Sites

4.1.1.1 - Statutory

There are no statutory designated sites within the 1km search radius[10].

4.1.1.2 – Non-Statutory

There are no non-statutory designated sites within the 1km search radius[10].

4.1.2 – Priority Habitat Data

There are no ancient woodlands present and no forms of Priority Habitat within the 1km search radius[10].

4.1.3 - Species Records

Species records were obtained from GLNP[10]. Within the 1km search radius of the site, 40 historical records of species which have one or more designations as notable and or protected species was identified. None of the records are from the project site. A number of the species are of particular interest to this project site: Barn owl *Tyto alba,* Bullfinch *Pyrrhula pyrrhula,* Cuckoo *Cuculus canorus,* Fieldfare *Turdus pilaris,* House Sparrow *Passer domesticus,* Lesser Redpoll *Acanthis cabaret,* Linnet *Linaria cannabina,* Song Thrush *Turdus philomelos,* Starling *Sturnus vulgaris,* Tree Sparrow *Passer montanus,* Badger *Meles meles,* Water Vole, *Arvicola amphibius,* Hedgehog *Erinaceus europaeus,* Common Pipistrelle *Pipistrellus,* Brown long-eared *Plecotus auritus* and Myotis sp.

House sparrow was identified during the survey. The above species have the potential to either forage/commute/shelter/roost or nest accordingly within the project site. Other species from the historical records have been excluded because of their distance or the habitats within the project site being unsuitable.

The full list of historical records for this 1km search radius is available upon request.

4.2 - Summary of PEA Survey

Date	Weather	Equipment Used
31/10/22	13ºC 10% Cloud No Rain Wind – 0 (Beaufort scale)	Binoculars Wildflower Key guide[11] CAT S61 Thermal imaging camera phone.
Comments - None		

4.2.1 - Survey Limitations

The site was fully accessible on the day of the field survey. However, it should be noted that whilst the survey was fittingly intensive and feel that no matters have been overlooked there is always potential for some species to be overlooked due to the time of year, time of day and movement of species.

4.3 Habitats

See Phase 1 Map (appendix 3)
See Species list (appendix 4)

4.3.1 - Miscellaneous – Boundaries – Intact Hedge – Native species-rich (J2.1.1)

This habitat is present along the northern boundary. The hedge is abundant with Hawthorn *Crataegus monogyna*. Blackthorn *Prunus spinosa* is frequent. Other species include: Elder *Sambucus nigra,* Dogwood *Cornus sanguinea,* Bramble *Rubus fruticosus* and Dog rose *Rosa canina.* Three stands of trees are present; one Horse chestnut *Aesculus hippocastanum* and two Ash *Fraxinus excelsior*. Both trees have no Potential Roost Features (PRF's) for bats. The field layer is dominated by Ivy *Hedra helix* and Common nettle *Urtica dioica* with Cleavers *Galium aparine* also present. Please see plate 4.1.

4.3.1.1 – Target Note 1 - Birds

The hedgerow has potential for nesting and foraging birds.

4.3.1.2 – Target Note 2 – Bats

The hedgerow has potential for foraging bats.

4.3.1.3 – Target Note 3 – Mammals

The hedgerow has potential for sheltering small mammals such as Hedgehog

Plate 4.1 – facing west, the Intact Native species-rich hedgerow of the northern boundary

4.3.2 - Miscellaneous – Boundaries – Hedge and Tree – Species-poor (J2.3.2)

This habitat is present along the southern and eastern boundaries. The southern boundary is abundant with Common hawthorn Blackthorn is frequent. Other species include: Elder and Dog rose. The field layer is dominated by Ivy and Common nettle. There are seven stands of trees; 2 Goat willow *Salix caprea* and 5 Ash. Two mature Ash trees have PRF's. One ash tree (Grid Ref: TF 07262 38085) has gaps behind mature ivy stems. The other Ash (Grid ref: TF 07288 38092) has Woodpecker holes, Rot holes, Knot holes and gaps behind mature ivy stems.

The eastern boundary is of a younger age. Hawthorn is dominant with the occasional Elder. Ash is the dominant tree species with Goat willow occasional. Again, the field layer is dominated by Ivy and Common nettle with Cleavers present. Please see plate 4.2 – 4.3.

4.3.2.1 – Target Note 1 - Birds

The hedge and tree habitat has potential for nesting and foraging birds.

4.3.2.2 – Target Note 2 – Bats

The hedge and tree habitat has potential for foraging bats.

4.3.2.3 – Target Note 3 – Mammals

The hedge and tree habitat has potential for sheltering small mammals such as Hedgehog

4.3.2.4 – Target Note 4 – Bats

Two Ash trees on the southern boundary have PRFs for bats.

Plate 4.2 (L) – facing SE, the Hedge and Tree habitat of the southern boundary in the background (R) – facing NE, the Hedge and Tree habitat of the eastern boundary in the background

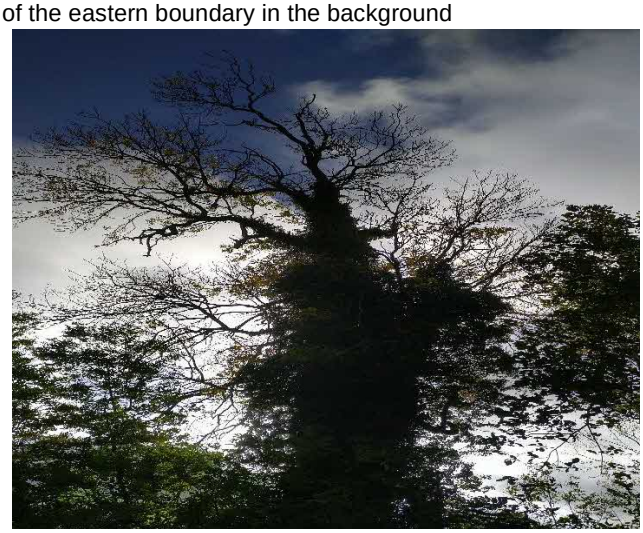

Plate 4.3 – facing South, the Ash tree (Grid ref: TF 07288 38092) on the southern boundary with a number of PRF's

4.3.3 - Miscellaneous – Boundaries – Hedge and Tree – Dry ditch (J2.3.6)

This dry-ditch runs adjacent to the southern and eastern boundaries. There was a small body of water present during the survey but only in certain areas which suggests that this ditch is only seasonally wet. In addition, there is no aquatic vegetation present which correlates with the ditch being dry for large parts of the year. The southern and eastern bank have the Hedge and tree habitats and the northern and western banks have likely-self-seed broad-leaved woodland trees that will reduce the likelihood of the ditches ability to retain water. Please see plates 4.4 – 4.5

The ditch was assessed for Water vole *Arvicola amphibius* Habitat Suitability[12]. The watercourse depth is approximately 70cm with a Freeboard (where water is present) is approximately 65cm. The width is approximately 2m. Both banks have no vegetation cover other than Ivy and Common nettle. Leaf litter from the surrounding trees covers the banks and base. The ditch is predominately shaded throughout the day. There is no berm to either ditch. There is no sufficient availability of food sources present due to the limited vegetation. The banks tree roots have potential for burrows. The banks are not steep or high enough and would be subjected to flooding in extreme cases. There is no nest building potential too due to the limited surrounding flora.

Where able to assess, the banks were assessed on both sides for evidence of Water vole in the forms of: burrows, feeding stations, lawns and runways; there was no evidence. The shoreline of the ditch was also assessed for faeces, latrines and footprints; there was no evidence. Items within the ditch such as rubbish, fallen branches and stones was also assessed for Water vole presence; no evidence was found. No Water voles are present and the ditch is unsuitable for Water voles.

4.3.3.1 - Target Note 5 – Waterbody

The proposed development, in the absence of mitigation could result in discharge into the ditch

Plate 4.4 – Southern dry-ditch (L) facing south, an area of the ditch where a low-level of water was present (R) – facing east, a typical view of the ditch

Plate 4.5 – Eastern dry-ditch facing south, a typical view of the ditch

4.3.4 – Woodland and scrub – Woodland – Broad-leaved – Semi-natural (A1.1.1)

This habitat classification is the closest representation for the likely self-seeded trees adjacent to the northern bank of the southern dry ditch and the western bank of the eastern bank. Goat willow is dominant in both sections. Hawthorn is present in both sections too and White willow *Salix alba* is also present in the southern section. Bramble is encroaching into this habitat.

The field layer is limited due to the leaf litter. Common nettle and Ivy are dominant with other tall ruderal species present such as: Cleavers, Broad-leaved dock *Rumex obtusifolius,* Creeping thistle *Cirsium arvense* and Cow parsley Anthriscus *sylvestris.* Please see the foreground of plate 4.2 and plate 4.6.

4.3.4.1 – Target Note 1 - Birds

The self-seeded trees have potential for nesting and foraging birds.

4.3.4.2 – Target Note 2 – Bats

The self-seeded trees have potential for foraging bats.

Plate 4.6 – (L) facing east, the self-seeded woodland adjacent to the dry ditch of the southern boundary (R) – facing SE, the self-seeded woodland adjacent to the dry ditch of the eastern boundary

4.3.5 – Woodland and scrub – Parkland.scattered trees – Broad-leaved (A3.1)

This habitat represents the single stand of Ash adjacent to the western boundary (Grid ref: TF 07204 38108). The tree has a single hollow/cavity PRF on one of its branches. The Ivy stems are too immature to be a suitable PRF for bats. Please see plate 4.7

4.3.5.1 – Target Note 1 - Birds

The self-seeded trees have potential for nesting and foraging birds.

4.3.5.2 – Target Note 2 – Bats

The self-seeded trees have potential for foraging bats.

4.3.5.3 – Target Note 4 – Bats

The tree has a PRFs for bats.

Plate 4.7 (L) facing south, the Ash tree adjacent to the western boundary (R) – facing west, the PRF highlighted

4.3.6 – Tall Herb and Fern – Other – Tall ruderal (C3.1)

This habitat is present is present adjacent to the western boundary and in-between the dry-ditch and Semi-natural Broad-leaved woodland on the southern boundary.
Adjacent to the western boundary, Common nettle is dominant. Other species include: Ivy, Creeping thistle, Cleavers, Broad-leaved dock, Cow parsley, Garlic mustard *Alliaria petiolata*, Herb robert *Geranium robertianum* and Rosebay willowherb *Chamaenerion angustifolium.*

In-between the dry-ditch and Semi-natural Broad-leaved woodland on the southern boundary Common nettle is dominant. Other species include; Creeping thistle, Cow parsley, Cleavers, Broad-leaved dock and Rosebay willowherb. Please see plates 4.6 (L), 4.7 (L) and 4.8.

Plate 4.8 (L) – facing east, the tall ruderal vegetation in the central southern section of the site. (R) – facing west the tall ruderal vegetation in the SE section of the site.

4.3.7 – Grassland and Marsh – Poor semi-improved Grassland (B6)

This habitat is present in the NW, SW and NE sections of the site. All areas have undesirable ruderal species present and will fall to succession by the surrounding Bramble scrub that is already encroaching.

In all sections of the site Cocks-foot *Dactylis glomerata* is abundant. Other species include, Annual meadow grass *Poa annua,* Tufted hair-grass *Deschampsia cespitosa,* Meadow fescue *Festuca pratensis* Perennial Rye Grass *Lolium perenne*, Red fescue *Festuca rubra,* False oat grass *Arrhenatherum elatius* and Meadow foxtail *Alopecurus pratensis*.

Herbaceous species include: Ribwort plantain *Plantago lanceolata*, Yarrow *Achillea millefolium,* Creeping buttercup *Ranunculus repens,* Common vetch *Vicia sativa,* Herb robert and Common sorrel *Rumex acetosa.*

Patches of tall ruderal vegetation most notably Broad-leaved dock are present too within this area. Other species include: Common nettle, Common ragwort *Jacobaea vulgaris*, Creeping thistle, Cow parsley and Rosebay willowherb.

As stated, the surrounding bramble scrub is encroaching. Other shrub species present are: Goat willow, Dog rose and a single stand of Silver birch *Betula pendula.* Please see plates 4.7 (L) and plate 4.9.

4.3.7.1 – Target Note 3 – Mammals

Hedgehogs and other mammals may forage/commute through the grassland.

Plate 4.9 (L) – facing NE, the Poor SI grassland in the SW section of the site (R) – facing SW, the Poor SI grassland in the NE section of the site

4.3.8 – Woodland and scrub – Scrub – Dense/continuous (A2.1)

This habitat is the largest by area on-site and is present in all areas of the site. Bramble is dominant. Other species include: Goat willow, Dog rose, Hawthorn and Buddleja *Buddleja sp.* Please see plate 4.10 - 4.11.

4.3.8.1 - Target Note 1 - Birds

The scrub habitat is suitable for breeding birds.

4.3.8.2 – Target Note 3 – Mammals

Hedgehogs and other mammals may forage/shelter in the scrub.

Plate 4.10 – facing south, the dense Bramble scrub in the left of the plate. (R) – facing NE, the dense Bramble scrub adjacent to the Poor SI grassland in the SW section of the site

Plate 4.11 – facing SE, the dense Bramble scrub adjacent to the Poor SI grassland in the NE section of the site. (R) – facing west, the dense Bramble scrub adjacent to the Poor SI grassland in the NE section of the site

4.3.9 – Immediate Surrounding habitats

To the north, east and west of the project site are residential properties. To the east are residential properties with associated gardens. To the south of the site is a Poor SI grassland playing field surrounded hedge and tree habitat. This bearing connects to the wider landscape by an arable field and beyond. Please see plate 4.12

Plate 4.12 – facing south, the Poor SI grassland of the neighbouring playing field

4.3.9.1 – Target Note 3 – Mammals

The southern boundary has connectivity to the wider landscape which is suitable for mammals such as Badgers, Brown hare *Lepus europaeus* and Hedgehogs.

5. Evaluation

5.1 – Designated Sites

5.1.1 – Statutory Sites

There are no statutory designated sites within the 1km search radius[10].

5.1.2 – Non-Statutory Sites

There are no non-statutory designated sites within the 1km search radius[10].

5.2 – Priority Habitats

There are no ancient woodlands present and no forms of Priority Habitat within the 1km search radius[10].

5.3 – Species Records

Species records were obtained from GLNP[10]. Within the 1km search radius of the site, 40 historical records of species which have one or more designations as notable and or protected species was identified. None of the records are from the project site. A number of the species are of particular interest to this project site: Bullfinch, Cuckoo, Fieldfare, House Sparrow, Lesser Redpoll, Linnet, Song Thrush, Starling, Tree Sparrow, Badger, Water Vole, Hedgehog, Common Pipistrelle, Brown long-eared and Myotis sp.

House sparrow was identified during the survey. The project sites trees and shrubs have the potential to support breeding birds, foraging bats and roosting bats. Badgers and Hedgehogs may forage and/or commute through the project site, most notably in the grassland, tall ruderal vegetation and dense scrub habitats.

5.3.1 – Conclusion

Please see chapters 7 and 8 for recommendations and enhancements.

5.4 – Project Site

5.4.1 – Habitats

The ecological value of the habitats present on site is assessed by their presence on the UK and LBAP's and their ability to support protected or notable species. Along with the priority habitat descriptions from UKBAP[13], Lincolnshire BAP[14] (see below) and the habitat distinctiveness as determined by Natural England Biometric[15], holistically this site has a Moderate ecological value. Those habitats which meet any of these criteria and/or are considered likely to be impacted by the proposals are highlighted as notable considerations. See table below:

Habitat	UKBAP (Y/N)	Lincolnshire BAP (Y/N)	Notable consideration (Y/N)
Miscellaneous – Boundaries – Intact Hedge – Native species-rich (J2.1.1)	Y	Y	Y
Miscellaneous – Boundaries – Hedge and Tree – Species-poor (J2.3.2)	Y	Y	Y

Miscellaneous – Boundaries – Hedge and Tree – Dry ditch (J2.3.6)	N	N	Y
Woodland and scrub – Woodland – Broad-leaved – Semi-natural (A1.1.1)	N	N	Y
Woodland and scrub – Parkland.scattered trees – Broad-leaved (A3.1)	N	N	Y
Tall Herb and Fern – Other – Tall ruderal (C3.1)	N	N	Y
Grassland and Marsh – Poor semi-improved Grassland (B6)	N	N	Y
Woodland and scrub – Scrub – Dense/continuous (A2.1)	N	N	Y

Table 5.1 – The list of habitats on site and their importance in relation to the UK and Lincolnshire BAP priority habitats.

5.5 – Impact Assessment in the Absence of Mitigation

5.5.1 - Miscellaneous – Boundaries – Intact Hedge – Native species-rich (J2.1.1)

This habitat has a Medium ecological value[15] and is a UK and LBAP priority habitat[13,14]. There are no protected or notable species present. The hedgerows may provide a food-source for a number of invertebrates, which in turn are a food-source for birds and small mammals. The hedgerows are suitable for breeding birds due to their dense composition and the invertebrates these hedgerows will support may provide suitable foraging and/or commuting for bats. This dense hedgerow may also provide shelter for small mammals.

Under the proposed development approximately 70% of this habitat will be cleared and replaced with tarmac, footpaths and permeable paving. These habitats have a very-low ecological value[15]. Without mitigation and compensation this could result in the loss of habitat for the above species. This would have a moderate negative impact at site level.

5.5.1.1 - Conclusion

Please see sections 7.1.1 – 7.1.3 for recommendations and sections 8.1 – 8.2 and 8.7 for biodiversity enhancements.

5.5.2 - Miscellaneous – Boundaries – Hedge and Tree – Species-poor (J2.3.2)

This habitat has a High ecological value[15] and is a UK and LBAP priority habitat[13,14]. There are no protected or notable species present. The hedge and trees may provide a food-source for a number of invertebrates, which in turn are a food-source for birds and small mammals. The hedge and trees are suitable for breeding birds due to their dense composition and the invertebrates this habitat will support may provide suitable foraging and/or commuting for bats. This dense nature of this habitat may also provide shelter for small mammals. Two Ash trees also have PRFs for bats.

Under the proposed development, this habitat will be retained but it is probable that the eastern boundary will be pruned to minimise their spread and encroachment onto the dwellings. Without mitigation, pruning and artificial light from the dwellings has the potential to disturb breeding birds and/or foraging/commuting/potentially roosting bats. This would have a minor negative impact at site level.

5.5.2.1 - Conclusion

Please see sections 7.1.1 – 7.1.3 for recommendations and sections 8.1 – 8.2 and 8.7 for biodiversity enhancements.

5.5.3 - Miscellaneous – Boundaries – Hedge and Tree – Dry ditch (J2.3.6)

Along with the adjacent Hedge and tree habitat, this habitat has a High ecological value[15]. The ditch is dry for most of the year as no associated aquatic vegetation is present; this along with been heavily shaded by the surrounding trees on both banks results in the ditch habitat being unable to provide biodiversity. For the reasons stated in section 4.3.3 the ditch is an unsuitable habitat for Water vole.

The construction phase has the potential to create run-off into this ditch and the potential to pollute it from chemicals or silt. Without mitigation, this could affect the 'water quality' and thereby reduce its biodiversity potential.

Under the proposed development the dry-ditch will be retained and remain undeveloped. There is the opportunity to enhance this habitat and increase the biodiversity of this habitat post-development.

5.5.3.1 - Conclusion

See section 7.1.5 for recommendations and section 8.4 for Biodiversity enhancements.

5.5.4 – Woodland and scrub – Woodland – Broad-leaved – Semi-natural (A1.1.1)

This habitat has a Medium ecological value[15]. All trees and shrubs are likely self-seeded and are immature. The woodland may provide a food-source for a number of invertebrates, which in turn are a food-source for birds and small mammals. The trees and shrubs are suitable for breeding birds and the invertebrates this habitat will support may provide suitable foraging opportunities for bats.

Under the proposed development this habitat will be cleared and replaced with amenity grassland, patio paving and dwellings. These habitats have a very-low to Low ecological value[15]. Without mitigation and compensation this could result in the loss of habitat for the above species. This would have a minor negative impact at site level.

5.5.4.1 - Conclusion

Please see sections 7.1.1 and 7.1.3 for recommendations and sections 8.2 and 8.7 for biodiversity enhancements.

5.5.5 – Woodland and scrub – Parkland.scattered trees – Broad-leaved (A3.1)

Due to the limitations of the JNCC methodology and habitat classification system, this single stand of Ash has a moderate ecological value and not a high ecological value[15]. The tree is suitable for breeding birds and the invertebrates this tree will support may provide suitable foraging opportunities for bats. This tree also has PRFs for bats.

Under the proposed development, this tree will be retained. Without mitigation, the artificial light from the development has the potential to disturb breeding birds and/or foraging//potentially roosting bats. This would have a minor negative impact at site level.

5.5.5.1 - Conclusion

Please see sections 7.1.1 and 7.1.2 for recommendations and section 8.6 for biodiversity enhancements.

5.5.6 – Tall Herb and Fern – Other – Tall ruderal (C3.1)

This habitat has a Low ecological value[15]. There are no protected or notable species present. The tall ruderal vegetation may provide a food-source for a small number of invertebrates, which in turn are a food-source for birds and small mammals.

Under the proposed development, this habitat will be cleared and replaced with amenity grassland. This habitat has a Low ecological value too[15].

5.5.6.1 - Conclusion

Please see section 8.1 for biodiversity enhancements.

5.5.7 - Grassland and Marsh – Poor semi-improved Grassland (B6)

This habitat has a Low ecological value[15]. There are no protected or notable species present. The grassland may provide a food-source for a small number of invertebrates, which in turn are a food-source for birds. The grassland may also provide foraging opportunities for mammals such as Badger and Hedgehog.

Under the proposed development, this habitat will be cleared and replaced with tarmac, footpaths, permeable paving, dwellings and amenity grassland. These proposed habitats have a Very Low-Low ecological value range[15].

Without mitigation and compensation this, albeit low ecological value habitat could result in potential accidental harm to mammals during the development phase. This would have a major negative impact at site level.

5.5.7.1 - Conclusion

Please see section 7.1.3 for recommendations and sections 8.1 and 8.3 for biodiversity enhancements.

5.5.8 – Woodland and scrub – Scrub – Dense/continuous (A2.1)

This habitat has a Medium ecological value[15]. There are no protected or notable species present. The shrub habitat may provide a food-source for a number of invertebrates, which in turn are a food-source for birds and small mammals. The scrub is suitable for breeding birds too.

Under the proposed development, this habitat will be cleared and replaced with: tarmac, footpaths, permeable paving, dwellings, amenity grassland, trees and a Swale. These habitats have a Very Low-Medium ecological value[15]. Without mitigation, the removal of the scrub has the ability to disturb breeding birds and potential accidental harm to mammals during the development phase. This would have a major negative impact at site level.

5.5.8.1 - Conclusion

Please see sections 7.1.1 and 7.1.3 for recommendations and sections 8.2 and 8.7 for biodiversity enhancements.

5.5.8 – Immediate Surrounding Habitats

To the south of the site is a Poor SI grassland playing field surrounded hedge and tree habitat. This bearing connects to the wider landscape by an arable field and beyond. It is possible that mammals commuting from this bearing may enter the project site during the development. Without mitigation this, could result in potential accidental harm to mammals during the development phase.

5.5.8.1 - Conclusion

Please see section 7.1.3 for recommendations.

5.6 – Protected or Notable Species within the Project Site and Immediate Surround area

5.6.1 – Great Crested Newt *Triturus cristatus* (GCN) & other Amphibians

The data search produced no records of GCN, 2 records of Common Frog *Rana temporaria* and 1 record of Common toad *Bufo bufo*[10]. The closest waterbody is approximately 600m SW of the project site; surrounded by optimal terrestrial habitat. The project sites hedgerow, hedge and tree, dense scrub and unmanaged Grassland are suitable terrestrial habitats for GCN. However, GCN prefer to stay in terrestrial habitat close to their breeding ponds[16]: *The most comprehensive mitigation, in relation to avoiding disturbance, killing or injury is appropriate within 50m of a breeding pond. It will also almost always be necessary to actively capture newts 50-100m away. However, at distances greater than 100m, there should be careful consideration as to whether attempts to capture newts are necessary or the most effective option to avoid incidental mortality. At distances greater than 200-250m, capture operations will hardly ever be appropriate.*

In addition, it is highly unlikely for GCN and other amphibians to be present within the project site for the following reasons:

There are no waterbodies within 100m of the project site.
There is no permanent waterbody present within the project site.
The project site and surrounding the project site is predominately residential. These habitats are sub-optimal for GCN commuting as it leaves them exposed to predation or desiccation[4].

5.6.1.1 - Conclusion

No further surveys or action is required.

5.6.2 - Bats

The data search produced 5 records of bats within the 1km search radius[10]; Common pipistrelle, Brown Long-eared and Myotis sp. bats. The three Ash trees have PRFs but these trees will be retained. The project site has a number of habitats that are suitable for foraging; most notably the Southern and Eastern boundaries but again these will be retained.

5.6.2.1 - Conclusion

No further surveys required. Please see section 7.1.2, 7.1.4 for recommendations and sections 8.5 - 8.6 for biodiversity enhancements.

5.6.3 – Birds

The data search produced 32 species records of birds within the 1km search radius[10]. The hedgerow, hedge and tree, Semi-natural broad-leaved woodland, scattered tree and Dense scrub are all suitable habitats for birds. Without mitigation and compensation, the proposed development will result in the loss of some of these habitats.

5.6.3.1 - Conclusion

Please see sections 7.1.1 and 7.1.2 for recommendations and 8.7 for biodiversity enhancements.

5.6.4 – Reptiles

The data search produced no records of Reptiles being present within the 1km search radius[10]. The habitats within the project site have low reptile potential due to the following factors[17]:

Vegetation – The habitats have structural diversity to support reptiles.
Extent – The project site is too small to support a large population of reptiles.
Aspect – There are no suitable areas for basking but there are sufficient areas of shade.
Topography – There are no suitable slopes within the project site.
Connectivity – Poor connectivity as the site is surrounded by residential properties.
History – There are no records of Reptiles present within 1km of the project site.

5.6.4.1 - Conclusion

Due to the form of development proposed no further surveys are needed but a PWMS will be adhered to minimise any potential impact to any potential Reptiles. Please see section 7.1.3 for recommendations.

5.6.5 – Flora

There are no notable or protected species of plant present within the project site.

5.6.5.1 - Conclusion

No further surveys are required.

[redacted]

5.6.7 – Water Vole & Otter *Lutra lutra* and Other protected or notable species

The dry ditch as discussed in section 4.3.3 is an unsuitable habitat for Water vole and in addition Otter too and therefore will not be discussed.

The data search produced 12 records of Hedgehog being present within the 1km search radius[10]. Hedgehogs may commute/forage within the project site; most notably the boundaries and grassland habitats. They may also seek refuge in the boundary habitats and dense scrub

5.6.7.1 - Conclusion

No further surveys are needed but a Precautionary Working Method Statement (PWMS) will be adhered to minimise any potential impact to any Hedgehogs or other species. Please see section 7.1.3 for recommendations.

6. Wildlife Legislation and Planning Policy

6.1 - The Wildlife and Countryside Act (WCA) 1981 (as amended)[18]

The long title of the WCA 1981 as amended;
An Act to repeal and re-enact with amendments the Protection of Birds Acts 1954 to 1967 and the Conservation of Wild Creatures and Wild Plants Act 1975;

to prohibit certain methods of killing or taking wild animals;
to amend the law relating to protection of certain mammals;
to restrict the introduction of certain animals and plants;
to amend the Endangered Species (Import and Export) Act 1976;
to amend the law relating to nature conservation, the countryside and National Parks and to make provision with respect to the Countryside Commission;
to amend the law relating to public rights of way; and for connected purposes.

6.1.1 – Animals

Animals are protected under Schedule 5 of the WCA. It is illegal to;

capture, kill, disturb or injure animals deliberately
damage or destroy a breeding or resting place
obstruct access to their resting or sheltering places (deliberately or by not taking enough care)
possess, sell, control or transport live or dead animals, or parts of them
take eggs

6.1.2 - Birds

Birds, their eggs and nest are protected by UK law under the following act:
Wildlife & Countryside Act (as Amended) 1981: Schedules 1-4 and in some cases 9.
To summarise, you would be breaking the law if you;

intentionally kill, injure or take birds
intentionally take, damage or destroy a nest while it's being used or built
intentionally take or destroy a bird's egg/s
possess, control or transport live or dead bird, or parts of them, or their eggs
sell birds or put them on display for sale
use prohibited methods to kill or take birds

Birds that are listed as a schedule 1 bird are provided further protection. Additionally, it is an offence to:

disturb them while they're nesting, building a nest, in or near a nest that contains their young
disturb their dependent young

6.2 - The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019[19]

The Conservation of Habitats and Species Regulations 2017 is an EU directive and consolidates all the various amendments made to the Conservation (Natural Habitats, &c.) Regulations 1994 in respect of England and Wales. The 1994 Regulations transposed Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) into national law. The Regulations place a duty on the Secretary of State to propose a list of sites which are important for either habitats or species. These sites form a network termed Natura 2000 and include Special Areas of Conservation and

Special Protection Areas. All European protected species and their resting places are listed in Annex IV and some bat species are also listed in Annex II giving those species even greater protection. Section 43 of this law states that it is an offence:

capturing, killing, disturbing or injuring European protected species deliberately
damaging or destroying a breeding or resting place
obstructing access to their resting or sheltering places (deliberately or by not taking enough care)
possessing, selling, controlling or transporting live or dead protected species, or parts of them
taking eggs

6.3 - The Natural Environment and Rural Communities (NERC) Act (2006)[20]

'An Act to make provision about bodies concerned with the natural environment and rural communities; to make provision in connection with wildlife, sites of special scientific interest, National Parks and the Broads; to amend the law relating to rights of way; to make provision as to the Inland Waterways Amenity Advisory Council; to provide for flexible administrative arrangements in connection with functions relating to the environment and rural affairs and certain other functions; and for connected purposes'.
In regards to the planning process sections 40 and 41 are of particular importance:
'Section 40 (1) Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.'
Section 41 lists habitats and species of primary importance to the conservation of biodiversity therefore making these habitats and species a consideration in the planning process.'

6.4 - National Planning Policy Framework (NPPF) (July 2021)[21]

This policy states under section 15 'Conserving and enhancing the natural environment' that;

174.
Planning policies and decisions should contribute to and enhance the natural and local environment by:
a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate;
d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.

175. Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.

176. Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty which have the highest status of protection in relation to these issues. The conservation and enhancement of wildlife and cultural heritage are also important considerations in these areas, and should be given great weight in National Parks and the Broads. The scale and extent of development within all these designated areas should be limited, while development within their setting should be sensitively located and designed to avoid or minimise adverse impacts on the designated areas.

177. When considering applications for development within National Parks, the Broads and Areas of Outstanding Natural Beauty, permission should be refused for major development other than in exceptional circumstances, and where it can be demonstrated that the development is in the public interest. Consideration of such applications should include an assessment of:
a) the need for the development, including in terms of any national considerations, and the impact of permitting it, or refusing it, upon the local economy;
b) the cost of, and scope for, developing outside the designated area, or meeting the need for it in some other way; and
c) any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated.

178. Within areas defined as Heritage Coast (and that do not already fall within one of the designated areas mentioned in paragraph 176), planning policies and decisions should be consistent with the special character of the area and the importance of its conservation. Major development within a Heritage Coast is unlikely to be appropriate, unless it is compatible with its special character.

Habitats and biodiversity
179. To protect and enhance biodiversity and geodiversity, plans should:
a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation; and
b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.

180. 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), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;
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; and
d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.

181. The following should be given the same protection as habitats sites:

a) potential Special Protection Areas and possible Special Areas of Conservation;
b) listed or proposed Ramsar sites; and
c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

182. The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.

6.5 - Department for Communities & Local Government Circular 06/2005 Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System[22]

'This circular provides administrative guidance on the application of the law relating to planning and nature conservation as it applies in England. It complements the national planning policy in the National Planning Policy Framework and the Planning Practice Guidance' (Department for Communities and Local Government, 2005).

6.6 - The 'UK Post-2010 Biodiversity Framework' (July 2012)[23]

The 'UK Post-2010 Biodiversity Framework', published in July 2012, succeeds the UK BAP and 'Conserving Biodiversity – the UK Approach'. It is the result of a change in strategic thinking. The UKBAP is still used as a source of reference with regards to habitats and species. UK Biodiversity Action Plan was a government initiative and contains a list of priority habitats and species of conservation concern in the UK which are the same as those listed within Section 41 of The Natural Environment and Rural Communities (NERC) Act 2006. The plan also outlines biodiversity initiatives designed to enhance their conservation status. The UKBAP requires conservation of biodiversity to be addressed at a county level via a Local BAP and are usually targeted towards species of conservation concern within each separate area.

6.7 - UK Biodiversity Action Plan (UKBAP) and Local BAP[13,14]

UK BAP priority species and habitats were those that were identified as being the most threatened and requiring conservation action under the UK Biodiversity Action Plan (UK BAP). The original lists of UK BAP priority species and habitats were created between 1995 and 1999, and were subsequently updated in 2007, following a 2-year review of UK BAP processes and priorities, which included a review of the UK priority species and habitats lists.
The aim of the 'Species and Habitats Review' was to ensure that the UK BAP lists of priority species and habitats remained up-to-date and focussed on the correct priorities. This was the first full review of the lists, generated over 10 years previously, and provided an opportunity to take into account emerging new priorities, conservation successes, and the huge amount of new information that had been gathered since the original lists were created. Selection of priority species and habitats for the priority lists followed consideration by expert working groups against a set of selection criteria, based on international importance, rapid decline, high risk, and habitats of importance for key species.
As a result of new drivers and requirements, the' 'UK Post-2010 Biodiversity Framework, published in July 2012, has succeeded the UK BAP. In particular, due to devolution and the creation of country-level biodiversity strategies, much of the work previously carried out under the UK BAP is now focussed at a country level.
The UK BAP lists of priority species and habitats remain, however, important and valuable reference sources.

LBAP have two targets: to reflect and help implement the national priorities identified in the UK Action Plans, and to identify and address local priorities and local distinctiveness.

6.8 - The Badgers Act 1992[24]

Badgers and their setts are protected by the following legislation: The Badger Protection Act 1992.To summarise, it would be illegal to;

intentionally capture, kill or injure a badger
damage, destroy or block access to their setts
disturb badgers in their setts
treat a badger cruelly
deliberately send or intentionally allow a dog into a sett
bait or dig for badgers

You are also breaking the law by doing any of the following;

have or sell a badger, or offer a live badger for sale
have or possess a dead badger or parts of a badger (if you got it illegally)
mark or attach a marking device to a badger

But there are exceptions. Licences to undertake some actions can be issued if it is justified, for example where a badger sett is found on a proposed site for a road or housing development.

6.9 - Local Planning Policy[25]

The Central Lincolnshire Local Plan 2012 – 2036 outlines the council's planning policy targets. Policy LP21 is the leading planning policy with regards to biodiversity.

Policy LP21: Biodiversity and Geodiversity

All development should:

- protect, manage and enhance the network of habitats, species and sites of international, national and local importance (statutory and non-statutory), including sites that meet the criteria for selection as a Local Site;
- minimise impacts on biodiversity and geodiversity; and
- seek to deliver a net gain in biodiversity and geodiversity.

Development proposals that will have an adverse impact on a European Site or cause significant harm to a Site of Special Scientific Interest, located within or outside Central Lincolnshire, will not be permitted, in accordance with the NPPF.

Planning permission will be refused for development resulting in the loss, deterioration or

fragmentation of irreplaceable habitats, including ancient woodland and aged or veteran trees, unless the need for, and benefits of, the development in that location clearly outweigh the loss or harm.

Proposals for major development should adopt an ecosystem services approach, and for large scale major development schemes (such as Sustainable Urban Extensions) also a landscape scale approach, to biodiversity and geodiversity protection and enhancement identified in the Central Lincolnshire Biodiversity Opportunity Mapping Study.

Development proposals should create new habitats, and links between habitats, in line with Biodiversity Opportunity Mapping evidence to maintain a network of wildlife sites and corridors to minimise habitat fragmentation and provide opportunities for species to respond and adapt to climate change. Development should seek to preserve, restore and re-create priority habitats, ecological networks and the protection and recovery of priority species set out in the Lincolnshire Biodiversity Action Plan and Geodiversity Action Plan.

Where development is within a Nature Improvement Area (NIA), it should contribute to the aims and aspirations of the NIA.

Development proposals should ensure opportunities are taken to retain, protect and enhance biodiversity and geodiversity features proportionate to their scale, through site layout, design of new buildings and proposals for existing buildings.

Mitigation

Any development which could have an adverse effect on sites with designated features and / or protected species, either individually or cumulatively, will require an assessment as required by the relevant legislation or national planning guidance.

Where any potential adverse effects to the biodiversity or geodiversity value of designated sites are identified, the proposal will not normally be permitted. Development proposals will only be supported if the benefits of the development clearly outweigh the harm to the habitat and/or species.

In exceptional circumstances, where adverse impacts are demonstrated to be unavoidable, developers will be required to ensure that impacts are appropriately mitigated, with compensation measures towards loss of habitat used only as a last resort where there is no alternative. Where any mitigation and compensation measures are required, they should be in place before development activities start that may disturb protected or important habitats and species.

7. Recommendations

7.1– Target Note Recommendations

7.1.1 - Breeding birds (TN1)

The project sites: Intact Hedge – Native species-rich hedgerow, Hedge and Tree – Species-poor, Broad-leaved – Semi-natural woodland, Parkland.scattered trees – Broad-leaved and Dense/continuous scrub habitats have the potential for breeding birds.

Under the proposed development, approximately 70% of the Intact Hedge – Native species-rich hedgerow, Broad-leaved – Semi-natural woodland and Dense/continuous scrub will be cleared. **It is strongly recommended that any clearing of the above habitats takes place outside of the breeding bird season (1st September – 28th February).**

If breeding birds are present then no works within 5m of a nest site can take place between 1st March-31st August[6]. This is the time when adult birds are rearing their young. It is an offence under the WCA 1981 to in relation to this proposed development to:

intentionally kill, injure or take birds
intentionally take, damage or destroy a nest while it's being used or built
intentionally take or destroy a bird's egg/s

If works need to be carried out during the nesting period (1st March to 31st August) checks should be made by an ecologist for nesting birds, up to 72hrs before the works are due to commence[6]. Any nesting birds found should be left to complete their breeding cycle (e.g., until the young have fully fledged) before any works can take place.

There will be a 5m buffer zone around identified nests. This zone will be highlighted with warning tape secured by 'HERAS' fencing or similar and a sign: 'Breeding birds present, no works within this buffer zone'. This buffer zone will remain in place during the entire nesting season.

7.1.2 – Birds and Bats (TN1, TN2)

Under the proposed development, the hedge and tree habitats and scattered tree are recommended not illuminated directly by artificial light.

7.1.2.1 - Lighting consideration[26]

Although the foraging and commuting routes of bats are not legally protected, the proposed development may create an increase in artificial light. Light pollution may have an effect on the commuting and foraging routes of neighbouring bats. Such effects may reduce their survival chances and the possibility of breeding.

The same is for bird species; artificial light may disturb breeding birds and as such may reduce their survival chances and the possibility of breeding. With regards to planning, it is an important consideration to manage and reduce the impact lighting may have on bats and breeding birds.

Under the proposed development there are no proposed external lighting to be installed. However, if this changes in the future, then the below lighting specifications are recommended.

Mitigation Strategy	Impact
No Light	The best solution for bats but probably not for the public

Variable lighting regimes (VLR)	This is controlled by a CMS (Central Monitoring System). This involves switching off or dimming lights for a period in the night at set times. This would be useful for high periods of bat activity for example, emergence and commuting.
Spacing and Height	Lights should be spaced as far apart as possible but not at the expense of coverage. The height should be as low as possible to the ground and there-by reducing the illuminated light.
Reducing Intensity	This will have the same effect as dimming and will result in less light pollution.
Changing the Light Type	Avoid lights that have a short blue/white wavelength. Long wavelength types such as warm white will be suitable. Avoid lights with a high UV content. Use UV filters or glass housings to reduce UV emittance.
Reduce Spill	This can be done by using reducing the angle under 70^0 or by installing accessories to direct the light.

Table 7.1 – Mitigation strategies to reduce the impact of lighting on bats and birds.

7.1.2.2 – Project Site Lighting

7.1.2.2.1 – Dwellings

If the dwellings are to have any external lighting installed then lighting will be downlighting only with cowling on the top. This will minimise light spread and light pollution. This is recommended for all plots but most notably:

Plots 14-19 South elevations
Plots 8, 9 and 19 East elevations

External lighting, where either an integrated bat or bird box is located, will be the same specification but operated on a PIR (passive infra-red) sensor. This will minimise light spread, light pollution and duration. Please see figure 7.3.

7.1.2.2.2 – Access tracks

If the access tracks are to be illuminated then it is recommended that these should have low level pathway lighting or bollard lighting. This will minimise illumination, light pollution and allow commuting/foraging bats to pass through the project site. Example of lighting types to be used shown below:

Figure 7.1 – Example of low-level lighting for the access tracks. Source - https://www.exteriorlightsuk.co.uk/design-ideas

Figure 7.2 – Example of bollard low-level lighting for the access tracks. Source - https://www.lights.co.uk/kristof-stainless-steel-sensor-path-light.html

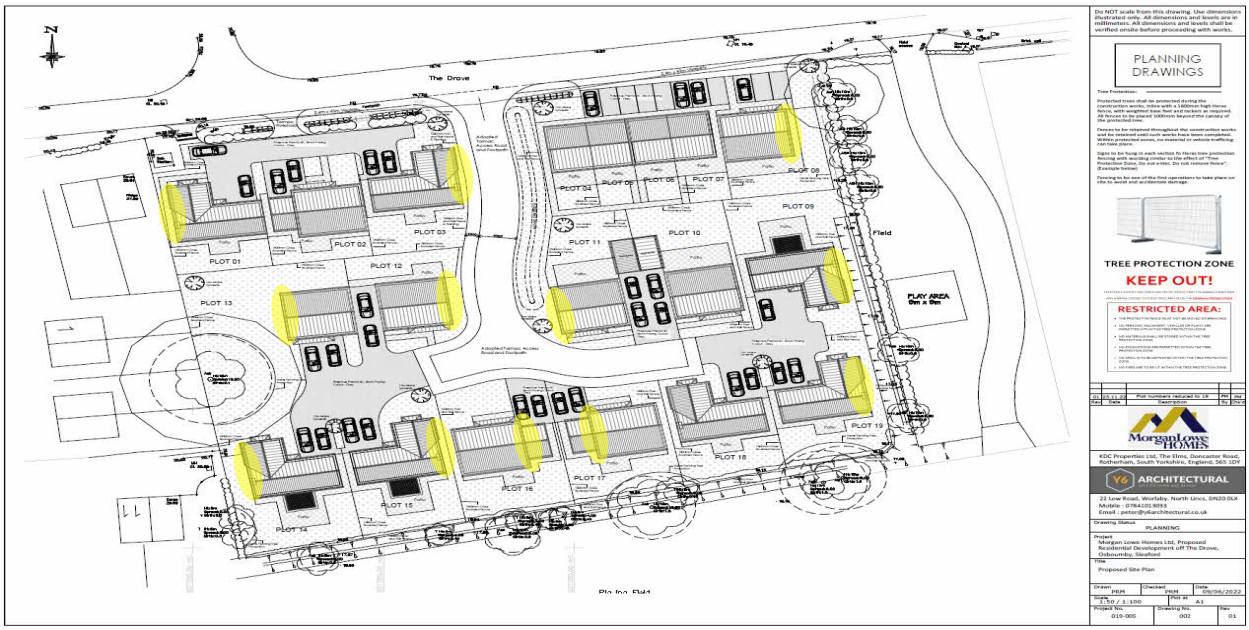

Figure 7.3 - Highlighted in yellow the Recommended lighting specifications (if applicable) to the elevations where integrated bat and bird boxes will be.

7.1.3 - Mammals (TN3)

It is highly unlikely for Amphibians and Reptiles to be present within the project site. However, the data search has illustrated that Mammals are present within 1km of the project site. Badger foraging and commuting routes are not legally protected[24] but under the Animal Welfare Act 2006 animals must still be able to exhibit normal behaviour, e.g., foraging for food and water. It is likely that, due to increased human occupation the project site will be unfavourable post-construction but pre-during construction Badgers and other mammals may still commute/forage within or close to the project site.

The following PWMS will be adhered to minimise any potential impact to any potential Badgers and other mammals commuting through the project site during the proposed development, please see below.

7.1.3.1 – PWMS Mammals – Vegetation Pile Clearance phase

The vegetation piles are removed by hand tools. Once the top layers have been removed and no access points in the pile have been identified then they can be removed by machinery. If access holes are present, then continue to remove by hand tools[27].
If any animals are found they will be safely removed and taken to eastern boundary as this has the greatest connectivity.

7.1.3.2 – PWMS - During development

Before and during the construction phase the contractors and people involved in the development should ensure they do not create temporary refuge sites. This will be done by ensuring heavy machinery left overnight is near the existing entrance[28].
Building materials and associated materials like plastic sheeting should be kept off the ground.
Rubble and other associated building materials should be bagged up and placed near the existing entrance[28].
Any Machinery left overnight should be placed near the existing entrance and fenced off with ground level fencing[27].
The machinery will be checked on a daily basis for animals prior to work commencing just in case they have managed to breech the fencing and become trapped in any machinery present[27].
If, by mistake this is not adhered to, then checks should be made each day prior to work commencing.
Perimeter fencing should be installed around any ground works and fitted tightly to the ground so any animals cannot get under the fencing[27]. The ground works will be checked on a daily basis for animals just in case they have managed to breech the fence.
Any excavations that will be left overnight should be covered over or equipped with a number of ramps and hydrophobic boards (loft insulation boards) to allow otherwise trapped mammals/amphibians/reptiles a means of escape[27,28].
Any piping >70mm in diameter will be capped off each day and re-opened during working daylight hours.

7.1.3.3 – What to do if Protected Species are Encountered

In the unlikely event that GCN, Badgers or Reptiles are present at the start or during the development work, works must be halted until a licensed GCN holder (for example Crow Ecology 07813900097) can attend the site and give further advice where necessary[4,27].
GCN should not be handled by unlicensed personnel. If it is absolutely necessary to remove GCN from the premises for overruling health and safety reasons or to avoid it being harmed gloves must be worn and the GCN placed carefully in a breathable container (if found on land) or a bucket (if found in water) containing the water and placed in a dark, quiet place, safe from predators, until a licensed GCN holder arrives[4].
The Ecologist will contact Natural England. Together they will examine a way forward for the site.
In the highly unlikely case that a solution cannot be found, works will cease until a Natural England License has been granted.

7.1.4 – Bats (TN4)

The three Ash trees as discussed in sections 4.3.2 and 4.3.5 have PRF's for bats. Under the proposed development, these trees with PRF's will remain undeveloped and therefore no further surveys or action is required, other than to follow the lighting specifications recommended in section 7.1.2.

7.1.5 – Waterbody (TN5) – Development close to the ditch

7.1.5.1 – Avoidance of Water Run-off

Due to the location of the proposed development being approximately 5m away from the ditch, there is the potential for surface run-off and pollution. To minimise potential run-off, it is recommended that construction materials are stored at least 10m away from the Ditch.

Post development, surface run-off will be reduced by the permeable paving that will be used for the parking and access roads.

7.1.5.2 – Non-Native species

No non-native species were present at the time of the site survey in the ditch in October 2022. The project site will become a development site and this will result in a high footfall and many different machines and building materials coming onto the site. There is the remote possibility that Non-native species maybe brought onto the project site during development.

To minimise the potential risk of Non-Native species and accidental encroachment onto the ditch, 'HERAS' fencing or post and hazard tape, spanning the entire length of the ditch will be sited 3m from ditch where the developments will be taking place. For Operations within 3m of the ditch, personnel will carry out the 'Check, clean, dry' policy[29]. Checking products are reputable and if they are hazardous to aquatic life. Cleaning equipment including footwear with disinfectant (30% bleach) prior to entering the 3m buffer zone to ensure no contaminants enter the ditch and then drying equipment will ensure no transmission into another environment.

Following these procedures should result in minimal risk to the drain, however if Non-native species appear during the development phase, then this needs to be reported to the Environment Agency.

7.1.5.3 – Siltation

Soil erosion; most notably during the ground clearance, grounds works are a natural by-product during development. Developments near a waterbody (in this case the ditch) can lead to sediment run-off into the 'waterbody' and affect the water quality and thereby also affect any aquatic life.

To reduce sediment run-off, a 'Silt fence' will be erected. Silt fences stop sediment entering a waterbody and act as a water filter, allowing filtered water to enter the waterbody. They can also stop other pollutants from entering a waterbody. An example of such a product can be seen at https://frogenvironmental.co.uk/product/silt-fence/ . The silt fence will be installed as follows;

- The silt fence will be erected prior to the development and will remain until the development has been completed.
- The silt fence will be erected 3m in from the ditch. Erecting it here will allow the soil quality to remain unchanged between the top of the bank and the silt fence.
- The silt fence will be erected to cover the length of the ditch; approximately 110m length.
- After the development has been completed, allow the silt collection along the silt fence to dry.
- After drying, remove the silt off-site.

7.1.5.4 – Pollution Impacts

Below sub sections have followed the *Pollution prevention for businesses* guidelines[30].
In addition to the silt fence discussed in the above section, to reduce any further potential pollution impacts to the ditch the following guidelines will be adhered to during the construction phase:

7.1.5.4.1 – Concrete and Cement

Concrete and cement are very alkaline and corrosive. To prevent concrete and cement potentially entering the ditch the following will be adhered to:

The mixing and washing areas will be sited at least 10m away from the ditch.
Wash water should either be discharged down a foul sewer (must have permission from the local sewerage first) or contain the wash waste for authorised disposal off-site.

7.1.5.4.2 – Oils & Chemicals

No oils and chemicals

If storing oils and/or chemicals on-site, these will be stored at least 10m away from the ditch and will have a secondary containment system such as a bund that is suitable for the product you are storing.
Use biodegradable oils if possible, especially near the ditch
Have a spill kit on-site
Remove any damaged or leaking containers immediately and dispose of using a registered waste contractor.

7.1.5.4.3 – Site Security

Vandalism of a site can cause pollution. To minimise vandalism the following steps are recommended if applicable:

Fitting lockable valves and trigger guns on pipework from storage containers on any containers containing chemicals or oil.
Installing ant-siphon valves on pipework from containers
Installing armoured hoses
Storing drums in a locked container/unit
Ensure the gates are locked and the fencing is secure.

7.1.5.4.4 – Refuelling of vehicles and/or Construction related Machinery

Refuelling can cause accidental spillages and therefore result in pollution.

Refuel machinery at least 10m away from the ditch.
Place a dip tray under pumps/hoses/valves during refuelling
Keep a spill kit close
Supervision at all times during refuelling
Don’t overfill the tank
Check hoses and valves regularly for any defaults
Turn off valve when not in use

7.1.5.4.5 - Materials

Sealant, coatings, adhesives and glazing can be toxic to plants and animals if released in to the environment.

If storing these products on-site they should be stored like any other chemicals in a sealed, locked container.

If possible, use water-based or low-solvent products
avoid products containing lead as a drying agent and those containing hazardous solvents (toluene or chlorinated hydrocarbons)

7.1.5.4.6 - Waste

Optimal waste storage location would be at least 10m from the ditch
Ensure site waste is removed by an approved agent.
Recycle waste where possible
Remove any waste generated frequently; this will prevent the wind blowing the waste away and possibly into the drain.

8. Project Site Biodiversity Enhancement

The measures set out in Chapter 7 help comply with: Natural Environment and Rural Communities Act 2006 (NERC)[20], the National Planning Policy Framework (NPPF)[21] and local planning policies (Policy LP21)[25]. In addition, biodiversity enhancements have been recommended to fulfil these policies and increase biodiversity on this site post-construction.

8.1 – Enhanced Amenity Grassland sowing

To compensate for the loss of the grassland and tall ruderal vegetation it, instead of sowing a 'standard' amenity grassland grass mixture, a grassland mixture that can tolerate heavy mowing but also provides herbaceous plant species is recommended (please see table 8.1 for an example of such a mixture). This will result in these areas still providing a food-source for many invertebrates and in-turn for birds and small mammals. This will not only boost biodiversity post-construction but it will also provide colour to the residents. Please see figure 8.1 below

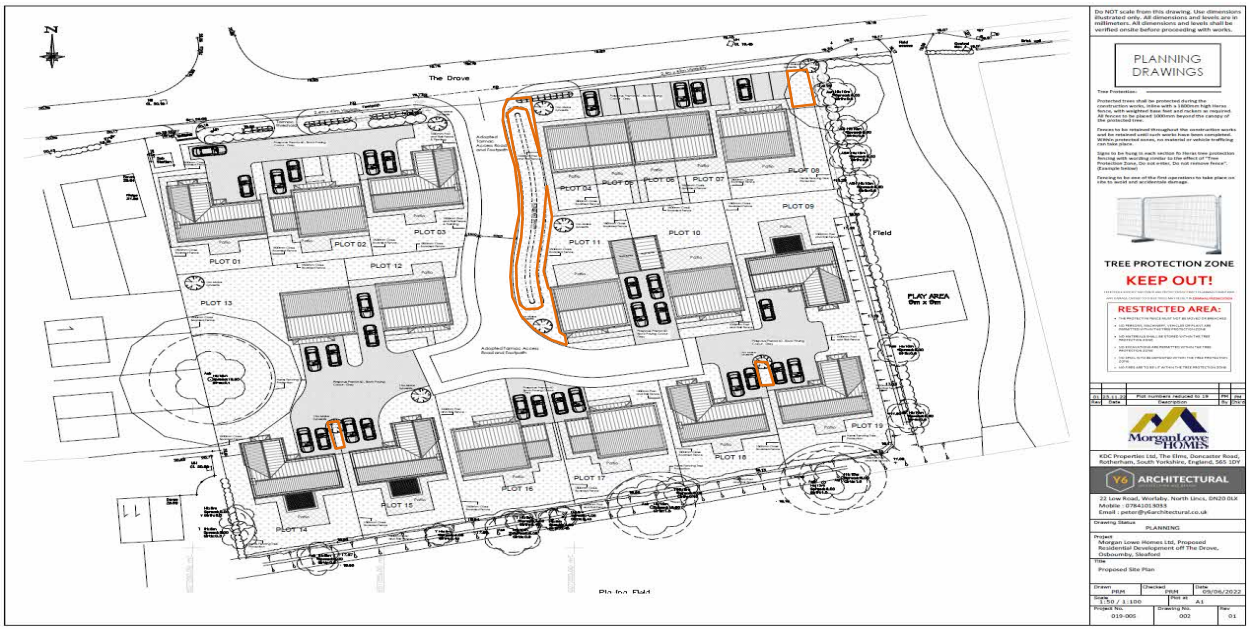

Figure 8.1 – the proposed locations of the enhanced amenity grassland highlighted in orange

It is recommended, due to their sizes that a 'wildflower turf' is laid in these locations. A product such as https://www.turfonline.co.uk/product/species-rich-lawn-turf/ would be optimal for these areas. The turf manufacturers' laying and maintenance protocols should be adhered to.

If sowing is chosen over turf, then the following mixture would be suitable:

Composition

Wild Flowers 20%

1.0 Betonica officinalis – Betony
2.4 *Centurea nigra* – Common Knapweed
1.2 *Galium verum* – Lady's Bedstraw
0.8 *Leontedon Hispidus* – Rough Hawkbit
2.4 *Lotus corniculatus* – Birdsfoot Trefoil
2.8 *Plantago lanceolata* – Ribwort Plantain
0.8 *Primula veris* – Cowslip
1.2 *Ranunculus acris* – Meadow Buttercup

0.4 *Salium silaus* – Pepper Saxifrage
0.4 *Vicia cracca* – Tufted Vetch
5.0 *Medicago lupulina* – Black Medic (Ag)
5.0 *Trifolium repens* – Small Leaved White Clover (Ag)
Grasses 80%
8.0 *Agrostis cappilaris* – Common Bent (Ag)
1.0 *Carex flacca* – Glaucous Sedge
39.0 *Cynosurus cristatus* – Crested Dogstail (Ag)
28.0 *Festuca rubra* – Red Fescue (Ag)
4.0 *Phleum bertolonii* – Smaller Cat's-tail (Ag)

Table 8.1 – Recommended mixture for plots 2 and 3. Source - https://wildseed.co.uk/product/mixtures/complete-mixtures/special-habitat-mixtures/flowering-lawn-mixture/

8.1.1 – Timing

January	February	March	April	May	June	July	August	September	October	November	December

The timetable above is the best time to create a suitable bedding area for the seeds and when the seeds should be sown.

8.1.2 – Sowing

4g/m^2.
Prepare sown area by mowing short in late summer.
Prepare by removing weeds by hand or with an herbicide.
The land should then be dug-over and raked over to create a medium tilth.
Seeds should be sown by hand broadcasting or by machine.

8.1.3 – Maintenance

Water to at least a depth of 10cm if dry weather follows sowing.
Most of the sown seeds are perennials so they will take time to germinate. They will not usually flower in the first year.
Weeds and dominant grasses will be abundant in the first year so they need to be controlled by mowing and/or spot treat with a herbicide. The annuals should be allowed to flower and then cut in mid-summer/late summer once the flowers have died off and the vegetation removed. This cut will allow the mixture to develop but also control undesirable species such as Nettles.

8.1.4 – Long-term management

Once established, the lawn can be cut regularly. To maintain a healthy sward, it should be cut biannually in late spring and early Autumn. The cuts should only be down to 5cm.The cuttings should be left for up to 7 days to allow any seedlings to drop to the ground. It is then important to remove to cuttings to keep soil fertility low. Any weeds should be removed by hand or spot treat with herbicide.

8.2 – Native Tree Planting

Under the proposed development, there will be 9 trees planted consisting of one species. It is recommended that a more diverse range of species are planted.

The trees specified are small trees in height and girth. This has been selected as there is a greater chance of the trees remaining in these locations. The residents can still enjoy the trees but they won't block their field of vision when looking out from their properties.

Once established, these trees will provide suitable nesting opportunities and foraging routes for bats. Any of the following species are recommended not only for their biodiversity value, there ease of management and size but some are also suitable for the local geology (approximate size once mature in brackets).

Rowan *Sorbus aucuparia* (18m) - The berries provide a food source for many birds especially the blackbird, Mistle thrush, Redstart, Redwing, Song thrush, Fieldfare and Waxwing. The leaves are eaten by some species of moths' caterpillars[31].
Hazel *Corylus avellana* (10m) - The leaves are eaten by some species of moths' caterpillars. It also supports a number of Butterfly species. The nuts provide a food-source for a number of birds listed in the data search. The flowers are a good source of pollen for bees[31].
Crab apple *Malus sylvestris* (10m) – Supports a number of insects and lepidoptera sp. Fruits eaten by birds and mammals[31].
Wild Cherry *Prunus avium* (9-12m) – The fruits provide a food source for birds. The flowers provide nectar and pollen for bees. The foliage provides a food source for a number of invertebrates[31].
Silver birch *Betula pendula* (18m) – Supports insects and moths which attracts bird eating insects. Catkins a food-source for some bird species[31].

8.2.1 - Timing

January	February	March	April	May	June	July	August	September	October	November	December

The above timescale is when it is best to plant Tree species. Do not plant if the soil is water logged or is frozen (you cannot get the spade in).

8.2.2 - Planting Tree Species[32]

Tree whips to be around 2-3m tall.
Clear the planting area of weeds if present.
Dig a pit deep and wide enough for the root system to bed into and place the whip with stake into the pit. Cover over with the dug soil and firm over but do not compact soil.
It is recommended to put 'biodegradable tree guards/shelters' around the whips and stake to prevent them being eaten. Once established take these guards off.

8.2.3 - Maintaining Tree species

This is the largest factor to ensure you have healthy trees. The more maintenance you do in the early years will result in less maintenance overall. Below is a timetable of how to maintain tree species;

YEAR 1	
March	Check Shelters
April	Apply foliar acting herbicide
July	Check losses
September	Check Shelters, pull out tall weeds (cut tall weeds between trees)

November	Replace losses
YEAR 2	
March	Check shelters
April	Apply foliar acting herbicide
July	Check losses
September	(Cut tall weeds between trees)
November	Replace losses, Check shelters, pull out tall weeds
YEAR 3	
January	(Apply residual herbicide)
March	Check shelters
April	Apply foliar acting herbicide
July	Check losses
September	(Cut tall weeds between trees)
November	(Replace losses) Check shelters, pull out tall weeds
YEAR 4	
March	Check shelters
April	(Apply foliar acting herbicide)
YEAR 5 AND ONWARDS	
Gradual removal of stakes and shelters. Occasional spot weeding around any trees still in need.	

Table 8.2 – Maintenance schedule for tree species Source - https://www.britishhardwood.co.uk/planting-and-maintenance-advice

8.3 – Swale

Swales are shallow channels that collect, in this case surface run-off from the hardstanding habitats[33]. They slow-run-off from hard surfaces, allow infiltration and a level of filtering of pollutants such as engine oil etc. In ecological terms they provide shelter and foraging opportunities for invertebrates, small mammals and birds. In addition, Swales can be an ever-changing habitat which fluctuate with the seasons thereby providing a habitat for a broad range of species. In seasonally wet times, water maybe present above the channel and thereby creating a temporary water habitat. In addition, they also make a colourful, relaxing features for the residents.

8.3.1 – Preparation and Sowing

Before any turfing or sowing, a topsoil bed of 100-150mm will be laid with a ‘gravel under drain’ to allow water to soak into the ground quickly. The turf/soil substrate should be at least 25mm below a hardstanding surface to allow run-off[33].

8.3.2 – Turf

Seeded turf for SUDs systems are readily available and provide a quick and easy solution. This is the recommended solution for this project site. These turfs come pre-seeded with wildflowers that have been

selected for this use. Please see https://wildflowerturf.co.uk/products/wildflower-turf/suds-turf/ for an example of this turf. The turf manufacturers' laying and maintenance protocols should be adhered to.

8.3.3 – Sowing

If a turf solution is not chosen then the Swale can be sown with a mixture again that has been selected for this type of habitat; please see below:

Composition
Wild Flowers 20%
Achillea millefolium – Yarrow
Agrimonia eupatoria – Agrimony
Angelica sylvestris – Wild Angelica
Centaurea nigra – Common Knapweed
Chaerophyllum temulum – Rough Chervil
Cruciata laevipes – Crosswort
Dipsacus fullonum – Wild Teasel
Filipendula ulmaria – Meadowsweet
Galium album – (Galium mollugo) – Hedge Bedstraw
Galium verum – Lady's Bedstraw
Leucanthemum vulgare – Oxeye Daisy – (Moon Daisy)
Lythrum salicaria – Purple Loosestrife
Malva moschata – Musk Mallow
Plantago lanceolata – Ribwort Plantain
Rumex acetosa – Common Sorrel
Silaum silaus – Pepper Saxifrage
Grasses 80%
10.0 *Agrostis capillaris* – Common Bent
3.0 *Anthoxanthum odoratum* – Sweet Vernal-grass (w)
6.0 *Briza media* – Quacking Grass (w)
26.0 *Cynosurus cristatus* – Crested Dogstail
2.0 *Deschampsia cespitosa* – Tufted Hair-grass (w)
28.0 *Festuca rubra* – Red Fescue
5.0 *Schedonorus pratensis – (Festuca pratensis)* – Meadow Fescue

Table 8.3 – Recommended mixture for Swales Source - https://wildseed.co.uk/product/mixtures/complete-mixtures/special-habitat-mixtures/pond-edge-mixture/

8.3.3.1 – Timing

January	February	March	April	May	June	July	August	September	October	November	December

The timetable above is the best time to create a suitable bedding area for the seeds and when the seeds should be sown.

8.3.3.2 – Sowing

4g/m^2.
Prepare by removing weeds by hand or with an herbicide.
The land should then be dug-over and raked over to create a medium tilth.
Seeds should be sown in either autumn or spring and sown by hand broadcasting or by machine.
The seeds should then be rolled or treaded down but not covered.

8.3.3.3 – Maintenance

Remove litter and debris
Undertake thinning or pruning if one species becomes too dominant e.g., Yellow iris *Iris pseudacorus*
For best results, Mow bi-annually in Spring and Autumn.
Remove silt build-up if necessary
Check inlets/outlets for any build up and remove if necessary
Treat undesirable ruderal species throughout (see sections 8.3.4). These will be most prominent during the first 1-3 years.
If regular cutting is to take place, then ensure the cut is no shorter than approximately 5cm and desirable would be cuts between 5cm – 45cm[33].

8.3.3.4 – Gaps in road kerbs

In order to allow surface run-off, there will be gaps in the kerbs where the Swale features are. This will allow run-off from the hardstanding and into the Swales. Please see a diagram below:

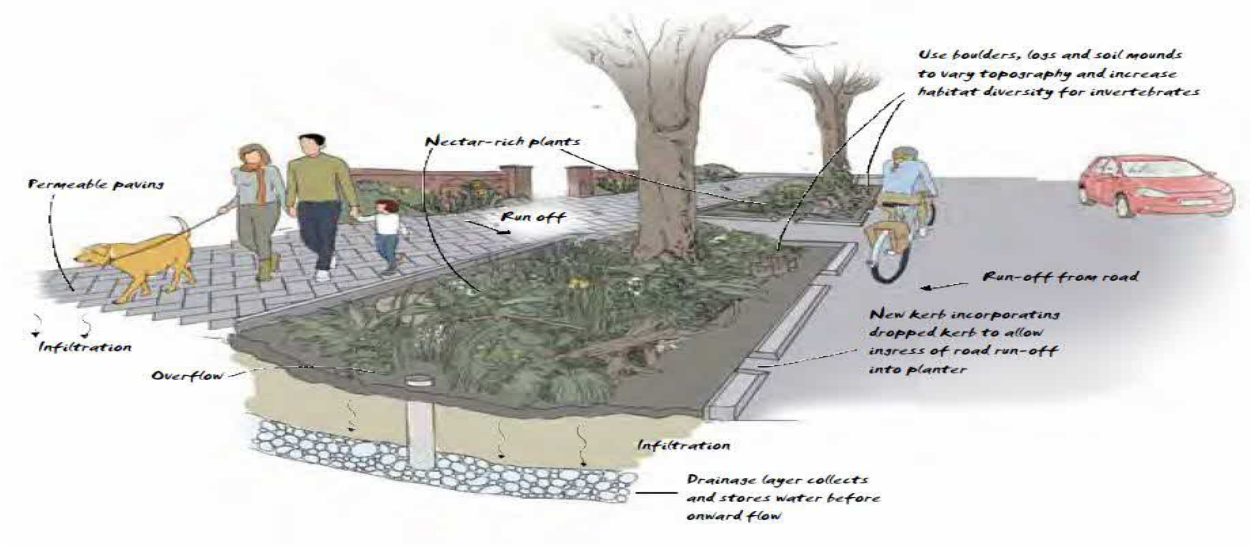

Figure 8.2 – Diagram illustrating dropped kerbs to allow surface run-off[33]

8.3.4 – Removal of Undesirable species

Species considered undesirable for this form of habitat include: Creeping thistle *Cirsium arvense*, Spear thistle *Cirsium vulgare*, Curled dock *Rumex crispus*, Broad-leaved dock *Rumex obtusifolius*, Common nettle *Urtica dioica*, Greater plantain Plantago major, White clover *Trifolium repens* and Cow parsley *Anthriscus sylvestris*[34].

Removal of undesirable species can take place via 3 methods:

Dig/hoe them out (labour intensive)
Cut them back (temporary solution as perennial weeds will grow back)
Use of an Herbicide (Spot treat)

For this project site, the enhanced amenity grassland is recommended to be Spot treating. For the swale, a mixture of all three is recommended

8.3.4.1 – When to Apply Herbicide

The best time to apply the herbicide is when each species of Undesirable species is not too small or too large. A broad-overview of time is usually Late spring/Early summer when the plant is its most active photosynthesising and sending nutrients from the leaves to the roots.

Please see examples below of a number of species highlighting the difference in vegetation height and when it is most optimal to apply[35]:

The best time to treat Docks

Docks – too early

Docks – Too late

Docks – just right

The best time to treat Nettles

Nettles – too early

Nettles – too late

Nettles – just right

The best time to treat Thistles

Thistle – too early

Thistle – too late


Thistle – just right

8.3.4.2 – Long term Management

The herbicide should be applied each time to each species dependent on its time growth until it has been eradicated.

8.3.4.3 – Herbicide

There are numerous herbicides products. A 'Natural weed killer' is more wildlife friendly. Please see an example of such product below:

8.3.4.3.1 – Herbicide Spray for Non PA1 and PA6 certified users

A Natural Weed Killer containing no active herbicides but still kills weeds. It can be used by the general public and is animal friendly, once dry. An example of such a product is:
https://homeandcleaning.co.uk/products/enviro-works-weed-gone-5l-with-long-hose-trigger

The Material Safety Data Sheet (MSDS) and application instructions will be adhered too for the use of this product.

8.3.4.3.2 – Herbicide Spray for PA1 and PA6 certified users

These products are designed for herbicide treatment but need to be applied by a certified professional.

The Material Safety Data Sheet (MSDS) and application instructions will be adhered too, for either or both products.

8.4 – Existing Dry-ditch

Following the removal of the vegetation adjacent to the Northern and Western banks to create the development, there is the opportunity to enhance this dry-ditch. The shade from the existing vegetation will no longer be present and light will now penetrate. The following is recommended:

Remove existing vegetation debris and litter
Remove existing weeds as sated in section 8.3.4.

Sow with the mixture recommended in section 8.3.3 and follow steps 8.3.3.1 – 8.3.3.3.

8.5 – Integrated Bat Boxes for Plots 1,11,13, 14, 17 and 18

This chapter will provide guidance as to which bat provisions are to be erected, their location and justification.

8.5.1 – Specification - Vivara Pro Build-in WoodStone Bat Box for all Plots

This box will accommodate crevice dwelling bats commonly found in urban and rural locations. Species such as: Pipistrelle sp., Natterer's, Whiskered, and Brandt's bats will use these boxes. Common pipistrelle and Myotis sp. have been recorded within 1km of the project site[10]. Please see figures 8.3 – 8.4. Please see appendix 5 for an example of this box.

8.5.2 – Location

The location of these boxes are as follows:

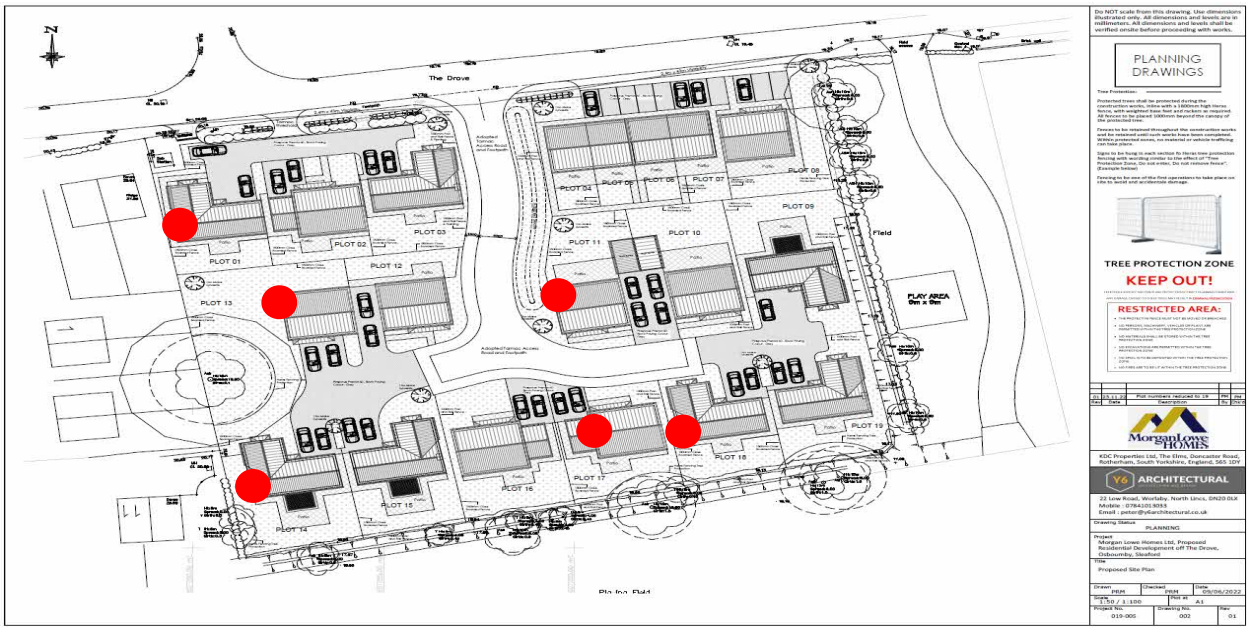

Figure 8.2 - Overview of integrated bat boxes

Figure 8.3 - (L) Location of integrated bat box on Plots 1 and 18 west elevation (R) – Location of integrated bat box on Plots 11 and 13 West gable ends.

Figure 8.4 – (L) - Location of integrated bat box on Plot 14 West elevation. (R) – Location of integrated bat box on Plot 17 West elevation gable end.

The boxes will be located as close as possible to the eaves of the gable ends without been cited above a window or door[36].
The eaves of the buildings will also provide a level of protection from rainfall[36].
These boxes are 'self-cleaning' so very little maintenance is needed.

8.5.3 – Location Justification

The box selected will accommodate crevice dwelling species that are present within the rural residential setting this development is in. The entrances are in a West-facing bearings which is one of the favoured bearings for bats[5], especially during the Summer months.

Surrounding the village of Osbournby is predominately agricultural land with associated hedgerow and ditches. In all bearings, there are a number of woodland parcels. This box will create a potential roost for bats that the site may not have previously and it is allowing the bats to forage/commute closer to their preferred foraging habitats along the ecotones of woodland, hedgerows and waterbodies.

8.5.4 – Timings

The boxes will be integrated during the development of each plot. The client will send photos of the integrated boxes, once installed to the LPA.

8.6 – Tree Mounted Bat box

A Medium Hollow tree mounted bat box is recommended to be erected on the Ash tree adjacent to the western boundary. The box will accommodate larger bats species such as: Brown Long-eared, Noctule and Myotis sp; Brown Long-eared and Myositis sp. have been recorded within 1km of the project site[10].

Please see appendix 6 for an example of this box.

8.6.1 – Specification

The Medium Hollow tree mounted bat box will be cited with the entrance in a south-facing bearing. The box should be placed[36]:

Ideally at least 4m above the ground (where safe installation is possible).
Sheltered from strong winds and exposed to the sun for part of the day (usually south or south-west)

These boxes are 'self-cleaning' so very little maintenance is needed.

8.6.2 – Location Justification

The box selected will accommodate hollow dwelling species that are present within this rural setting. The boxes' entrance will have a south-facing bearing as this is a favoured bearing for bats[5], most notably during the summer months.

Surrounding the village of Osbournby is predominately agricultural land with associated hedgerow and ditches. In all bearings, there are a number of woodland parcels. This box will create a potential roost for bats that the site may not have previously and it is allowing the bats to forage/commute closer to their preferred foraging habitats along the ecotones of woodland, hedgerows and waterbodies.

8.6.3 – Timings

The box is recommended to be in place post-development. The client will send photographs of this installed box to the LPA.

8.7 – Integrated Bird Boxes

This chapter will provide guidance as to which boxes are to be erected, their location and justification.

8.7.1 – Specification - Manthorpe Swift Brick for Plots 8 and 12

This box will accommodate swifts that are in decline partly due to less suitable nesting areas. Please see appendix 7 for an example of this brick.

8.7.1.2 – Location

The location of this brick will be cited on the east gable end of plots 8 and 12. Please see figures 8.6.

The brick will be located as close as possible to the eaves of the North gable end at least 5m high without been cited above a window or door[37].
The eaves of the buildings will also provide a level of protection from rainfall[37].

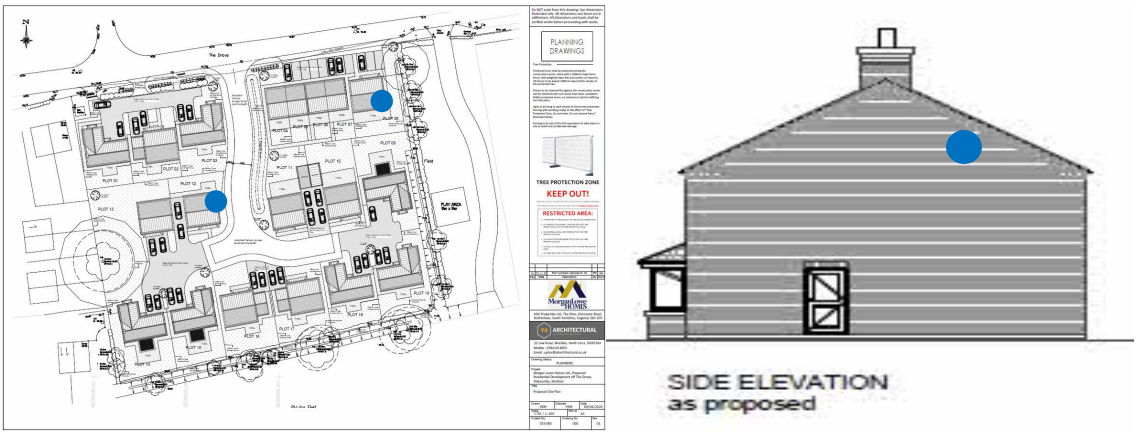

Figure 8.5 – (L) overview of integrated swift brick. (R) – east elevation of plot 8 and location of integrated swift box

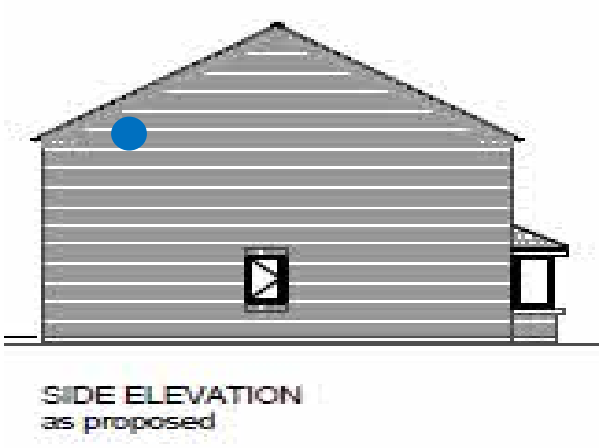

Figure 8.6 – East elevation of plot 12 and location of integrated swift box

8.7.1.3 – Location Justification

The brick will be cited with an East-facing bearing to avoid strong sunlight and prevailing wind and rain[37]. The prevailing winds in Osbournby are more frequent in a SE to SW bearing[38]. In addition, the entrance faces the neighbouring Swale which will provide a food source for Swifts, especially during the breeding season.

8.7.1.4 – Timings

The brick will be integrated during the development of each plot. The client will send photos of the integrated brick, once installed to the LPA.

8.7.2 – Specification - Vivara Pro WoodStone House Sparrow Nest Box for Plots 9, 15 and 19

This box will accommodate House Sparrow species that are in a state of decline for a number of reasons, with rural populations down by a half from 1970 – 2008[39].This box will help give House sparrows a place to breed in future years. Please see appendix 8 for an example of this box.

8.7.2.1 – Locations

Please see figures 8.7 – 8.8

The boxes will be located as close as possible to the eaves without been cited above a window or door[37].
The eaves of the buildings will also provide a level of protection from rainfall[37].

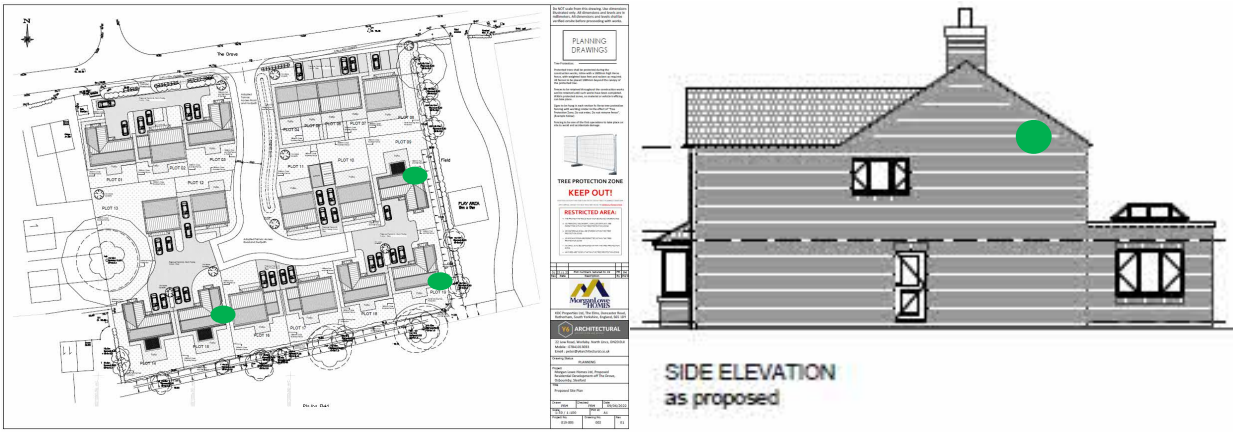

Figure 8.7 – (L) Overview of integrated Sparrow boxes (R) Location of integrated House sparrow box on Plots 9 and 15 East elevation

Figure 8.8 - (L) Location of integrated House sparrow box on Plot 19 East elevation

8.7.2.2 – Location Justification

The boxes will be cited with an East-facing bearing to avoid strong sunlight and prevailing wind and rain[37]. The prevailing winds in Osbournby are more frequent in a SE to SW bearing[38]. In addition, these locations are adjacent to the Tree and Hedge habitats which will provide foraging opportunities.

8.7.2.3 – Timings

The boxes will be integrated during the development of each plot. The client will send photos of the integrated boxes, once installed to the LPA.

8.7.3 – Starling Box - Smooth Brick for Plots 3 and 16

This box will accommodate Starlings that are in a state of decline for a number of reasons but mainly loss of habitat and breeding sites. This box will help give Starlings a place to breed in future years. Please see appendix 9 for an example of this box.

8.7.3.1 – Specification & Location

The location of these boxes will be cited on the East elevation of plots 3 and 16. Please see figures 8.9 – 8.10.

The box will be located as close as possible to the eaves without been cited above a window or door[37].

The eaves of the buildings will also provide a level of protection from rainfall[37].

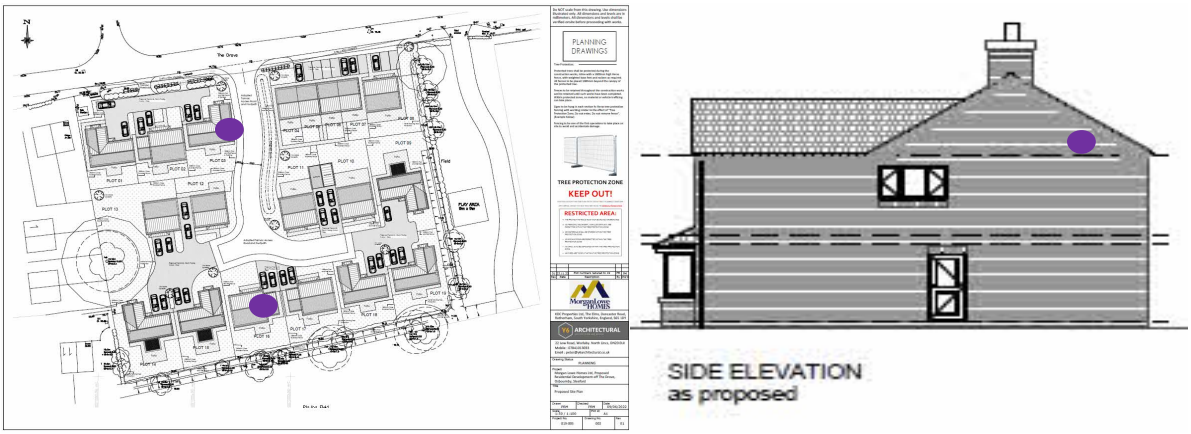

Figure 8.9 – (L) – Overview of integrated Starling boxes (R) Location of integrated Starling box on Plot 3 East elevation

Figure 8.10 – Location of integrated Starling box on Plot 16 East elevation

8.7.3.2 – Location Justification

The box will be cited with an East-facing bearing to avoid strong sunlight and prevailing wind and rain[37]. The prevailing winds in Osbournby are more frequent in a SE to SW bearing[38].

8.7.3.3 – Timings

The boxes will be integrated during the development of each plot. The client will send photos of the integrated boxes, once installed to the LPA.

8.8 – Hedgehog highways

Hedgehogs are in a state of decline. Since 2000, rural populations have declined by at least a half and urban populations by up to a third in the same period[40]. Hedgehogs are listed on the UKBAP[13] and LBAP[14].

8.8.1 – Enabling Hedgehog commuting

Hedgehogs travel approximately 1-2km/night during foraging[40]. Therefore, it is critical that Hedgehogs have the ability to commute through the site. The dwellings will have boundary fences erected. Gaps of 13 x 13cm in each boundary will be installed to allow Hedgehogs to commute/forage through the site, but this size gap is too small for most domestic pets and therefore will provide a natural barrier for any residents with pets. This can be done simply by cutting this size gap out of the panels and then sanded

down so the edging of the gap is smooth or a Hedgehog hole fence plate can be installed so the new residents know what the hole is used for (please see appendix 10). Alternatively, if the bases of the fencing will be concrete you can buy and/or modify to create openings, please see an example of such gravel boards: https://knight-fencing.co.uk/product/concrete-gravel-board-with-hedgehog-hole/

8.8.2 – Timing

Post-development.

9. Summary of Recommendations

Habitat or Species	Timing	Location/Activity	Notes
Breeding Bird Survey	1st March – 31st August	Intact Hedge – Native species-rich hedgerow, Hedge and Tree – Species-poor, Broad-leaved – Semi-natural woodland, Parkland.scattered trees – Broad-leaved Dense/continuous scrub habitats	Only if clearing takes place during the breeding bird season. An Ecologist will need to be on site if any works to these habitats take place during this time. See section 7.1.1. It is strongly recommended that any clearing of the above habitats takes place outside of the breeding bird season (1st September – 28th February).
Bats & Birds	Post-development	Lighting specifications	See section 7.1.2.
PWMS for Mammals	Pre-during construction	Entire site	PWMS – See section 7.1.3
PWMS for Dry-ditch	Pre-post development	Adjacent to Dry-ditch	PWMS – See section 7.1.5
Project site Biodiversity Enhancement	During-Post construction	Enhanced amenity grassland turf/sowing Native Tree planting Swale Enhancement of Dry-ditch Integrated Bat boxes Tree-mounted bat box Integrated bird boxes Hedgehog highways	To comply with NERC, NPPF and Local policy. See Chapter 8

I hope that this report provides all the necessary information, but should any further information be needed please do not hesitate to contact the author.

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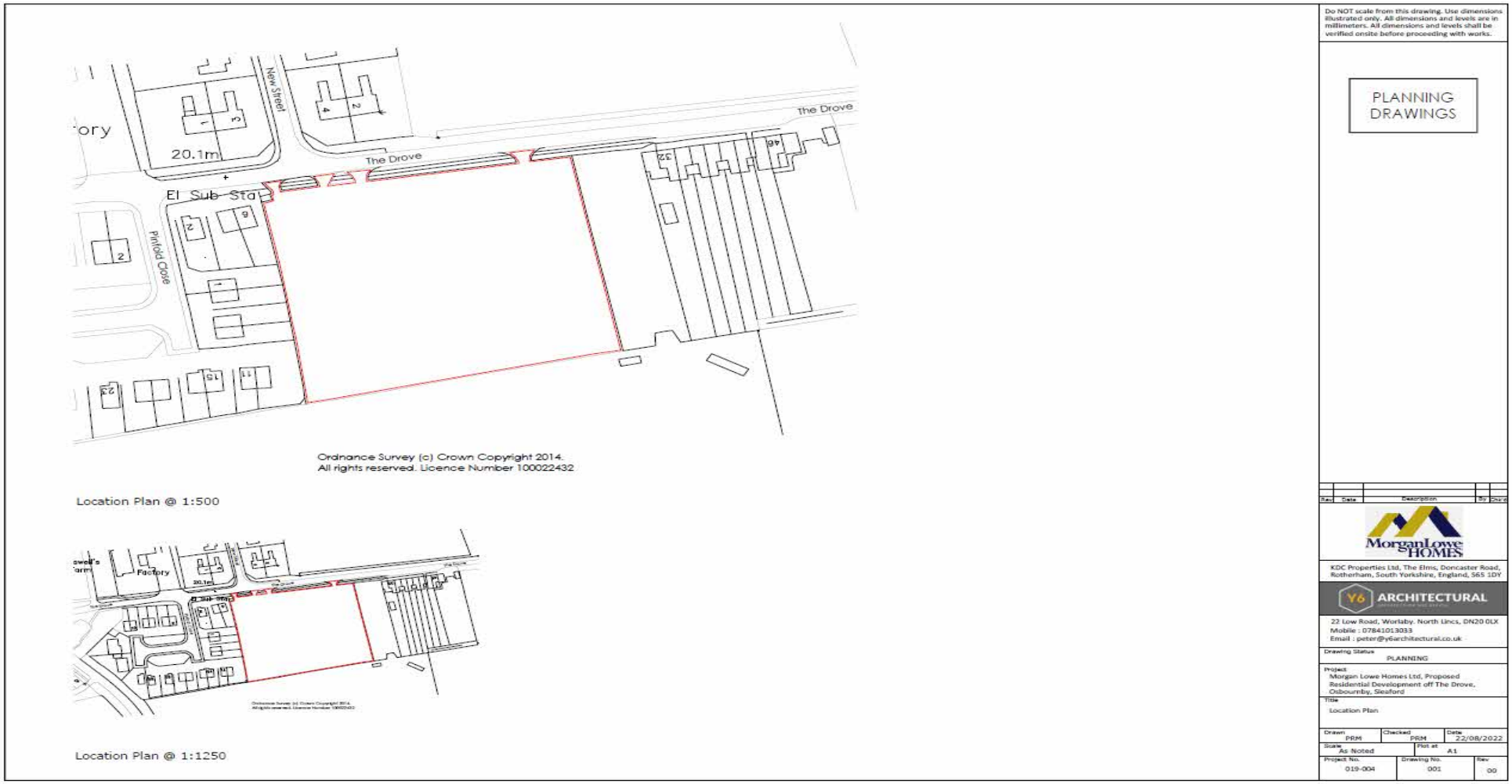
11. Appendices

Appendix 1 – Existing Layout



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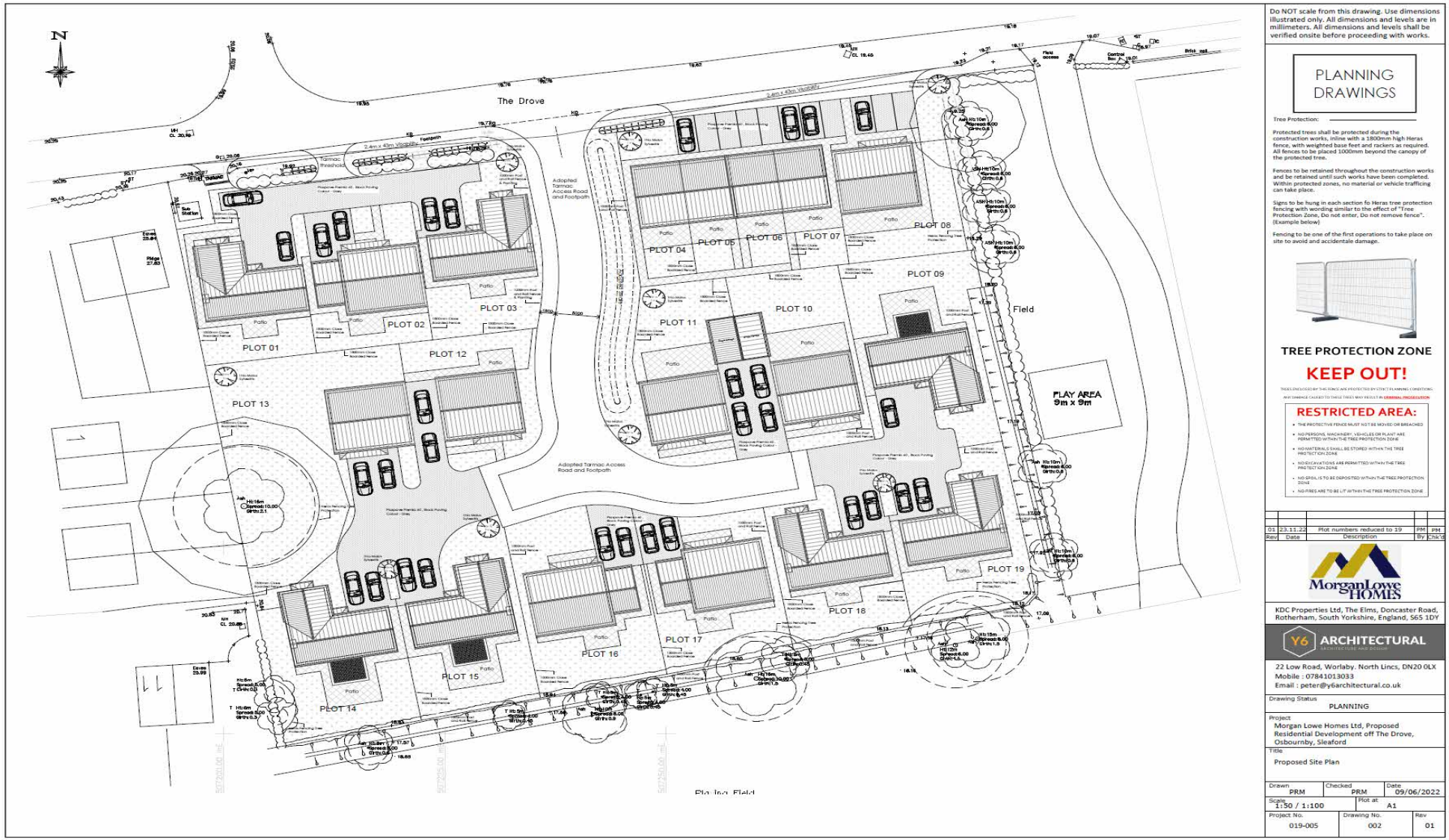
Appendix 2 – Proposed layout



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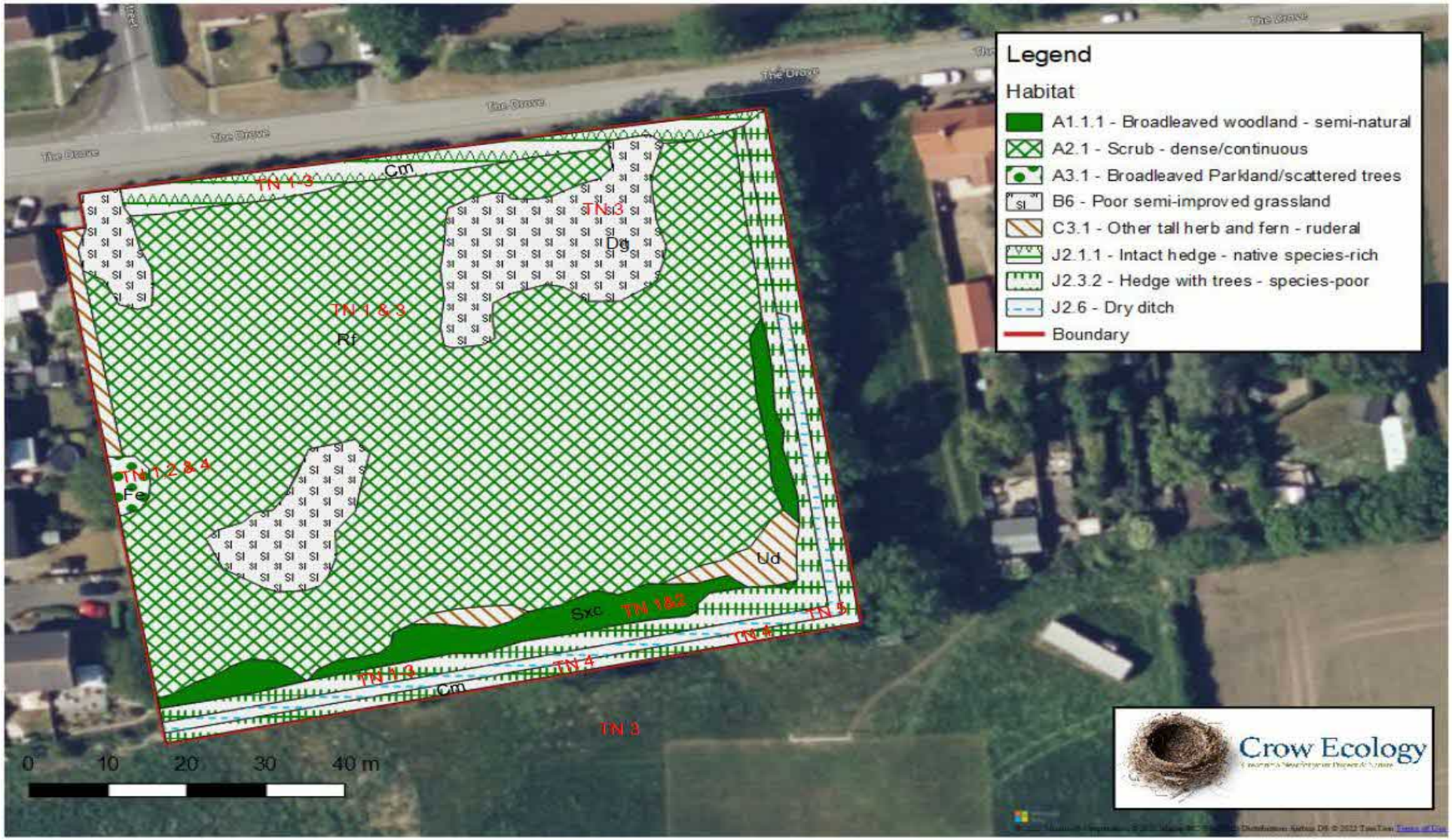
Appendix 3 – Phase 1 Habitat Map with Target Notes (Red) and Dominant Species (Black)



Appendix 4 – Species List

Plants - Common Name & Scientific Name	**Animals – Common Name & Scientific Name**
Hawthorn *Crataegus monogyna*	
Blackthorn *Prunus spinosa* is frequent	
Elder *Sambucus nigra*	
Dogwood *Cornus sanguinea*	
Bramble *Rubus fruticosus*	
Dog rose *Rosa canina*	
Horse chestnut *Aesculus hippocastanum*	
Ash *Fraxinus excelsior*	
Ivy *Hedra helix*	
Common nettle *Urtica dioica*	
Cleavers *Galium aparine*	
Goat willow *Salix caprea*	
White willow *Salix alba*	
Broad-leaved dock *Rumex obtusifolius*	
Creeping thistle *Cirsium arvense*	
Cow parsley Anthriscus *sylvestris*	
Garlic mustard *Alliaria petiolata*	
Herb robert *Geranium robertianum*	
Rosebay willowherb *Chamaenerion angustifolium*	
Cocks-foot *Dactylis glomerata*	
Annual meadow grass *Poa annua*	
Tufted hair-grass *Deschampsia cespitosa*	
Meadow fescue *Festuca pratensis*	
Perennial Rye Grass *Lolium perenne*	
Red fescue *Festuca rubra*	
False oat grass *Arrhenatherum elatius*	
Meadow foxtail *Alopecurus pratensis*	
Ribwort plantain *Plantago lanceolata*	
Yarrow *Achillea millefolium*	
Creeping buttercup *Ranunculus repens*	
Common vetch *Vicia sativa*	
Common sorrel *Rumex acetosa*	
Common ragwort *Jacobaea vulgaris*	
Silver birch *Betula pendula*	
Buddleja *Buddleja sp*	

Appendix 5 – Integrated bat Box

PRO UK Build-in WoodStone Bat Box

Manufacturer: Vivara Pro

Designed to fit in wall cavities
Matches UK brick dimensions
Entrance sits flush with wall
Fully FSC Certified

In stock

£35.99

#256321

About this product

The Build-in WoodStone Bat Box has been specifically designed to fit into the cavity of house walls, with the entrance sitting flush with the outside bricks. It has been redesigned since older iterations to match the standard brick size in the UK. Manufactured from hard-wearing WoodStone and plywood with removable wooden side panels so that several boxes can be placed side by side to create one large chamber, the Woodstone Bat Box is a great choice for new-builds and renovations. Thanks to the sloping entrance ramp, droppings will fall out of the box, creating a maintenance-free habitat for a variety of bat species. Position the box at least 2.5m above ground level and away from artificial light sources.

WoodStone is a mixture of sawdust from FSC wood sources and concrete, and it is designed to last for years. It is breathable so there will be no problems with condensation and Woodstone maintains a consistent temperature inside, providing excellent insulation for roosting bats.

Dimensions:

Bottom section: 14cm x 21cm x 15cm
Top section: 50cm x 21cm x 5cm

Specification

* Total Height: 640mm
* Total Width: 210mm
* Total Depth: 150mm
* Weight: 6.7kg
* Material: WoodStone

Source – www.nhbs.com

Please note – This is an example of a suitable box, other brands and companies are available.

Appendix 6 – Tree Mounted Bat Boxes

MEDIUM HOLLOW BAT BOX

£60

Individually Handmade - Specifications are in CM and approximate.

External: 43 high x 21.5 wide x 13.5 deep.

Internal: 41 x 16.5 x 8.5

Made with larger groups of those species preferring a wider cavity in mind, such as Brown Long Eared, Noctules, Myotis Sp. Serotine. Approx. 6.75kg

Source – https://www.greenwoodsecohabitats.co.uk/shop

Please note – This is an example of a suitable box, other brands and companies are available.

Appendix 7 – Integrated Swift Brick

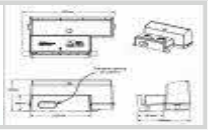
Manthorpe Swift Brick

Made from long-lasting PVC and Polypropylene
Blends into the surrounding brickwork
Available in six colours

Terracotta **In stock**

£34.99
#242167

Additional images



About this product
Swifts visit the UK between April and August, during which time they breed and raise their chicks before leaving again for warmer places to spend the winter months. Unlike swallows and house martins, swifts prefer to use existing holes, cracks and crevices for their nests such as those in old buildings. As modern building practices have improved the quality of homes in the UK, these nest sites are becoming more and more scarce and swifts are becoming much more dependent on nest boxes.

The Manthorpe Swift Brick has been developed with the help of conservation experts and is designed to provide a safe and spacious area for swifts to nest within the modern home. Available in six different colours, the box is designed to blend into the brickwork and so provides an aesthetically pleasing addition to any new build or development. Manufactured from PVC and Polypropylene, this nest box is designed to last for an extremely long time and will not rot or degrade.

The Swift Brick should be sited high within the gable wall of the property, ideally above 5 metres. If possible, avoid locations which receive long periods of direct sunlight throughout the day. An ideal place is below the overhang of the verge and barge board.

Key features:
* The visible part of the nest box takes the space of a single brick and is designed to blend into the surrounding masonry
* Very simple to install, it can be fitted quickly and easily during the bricklaying process (see installation instructions below)
* The nest box at the rear features a pre-made nest concave which provides a useful starting point for nest building
* The entrance hole is obround in shape and measures 29 x 65mm; the ideal size for swifts
* The size of the nest box has been specifically designed to provide the maximum amount of living space possible within the wall
* A built-in cavity tray in the roof of the bricks prevents water from getting into the nest box

Recommended reading:
Manthorpe Swift Box Installation Instructions

Specification
* Width: 347mm
* Depth: 200mm
* Height: 153mm
* Dimensions of protruding "brick" section: 80 x 227mm
* Entrance hole: Obround; 29 x 65mm
* Weight: 0.71kg
* Materials: PVC (base); Polypropylene (top)
* Available colours: Terracotta, Slate Gray, Antique Red, Buff, White, Black
* Manufacturing: Injection moulded

Source – www.nhbs.com

Please note – This is an example of a suitable brick, other brands and companies are available

Appendix 8 – Integrated Sparrow Bird Box

Vivara Pro WoodStone House Sparrow Nest Box

Double Chamber: **In stock**

£31.50

#210670

Additional images

About this product

House sparrows (*Passer domesticus*) are sociable opportunists that survive in most UK habitats, from towns and cities to farmland and countryside. Substantial declines in both urban and rural populations (estimated 71% decrease between 1977 and 2008) have led to concerns for this species.

This House Sparrow Nest Box is manufactured from WoodStone - a mix of concrete and FSC wood fibres. This material is strong and highly insulating which helps to provide a thermally stable environment within the box. It also protects against damage from predators such as cats, woodpeckers and squirrels. It is available with one or two breeding chambers, which can be particularly suitable for house sparrows as they prefer to nest in colonies.

The House Sparrow Nest Box can be integrated into the masonry of a new house or fixed onto an external wall using strong screws and wall plugs (not included). If possible, it should be positioned near to vegetation and at a minimum of 2m above ground.

Standard VAT and delivery within mainland UK. Please contact us for delivery charges outside of mainland UK.

Double Chamber:
* Weight: 7.5kg
* Dimensions: Depth 16cm x Height 29cm x Width 21cm
* Number of chambers: 2

Source – www.nhbs.com

Please note – This is an example of a suitable box, other brands and companies are available.

Appendix 9 – Integrated Starling Bird Box

Starling Box - Smooth Brick

Select product

Red Brick **Usually dispatched within 1-2 months**

£159.95
#197678

Selected product: £159.95

Additional images

About this product

Please note that due to the nature of this product, we are unable to ship by our usual shipping methods. As a result the actual shipping price may not be accurately reflected during on-line check out. Items usually incur a minimum shipping cost of £59.50 (ex VAT) and may be higher for some postcodes. We are unable to send this item outside of mainland UK. Please contact our Customer Services Department on 01803 865913 or customer.services@nhbs.com to obtain a shipping quote. Boxes are made to order and the manufacture time is expected to be 2-4 weeks

Please note that these boxes are made to order and cancellation of orders can only be made free charge up until the time at which the factory commence manufacturing the product(s), after this time there may be a partial or full cancellation charge.

Starling populations have declined dramatically in recent years and are now on the Red List of birds of high conservation concern. Loss of habitat is one of the major pressures on this species and household renovations and new buildings offer much fewer nesting sites than have previously been available. Providing these birds with a safe and secure habitat and nesting environment is a great way to help ensure their future survival.

The Starling Box is a large, solid box made of insulating concrete with an internal nesting space which can be incorporated into the fabric of a building as it is built or renovated. The box is designed especially to be unobtrusive and aesthetically pleasing.

This box is faced in standard Staffordshire Smooth brick (Red or Blue), and is ideal for new builds. It is supplied unpointed so it can be matched as closely as possible to the building. It is also available as an unfaced box which can be rendered to match your building.

For every Starling Box purchased, a donation is made to the RSPB.

Specification

Dimensions:
* Height: 215 mm
* Width: 215 mm
* Depth: 150 mm
* Hole diameter: 45mm

Source – www.nhbs.com

Please note – This is an example of a suitable box, other brands and companies are available.

Appendix 10 – Hedgehog Hole Fence Plate

Eco Hedgehog Hole Fence Plate

Pack of two **In Stock**

£8.99

#242608

About this product

Hedgehog numbers have dramatically declined in recent years. Research suggests that this is partly because it is becoming harder for hedgehogs to move freely due to an increase in the number of solid walls and fences being erected around gardens. This reduces the available foraging area and so restricts the amount of food that they can eat as well as reducing the possibility of meeting a mate. Creating a hole in a garden wall or fence will allow your local hedgehogs to pass through from garden to garden safely.

A hole measuring 13cm by 13cm is the right size for a hedgehog to pass through but too small for most pets. Once you have made your hole in the fence or wall, you can fix the Eco Hedgehog Hole Plate to the fence, ensuring that the hole does not get blocked or stretched. The plate has six screw holes, three along each side, which can be used to fix the plate to your fence or wall. Additional holes can be made in the plastic if required.

The Eco Hedgehog Hole Plate is made from 100% recycled plastic, which is mostly derived from plastic waste from farms across the UK. The plastic hedgehog hole is UV-stabilised so will not rot or degrade over time.

Available singly or in a pack of two.

Specification

* Material: Low density Polyethylene board (100% recycled plastic)
* Dimensions: Height 26cm x width 23cm
* Entrance Hole: 13cm x 13cm
* Country of Manufacture: England

Source - www.NHBS.com

Please Note – This is an example of a suitable access holes, others are available